

GOVERNMENT OF MAHARASHTRA
PUBLIC WORKS DEPARTMENT
PUBLIC WORKS REGION, NAGPUR
PUBLIC WORKS CIRCLE, NAGPUR
P.W. Division No. 3, Nagpur

DRAFT E - TENDER PAPERS

**CONSTRUCTION OF CEMENT CONCRETE
ROAD (7.00 M CARRIAGEWAY)
SONEGAON SHIWANGAON GUMGAON
SALAIDHABA BUTIBORI TAKALGHAT
ROAD, S.H. 348, KM. 2/100 TO 3/00 IN
TALUKA HINGNA, DISTRICT NAGPUR**

NAME OF AGENCY : _____

AGREEMENT No. : _____

GOVERNMENT OF MAHARASHTRA

PUBLIC WORKS DEPARTMENT

Original Agreement No. : B-1 (Percentage Rate)

Name of Work : CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

Name of Contractor :

Date of Receipt of Tender : As per Online tender schedule

No. & Date of Work Order :

Amount put to Tender : Rs. 2,64,97,350/-

Percentage quoted :

Amount of Contract :

Date of Commencement :

Time stipulated for completion of work : 4 (Four) Calender Months from the date of written order to start work, which will include the monsoon period.

Date of completion as per Agreement :

Acutual Date of Completion :

Reference to sanction of tender :

Extension of time limit : 1
2
3

Certified that this original Agreement contains : Pages 1 to 104

Contractor

No. of Corrections

Executive Engineer

DETAILS OF WORK

NAME OF WORK: - CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

Estimated Cost put to tender Rs. **2,64,97,350/-**

Earnest Money Rs. **1,50,000/-**

Term Deposit Receipt of Schedule Bank/ Nationalised Bank/of India or Valid E.M.D. Exemption Certificate duly attested shall be uploaded at the time of submission.

Total Security Deposit 4% (four percent) **Rs. 10,60,000/-** (50% in cash at the time of Agreement and 50% from R.A.bills) **Rs. 5,30,000/-**

TENDER SCHEDULE

Cost of Tender Form	:	Rs. 10,000/-
Period for Downloading Tender Forms	:	Refer Online schedule on portal https://pwd.maharashtra.etenders.in
Date of Pre-bid meeting	:	<u>12.4.2013</u> at 16.00 hours C.E., P.W. Region, Nagpur's office
Last date and time for online bid preparation and hash submission (technical and financial)	:	Refer Online schedule on portal https://pwd.maharashtra.etenders.in
Date and time for online bid data decryption and re-encryption (technical and commercial)	:	Refer Online schedule on portal https://pwd.maharashtra.etenders.in
Receipt of bid security (Orifinal) / EMD (If EMD exempted then EMD exemption Certificate), stamp paper of Rs. 100/- bond Affidavit (Original) in prescribed format given in Annexure I sworn before Executive Magistrate / Notary and Tender Document fees, DD / Pay Order (Original) / TDR of Additional performance Security Deposit (If required)	:	Shall be submitted in original 1 days before opening of the technical bid at the office of Executive Engineer, P. W. Division No. 3, Nagpur to the Accountant / Tender Clerk
Registration class of Contractor	:	Class III and above

TO BE FILLED BY THE CONTRACTOR

I/We have quoted my/our offer in percentage rate in words as well as in figures. I/We further undertake to enter into contract in regular "B-1" form in Public Works Department.

Name and signature of Contractor / Power of Attorney holder with complete address

Contractor

No. of Corrections

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**GOVERNMENT OF MAHARASHTRA
PUBLIC WORKS DEPARTMENT**

INVITATION FOR TENDERS

DETAILED TENDER NOTICE

Name of Work : CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY)
SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT
ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

Online percentage rate tenders in 'B-1' Form are invited by the **Executive Engineer, Public Works Division No. 3, Nagpur** for the following work from Contractors registered in appropriate class of the Public Works Department of Maharashtra State. The name of work, estimated cost, earnest money, security deposit, time limit for completion etc. are as under.

Sr. No.	Name of work	Estimated Cost (Rupees)	Earnest Money (Rupees)	Security Deposit (Rupees)	Class of Contractor	Time limit in Tender (Calendar Months)
1	CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR	2,64,97,350/-	1,50,000/-	10,60,000/-	Class III and Above	4 (Four) Calendar Months (including monsoon)

Tender form, conditions of contract, specifications and contract drawings can be downloaded from the eTendering portal of Public Works Department, Government of Maharashtra i.e. <https://pwd.maharashtra.etenders.in> after entering the details, payment of **Rs. 10,000/- (Rupees Ten Thousand only)** in the form of DD / Pay Order of scheduled or Nationalised Bank in favour of **Executive Engineer, P. W. Division No. 3, Nagpur payable at Nagpur. The DD / Pay Order shall be adjusted against as fees of tender document and it will be non refundable.** Further information regarding the work can be obtained from the above office.

The Tender Fee in the form of DD / Pay Order, Drawn in the name of **Executive Engineer, P. W. Division No. 3, Nagpur** / Attested EMD Exemption certificate, Affidavit on Rs. 100/- stamp paper in prescribed form given in Annexure I sworn before Executive Magistrate / Notary, Additional Performance Security Deposit (If required) should be submitted by Registered Post / Courier service / by hand in sealed covers addressed to the **Superintending Engineer, P.W. Circle, Civil Lines, Nagpur** with the name of the work written at the top of the envelope will be received in the office of the **Executive Engineer, P. W. Division No. 3, Nagpur** one day prior of the opening of Envelope 1 and Envelope 2. Bids will be opened as per the Tender Schedule, in the presence of such intending Tenderers or his/ their authorized representatives who may be present at that time.

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TENDERING PROCEDURE: -

1.1 A Blank Tender Forms

Tender Forms can be downloaded from the eTendering Portal of Public Works Department, Government of Maharashtra i.e. <http://pwd.maharashtra.etenders.in> after entering the details of payment towards Tender Fees as per the **Tender Schedule**.

1.2 B PRE-TENDER CONFERENCE: -

- 1.2.1** Pre-tender conference open to all prospective tenderers who have downloaded tender form before the date of Pre-tender Conference, will be held on **12/04/2013 at 16.00** Hrs. in the office of the **Chief Engineer, Public Works Region, Nagpur – 400001** wherein prospective tenderers will have an opportunity to obtain clarifications regarding the work and the Tender Conditions.
- 1.2.2** The prospective tenderers are free to ask for any additional information or clarification either in writing or orally concerning the work, and the reply to the same will be given by the **Chief Engineer, Public Works Region, Nagpur** in writing and this clarification referred to as Common Set of Conditions / Deviations (C.S.D.), shall form part of tender documents and which will also be common and applicable to all tenderers. The point/points if any raised in writing and/or verbally by the contractor in pre-tender conference and not finding place in C.S.D. issued after the pre- bid conference, is/are deemed rejected. In such case the provision in NIT shall prevail. No individual correspondence will be made thereafter with the contractor in this regard.
- 1.2.3** The tender submitted by the tenderer shall be based on the clarification, additional facility offered (if any) by the Department, and this tender shall be unconditional. Conditional tenders shall be summarily REJECTED.
- 1.2.4** All tenderers are cautioned that tenders containing any deviation from the contractual terms and conditions, specifications or other requirements and conditional tenders will be treated as non responsive. The tenderer should clearly mention in forwarding letter that his offer (in envelope No. 1 & 2) does not contain any conditions, deviations from terms and conditions stipulated in the tender.
- 1.2.5** Tenderers should have valid Class II / III Digital Signature Certificate (DSC) obtained from any Certifying Authorities. In case of requirement of DSC, interested Bidders should go to <http://maharashtra.etenders.in/mah/DigitalCerti.asp> and follow the procedure mentioned in the document 'Procedure for application of Digital Certificate'.
- 1.2.6** The Tenderers have to make a payment of **Rs. 1038/-** online as service charges for the use of Electronic Tendering during Online Bid Data Decryption and Re-encryption stage of the Tender
- 1.2.7** For any assistance on the use of Electronic Tendering System, the Users may call the below numbers:
- Landline No. - 020 - 2531 5555 / 56
- Landline No. - 022 - 2661 1117 (Ext 25 / 26)
- Mobile No. - 91679 69601 / 04 / 14
- 1.2.8** Tenderers should install the Mandatory Components available on the Home Page of <http://maharashtra.etenders.in> under the section '**Mandatory Components**' and make the necessary Browser Settings provided under section '**Internet Explorer Settings**'

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1.3. **Guidelines to Bidders on the operations of Electronic Tendering System of Public Works Department.**

<http://pwd.maharashtra.etenders.in>

A Pre-requisites to participate in the Tenders processed by PWD

1 Enrolment and Empanelment of Contractors on Electronic Tendering System:

The Contractors interested in participating in the Tenders of Public Works Department – processed using the Electronic Tendering System shall be required to enroll on the Electronic Tendering System to obtain User ID.

After submission of application for enrolment on the System, the application information shall be verified by the Authorized Representative of the Service Provider. If the information is found to be complete, the enrolment submitted by the Vendor shall be approved

For participating in Limited and Restricted tenders the registered vendors have to apply for empanelment on the sub-portal of PWD in an appropriate class of registration. The empanelment will have to be approved by the respective officer from the PWD. Only empanelled vendors will be allowed to participate in such tenders.

The Contractors may obtain the necessary information on the process of enrolment and empanelment either from Helpdesk Support Team or may visit the information published under the link Enroll under the section E-Tendering Toolkit for Bidders on the Home Page of the Electronic Tendering System.

2. Obtaining a Digital Certificate:

The Bid Data that is prepared online is required to be encrypted and the hash value of the Bid Data is required to be signed electronically using a Digital Certificate (Class – II or Class – III). This is required to maintain the security of the Bid Data and also to establish the identity of the Contractor transacting on the System.

The Digital Certificates are issued by an approved Certifying Authority authorized by the Controller of Certifying Authorities of Government of India through their Authorized Representatives upon receipt of documents required to obtain a Digital Certificate.

Bid data / information for a particular Tender may be submitted only using the Digital Certificate which is used to encrypt the data / information and sign the hash value during the Bid Preparation and Hash Submission stage. In case during the process of preparing and submitting a Bid for a particular Tender, the Contractor loses his/her Digital Signature Certificate (i.e. due to virus attack, hardware problem, operating system problem); he / she may not be able to submit the Bid online. Hence, the Users are advised to store his / her Digital Certificate securely and if possible, keep a backup at safe place under adequate security to be used in case of need.

In case of online tendering, if the Digital Certificate issued to an Authorised User of a Partnership Firm is used for signing and submitting a bid, it will be considered equivalent to a no objection certificate / power of attorney to that User to submit the bid on behalf of the Partnership Firm. The Partnership Firm has to authorize a specific individual via an authorization certificate signed by a partner of the firm (and in case the applicant is a partner, another partner in the same form is required to authorise) to use the digital certificate as per Indian Information Technology Act, 2000.

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Unless the Digital Certificate is revoked, it will be assumed to represent adequate authority of the Authority User to bid on behalf of the Firm for the Tenders processed on the Electronic Tender Management System of Government of Maharashtra as per Indian Information Technology Act, 2000

The Digital Signature of this Authorized User will be binding on the Firm. It shall be the responsibility of Partners of the Firm to inform the Certifying Authority or Sub Certifying Authority, if the Authorized User changes, and apply for a fresh Digital Signature Certificate. The procedure for application of a Digital Signature Certificate will remain the same for the new Authorised User.

The same procedure holds true for the Authorized Users in a Private / Public Limited Company. In this case, the Authorisation Certificate will have to be signed by the Director of the Company or the Reporting Authority of the Applicant.

For information on the process of application for obtaining Digital Certificate, the Contractors may visit the section Digital Certificate on the Home Page of the Electronic Tendering System.

3. Recommended Hardware and Internet Connectivity:

To operate on the Electronic Tendering System, the Contractors are recommended to use Computer System with at least 1 GB of RAM and broadband connectivity with minimum 512 kbps bandwidth.

4. Set up of Computer System for executing the operations on the Electronic Tendering System:

To operate on the Electronic Tendering System of Government of Maharashtra, the Computer System of the Contractors is required be set up. The Contractors are required to install Utilities available under the section Mandatory Installation Components on the Home Page of the System.

The Utilities are available for download freely from the above mentioned section. The Contractors are requested to refer to the E-Tendering Toolkit for Bidders available online on the Home Page to understand the process of setting up the System, or alternatively, contact the Helpdesk Support Team on information / guidance on the process of setting up the System

5. Payment for Service Provider Fees:

In addition to the Tender Document Fees payable to PWD, the Contractors will have to pay Service Providers Fees of Rs. 1,038/- through online payments gateway service available on Electronic Tendering System. For the list of options for making online payments, the Contractors are advised to visit the link E-Payment Options under the section E-Tendering Toolkit for Bidders on the Home Page of the Electronic Tendering System

B. Steps to be followed by Contractors to participate in the e-Tenders processed by PWD

1. Preparation of online Briefcase:

All Contractors enrolled on the Electronic Tendering System of Government of Maharashtra are provided with dedicated briefcase facility to store documents / files in digital format. The Contractors can use the online briefcase to store their scanned copies of frequently used

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documents / files to be submitted as a part of their bid response. The Contractors are advised to store the relevant documents in the briefcase before starting the Bid Preparation and Hash Submission stage.

In case, the Contractors have multiple documents under the same type (e.g. multiple Work Completion Certificates) as mentioned above, the Contractors advised to either create a single .PDF file of all the documents of same type or compress the documents in a single compressed file in .zip or .rar formats and upload the same.

It is mandatory to upload the documents using the briefcase facility. Therefore, the Contractors are advised to keep the documents ready in the briefcase to ensure timely bid preparation.

Note: .Uploading of documents in the briefcase does not mean that the documents are available to PWD at the time of Tender Opening stage unless the documents are specifically attached to the bid during the online Bid Preparation and Hash Submission stage as well as during Decryption and Re-encryption stage.

2. Online viewing of Detailed Notice Inviting Tenders:

The Contractors can view the Detailed Tender Notice along with the Time Schedule (Key Dates) for all the Live Tenders released by PWD on the home page of PWD e-Tendering Portal on <http://pwd.maharashtra.etenders.in> under the section Recent Online Tender.

3. Download of Tender Documents:

The Pre-qualification / Main Bidding Documents are available for free downloading. However to participate in the online tender, the bidder must purchase the bidding documents online by filling up details of Demand Draft towards the cost of Tender Form Fee.

4. Online Bid Preparation and Submission of Bid Hash (Seal) of Bids:

Submission of Bids will be preceded by online bid preparation and submission of the digitally signed Bid Hashes (Seals) within the Tender Time Schedule (Key Dates) published in the Detailed Notice Inviting Tender. The Bid Data is to be prepared in the templates provided by the Tendering Authority of PWD. The templates may be either form based, extensible tables and / or uploadable documents. In the form based type of templates and extensible table type of templates, the Contractors are required to enter the data and encrypt the data using the Digital Certificate.

In the uploadable document type of templates, the Contractors are required to select the relevant document / compressed file (containing multiple documents) already uploaded in the briefcase.

Notes:

A The Contractors upload a single document or a compressed file containing multiple documents against each unloading option.

b. The Hashes are the thumbprint of electronic data and are based on one – way algorithm. The Hashes establish the unique identity of Bid Data.

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c. The bid hash values are digitally signed using valid Class – II or Class – III Digital Certificate issued any Certifying Authority. The Contractors are required to obtain Digital Certificate in advance.

d. After the hash value of bid data is generated, the Contractors cannot make any change / addition in its bid data. The bidder may modify bids before the deadline for Bid Preparation and Hash Submission as per Time Schedule mentioned in the Tender documents.

e. This stage will be applicable during both, Pre-bid / Pre-qualification and Financial Bidding Processes.

5 Close for Bidding (Generation of Super Hash Values):

After the expiry of the cut – off time of Bid Preparation and Hash Submission stage to be completed by the Contractors has lapsed, the Tender will be closed by the Tender Authority.

The Tender Authority from PWD shall generate and digitally sign the Super Hash values (Seals).

6 Decryption and Re-encryption of Bids (submitting the Bids online):

After the time for generation of Super Hash values by the Tender Authority from PWD has lapsed, the Contractors have to make the online payment of Rs. 1,038/- towards the fees of the Service Provider.

After making online payment towards Fees of Service Provider, the Contractors are required to decrypt their bid data using their Digital Certificate and immediately re-encrypt their bid data using the Public Key of the Tendering Authority. The Public Key of the Tendering Authority is attached to the Tender during the Close for Bidding stage.

Note: The details of the Processing Fees shall be verified and matched during the Technical Opening stage.

At this time, the Contractors are also required to upload the files for which they generated the Hash values during the Bid Preparation and Hash Submission stage.

The Bid Data and Documents of only those Contractors who have submitted their Bid Hashes (Seals) within the stipulated time (as per the Tender Time Schedule), will be available for decryption and re-encryption and to upload the relevant documents from Briefcase. A Contractor who has not submitted his Bid Preparation and Hash Submission stage within the stipulated time will not be allowed to decrypt / re-encrypt the Bid data / submit documents during the stage of Decryption and Re-encryption of Bids (submitting the Bids online).

7. Short listing of Contractors for Financial Bidding Process:

The Tendering Authority will first open the Technical Bid documents of all Contractors and after scrutinizing these documents will shortlist the Contractors who are eligible for Financial Bidding Process. The short listed Contractors will be intimated by email.

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8. Opening of the Financial Bids:

The Contractors may remain present in the Office of the Tender Opening Authority at the time of opening of Financial Bids. However, the results of the Financial Bids of all Contractors shall be available on the PWD e-Tendering Portal immediately after the completion of opening process.

9. Tender Schedule (Key Dates):

The Contractors are strictly advised to follow the Dates and Times allocated to each stage under the column "Contractor Stage" as indicated in the Time Schedule in the Detailed Tender Notice for the Tender. All the online activities are time tracked and the Electronic Tendering System enforces time-locks that ensure that no activity or transaction can take place outside the Start and End Dates and Time of the stage as defined in the Tender Schedule.

At the sole discretion of the Tender Authority, the time schedule of the Tender stages may be extended

A) Works

1.4 ENVELOPE No. 1: (Documents)

This first envelope "Envelope No.1" shall contain the following documents.

These documents shall be scanned from original documents.

- 1.4.1 Scanned from original copy of Government treasury challan or Term Deposit Receipt valid for a period of one year of Rs1,50,000/- issued from any Schedule Bank and duly endorsed in the name of Executive Engineer, Public Works Division, No III Nagpur or valid certificate of exemption from payment of earnest money if applicable and Scanned from original copy Additional (Performance) Security (if Required) (copy to be Submitted as per the tender Schedule).
- 1.4.2 Scanned from original copy of DD/ Pay Order payable towards cost of document in the name of Executive Engineer, Public Works Division, No III Chanbdrapur
- 1.4.3 Scanned from original copy of Valid certificate as a Registered Contractor with the Government of Maharashtra in appropriate class
- 1.4.4 Scanned from original copy of valid VAT registration certificate from Maharashtra State Sale Tax Department (Maharashtra Value Added Tax Act 2005)
- 1.4.5 Scanned from original copy of list of works in hand and works tendered along with supporting certificates.
- 1.4.6 Scanned from original copy of list plants and Machinery
- 1.4.7 Scanned from original copy of Details of work with supporting certificates.
- 1.4.8 Scanned from original copy of List of Technical Persons /employee.

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1.4.9 Scanned from original copy of affidavit regarding completeness, correctness and truthfulness of documents submitted on Rs 100/- Stamp paper as per prescribed proforma given in Annexure I sworn before Executive Magistrate/ Notary,

1.4.10 Scanned from original copy of Professional Tax Clearance Certificate

1.4.11 Scanned from original copy of Registration of firm, Partnership Deed and Power of Attorney, in case of a firm tendering for work.

1.4.12 **USE OF SPECIALIZED MACHINERY**

For carrying out cement concrete items of the work, use of specialized machinery such as Ready mix concrete batching plant, concrete paver finisher, etc. with a view to ascertaining whether such machinery is in the possession of the contractor, and whether he can make available such machinery immediately for use on the work it is necessary for the contractor to submit the details of such machinery in envelope No.1 in the format as given in Statement of machineries with proof of owner of the machineries. The details of machinery may be verified by the department if required by physical verification of machinery own by contractor by visiting sites.

Statement of Machineries

Questionary on Machinery :

Information regarding availability and ownership of following machinery required for this work.

1) Slip form paver / fix form paver equipped with GANG MOUNTED NEEDLE VIBRATOR assembly

1) Needle Vibrator

2) Slip form paver

3) Cement Concrete batch mix of at least 18 cum/per hrs

4) Vibratory Roller

The machineries specified under Sr. No. 1 to 4 above shall be owned by the contractor. Scan Copy From original of ownership of the documents of the above machinery shall be Uploaded failing which envelop No.2 shall not be opened.

STATEMENT NO. 2-A

(A) Give the following information of above machineries.

Type of Machinery	No. of machinery	Name of works on which deployed at present	Location	Output	Balance quantity in tonnes for execution on works in hand
1	2	3	4	5	6

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1.4.13 Qualification criteria : To qualify for the opening of envelope No 2 i.e. Price Bid, each bidder should have

(i)	Scanned Copy from original Certificate successfully Completed Minimum one Single Cement Concrete Road work costing not Less than Rs 150.00 lakh (One Crore fifty lakh) updated to current cost during last five years and current Year. For updating to current cost please refer table at the end of this clause. (Such certificate are required to be obtained from the officer not below the Rank of Executive Engineer (Completed Work Carried out In Govt/ Semi Govt Bodies such as MHADA, MSEB, MIDC, CIDCO Etc or Local Bodies. will only be considered.)
(ii)	Scanned Copy of original certificate for having satisfactorily executed minimum quantities of following items in any continuous twelve calendar months during last three year and current year. (Such certificates including SDBC,BM, , Period of execution etc are required to be obtained from the officer not below the rank of Executive Engineer or Equivalent) <u>and the certificate shall specially mention the period of execution as continuous twelve calendar months.</u> (Work carried out in Govt/ semi Govt bodies such as MHADA, MSEB, MIDC, CIDCO etc or local bodies registered co-operative or public limited companies will only be considered.) (i) Cement Concrete M-40 (P.Q.C) – 600.00Cum
	In case of information for items 1.4.13 (i) to 1.4.13 (ii) the tenderer shall provide authentic proof of information given therein. This shall for items 1.4.13 (i) & 1.4.13 (ii) and certificates from an officer not below the rank of Executive Engineer in envelop No. 1 only.. In absence of these documents, envelope No. 2 shall not be opened. For satisfying the above criteria at Sr No 1.4.13 (i) to 1.4.13 (ii) above work carried out in government organization or the works of semi govt's bodies such as MHADA, MSEB, MIDC, CIDCO etc or local bodies will only be considered.

1.5 ENVELOPE No. 2 TENDER (FINANCIAL BID)

- i) Upload Blank Tender Copy (In Word Format) Issued and Digitally Signed by the Department
- ii) Upload Common Set of Deviations (CSD) Issued and Digitally Signed by the Department after P.T.C (In Word Format)
- iii) Offer to be submitted Online

1.6 SUBMISSION OF TENDER: -

Refer to Section '**Guidelines to Bidders on the operations of Electronic Tendering System of Public Works Department**' for details.

1.7 OPENING OF TENDERS:

On the date, specified in the Tender Schedule, following procedure will be adopted for opening of the Tender.

(A) ENVELOPE No. 1 :- (Documents)

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First of all Envelope No. 1 of the tender will be opened online to verify its contents as per requirements. If the various documents contained in this envelope do not meet the requirements of the Department, a note will be recorded accordingly by the tender opening authority and the said tenderers Envelope No. 2 will not be considered for further action and the same will be recorded.

The decision of the tender opening authority in this regard will be final and binding on the contractors.

(B) ENVELOPE No. 2: (Financial Bid)

a) This envelope shall be opened online immediately after opening of Envelope No. 1, only if contents of Envelope No. 1 are found to be acceptable to the Department. The tendered rates in Schedule 'B' or percentage above/below the estimated rates shall then be read out. (From Page No. 19) in the presence of bidders who remain present at the time of opening of Envelope No. 2.

1.8 EARNEST MONEY :

- (i) Earnest money of minimum Rs 1,50,000/- to be attached with the tender should be in the form of challan showing deposit of cash in to the treasury / bank or Term deposit receipt for period of one year issued by the Scheduled Bank duly endorsed in the name of **Executive Engineer, Public Works Division No. 3, Nagpur**.
- (ii) Scanned copy of earnest money exemption certificate will be accepted in lieu Earnest Money Deposit from the Registered Contractors of Maharashtra State only.
Earnest Money in the form of cheques or any other form except above will not be accepted.
- (iii) The amount will be refunded to the unsuccessful tenderers on deciding about the acceptance or otherwise of the tender. In case of successful tenderer, it will be refunded on his paying initial Security Deposit and completing the tender documents in form B-1.
- (iv) In case of Joint Venture Earnest money Exemption certificate in individual Capacity will not be accepted. Earnest money, Security Deposit, additional security deposit etc. in the form of T.D.R/F.D.R issued in the name of Joint Venture Company drawn by scheduled bank having branches in Maharashtra and endorsed, in the name of **Executive Engineer, Public Works Division No. 3, Nagpur** for the period of one year will be considered.

1.9 A SECURITY DEPOSIT:

- (i) The successful tenderer whose tender is accepted will have to pay Rs. 10,60,000/- towards the Security Deposit
- (ii) Rs. **5,30,000/-** is to be deposited in cash or bank guarantee of scheduled bank, F.D.R. of the scheduled bank / National Saving Certificate duly pledged in the name of the **Executive Engineer Public Works Division No 3 Nagpur** towards the initial Security Deposit, valid within the time limit prescribed in clause 1 of B-1 Form, agreement till completion of defect liabilities period failing which his earnest money will be forfeited to Government.
- (iii) In addition to the above, an amount of Rs. 10,60,000/- will be deducted from the running bills at 4 % of value of the gross bill towards balance security deposit. This is a compulsory deduction.

1.9.B. Condition for payment of additional security deposit, if offer quoted by the tenderer is more than 15% below the cost put to tender.

The contractor shall deposit an additional security deposit along with the security deposit as per clause 1.9 within 10 days of acceptance of tender in the form of Bank guarantee, when the below percentage quoted is more than 15% of cost put to tender.

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The amount of security deposit shall be worked out as per following formula.

Additional Security Deposit

= Rs. [$\frac{\% \text{ rate quoted by the contractor} - 15}{100} \times 50 \times \text{Cost put tender}$]

100

If the contractor does not deposit this additional security deposit (if applicable) within stipulated time then his earnest money deposit will be forfeited and his tender will not be considered for acceptance.

This additional security deposit shall be extendable up to expiry of valid extensions if any and it shall be refunded along with the final bill, after satisfactory completion of work.

- 1.10 ISSUE OF FORMS:** Information regarding contract as well as blank tender forms can be downloaded from the eTendering website upon providing the details of the payment of cost as detailed in the N.I.T.
- 1.11 TIME LIMIT:** The work is to be completed within time limit as specified in the N.I.T. which shall be reckoned from the date of written order for commencing the work and shall be inclusive of monsoon period.
- 1.12 TENDER RATE:** No alteration in the form of tender and the schedule of tender and no additions in the scope of special stipulations will be permitted. Rates quoted for the tender shall be taken as applicable for all leads and lifts.
- 1.13 TENDER UNITS:** The tenderers should particularly note the units mentioned in the Schedule "B" on which the rates are based. No change in the units shall be allowed. In the case of difference between the rates written in figures and in words, the correct rate will be the one, which is lower of the two.
- 1.14 CORRECTION:** No corrections shall be made in the tender documents. Any corrections that are to be made shall be made by crossing the incorrect portion and writing the correct portions above with the initials of tenderer.
- 1.15 TENDER'S ACCEPTANCE** : Acceptance of tender will rest with the Superintending Engineer, P.W. Circle, Nagpur who reserves the right to reject any or all tenders without assigning any reason therefor. The tenderer whose tender is accepted will have to enter in to a regular B-1 agreement within 10 days of being notified to do so. In case of failure on the part of Tenderer to sign the agreement within the stipulated time, the earnest money paid by him shall stand forfeited to the Government and the offer of the tenderer shall be considered as withdrawn by him.
- 1.16 CONDITIONAL TENDER** : The tenders who do not fulfill the condition of the notification and the general rules and directions for the guidance of contractor in the agreement form or are incomplete in any respect are likely to be rejected without assigning any reason therefore.
- 1.17**
- (a) The Tenderers shall be presumed to have carefully examined the drawings, conditions and specifications of the work and have fully acquainted themselves with all details of the site, the conditions of rock and its joints, pattern, river, weather characteristics, labour conditions and in general with all the necessary information and data pertaining to the work, prior to tendering for the work.
 - (b) The data whatsoever supplied by the Department along with the tender documents are meant to serve only as guide for the tenderers while tendering and the Department accepts no responsibility whatsoever either for the accuracy of data or for their comprehensiveness.
 - (c) The quarries for extraction of metal, murum etc. provided in the sanctioned estimate are as per survey conducted by the Department. The Contractor should however examine these quarries

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and see whether full quantity of materials required for execution of the work strictly as per specification are available in these source before quoting the rates. In case the materials are not available due to reasons whatsoever, the contractor will have to bring the materials from any other source with no extra cost to Government. The rates quoted, should therefore be for all leads and lifts from wherever the materials are brought at site of work and inclusive of royalty to be paid to the Revenue Department by the Contractor.

- 1.18 **POWER OF ATTORNEY:** If the tenderers are a firm or company, they should in their forwarding letter mention the names of all the partners together with the name of the person who holds the power of Attorney, authorizing him to conduct all transactions on behalf of the body, along with the tender.
- 1.19 The tenderer may, in the forwarding letter, mention any points are may wish to make clear but the right is reserved to reject the same or the whole of the tender if the same becomes conditional tender thereby.
- 1.20 The contractor or the firms tendering for the work shall inform the Department if they appoint their authorized Agent on the work.
- 1.21 No foreign exchange will be released by the Department for the purchase of plants and machinery for the work by the Contractor.
- 1.22 Any dues arising out of contract will be recovered from the contractor as arrears of Land Revenue, if not paid amicably. Moreover, recovery of Government dues from the Contractors will be affected from the payment due to the Contractor from any other Government works under execution with them.
- 1.23 All pages of tender documents, conditions, specifications, correction slips etc. shall be initialled by the tenderer. The tender should bear full signature of the tenderer, or his authorized power of Attorney holder in case of a firm.
- 1.24 The Income Tax at 2.30 % including surcharge or percentage in force from time to time or at the rate as intimated by the competent Income Tax authority shall be deducted from bill amount whether measured bill, advance payment or secured advance.
- 1.25 The successful tenderer will be required to produce, to the satisfaction of the specified concerned authority a valid concurrent license issued in his favour under the provisions of the Contract Labour (Regulation and Abolition) Act 1970 for starting the work. On failure to do so, the acceptance of the tender shall be liable to be withdrawn and also liable for forfeiture of the earnest money.
- 1.26 The tenderer shall submit the list of apprentices engaged by the Contractor under Apprentice Act.
- 1.27 Cess @ 1% (One percent) shall be deducted at source from every bill of the Contractor by the Executive Engineer Under “ Building and Other Construction for workers Welfare Cess Act 1996
- 1.28 Value Added Tax Deduction 2 % from the registered contractors under the MVAT Act, 2005 and 4 % from the unregistered contractor under MVAT Act, 2005, shall be recovered from the contractor from the gross bill amount of every bill, whether for measured works or Advance Payment or Secured Advance
- 1.29 The tender rates are inclusive of all taxes, rates, cesses and are also inclusive of the leviable tax in respect if sale by transfer of property in goods involved in the execution of a work contract under the provision of Rules 58 of Maharashtra Value Added Tax Act-2005. For the purpose of levy of tax.
- 1.30 **VALIDITY PERIOD :** The offer shall remain open for acceptance for minimum period of 90 days from the Date of opening of Envelope No. 2 (Financial Bid) and thereafter until it is withdrawn by the contractor by notice in writing duly addressed to the authority opening the tender and sent by Registered Post Acknowledgment due.

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WORK DESCRIPTION

CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

- 1) Cement Concrete Road 2/100 to 2/630 (530 Rmt), 7.00 m wide carriageway, 100 mm thick, Dry Lean Concrete (DLC) of M-10 grade and 300 mm thick Pavement Quality Concrete (PQC) for 530 m length in M-40
- 2) Cement Concrete Road, 2/630 to 3/050 Widening, 3.75 to 7.00 m, From Ch. 2/600 to 3/050, 1.625 m wide with 150 mm thick DLC of M-15 grade C.C. to match with existing grade of concrete road in widen portion on both side and 300 mm thick PQC for 420 m length for 7.00 m wide in C.C. M-40.
- 3) Providing reconstruction of 1 No. of C.D. work 1000 mm dia. N.P. 3 class for 12.50 m wide @ Ch. 2/570
- 4) Misc. Items such as Thermoplastic paint, Cautionary / Informatory Boards

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FORM B-1

- 1) All work proposed to be executed by contract shall be notified in a form of invitation to tender, pasted on a board hung up in the office of the Executive Engineer and signed by **Executive Engineer, Public Works Division No. 3, Nagpur.**

The form will state the work to be carried out as well as date of submitting and opening tender the time allowed for carrying out the work, also the amount of earnest money to be deposited with the tender and the amount of security deposit to be deposited by the successful tenderer and the percentage if any to be deducted from bills. It will also states whether a quarry fees, royalties and ground floor rents will be granted. Copies of the specifications designs and drawings and estimated rates, schedule rates and any other documents required in connection with the work which will be signed by Executive Engineer for the purpose of identification shall also be open for inspection by contractors at the office of the Executive Engineer during office hours.

Where the work are proposed to be executed according to the specifications recommended by a contractor and approved by a competent authority on behalf of the Government of Maharashtra, specifications with designs and drawing shall form part of the accepted tender.

- 2) In the event of the tender being submitted by a firm, it must be signed separately 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 authorising him to do so.

- A (i) The contactor shall pay along with the tender the sum of **Rs. 1,50,000/-** as and by way of earnest money. The contractor may pay the said amount by forwarding along with the tender in the form of Treasury Challan for the said amount or a Term Deposit Receipt for a period of one year issued by a scheduled bank and duly endorsed in the Name of **Executive Engineer, Public Works Division No. 3, Nagpur** The said amount of earnest money shall not carry any interest whatsoever

(ii) In the event of his tender being accepted, subject to the provision of sub clause (iii) below, the said amount of earnest money shall be appropriated towards the amount deposit payable by him under condition of General Conditions of Contract.

(iii) 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 balance of security deposit, without prejudice to any other rights and powers of the Government hereunder, or in law, Government shall be entitled to forfeit the full amount of the earnest money deposited by him.

iv) In the event of his tender not being accepted, the amount of earnest money deposited by the contractors shall, unless it is prior thereof forfeited under the provision of sub-clause (ii) above, be refunded to him on his passing receipt therefore.

- 3) Receipt 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 a firm, in which case the receipts 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 for the firm.

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- 4) Any person who submits a tender shall fill up the usual printed form including the column of estimated quantities stating at what rate he is willing to undertake all item of the work. Tenders which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work or which contain any other conditions of any sort, will be liable for rejection. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit a separate tender for each. Tenderers shall have the name and the number of work to which they refer written outside the envelope
- 5) The **Executive Engineer, Public Works Division No. 3, Nagpur** or his duly authorized assistant will open tenders in the presence of any intending contractors who may be present at the time and will enter the amount of the several tenders in a comparative statement in a suitable form. In the event of a tender being accepted, the contractor shall thereupon, for the purpose of identification, sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected, the Divisional Officer shall authorised the Treasury Officer / Bank concerned to refund the amount of earnest money deposited by the contractor making the tender, on his giving a receipt for the return of the money
- 6) The Officer competent to dispose of the tender shall have the right to reject any or all of the tenders.
- 7) No receipt for any payment alleged to have been made by a contactor in regard to any matter relating to this tender or the contract shall be valid and binding on Government unless it is signed by the Executive Engineer.
- 8) The memorandum of the work to be tendered for and the schedule of materials to be supplied by the Public Works Department and their rates shall be filled in and completed by the office of the Executive Engineer before the tender form is issued if a form issued to an intending tenderer has not been so filled in and completed he shall request the said office to have done this before the completes and delivers his tender
- 9) All work shall be measured net by standard measure and according to the rules and customs of the Public Works Department without reference to any local custom.
- 10) Under no circumstance shall any contractor be entitled to claim enhanced rates for any item in this contract.
- 11) All correction and additions or pasted slips should be initialed.
- 12) The measurement of work will be taken according to the usual method in the Public Work Department and no proposal to adopt alternative methods will be accepted. The Executive Engineer's decision as to what is "the usual method in use in Public Work Department will be final".
 - (i) The contractor shall give a list of machinery in their possession and which they propose to use on the work.
 - (ii) The contractor will have to construct shed for storing materials procured by him at his own cost at the work site having double locking arrangement. The materials will be taken for use in the presence of the Departmental Person. No materials will be allowed to be removed from site of the work.
- 13) The tender will be liable to be rejected, if while submitting it, the tenderer or in the case of a firm each partner thereof does not sign or the signature / signatures is / are not attested by a witness on page **22** of the tender in the space provided for the purpose.

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14) **Use of Government Machinery**

(a) If Government Machinery is available and the contractor desires to hire it for Work on the project it may be hired to him subject to the rules and hire charges that may be laid down by the Government from time to time during the currency of tender

(b) No security will be taken from the contractor, so long as the machinery is worked by the departmental staff and under the entire control of department and is not handed over to the contractor at all for operation by his crew and staff and the charges for the use of machinery are levied on hourly basis and as per prevailing schedule of rate for hire charges.

(c) Machinery should be worked only where the departmental staff is confident to use it safely & never in difficult situation and dangerous spot.

(d) The recovery of plant hire charges will be immediately made through the next Running Accounts bills.

15) The tendering contractors shall furnish a declaration along with the tender showing all works for he has already entered into contract, and the value of work that remains to be executed in each case on the date of submitting tender

16) In view of the difficult position regarding the availability of foreign exchange, no foreign exchange would be released by the Department for the purchase of plant and machinery required for the execution of the work contracted for.

17) The contractor will have to construct shed for storing controlled and valuable materials issued to him under schedule 'A' of the agreement. The materials will then be taken for use in the presence of the departmental person. No material will be allowed to be removed from the site of works.

18) The tendering contractor should furnish a detailed statement of works in hand, showing the cost of works in hand, the works completed against each with certificate from head of the office concerned.

19) In case of joint venture, the copy of registered partnership deed shall be produced at the time of purchasing of tender form and also in envelope No I.

20) Two or more contractors of any class may combine and tender for a work costing to the amounts up-to which each individual contractor or the higher of two limits if they are of different categories are empowered to tender as per the original registration provided.

(i) The combination is of the contractor as a whole and not individual partners and

(ii) They draw a registered partnership deed.

(iii) They should register in the name of joint Venture on the <http://pwd.maharashtra.etenders.in>

(iv) For empanelment on the <http://pwd.maharashtra.etenders.in> they should submit notarised joint Venture papers to Authority /Engineers In charge

(v) The Empanelment on <http://pwd.maharashtra.etenders.in> shall be only for this work.

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- 21) Whenever the advantage of such combination of two or more contractors is to be taken for quoting for a work, the registered partnership deed should be irrevocable till the completion of work for which they have combined and till all the liabilities there of are liquidated and the share of the contractor of higher category should not be less than 50 % . Further the percentage share of the contractor of the lower category in such a partnership/ combination should not be more than his limit of eligibility to quote for works divided by the estimated cost of work put to tender (i.e. when such a percentage is applied to the cost of the work, his share of cost not exceed his own eligibility limit of tendering for works.)
- 22) The lead partners shall meet not less than 50 percent of all qualifying criteria like annual turnover, single work, quantities of items and Bid Capacity above. The joint venture must collectively satisfy the criteria of para annual turnover ,single work, quantities of items and Bid capacity above The experience of the other joint partners shall be considered if it is not less than 30 percent of the qualifying criteria like annual turnover, single work ,quantities of items and Bid capacity above
- 23) If joint venture firm is found lowest at the time of opening of bids, the tenderer shall register the joint venture with the Registrar of Firm and submit the same to the Engineer-in-charge within 45 days from the date of opening of tender, failing which his bid shall be considered non responsive and the Earnest Money shall be forfeited.

Contractor

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TENDER FOR WORKS

I / We hereby tender for the execution for the Governor of Maharashtra (here in before and here in after referred to as Government) of the work specified in the under written memorandum within the time specified in such memorandum at* _____

* In figure as well as in words.

_____) 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, drawing and instructions in writing referred to in rule 1 here of and in clause 13 of the annexed conditions of contract and agree that when materials for the work are provided by Government such materials and the rates to be paid for them shall be as provided in Schedule 'A' hereto.

Contractor

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Executive Engineer

MEMORANDUM

(a) If several sub work are included they should be detailed in a separate list.

(c) The amount of earnest money to be deposited shall be in accordance with the provision of the paras 206 and 207 of the M.P.W. Manual.

(d) The deposit shall be accordance with paras 213 & 214 of M.P.W. Manual.

(e) This percentage where no security deposit is taken will vary from 5% to 10% according to the requirement of the case. Where security deposit is taken see note to clause (1) of condition of contract.

(f) Give schedule where necessary , showing dates by which various items to be completed.

(a) General Description : CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR
(Please Refer Page No. 14)

(b) Estimated cost : Rs. **2,64,97,350/-**

(c) Earnest Money: Rs. 1,50,000/-

(d) Security Deposit :

(i) Cash (not less than amount of earnest money) Rs. 5,30,000/-

(ii) To be deducted from current bills Rs. 5,30,000/-
Total : Rs 10,60,000/-

(e) Percentage, if any, to be deducted from bill so as to make up the total amount required as security deposit by time the half the work as measured by the cost is done 4 percent.

(f) Time allowed for the work from date of written order to commence is 4 (Four) months including monsoon should this tender be accepted.

I / We hereby agree that this offer shall remain open for acceptance for a minimum period of 90 days from the date fixed for opening the same and thereafter until it is withdrawn by us / by notice in writing duly addressed to the authority opening the tenders and sent by registered post A.D. or otherwise delivered at the office of such authority. Treasury challan No. _____ dated _____ Term Deposit Receipt; in respect of sum of **Rs. 1,50,000/-** representing the earnest money is herewith forwarded. The amount of earnest money shall not bear interest and shall be liable to be forfeited to the government should I / We fail to (1) abide by the stipulation to keep the offer open for the period mentioned above or (2) signed and complete the contract documents required by the Engineer and furnish the security deposit as specified in item (d) of memorandum contained in paragraph 1 above, within the time limit laid down in clause (i) of the annexed general conditions of the contract. The amount of earnest 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 above, within the time limit laid down in clause

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I / We have secured exemption from payment of earnest money after executing the necessary bond in favour of Government a true copy of which is enclosed herewith, should any occasion for forfeiture of earnest money for this work arise due to failure on my / our part to (1) abide by the stipulation to keep the offer open for the period mentioned above or (2) sign and complete the contract documents and furnish the security deposit as specified in item (d) of the memorandum contained in paragraph 1 above within the time limit laid down in clause (1) of the annexed General condition of the contract the amount payable be me/us may, at the option of the Engineer, be recovered out of the amount deposited in lump sum for securing exemption in so far as the same may extend in terms of the said bond and in the event of the deficiency, out of any other money which are due or payable to me / us by the Government under any other contract or transaction of any nature whatsoever or otherwise. should this tender be accepted

I /we hereby agree to abide by and fulfill all the terms and provision of the conditions of contract annexed hereto so far as applicable and in default to forfeit and pay to government the sum of money mentioned in the said condition. Receipt no ----- dt ----- from the government Treasury at in respect of the sum Rs **1,50,000/-** forwarded representing the earnest money (a) the full value of which is to be absolutely forfeited to Government should/we not deposit the fully amount of security specified in the above memorandum in accordance with Clause 1(A) of the said conditions of the contract. otherwise the said sum of Rs. **1,50,000/-** shall be refunded

Contractor

Signature of
Contractor before
submission of tender.

(Address)
Dated the _____ day of _____ 2013

Witness

Signature of witness
to Contractor's
Signature.

(Address)
Dated the _____ day of _____ 2013

Signature of the officer by
whom accepted.

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

**Executive Engineer
Public Works Division No. 3
Nagpur**

Dated the _____ day of _____ 2013

Contractor

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CONDITIONS OF CONTRACT

Security Deposit

Clause1: The person / persons whose tender may be accepted (herein after called the contractor, which expression shall unless excluded by or repugnant to the context include his, heirs executors, administrators, contractor and assigns) shall (A) within 10 days (which may be extended by the Superintending Engineer concerned upto 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 cash or Govt. securities endorsed to the Executive Engineer (if deposited for more than 12 months) of sum sufficient which will make up the full security deposit specified in tender or (B) permit Government at the time of making any payment to him for work done under the contract to deduct such as will amount to 4 (Four) percent of all moneys so payable, such deduction to be held by Government by way of security deposit, provided always, that, in the event of the contractor depositing a lump sum by way of security deposit as contemplated at (A) above, then and in such case, a the sum so deposited shall not amount to 2 (Two) percent, of the total estimated cost of the work, it shall be lawful for Government at the time of making any payment to the contractor for work done under the contract, to make up the payment to the contractor for work done under the contract to make up the full amount of 2(Two)percent, by deducting a sufficient sum from every such payment as last aforesaid, until the full amount of the security deposit is made up.

All compensation or other sum of money payable by the contractor to government under the terms of his contract may be deducted from or paid by the sale of sufficient part of his security deposit or from the interest arising there from or from any sums which may be due or may become due by Government 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 by reason of any such deduction or sale as aforesaid the contractor shall within ten days there after make good in cash or Government securities endorsed as aforesaid, any sums or sums which may have been deducted from or raised by sale of his security deposits or may part thereof. The security deposit referred to, when paid in cash may, at the cost of the depositor, be converted into interest bearing securities provided that the depositor has expressly desired this in writing.

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If the amount of the Security Deposit to be paid in lump sum within the period specified at (A) above is not paid, the tender / Contract already accepted shall be considered as cancelled and legal step will be taken against the contractor for recovery of the amounts. The amount of the Security Deposit lodged by a contractor shall be refunded along with the payment of the final bill, if the date up to which the contractor has agreed to maintain the work in good order is over. If such date is not over, only 50% amount of security deposit shall be refunded along with the payment of the final bill. The amount of security deposit retained by the Government shall be released after expiry of period up to which the contractor has agreed to maintain the work in good order is over. In the event of the contractor failing or neglecting to complete rectification work within the period up to which the contractor has agreed to maintain the work in good order, then subject to provisions of clause 17 and 20 here of the amount of security deposit retained by Government shall be adjusted towards the excess cost incurred by the department on rectification work**. This will be the same percentage as that in the tender at (e).

Compensation for delay

Clause 2 : 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, all due diligence (time being deemed to be the essence of the contract on part of the contractor) and the contractor shall 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 amount of the estimated cost of the whole work as shown in the tender for every day that work remains un-commenced, or unfinished after the proper dates. And further to ensure good progress during the execution of the works, the contractor shall be bound in all cases, in which the time allowed for any work exceeds one month to complete.

¼ of the work in	1/3 of the time
½ of the work in	½ of the time
¾ of the work in	¾ of the time
Full work	4 (Four) Calendar Months

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 amounts 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 provision of this clause shall not exceed 10 percent of the estimated cost of the work shown in the tender. Superintending Engineer should be the final authority in this respect irrespective of the fact that the tender is accepted by Chief Engineer, P.W. Region, Nagpur.

Contractor

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Action when whole of Security Deposit is forfeited. **Clause 3 :** In any case in which under any clause or clauses of this contracts the contractor shall have rendered himself liable to pay compensation amounting to the whole of his 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.

a) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the 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 Government.

b) To carry out of 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 unexecuted 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 the contract. The certificate of the Executive Engineer as to the cost of the work and other allied expenses so included and 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 cost of the work executed by the new contract agency will be debited to 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. This 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 done by the new contractor and as to the value of the work so done shall be final and conclusive against contractor.

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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 thereto actually performed by him under this contract unless and until the Executive Engineer shall have certified in writing the performance of such work and the amount payable to him in respect thereof 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 contractor, the amount of excess value shall be deducted from any money due to the contractor by the Govt. under the contract or otherwise, howsoever or from his security deposit or the sale proceeds thereof provided howsoever, that the contractor shall have no claim against government even if certified value of the work done departmentally or through a new contract except 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 reason of him having no claim to compensation for any materials, or entered into engagement or made any advance on account of or with a view of the execution of the work or the performance of contract.

Action when
process of
particular work
is unsatisfactory

Clause 4 : If the progress of any particular portion of the work is unsatisfactory the Executive Engineer shall not with standing that the general progress of the work is satisfactory in accordance with clause 2 be entitled to take action under clause 3 (b) after giving the contractor 10 days notice in writing and the contractor will have no claim for compensation for any loss sustained by him owing to such action.

**Contractor
remains
liable to pay
compensation
if action not
taken under
clause 3.**

Clause 5 : In any case in which any of the powers conferred upon the Executive Engineer by clause 3 and 4 hereof shall have become exercisable and the same shall not have been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall not-with standing be exercisable in any future case of default by the contractor for which by under any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his security deposit and the liability of the contractor for past and future compensation shall remain unaffected. In the event of the Executive Engineer taking action under sub-clause (a) or (c) of clause (3) he may, if he so desires, take possession of all or any tool plant, materials and stores in or upon the works or the site thereof or belonging to the contractor or procured by him and intended to be used for the execution of the works or the site thereof or belonging to the contractor, or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing, for the same in 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 there of shall be final. In the alternative the Executive Engineer may, by notice in writing to the contractor or to his clerk of the works, foreman or other authorised 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 contractor failing to comply with any such requisition the Executive Engineer may remove them at the contractor's expenses or sale them by auction or private sale, at risk and account of the contractor in all such removal and the amount of the proceeds and expenses of any such sale be final and conclusive against the contractor.

Power to
take
possession
of or required
removal of or
all
contractor's
plant

Contractor

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Extension of time limit.	<p>Clause 6: If the contractor desires an extension of the time for completion of the work on the ground of his having unavoidable hindering in its execution or on the other ground, he shall apply in writing to the Executive Engineer before the expiration of the period stipulated in the tender or before the expiration of 30 days from the date to which he was hindered as aforesaid or on which the cause for asking for extension occurred, whichever is earlier and the Executive Engineer may, 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 Executive Engineer in this matter shall be final.</p> <p>Clause 6 A : In the case of delay in handing over the land required for the work due to unforeseen cause, the contractor shall not be entitled for any compensation whatsoever from the Government on the ground that the machinery or the labour was idle for a certain period. Contractor may, however, apply for extension of time limit which may be granted on the merit of the case.</p>	
Final Certificate	<p>Clause 7 : On completion of the work the contractor shall be furnished with a certificate by the Executive Engineer (Hereinafter called the Engineer-in-charge) in such completion but no 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 of the dirt from all wood work, doors, floors or other parts of any building in or upon which the work has been executed or on which he may have had possession for the purpose of executing the work or until the work shall have been measured by the Engineer-in-charge or where the measurements have been taken by his subordinates until they have received the approval of the Engineer-in-charge the said measurement being binding and conclusive against the contractor. If the contractor fails to comply with the requirement of the 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 Executive-in-charge may at the expense of the contractor, remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit and clean of such dirt as aforesaid and the contractor shall forthwith pay the 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 actually realized by the sale thereof.</p>	
Payments on intermediate certificate to be regarded as advance.	<p>Clause 8 : No payment shall be made for any work estimated to cost less than Rs. One thousand till after the whole of the said work shall have been completed and a certificate of completion given. But in the case of the works estimated to cost more than Rs. One thousand, the contractor shall not submit a monthly bill thereon but 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 payable shall be final and conclusive against the contractor. All such intermediate payment shall be regarded as payment by way of advance against the final payment only and not preclude the Engineer-in-charge from requiring any bad, unsound, imperfect or unskillful work to be removed and taken away and reconstructed or rejected, nor shall any such payment be considered as an admission of the due performance of the contractor or any part thereof, in any respect of the occurring of any claim, nor shall it conclude,</p>	
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determine or affect in any way the powers of the Engineer-in-charge as to 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 months of the date fixed for the completion of the work otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work shall be final and binding on all parties.

Payment at reduced rates on account of items of work not accepted as completed to be at the discretion of the Engineer in charge.

Clause 9 : The rates for several items of work estimated to cost more than Rs. One thousand agreed to within shall be valid only when the item concerned is accepted as having been completed fully in accordance with the sanctioned specifications. In 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 preparation of final or on account bills.

Bill to be submitted monthly

Clause 10 : A bill shall be submitted by the contractor each month on or before the date fixed by the Engineer-in-charge for all work executed submitted in the previous month, and the Engineer-in-charge shall take or cause to be taken the requisite measurement for the purpose of having the same verified and the claim so far as it is admissible shall be adjusted, if possible within ten days from the presentation of the bill. If the contractor does not submit the bill within time fixed as aforesaid, the Engineer-in-charge may depute a subordinate to measure up the said work in the presence of the contractor or his duly authorised agent whose counter signature to the measurement list shall be sufficient warrant and the Engineer-in-charge may prepare a bill from such list which shall be binding on the contractor in all respects.

Bill to be on printed form.

Clause 11 : The contractor shall submit all bills on the printed forms to be had on application at the office of the Engineer-in-charge. The charges to be made in the bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions and not mentioned or provided for in the tender, at the rate hereinafter provided for such work.

Stores supplied by Government

Clause 12 : If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the P.W.D. store or if it is required that the contractor shall use certain stores to be provided by the Engineer-in-charge (such material and stores, and the prices to be charged therefore as hereinafter mentioned being so far as practicable for the convenience of the contractor but not so in any way to control the meaning or effect of this construction specified in the schedule or memorandum hereto annexed) the contractor shall be supplied with such materials and stores as may be required from time to time to be used by him for the purpose of the construction only, and values of the full quantity of materials and stores as supplied shall be set off or reduced from any sums then due, or here after to become due to the contractor under the contract or otherwise or from the security deposits, or the proceeds of sale thereof, if the deposit is held in Government, and shall on no account be removed from the site of the work and shall at all times be

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open to inspection by the Engineer-in-charge. Any such material unused and is perfectly in good condition at the time of completion or determination of the contract shall be returned to the Public Works Department stores, if the Engineer-in-charge so requires by a notice in writing given under his hand, but the contractor shall not be entitled to return any such materials except with such consent and he shall have no claim for compensation on account of any such material supplied to him as aforesaid but remaining unused by him or for any wastage into damage thereto.

Store Material

Clause 12 A : All store of contractor material such as cement, steel, bitumen etc Supplied by the contractor at his own cost should be kept by the contractor under lock and key and will be accessible for inspection by the Executive Engineer or his agent at all times.

Work to be executed in accordance with specification, drawing, orders etc.

Clause 13 : The contractor shall execute the whole and every part of the work like manner and both as regards materials and every other respect in strict accordance with specifications. The contractor shall also confirm exactly fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the contractor shall be entitled to have access for the purpose of inspection at such office or at the site of work during office hours. The contractor will be entitled to receive three sets of contracts 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. 500 /- per set of contract drawing and Rs. 150/- per working drawing except where otherwise specified.

Alteration in Specifications and designs not to invalidate contract.

Clause 14 : The Engineer-in-charge shall have power to make any alterations in, or additions to, the original specifications, drawings, designs and instructions, that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Engineer-in-charge and such alteration shall not invalidate the contract, and any additional work which the contractor may be directed to do in the manner above specified as a part of the work shall be carried out by the contractor in the same conditions in all respects on which he agreed to the main work and at the same rates as per specified in the tender for the main work. And if the additional or 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 entered in Schedule of Rates of the division or at the mutually agreed upon between the Engineer-in-charge and the contractor, whichever are lower. If the additional or altered work, for which no rate is entered in the schedule of rates of the division, is ordered to be carried out before the rates are agreed upon, then the contractor shall within seven days of the date of receipt by him of order to carry out work inform the Engineer-in-charge of the rate which it is his intention to charge for such class of work, and if the Engineer-in-charge does not agree to this rate he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider advisable, provided always that if the contractor shall commence work or incurs any expenditure in regard thereto before the rate shall have been determined as lastly herein-before mentioned then in such case he shall only be entitled to be paid in-respect if the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of a dispute the decision of the Superintending Engineer of the Circle will be final.

Rate for work not entered in estimate or schedule of rates of the district.

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Where however, the work is to be executed according to the designs, drawings, and specification recommended by the contractor and accepted by the competent authority the alterations above referred to shall be within the scope of such designs, drawing and specifications to the tender.

Extension of time in consequence of addition or alteration.

The time limit for the completion of work shall be extended in the proportion that the increase in its cost occasioned by alterations or additions bears to the cost of the original contact work and the certificate of the Engineer-in-charge as to such proportion shall be conclusive.

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

Clause 15 : (1) If at any time after the execution of the contract documents, the engineer shall for any reason whatsoever (other than default on the part of the contractor and for which Government is entitled to rescind the contract) desire 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 state 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 the decision of the Engineer as to the stage at which the work or any part or it could be or could have been safely stopped or suspended shall be final and conclusive against the contractor. The contractor shall have no claim to any payment or compensation what-so-ever by reason of or in pursuance of any notice as aforesaid on account of any suspension, stoppage or curtailment except to the extent specified here-in-after.

(2) Where the total suspension of the 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 measurements of the work already done and to pay the final bill. Upon given such notice, the contractor shall be deemed to have been discharged from his obligation to complete the remaining unexecuted work under this contract. On receipt of such notice the Engineer shall proceed to complete the measurement and make such payment as may be finally due to the contractor within a period of 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 provision of this clause.

(3) Where the Engineer requires the contractor to suspend the work for a period in excess of 30 days at anytime or 60 days in the aggregate, the contractor shall be entitled to apply to the Engineer within 30 days of the resumption of the work after such suspension for payment of compensation to the extent of pecuniary loss suffered by him in respect of working machinery rendered idle on the site or on account of his having, had to pay the salary or wages of labour 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

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wages for the first 30 days whether consecutive or in the aggregate of such suspension or in respect of any suspension what-so-ever occasioned by unsatisfactory work or any other default on his part. The decision of the Engineer in this regard shall be final and conclusive against the contractor.

(4) In the event of

- (i) Any total stoppage of work on notice from the engineer under sub-clause (1).
- (ii) Withdrawal by the contractor from the contractual obligation to complete the remaining unexecuted work under sub-clause (2) on account of continued suspension of work for a period exceeding 90 days.
- (iii) Curtailment in the quantity of any item or items originally tendered on account of any alteration, omission or 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% at the rate for the items specified in the tender is more than Rs. Five Thousand (Rs.5000/-)

It shall be open to the contractor within 90 days from the service of (i) the notice of stoppage of work or (ii) the notice of withdrawal from the contractual obligation under the contract on account of the continued suspension of the work (iii) notice under clause 14(1) resulting such curtailment or produce to the Engineer satisfactory documentary 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 rates determined by the Engineer, provided however, such rates shall in no case exceed the rates at which the same were acquired by the contractor. The Government shall thereafter take over the material so offered, provided the quantities offered are not in excess of the requirement of the unexecuted work as specified in the accepted tender and are of quality and specification approved by the Engineer.

Time limit for unforeseen claims.

Clause 16: Under no circumstance what so ever shall the contractor be entitled to any compensation from Government on any account unless the contractor shall have submitted claim in writing to the Engineer -in Charge within one month of the cause of such claim occurring.

Action and compensation payable in case of bad work.

Clause 17: If 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 subordinate in-charge or the work, that any work has been executed with unsound, imperfect unskilled 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 a quality inferior to that contracted for or are otherwise not in accordance with the contractor, it shall be lawful for the Engineer-in-charge to intimate this fact in writing to the contractor and then 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 and reconstruct the work so

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specified in whole or in part, as the case may be require or if so required, shall remove the materials or articles so specified and provided other proper and suitable materials or article 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 1% on the amount of the estimate 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 article 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 therefor.

Work to be open to inspection.

Clause 18: All works under or in course of execution or executed in pursuance of the contract shall at all times be open to the inspection to 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 of his subordinates to visit the works shall have been given to the contractor, either himself be present to receive order and instructions, or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the contractor's duly authorised agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

Contractor or responsible agent to be present.

Notice to be given before the work is covered up.

Clause 19 : The contractor shall give not less than 5 days notice in writing to the Engineer-in-charge or his subordinates in charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions hereof taken before the same is so covered up or placed beyond the reach of measurement and shall not cover up or placed beyond the reach of measurement any work without the consent in writing of the Engineer-in-charge or his subordinate in charge of 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 contractors expense and in default thereof payment or allowance shall be made for such work or for the materials with which the same was executed.

Contractor liable for damage done and for imperfection.

Clause 20 : If during the period of **24 (Twenty Four)** months from the date of completion as certified by the Engineer-in-charge pursuant to the clause 7 of the contract or **24 (Twenty Four)** months after commissioning of the work whichever is earlier in the opinion of the Executive Engineer, the said work is defective in any manner whatsoever, the contractor shall forthwith on receipt on the 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 and setting right the defects specified therein including dismantling and reconstruction of unsafe portions

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strictly in accordance with and in the manner prescribed and under the supervision of the Executive Engineer. In the event of the contractor failing and neglecting to commence execution of the said rectification work within the period prescribed therefore in the said notice the Executive Engineer may get the same executed and carried out departmentally or by other agency at the risk on account and at the cost of the contractor. The contractor shall forthwith on demand pay to the government the amount of such costs, charges and expenses sustained or incurred by the government of which the certificate of the Executive Engineer shall be final and binding on the contractor. Such costs, charges and expense shall be deemed to be arrears of land revenue and in the event of contractor failing or neglecting to pay the same on demand as aforesaid without prejudice to any other rights and remedies of the Government, the same may be recovered from the contractor as arrears of land revenue. The government shall also be entitled to deduct the same from any amount which may then be payable or which may thereafter becomes payable by government to the contractor either-in-respect of the said work or any other work whatsoever, or from the amount of the security deposit retained by government.

Contractors
to supply
plant,
ladders,
scaffolding
etc.

Clause 21 : The contractor shall supply at his own cost all materials (except such special material if any) as may be supplied from the Public Works Department Stores, in accordance with the contract, plant, tools, appliances, implements, ladders, cordage, tackle, scaffolding and any temporary works which may be required for the proper execution of the work, in the original, altered or substituted form, 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 the purpose of satisfying or complying with requirements of the Engineer-in-charges as to any matter on which

And is liable
for damages
arising from
non-
provisions of
lights,
fencing etc.

under these Conditions he is entitled to be satisfied, or which be entitled to require together with carriage therefor, to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or materials. Failing this the same may be provided by the Engineer-in-charge at the expense of the contractor and the expenses may be deducted from any money due to the contractor under the contract or from his security deposit or the proceeds of sale thereof or of 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 every suit, action or other legal proceedings at law that may be brought by any person for injury sustained owing to the neglect of the above precautions, and to pay damages and cost such person or which may with the consent of the contractor be paid in compromising any claim by any such person.

Clause 21A: The contractor shall provide suitable scaffolds and working platforms, gangways, and stairways and shall comply with the following regulations in connection therewith:

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- a) Suitable scaffolds shall be provided for workmen for all work that cannot be safely done from a ladder or by other means.
- b) A scaffold shall not be constructed, taken down 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 appliance connected therewith and all leaders 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.
- d) Scaffolds shall be so constructed that no part there of can be displaced in consequence of normal use.
- e) Scaffolds shall not be overloaded and as far as practicable the load shall be evenly distributed.
- f) Before installing lifting gear on scaffolds special precaution shall be taken to ensure the strength and stability of the scaffolds.
- g) Scaffolds shall be periodically inspected by a competent person.
- h) Before allowing a scaffold to be used by his workmen, the contractor shall check whether the scaffold has been erected by his workmen or not take steps and to ensure that it complies fully with the regulations herein specified.
- i) Working platforms, gangways, and stairways shall -
 - i) Be so constructed that no part thereof can sag unduly or unequally.
 - ii) 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
- j) In the case of working platforms, gangways, working places and stairways at a height exceeding 3 meters.
 - i) Every working platform and every gangways shall have to be closely boarded unless other adequate measures are taken to ensure safety.
 - ii) Every working platform, gangways, working places, stairway shall be suitably fenced.

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- k) Every opening in the floor of the building or in working platform shall except for the time and to the extent required to allow the access or persons or the transport or shifting of materials be provided with suitably means to prevent the fall of persons or material.
- l) When persons are employed on a roof where there is danger of falling from a height exceeding 3 meters suitable precaution shall be taken to prevent the fall of persons or materials.
- m) Suitable precautions shall be taken to prevent persons being struck by articles, which might fall from scaffolds or other working place. Safe means of access shall be provided to all working platforms and other working places.
- n) Safe means of access shall be provided to all working platform and other working places.

Clause 21 B : The contractor shall comply with the following regulations as regards the Hoisting Appliances to be used by him.

- a) Hoisting machines and tackle, including their attachment, anchorage's and sports shall -
 - i) Be of good mechanical construction, sound material and adequate strength and free from patent defect, and
 - ii) Be kept in good repair and in good working order.
- b) Every rope used in hoisting or lowering material or as a means of suspension shall be of suitable quality and adequate strength and free from patent defect.
- c) Hoisting machines and tackle shall be examined and adequately tested after erected on the site and before use and be reexamined in position at intervals to be prescribed by the government.
- d) Every chain, ring, hook, shackle, swivel and pulley block used in hoisting or lowering of materials or as a means of suspension shall be periodically examined.
- e) Every crane driver or hoisting appliance operator shall be property qualified.
- f) No person who is below the age of 21 years shall be in control of any hoisting machine, including any scaffolds, which give signals to the operator.
- g) In the case of every hoisting machine and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or lowering or as a means of suspension the safe working load shall be ascertained by adequate.
- h) Every hoisting machine and all gear referred to in the preceding regulation shall be plainly marked with the safe working load.

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- i) In the case of hoisting machine having a variable safe working load, each safe working load and condition under which it is applicable shall be clearly indicated.
- j) No part of any hoisting machine or of any gear referred to in regulation of above shall be loaded beyond the safe working load except for the purpose of testing.
- k) Motors, gearing transmissions, electric wiring and other dangerous part of hoisting appliance shall be provided with efficient safe guards.
- l) Hoisting appliances shall be provided with such means as will reduce to a minimum risk of the accidental descent of the load.
- m) Adequate precautions shall be taken to reduce to a minimum the risk of any part of a suspended load becoming accidentally displaced.

Measure for prevention of fire.

Clause 22: The contractor shall not set fire to any standing jungle, trees, bush wood or grass without a written permit from the Executive Engineer.

When such permit is given and also in all cases when destroying cut or dug up trees, bush wood grass etc. by fire, the contractor shall take necessary measures to prevent such fire spreading to or otherwise damaging surrounding property.

The contractor shall make his own arrangement for drinking water for the labour employed by him.

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

Clause 23: Compensation for all damage done intentionally or unintentionally by contractors labour whether in or beyond the limits of contractor for government property including any damage caused by the spreading of any damage fire mentioned in clause 22 shall be estimated by the Engineer-in-charge or such other officer as he may appoint and the estimates 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 in the manner prescribed in clause 1 or deducted by the Engineer-in-charge from any sum that may be due to or become due from government to the 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 person for injury sustained by him owing to neglect of precautions to prevent the spread of fire and he shall also pay any damages and cost that may be awarded by the court in consequence.

Employment of female labour

Clause 24 : The employment of female labourers on works in the neighborhood of soldier's barracks should be avoided as far as possible.

Work on Sunday

Clause 25 : No work shall be done on a Sunday without the sanction in writing of the Engineer-in-charge.

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Work not to be sublet. Contract may rescind and security deposit forfeited for subletting it without approval or for bribing a public officer or if contractor becomes insolvent.	Clause 26 : The contract shall not be assigned or sublet without the written approval of the Engineer-in-charge. And if the contractor shall assign or sublet his contract, or attempt so to do, or become insolvent or commence any proceedings to be adjudicated and insolvent or make any composition with his creditors, or attempt so to do the Engineer-in-charge may be notice in writing rescind the contract. Also if any bribe, gratuity, gift, loan, perquisite, reward or advantage, pecuniary or otherwise, shall either directly or indirectly be given, promised by the contractor or any of his servants or agents to any public officer or person in the employment of government 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 be giving notice in writing rescind the contract. In the event of a contract being rescinded, the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of the Government and same consequences shall as ensure as if the contract has 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.	
Sum payable by way of compensation to be considered as reasonable compensation without reference to actual loss.	Clause 27 : All sum payable by a contractor by way of compensation under any of these condition shall be considered as a reasonable compensation to be applied of the use of Government without reference to the actual loss or damage sustained and whether any damage has or has not been sustained.	
Changes in the constitution of the firm to be notified.	Clause 28 : In the case of a tender by partners any change in the construction of a firm shall be forthwith notified by the contractor to the Engineer-in-charge for his information.	
	Clause 29 : All works to be executed under the contact shall be executed under the direction and subject to the approval in all respects of the Superintending Engineer of the Circle for the time being, who shall be entitled to direct at what point or points and in what manner they are commenced and from time to time carried out.	
Work to be under direction and control of Superintendi ng Engineer.	Clause 30 (1) : Except where otherwise specified in the contract and subject to the power delegated to him by Government 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 to the contract upon all questions relating to the meaning of the specifications ,designs ,drawings and instructions herein before mentioned and as to the quality of the workmanship or material used on the work or as to any other question, claim, right, matter or things whatsoever, in any way arising out of or relating to the contract designs, drawing, specifications, estimates, instructions , orders of 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.	
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(2) 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 lacks (Rupees Ten Lakhs)

(b) Amount of claim is not less than Rs. 1.00 lakh (Rupees one lakh)

(3) 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 concerned Secretary, Public Works Department who, if convinced the prima-facie the contractor's claim rejected by the 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 Standing Committee, shall put up to the Standing Committee at Government level for suitable decision.

Store of European or American manufactures to be obtained from the Government

Clause 31 : The contractor shall obtain from the P.W.D. stores all stores and article of European or American manufacture which may be required for the work, or any part of the work or in making up any article required therefore or in connection therewith unless he has obtained permission in writing from the Engineer-in-charge to obtain such stores and articles elsewhere. The value of such stores and articles as may be supplied to the contractor by Engineer-in-charge will be debited to the contractor in his account at the rates shown in the Schedule in form "A" attached to contract and if they are not entered in the said Schedule, they shall be debited to him at cost price which for the purpose of this contract shall include the cost of carriage and all other expenses whatsoever, which may have to be incurred in obtaining delivery of the same as the stores aforesaid.

Lump sums in estimates.

Clause 32 : When the estimate on which a tender is made includes lump sumps in respect of parts of the work the contractor shall be entitled to payment in respect of items of work involved or the part of the work in question at the same rates as are payable under this contract for such items, or if part of the work question is not in the opining of the Engineer-in-charge capable of measurement the Engineer-in-charge may at his discretion pay 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 with regard to any sum or sums payable to him under the provision of this clause.

Action where no specification.

Clause 33 : In the case of any class of work for which there is no such specification as in mentioned in Rule-1, 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 the instruction and requirement of the Engineer-in-charge.

Definition of work.

Clause 34 : The expression 'works' or 'work' where used in these condition shall, unless there be something in the subject or context repugnant to such construction be constructed to mean the work or the work contractor to be executed under or in virtue of the contract, whether temporary or permanent and whether original altered substituted or additional.

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Contractor's percentage whether applied to net or gross amount of bill.	Clause 35 : The percentage referred to in the tender shall be deducted from / added to the gross amount of the bill before deducting the value of any stock issued.	
Quarry fees and royalties	Clause 36 : All quarry fees, royalties, octroi dues and ground rent for stacking materials if any, should be paid by the contractor.	
Compensation under Workman's Compensation Act.	<p>Clause 37 : The contractor shall be responsible for and shall pay compensation to his Workmen payable under the Workmen's compensation Act, 1923 (VIII of 1923), (hereinafter compensation is payable and or paid by Government as principal under the subsection 91) of section 12 of the said Act on behalf of the contractor this shall be recoverable by Government from the contractor under sub section 92) of the said section. Such compensation shall be recovered in the manner laid down in clause 1 above.</p> <p>Clause 37 A : The contractor shall be responsible for and shall pay expenses of providing Medical aid to any workmen who may suffer a bodily injury as a result on an accident. If such expenses are incurred by Government the same shall be recoverable from the contractor forthwith and be deducted without prejudice to any other remedy of Government from any amount due or that may become due to the contractor.</p> <p>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 regulation in connection therewith :</p> <p>(a) The worker 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.</p> <p>(b) When work carried on in proximity to any place where there is no risk of drawing, all necessary equipment's shall be provided and kept ready for use and all necessary steps shall be taken prompt rescue of any person in danger.</p> <p>(c) Adequate provision shall be made for prompt first-aid treatment for all injuries likely to be sustained during the course of the work.</p> <p>Clause 37 C : The contractor shall duly comply with the provision of "The Apprentices Act 1961 (III of 1961) the rules made there under and the orders that may be issued from 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".</p>	
Claim for quantity of works entered in the tender or estimate.	Clause 38 : (1) Quantities in respect of the several items shown in the tender are approximate and no revision in the tendered rates shall be permitted in respect of any of the items so long as, subject to any special provision contained in the specification prescribed a different percentage of permissible variation, the quantity of the items does not exceed the tender quantity by more than 25% and so long as the value of excess quantity beyond this limit at the rate of the items specified in the tender, is not more than Rs. 5,000/-	
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(2) The contractor shall if ordered in writing by the Engineer, so to do also carry out any quantities in excess of the limit mentioned in Sub Clause (1) hereof on the same conditions as and in accordance with the specifications in the tender and at the rates (i) derived from the rates entered in the current schedule of rates and in the absence of such rates (ii) at the rate prevailing in the market, the said rates being increased or decreased as the case may be, by the percentage which the total tendered amount bears to the estimated cost of the work as put to tender based upon the Schedule rates of applicable to the year in which the tenders were invited (for the purpose of operation of this clause, this cost shall be taken to **Rs. 2,64,97,350/-**

(3) Claim arising out of reduction in the tendered quantity of any item beyond 25 percent will be governed by the provisions of clause 15 only when the amount reduction beyond 25% at the rate of the item specified in the tender is more than Rs. 5000/-.

Employment of female or other labour.

Clause 39 : The contractor shall employ any female, convict or other labour of a particular kind of class if ordered in writing to do so by the Engineer-in-charge.

Claim for compensation for delay in starting work

Clause 40 : No compensation shall be allowed for any delay caused in the starting of the work on account of acquisition of land and in the case of the clearance work of any delay in according sanction to estimates.

Claim for compensation for delay in the execution of work

Clause 41 : No compensation shall be allowed for any delay in 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, subsoil water or water standing in borrow pits and no claim for an extra rate shall be entertained unless otherwise expressly specified.

Entering upon or commencing any portion of work.

Clause 42 : The contractor shall not enter upon or commence any portion of 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 for work.

Minimum age of persons employed, the employment of donkey and/or other animals and the payment of fair wages.

Clause 43 : (i) No contractor shall employ any person who is under the age of 18 years.

(ii) No contractor shall employ donkeys or other animals with breeching of string or thin rope. The breeching must be at least 3 inches wide and should be of tape (Newar)

(iii) No animals suffering from sores, lameness or emaciation or which is immature shall be employed on the work.

(iv) The Engineer-in-charge or his agent authorised to remove from the work any person or animal found working which does not satisfy these conditions and no responsibilities shall be accepted by the Government for any delay caused in the completion of the work by such removal.

(v) The contractor shall pay fair and reasonable wages to the workmen employed by him in the contract undertaken by him. In the event of any disputes 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 Executive Engineer who shall decide the same. The decision of the Executive Engineer shall

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be conclusive and binding on the contractor, but such decision shall not in any way affect the condition in the contract regarding the payment to be made by the Government at the sanctioned tender rates.

(vi) The contractor shall provide drinking water facilities to the workers. Similar amenities shall be provided to the workers engaged on large work in urban areas.

Method of payment.

Clause 44: Payments to contractor shall be made by cheques drawn on any treasury within the Division convenient to them. Provided the amount exceeds Rs. 100/- Amount not exceeding Rs. 100/- will be paid in cash.

Acceptance of conditions compulsory before tendering the work.

Clause 45 : Any contractor who does not accept these conditions shall not be allowed to tender for works.

Employment of scarcity labour.

Clause 46: If Government declares a state of scarcity or famine to exist in any village situated within 1 Kms. of work, the contractor shall employ upon such parts of the work as suitable for unskilled labour any person certified to him by the Executive Engineer or by any person to whom Executive Engineer may have delegated this duty in writing to be in need of relief and shall be bound to pay to such persons wages not below minimum 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.

Clause 47: The price quoted by the contractors shall not in any case exceed the control price, if any, fixed by Government or reasonable price which is permissible for him to charge as private purchaser for the same class and description of goods under the provisions of Hoarding and profiteering Prevention Ordinance 1984 as amended from time to time. If the price quoted exceeds the controlled price or the price permissible under Hoarding and Profiteering Prevention Ordinance, the contractor will specifically mention this fact in his tender along with reasons for quoting such higher price. The purchaser at his tender along with reasons for quoting such higher price. The purchaser at his discretion will in such higher price. The purchaser at his discretion will in such case exercises the right of revising the price at any stage so as to confirm with the controlled price on the permissible under the Hoarding and Profiteering Ordinance. This discretion will be exercised without prejudice to any other action that may be taken against the contractor.

Clause 48: The rates to be quoted by the contractor must be inclusive of sales tax No extra payment on this account will be made to the contractor

Clause 48 A : The contractors are bound to pay to the labourers wages according to the Minimum Wages Act 1948 applicable to the Zone in accordance with the order issued in Government P.W.D./Circular No. MWA/ 1063, dated 07/12/1968.

Clause 49: In case of materials that remains surplus with the contractor for those issued for the work contracted from the date of ascertainment of the materials being surplus be taken as the date of sale for the purpose of sales tax and the sale tax will be recovered on such sale.

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Clause 50: The contractor shall employ the unskilled labour to be employed by him on the said work only from locally available labours and shall give preference to those persons enrolled under Maharashtra Government Employment and Self Employment Department Scheme. Provided, however, that if the required unskilled labour are not available locally, the contractor shall in the first instance employ such number of persons as is available and thereafter may with previous permission, in writing of the Engineer-in-charge of the said work obtained the rest of requirement of unskilled the labour from outside the above scheme.

Clause 51: Deleted

Clause 52: All amount whatsoever which the contractor is liable to pay to the Government in connection with the execution of the work including the amount payable in respect of (1) Material and / or stores supplied / issued hereunder by the Government to the contractor, (2) Hire charges in-respect of heavy plant machinery and equipment given on hire by the Government to the contractor, for execution by him of the work and / or on which the advance have been given by the Government to the contractor shall be deemed to be arrears of the lands revenue and the Government may without prejudice to any other rights and remedies of the Government recover the same from the contractor as arrears of land revenue.

Clause 53: 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 provision 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 make short payment and the Government 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 Government to such worker shall be deemed to be arrears of land revenue and the Government shall be entitled to recover the same as such from the contractor or deduct the same from the amount payable by the Government to the contractor hereunder or from any other amounts payable to him by the Government (Minimum Wages Act, as per Government Circular (AT / 1284 / (120) / Building, dated 14/08/1988).

**Price
Variation**

Clause 54 : If during the operative period of the contract as defined in condition (i) below, there shall be any variation in the consumer price index (New series) for industrial Workers for Nagpur 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 Advisor, Ministry of Industry, Government of India or in the price of petrol / Oil and Lubricants, and major construction material like bitumen, cement, steel, various type of metal, pipes, etc. then subject to the other conditions mentioned below, price adjustment on account of

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- (i) Labour component,
- (ii) Material component,
- (iii) Petrol Oil and Lubricants components
- (iv) Bitumen component
- (v) T.M.T. Steel component
- (vi) Cement component

Calculated as per formula hereinafter appearing shall be made. Apart from these, no other adjustment shall be made to the contract price for any reasons whatsoever. Component percentage as given below are as of the total cost of work put to tender. Total of Labour, Material & POL components shall be 100 and other components shall be as per actual.

1)	Labour Component - K_1	9.91 %
2)	Material Component - K_2	86.20 %
3)	POL Component - K_3	3.89 %
	Total	100 %
4)	Bitumen Component	Actual
5)	T.M.T Steel component	Actual
6)	Cement Component	Actual

(1) FORMULA FOR LABOUR COMPONENT:

$$V_1 = 0.85 \times P \times \left[\frac{K_1}{100} \right] \times \left[\frac{L_1 - L_0}{L_0} \right]$$

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 **Minus**
the cost of Cement, Steel and Bitumen calculated at the basic star rates as applicable for the tender consumed during the quarter under consideration. These star rates are specified here

Star Rates

(1) Cement - Rs. 4800.00 per MT

(2) T.M.T. Steel - Rs. 41300.00 per MT

K_1 = Percentage of Labour Component as indicated above.

L_0 = Basic Consumer Price Index for Nagpur centre shall be average consumer price index for the quarter preceding the month in which the last date prescribed for receipt of tender falls.

L_1 = Average Consumer Price Index for Nagpur Centre for the quarter under Consideration.

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(2) FORMULA FOR MATERIAL COMPONENT :

$$V_2 = 0.85 \times P \times \left[\frac{K_2}{100} \right] \times \left[\frac{M_1 - M_0}{M_0} \right]$$

WHERE

- V_2 = Amount of price variation in Rupees to be allowed for material Component
- P = Same as worked out for labour component.
- K_2 = Percentage of Material Component as indicated above
- M_0 = Basic Wholesale Price Index shall be 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

3740) FORMULA FOR PETROL, OIL & LUBRICANT COMPONENT

$$V_3 = 0.85 \times P \times \left[\frac{K_3}{100} \right] \times \left[\frac{P_1 - P_0}{P_0} \right]$$

WHERE

- V_3 = Amount of price variation in Rupees to be allowed for POL component
- P = Same as worked out for labour component.
- K_3 = Percentage of Petrol, Oil and Lubricant component
- P_0 = Average price of H S.D.at Mumbai during the quarter preceding the month in which the last date prescribed for receipt of tender falls
- P_1 = Average Price of HSD at Mumbai during the quarter under consideration

(4) FORMULA FOR TMT/ STRUCTURAL STEEL COMPONENT

$$V_5 = S_0 \frac{(SI_1 - SI_0)}{SI_0} \times T$$

WHERE

- V_5 = Amount of price variation in Rupees to be allowed / Mild Steel TMTSteel component.
- S_0 = Basic rate of T.M.T /Mild Steel in rupees per metric tonne as considered for working out value of P.
- SI_1 = Average Steel Index published in the RBI Bulletin during the quarter under consideration.
- SI_0 = Average of Steel Index published in the RBI Bulletin for the quarter preceding the month in which to the last date prescribed for receipt of tender falls.
- T = Tonnage of steel used in the permanent works for the quarter under consideration.

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(5) FORMULA FOR CEMENT COMPONENT

$$V_6 = C_0 \frac{(Cl_1 - Cl_0)}{Cl_0} \times T$$

WHERE

- V_6 = Amount of price variation in Rupees to be allowed for cement component.
- C_0 = Basic rate of cement in rupees per metric tonne as considered for working out value of P.
- Cl_1 = Average cement Index published in the RBI Bulletin for the quarter under consideration.
- Cl_0 = Average of cement Index published in the RBI Bulletin for the 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.

(6) FORMULA FOR BITUMEN COMPONENT:

$$V_4 = Q_B (B_1 - B_0)$$

WHERE

- V_4 = Amount of price variation in Rupees to be allowed for Bitumen component.
- Q_B = Quantity of Bitumen (Grade) in metric tonnes used in the permanent works and approved enabling works during the quarter under consideration.
- B_1 = Current average ex-refinery price per metric tonne of Bitumen (Grade) under Consideration including taxes (octroi, excise, sales tax) during the quarter under consideration.
- B_0 = Basic rate of Bitumen in rupees per metric tonne as considered for working out value of P or average ex-refinery price in rupees per metric tonne including taxes (octroi, excise, sales tax) of Bitumen for the grade of bitumen under consideration prevailing quarter preceding the month in which the last date prescribed for receipt of tender, falls, whichever is higher.

The following conditions shall prevail :

- i) The operative period of the contract shall mean the period commencing from the date of work order issued to the contractor and ending on the date on which the time allowed for the completion of work specified in the contract for work expires taking into consideration the extension of time if any for completion of the work granted by Engineer under the relevant clause of the conditions of contract in cases other than those where such extension is necessitated on account of default of the contractor. The decision of the Engineer as regards the operative period of the contract shall be final and binding on the contractor. 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 work from the date of levy of such compensation shall be worked out by pegging the indices L_1 , M_1 , B_1 , P_1 , Cl_1 and Sl_1 to the levels corresponding to the date from which such compensation is levied.

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ii) The price variation under this clause shall not be payable for the extra items required to be executed during the completion of the work and also on the excess quantities payable under the provisions of Clause 38 of the contract form B-1 since the rates payable for the extra items or the extra quantities under the clause 38 are to be fixed as per the current DSR 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 form B-1 extends beyond the operative date of the DSR, from the rates payable for the same beyond the date shall be revised with reference to the next current DSR prevalent at that time on year to year basis or revised rates, in accordance with mutual agreement thereon, as provided for in the contract, whichever is less.

iii) This clause is operative both ways, i.e. if the price variation as calculated above is in 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 amount shall be deductible from any amounts due and payable under the contract.

iv) 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.

Clause 55 : (A) The anti-malaria and other health measures shall be as directed by he Joint Director (Malaria and Filariasis) of Health Services, Pune.

(B) Contractor shall see that mosquitogenic conditions are not created so as to keep vector population for minimum level.

(C) Contractor shall carry out anti malaria measures in the areas as per guidelines prescribed under National Malaria Eradication Programme as directed by the Joint Director (M & F) of health Services, Pune.

(D) In case of a default in carrying out prescribed anti malaria measures, resulting in increase in malaria incidence the contractor shall be liable to pay to Government the amounts spent by Govt. on anti Malaria measures to control the situation in addition to fine.

(E) Relations with Public Authorities: The contractor shall make sufficient arrangement for draining away the sludge water as well as water coming from the bathing and washing places and shall dispose off this water in such a way so as not to cause any substance. He shall also keep the premise clean by employing sufficient number of sweepers. The contractor shall comply with all rules, regulation bylaws 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 Government.

Clause 56: The contractor shall comply with all the provision of the Apprentices Act, 1961 and Rules and Orders issued there under from time to time. If he fails to do so, his failure will be breach of the contract and the Superintending Engineer may in his discretion cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provision of the Act.

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Clause 57: The tender rates are inclusive of all taxes, rates, cesses and are also inclusive of the leviable tax in respect of sale by transfer of property in goods involved in the execution of a work contract under the provision of Rules 58 of Maharashtra Value Added Tax Act-2005. For the purpose of levy of tax.

Clause 58 : In case of material which become surplus with the contractor from those issued for the work contracted from the date of ascertainment of the materials as being surplus will be taken as the date of sale for the purpose of sales tax and sale tax will be recovered on such sale.

Clause 59(1) : QUALITY ASSURANCE AND MAINTENANCE

To ensure the specific quality of work which will also include necessary surveys, temporary works, etc., the contractor shall prepare a quality assurance plan and get the same approved from the Engineer-in-charge within one month from the date of work order. For this, the contractor shall submit an organisation chart of his technical personnel to be deployed on the work along with their qualification, job description defining the function of reporting, supervising, inspecting and approving. The contractor shall also submit a list of tools, equipment and the machinery and instrumentation, which he proposes to use for the construction and for testing in the field and/or in the laboratory and monitoring. The contractor shall modify supplement the organisation chart and the list of Machinery/ equipment etc. as per the direction of the Superintending Engineer and shall deploy the personnel and equipment on the field as per the approved chart and the list respectively.

The contractor shall submit written method statements dealing his exact proposal of execution of the work in accordance with the specification. He will have to get these approved from the Engineer-in-charge. The quality of the work shall be properly documented through certificates, records, check lists and Log book of results etc. such records shall be complied from the beginning of the work and be continuously updated subsequently and this will be the responsibility of the contractor. The form should be got approved from the Engineer in charge.

Clause 59 (2) :Where the work is to be on lump-sum basis on contractor's design the contractor shall also submit a maintenance manual giving procedure for maintenance, with the periodically of maintenance works including inspections to be used, means of accessibility for all parts of the structure. He shall also include in the manual, the specification, for maintenance works that would be appropriate for his design and technique of construction. This manual shall be submitting within the contract period.

Clause 60 : It is obligatory on the part of agency to procure R.C.C. pipe (ISI marked) required for the work from the M.S.S.I.D.C. only. The proof of such procurement like bill of M.S.S.I.D.C. certification of the Divisional Manager M.S.S.I.D.C. to that effect will have to be enclosed along with the bill pertaining to the work concerned. The payment towards the procurement of R.C.C.pipes and also items, in which the use of R.C.C. pipes is contemplated, would be released only after fulfillment of the conditions, laid down as above.

Note: In case provisions of this form B-1 conflicts with those in detailed cyclostyled provisions and conditions attached to this tender. The detailed cyclostyled provision and conditions would prevail over those in this form ' B-1'

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GENERAL CONDITIONS OF CONTRACT

1.AUTHORITY OF ENGINEER – IN – CHARGE

Save in so far as it is legally or physically impossible, the contractor shall execute complete and maintain the works in strict accordance with the contract under the directions and to the entire satisfaction of the Engineer – in – charge and shall comply with and adhere strictly to the Engineer – in – charge instructions and directions on any matter (Whether mentioned in the contract or not) pertaining to this work.

The Engineer – in – charge shall decide all questions which may arise as to quality and acceptability of materials furnished and work executed, manner of executions, rate of progress of work, interpretations of the plans and specifications and acceptability of fulfillment of the contract on the part of contractor. He shall determine the amount and quality of work performed and materials furnished and his decision and measurements shall be final. In all such matters and in any technical questions which may arise touching the contract, his decision shall be binding on the contractor. The engineer in charge shall have power to enforce such decisions and orders if the contractor fails to carry out them promptly. If the contractor fails to execute the work order by the engineer in charge, the engineer in charge may give notice to the contractor specifying a reasonable period therein and on the expiry of that period proceed to execute such work as may be deemed necessary and recover the cost thereof from the contractor.

1.1 AUTHORITY OF ENGINEER-IN-CHARGE REPRESENTATIVE

The duties of the representative of the engineer in charge are to watch and supervise the work and to test and examine any material to be used or workmanship employed in connection with the works.

1.2 The Engineer in charge may from time to time in writing delegate to his representative any of the powers and authorities vested in the Engineer in charge and shall furnish to the contractor a copy of all such delegations of powers and authorities. Any written instructions of the approval given by the representative of the engineer in charge to the contractor within the terms of such delegations (but not otherwise) shall bind the contractor and department as though it had been given by the Engineer in charge provided always as follows.

- (a) Failure of the representative of the engineer in charge to disapprove any work or materials shall not prejudice the power of the engineer in charge. Thereafter to disapprove such work or materials and to order pulling down, removal or breaking up thereof.
- (b) If the contractor is dissatisfied with any decision of the representative of the engineer in charge he shall be entitled to refer the matter to the engineer in charge who shall thereupon confirm reverse or vary such decisions.

2. OTHER CONDITIONS FOR SUBMISSION OF TENDER

2.1 The contractor shall be deemed to have carefully examined the work and site conditions including labours, the general and he special conditions, the specification schedule and drawing and shall be deemed to have visited the site of the work and to have fully informed himself regarding the local conditions and carried out his own investigations to arrive at the rates quoted in the tender. In this regards he will be given necessary information to the best of the knowledge of Department but without any guarantee about it.

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2.2 It is presumed that the contractor has carefully gone through the works specifications. P.W.D. Hand Book and the Schedule of rates of the division and studied the site conditions before arriving at the rates quoted by him.

3. **TREASURE TROVE :**

In the event of discovery by the contractor or his employees during the progress of the works of the any treasure, fossils, minerals or any other article of value or interest, the contractor shall give immediate intimation thereof to the Engineer. And forth with mark over to the Engineer his representative such treasure or things, which shall be the property of Government.

3 –A **LAYOUT OF WORK :**

Layout of the work will be done by the contractor in consultation with the Engineer in charge or his representative. Some permanent marks should be established to indicate the demarcation of the structures or any component thereof made to these permanent marks in measurement books and drawing, signed by the contractor and the departmental officer. Preparation of layout plan and marking it on site will be the responsibility of contractor. Once the layout plan is prepared he should submit it to Engineer incharge or his authorised representative for approval and get it approved from the Engineer in charge. Once the layout plan is approved contractor shall proceed with marking it at site of work.

4. **AGENT AND WORK ORDER BOOK :**

4.1 The contractor shall himself engage an authorised all time agent on the work capable of managing and guiding the work and understanding the specifications and contract conditions. A qualified and experienced Engineer shall be provided by the contractor as his agent for technical matters. Site engineer can also be designated as an agent of the contractor. Agent will take orders as will be given by the Executive Engineer or his representative and shall be responsible for carrying them out. This agent shall not be changed without prior intimation of the Executive Engineer and his representative on the work site. The Engineer-in-charge has the unquestionable right to ask for changes in the quality and strength of supervisory staff of contractor and to order removal from work of any of such staff. The contractor shall comply with such order and effect replacements of the satisfaction of the Engineer-in-charge.

4.2 A work order book shall be maintained on site and it shall be the property of Government and the contractor shall promptly sign orders given therein by the Executive Engineer or his representative and his superior officer, and comply with them. The compliance shall be reported by contractor to the Engineer in good time so that it can be checked, the blank work order book, with machine numbered pages will be provided by the Department free of charge for this purpose. The contractor will be allowed to copy out the instruction therein from time to time.

5. **INITIAL MEASUREMENT OF RECORD :**

Where for proper measurements of the work it is necessary to have an initial set of levels or other measurements taken the same as recorded in the authorised field book or M.B. of Government by the Engineer or his authorised representative will be signed by the contractor who will be entitled to have a true copy of same made at his cost. Any failure on the part of the contractor to get such level etc. recorded before starting the work will render him liable to accept the decision of the Engineer as to basis of taking measurements and will be binding on contractor Likewise the contractor will not carry out any work which will render its subsequent measurement difficult or impossible without first getting the same jointly measured and recorded by himself and the authorised representative of the Engineer. The record of such measurement maintained by Government shall be signed by the contractor and he will be entitled to have a true copy of the same made at his cost.

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6.CUSTODY OF WORK :

All work and materials before being finally taken over by Government will be the entire liability of the contractor for guarding, maintaining and making good any damages of any magnitude. It is however to be understood that before taking over such work, Government will not put it to its regular use as distinct from casual or incidental use except as specially mentioned elsewhere in this contract or as mutually agreed to.

7. CO-ORDINATION :

When several agencies for different sub works of the project are to work simultaneously on the project site, there must be full co-ordination between the contractors to ensure timely completion of the whole project smoothly. The scheduled dates for completion specified in each contract shall, therefore be strictly adhered to. Each contractor may make his independent arrangements for water, power, housing etc. if they so desire. On the other hand the Contractors are at liberty to come to mutual agreement on his behalf and make joint agreement with the approval of the Engineer. No contractor shall take or cause to take any steps or action that may cause destruction, discontent or disturbance to work, labour or arrangements etc.of other contractors in the project localities. Any action by any Contractors which the Engineer in his unquestioned discretion may consider as infringement of the above code would be considered as a breach of the contract conditions and shall be dealt with accordingly.

In case of any dispute or disagreement between the various contractors, the Engineer's decision regarding the co-ordination, co-operation and facilities to be provided by any of the contractor shall be final and binding on the contractor concerned & such a decision shall not vitiate any contract nor absolve the contractor of his obligations under the contract nor form the grounds for any claim or compensation.

8. PATENTED DEVICES, MATERIALS AND PROCESS :

Whenever the contractor desires to use any designed device, materials or process covered by letter of patent or copyright, the right for such use shall be secured by suitable legal arrangement and agreement with patent owner and the copy of their agreement shall be filed with the Engineer-in-charge, if so desired by the later.

9.RELATION WITH PUBLIC AUTHORITIES:

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

10. INDEMNITY :

The contractor shall indemnify the Government against all actions, suits, claims, and demands brought or made against it in respect of anything done or committed to be done by the Contractor in execution of or in connection with the work of this contract and against any loss or damage to the Government in consequence to any action or suit being brought against the contractor for any thing done or committed to be done for the execution of this contract.

The Government may at its discretion and entirely at the cost of the contractor defend such suit, either jointly with the contractor or single in case the latter chooses not to defend the case.

11. STACKING, STORAGE AND GUARDING OF MATERIALS :

11.1 The stacking and storage of building materials at site shall be in such a manner as to prevent deterioration or inclusion of foreign materials and to ensure the preservation of the quantity, properties and fitness of the work, suitable precautions shall be taken by contractor to protect the materials against atmospheric action, fire and other hazards. The materials likely to be carried away by wind shall be stored in suitable stores or with suitable barricades and where there is likelihood of subsidence of soil, heavy materials shall be stored on paved platforms, suitable separating barricades and enclosure as directed shall be provided to separate materials brought by contractor and from different sources of supply.

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11.2 The contractor shall at his own expenses, engage watchman for guarding the Materials and plant and machinery and the work during day and night against any pilferage or damage and also for prohibiting trespassers.

11.3 No Materials brought to site shall be removed from the site without prior approval of the Engineer –in-charge

12. 12.1 The contractor shall inform the Engineer in charge in writing when any portion of the work is ready for inspection giving him sufficient notice to enable him to inspect these without affecting the further progress of the work.

12.2 The contractor shall provide at his cost necessary ladders and such arrangements as are considered safe by the Engineer in charge for proper inspection of all parts of the work.

12.3 The contractor shall extend his full co-operation and make all necessary arrangement when needed for carrying out inspection of the work or any part of the work by the local representative, M.L.A's M.P.'s and officers and dignitaries / delegates of various Government department, local bodies, private sectors etc. no compensation shall be paid to the Contractor on this account.

13. **PRECAUTIONS TO BE TAKEN BY CONTRACTOR :**

13.1 The work shall be carried out by the contractor without causing damage to the existing Govt. property and / or private property. If any such damages are caused the contractor shall pay for restoration of the property to the original condition and any other consequent damages.

13.2 In the event of an accident involving serious injuries or death of any persons, at site of work or quarry or at place in connection with the work the same shall be reported in writing within 24 hours of the occurrence to the Engineer in charge and the Commissioner of workmen's compensation.

14. **CLEARANCE OF SITE ON COMPLETION OF WORK:**

The contractor after completion of work shall clean the site of all debris and remove all unused materials other than those supplied by the department and all plant and machinery equipment, tools, etc. belonging to him within one month from the date of completion of the work, or otherwise the same will be removed by the department at his cost or disposed off as per departmental procedure. In case the materials is disposed off by department, the sale proceeds will be credited to the contractor's account after deducting the cost sale incurred. However no claim of the contractor regarding the price or amount credited will be entertained afterwards.

15. **REMOVAL OF CONSTRUCTIONAL PLANT WITH PRIOR PERMISSION :**

All constructional plant, provided by the contractor shall when brought on the site be deemed to be exclusively intended for the construction and the contractor shall not remove the same or any part thereof (Save for the purpose of moving it from one part to the site to another) without the consent in writing of the engineer in charge who shall record the reasons for withholding the consent.

16. **RESTRICTIONS BECAUSE OF LOCAL TRAFFIC :**

As there is local traffic by the side of construction of the work, the contractor will have to take proper precautions such as proper barricading, fencing, lighting, information and cautionary boards for safe and smooth flow of traffic, and keeping the concerned authorities informed about the work in progress.

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17. COMPLETION CERTIFICATE :

17.1 The work shall not be considered to have been completed in accordance with the terms of the contract until the Engineer in charge shall have certified in writing to that effect. No approval of material or workmanship or approval of part of that during the progress of execution shall bind the engineer in charge or any way prevent him for even rejecting the work which is claimed to be completed and to suspend the issue or his certificate of completion until such alterations and modification or reconstruction have been effected at the cost of the contractor as shall enable him to certify that the work has been completed to his satisfaction.

17.2 After the work is completed, the contractor shall give notice of such completion to the Engineer in charge and within 30 days of receipt of such a notice the Engineer in charge shall inspect the work and if there is no defect in the work, shall furnish the contractor with a certificate indicating the date of completion. However, if there are defects which in the opinion of the engineer in charge are rectifiable he shall inform the contractor the defects noticed. The contractor after rectification of such defects shall then inform the engineer in charge and engineer in charge on his part shall inspect the work and issue the necessary completion certificate within 30 days if the defects are rectified to his satisfaction, and if not he shall inform the contractor indicating defects yet to be rectified. The time cycle as above shall continue.

17.3 In case defects noticed by the Engineer in charge which in his opinion are not rectifiable but otherwise work is acceptable at reduced payment, work shall be treated as completed. In such cases completion certificate shall be issued by the Engineer in charge within 30 days indicating the un-rectifiable defects for which specified reduction in payment is being made by him.

17.4 The issue of completion certificate shall not be linked up with the site clearance on completion of the work.

17.5 Should regular, public traffic be allowed on the bridge, road at any stage prior to being taken over then the maintenance period shall be deemed to commence from the date of such traffic passing over the bridge, road & shall be upto 30 days after the date of issue of completion certificate by Engineer in charge but not more than 12 months after opening to traffic.

18. ANCILLARY WORKS :

The contractor shall submit to Engineer in charge in writing the details of all ancillary works including layout and specifications to be allowed for its constructions. Ancillary work shall not be taken up in hand unless approved by Engineer in charge. The Engineer in charge reserves the right to suggest modification or make complete changes in the layout and specifications proposed by the Contractor at any stage to ensure the safety on the work site. The contractor shall carry out all such modifications to the ancillary works at his own expenses as ordered by the Engineer in charge.

19. TEMPORARY QUARTER :

The contractor shall at his own expense maintain sufficient experienced supervisory staff etc., required for the work and shall make his own arrangements for housing of such staff with all necessary amenities. General layout plan for such responsibility of the contractor to get his layout plan of temporary structure approved from the local competent authorities.

20.SAFETY MEASURES :

The contractor shall take all necessary precautions for the safety of the workers and preserving their health while working on such jobs as required special protection and precaution wherever required. The following are some of the requirements listed though not exhaustive. The contractor shall also comply with the directions issued by the Engineer in this behalf from time to time at all times.

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The following are some of the requirements (The list is not exhaustive)

- (1) Providing protective footwear to workers in situations like mixing and placing of mortar of concrete, in quarries and place where the work is to be done under too much wet conditions as also for movements over surfaces tested with oyster growth.
- (2) Providing protective headwear to workers in quarries etc. to protect them against accidental fall of materials from above.
- (3) Providing handrails to the edges of the loading platforms of barrages ropeways, ladders not allowing rails of metal parts or unless timber to spread around etc.
- (4) Providing workmen with proper safety belts, ropes, etc. when working on any masts, cranes, circle hoist, dredges etc.
- (5) Taking necessary steps towards training the workers concerned of the use of machinery before they are allowed to handle it independently and taking all necessary precautions in and around the areas where machines, hoists and similar units are working. Wherever required by the law the persons handling the machinery shall have the required license, certificate etc.
- (6) Preventing over loading and over crowding of floating the land based machinery and equipment.
- (7) Providing life belts to all men working at such situations from where they may accidentally fall into water, equipping the boats with adequate number of life boats etc.
- (8) Avoiding bare live wires etc. as would cause electrocution to workers.
- (9) Making all platforms, stagings and temporary structures sufficiently strong and not causing the workmen and supervisory staff to take undue risks.
- (10) Providing sufficient first aid trained staff and equipment to be available quickly at the work site to render immediate first-aid treatment in case of accident due to suffocation, drowning and other injuries.
- (11) Taking the all-necessary precautions wherever divers are engaged on work.
- (12) Providing full length gum boots, leather hand gloves, leather jackets with fireproof aprons to cover the chest and back reaching upto knees, plain goggles for the eyes to the labour working with hot asphalt, handling, vibrators in cement concrete and also where use of any or all these items is, essential in the interest of health and well-bring of the labourers in the opinion of the Engineer-in –charge

21. Medical and sanitary arrangements to be provided for labour employed in the construction by the contractor.

- (a) The contractor shall provide an adequate supply of pure and wholesome water for the use of labourers on works and in camps.
- (b) The contractor shall construct trenches, semi permanent latrines for the use of labourers. Separate latrine shall be provided for men and women.
- (c) The contractor shall build sufficient number of huts on suitable plot of land for use of the labourers according to the following specifications.
 - (1) Huts of bamboos and grass may be constructed.
 - (2) There should be no over crowding. Floor space at the rate of 3 Sqm(30 Sq.ft.) per head shall is provided. Care should be taken to see that the huts are kept clean and in good order.
 - (3) The contractor must find his own land. If he wants Govt.land he should apply for it. Assessment for it if demanded will be payable by contractor. However the Department does not bind itself for making available the required land.
 - (4) A good site not liable to submergence shall be selected on high ground remote from jungle but well provided with trees; shall be chosen wherever it is available. The neighborhood of tank, jungles, trees or woods should be particularly avoided. Camps should not be established close to large cutting of earthwork.

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- (5) The lines of huts shall have open space of at least 10 meters between rows. When a good natural site cannot be procured particular attention should be given to the drainage.
- (d) The contractor shall construct sufficient number of bathing places, sufficient number of washing places also be provided for the purpose of the washing cloths.
- (e) The contractor shall make sufficient arrangement for draining away the surface and suage water as well as water from the bathing and washing places and shall dispose of the waste water in such away as not cause any nuisance.
- (f) The contractor shall engage a medical officer with a traveling dispensary for a camp containing 500 or more person if there is no Government or other dispensary situated within eight Kilometers from the camp. In case of an emergency contractor shall at his cost, free transport for quick medical help to his sick workers..
- (g) The contractor shall provide the necessary staff for affecting the satisfactory conservancy and cleanliness of the camp to the satisfaction of the Engineer –in charge. At least one sweeper per 200 person should engaged.
- (h) The Assistant Director of public health shall be consulted before opening a labour camp and his instruction on matters such as water supply, sanitary, convenience, the camp site, accommodation and food supply shall be followed by the contractor.
- (i) In addition to above all provision of the relevant labour act pertaining to basic amenities to be provide to the labour shall be applicable which will be arranged by the contractor
- (j) The contractor shall make arrangement for all anti malaria measures to be provided for the labour employed on the work. The anti malaria measures shall be as directed by the Public Health Officer.

22. The contractor except as provided in special conditions which follow shall if necessary construct at his cost temporary roads and maintain these in proper conditions till completion of the work at his own cost.

23. The contractor except as provided in special conditions which follow shall have to at his own expenses make all preliminary arrangements for labour, water, electricity and material etc. immediately after getting the work order. The Government may render necessary assistance in this regard by way of letters of recommendations, if so requested by the contractor. No claim for any extra payment or applications for extension of time on the grounds of any difficulty in connection with the above matters will be entertained.

24. WORKING METHODS AND PROGRESS SCHEDULES :

24.1 The contractor shall submit within the time stipulated by the Engineer-in-charge in writing the details as actual methods that would be adopted by the contractor for the execution of any items as required by Engineer at each of the location supported by necessary detailed drawing and sketches including those of the plant and machinery that would be used their locations arrangement for conveying and handling materials etc., and obtain prior approval of the Engineer-in-charge well in advance of starting of such item of works. The Engineer-in-charge reserves the right to suggest modifications or make corrections in the method proposed by the contractor whether accepted previously or not at any stage of the work to obtain the desired accuracy, quality and progress which shall be binding on the contractor no claim on account of such change in method of execution will be entertained by Government so long as specification of the item remain unaltered.

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- 24.2 The contractor shall furnish within one month of the order to start the work programme of work in quadruplicate indicating the date of actual start, the monthly progress expected to be achieved and anticipated completion date of each major item of work to be done by him also indicating dates of procurement of materials and setup of plant and machinery. The programme is to be such as practicable of achievement towards the completion of whole work in the time limit and of the particular items; if any of due dates specified in contract, planning and programme of work should be done by the mature decision between the **Executive Engineer, P.W. Division No. 3, Nagpur** and the contractors representative in charge of work. The progress of work shall be reviewed in every two months and revised programmes shall be drawn if necessary. No revised programme shall be operative without the approval of engineer in charge in writing. The Engineer is further empowered to ask for more detailed schedule or schedules say weekly for any item or items. In case of urgency of work as will be directed by him and the contractor shall supply the same and when asked for. Acceptance of the programme or the revised programme by the Engineer in charge shall not relieve the contractor of his responsibility to complete the whole work by the prescribed time or the extended time if any.
- 24.3 The contractor shall employ sufficient plant, equipment and labour as may be necessary to maintain the progress schedule. The working and shift hours restricted to one shift a day for operations to be done under the Government supervision shall be such as may be approved by the Engineer in charge. They shall not be varied without prior approval of the Engineer. Night work which requires supervision shall not be permitted except when specially allowed by Engineer on each item if required by contractor. The contractor shall provide necessary lighting arrangement etc. for night work as directed by Engineer without extra cost to Government.
- 24.4 The contractor shall submit reports on progress of work in forms and statements etc. at periodical intervals in the form of progress chart, forms, statements and / or reports as may be approved by the Engineer in charge. Forms for the sending reports about the progress will be supplied by the Executive Engineer.
- 24.5 The contractor shall maintain proforma, charts, details regarding the machinery, equipments, labour, materials, periodical returns thereof, proforma to be got approved from the Engineer in charge.

25. PAYMENTS :

The contractor must understand clearly that the rates quoted are for completed work and include all cost due to labour, all leads and lifts involved and if further necessitated, scaffolding, plants, machineries, supervision power, service works, royalties, octroies, taxes, etc. and should also include all expenses to cover the cost of lighting, night works if and when required & no claim for additional payment beyond the rates quoted will be entertained and the contractor will not be entitled subsequently to make any claim on the ground of any representation or on any promise by any person (whether member in the employment of any Public Works Department or not) or on the ground of any failure on his part to obtain all necessary information for the purpose of making his tender and fixing the several prices and rates therein relieve him from any risks or liabilities arising out of or consequences upon submission of the tender. Payment to the contractor will be made by the cheque drawn on any treasury within the division provided the amount to be paid exceeds Rs. 100/- shall amount will be paid in cash.

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26. CLAIM FOR EXTRA WORKS :

- 26.1 Claim for extra works shall be registered within 30 days of occurrence of the event. However, bills for these claims along with supporting data details may be submitted subsequently.
- 26.2 Bills for extra works or for any claim shall be paid separately apart from the interim bills for the main works. The payment of bills for the main work shall not be withheld for want of decision on extra claim not covered in the schedule of item for extra work.

27. BILLS AND PAYMENT :

- 27.1 Two running payments in the month are permitted. First of the bills shall be submitted by the contractor by the 10th day of month. Second bill, if necessary, shall be submitted by the 25th day of the month.
- 27.2 The format of the running bill on which the bills are to be submitted by the contractor shall be supplied to the contractor by the department. Printed copies of the bills forms as per his format shall be arranged by the contractor at his cost. The bills in five copies shall be submitted to the concerned engineer's representative in the standard proforma only.
- 27.3 The final bill shall be submitted by the contractor within one month of the date of issue of completion certificate. The final bill shall be paid within six months of initial submission.
- 27.4 Recovery of secured advance shall be effected through bills proportionately as per consumption of materials in the work billed for.
- 27.5 The contractor can have true copy of the bills paid to him after paying charges for photocopying the same.

CONTROLLED CONCRETE :

Acceptance criteria shall be as per IS : 456 – 2000 (With latest amendments)

NORMAL MIX CONCRETE :

Acceptance criteria shall be as per IS : 456 – 2000 (With latest amendments)

28. ASSISTANCE IN PROCURING PRIORITIES, PERMIT ETC. :

- 28.1 The engineer on written request by contractor, will if in his opinion the request is reasonable and in the interest of work and its progress, assist the contractor in securing, the priorities for deliveries, transport, permits for controlled materials etc. where such are needed. The department however will not be responsible for the non-availability of such facilities or delays in this behalf and no claims on account of such failure or delay, shall be allowed by the Department.
- 28.2 The contractor shall have to make his own arrangement for machinery required for the work. However if same is conveniently available with the department it may be spared as per rules in force on recovery of necessary security deposit and rent at the rate approved from time to time by the independent to this contract and the supply or non supply of machinery shall not form a ground for any claim or extension of time limit for this work.

29. WATER SUPPLY :

- 29.1 Availability of adequate water for work and sources thereof shall be confirmed by the contractor before submitting the tender.
- 29.2 The contractor shall make his own arrangements at his own cost for entering into contract with concerned authority for obtaining the connection and carry the water upto the work site as required by him. The location of the pipeline with

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respect to the road shall be decided by Engineer-in-charge and shall be binding on the contractor. The department shall not bear any responsibility in respect of any problems and contractor shall not be liable for getting the any compensation on any ground. The progress of work shall not hamper for the above reasons.

29.3 The contractor is advised to provide water storage tanks of adequate capacity to take care of possible shut down of water supply system.

29.4 The contractor shall have to supply water required by the department for its establishment at work site free of cost.

30. **ELECTRICITY :**

30.1 The contractor will have to make his own arrangement at his own cost for obtaining or providing electric supply at work site. The department shall not bear any responsibility in respect of any problems and contractor shall not be liable for getting any compensation on any ground. The progress of work shall not hamper for the above reasons.

30.2 Electrical supply for the Department's use at work site shall be provided by the contractor on mutual agreed terms. The contractor may not abide by these conditions when power supply at the site fails.

31. **TELEPHONE FACILITIES :**

The contractor will have to make his own arrangement at his own cost for a telephone connection at work site if required.

32. **MATERIAL SOURCES :**

32.1 The contractor shall make their own independent investigation as to the availability as well as suitability of various materials required for construction as referred to in these paras.

32.2 If any quarry is in the possession of the department the contractor will be allowed to use the same on usual condition. In other cases, the contractor will have to make his own arrangement for procuring quarries or the quarry permits, necessary assistance for which will be given by the department.

32.3 Lime stone shall not be permitted for any concrete work.

33. **LAND :**

33.1 The contractor shall make all efforts to obtain land required for the ancillary works. In case the contractor is unable to obtain land and if requested, then the department may requisitioned land at his own cost.

33.2 Land as available with department for requisitioned by the department at the request of a contractor will be handed over to the contractor for such use as will be necessary for ancillary works, on payment of rent to the department. Plot development if any will have to be done by the contractor at his own cost. The development shall be in conformity with the regulations with the local authorities.

33.3 If for the purpose of construction of the work it becomes necessary for the contractors to occupy land not in possession of the department, the contractors will have to make his own arrangement with the land owners, and pay such compensation as a mutually agreed between them. on completion of work , all land mentioned in para 33.1 and 33.2 and 33.3 shall be handed back to the owners or the department as the case may be after cleaning the land as directed by the Engineer in charge.

33.4 Dismantling of building on a Govt. or department land shall be done only after the approval of Engineer-in-charge.

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34. **FLOODS AND ACCIDENTS :**

The contractor shall take all precaution against damages by floods or from accidents etc. No compensation will be allowed to the contractor on this account or for correction and repairing any such damage to the work during construction. The contractor shall be liable to make good at his cost any plant or material belonging to the Govt. loss or damaged by floods or from any other cause while in his charge. The proof of occurrence of flood report with flood level will have to be furnished by the contractor .No compensation will be allowed for damages on ancillary items and equipments etc which are brought to the site by the contractor for effecting execution of work.

35. **URGENT WORK :**

If any "Urgent Works"(In respect where decision of the Engineer –in –Charge shall be final and binding) become necessary and contractor is unable or unwilling to carry it out at once, the Engineer in charge by his own or through the other people have it carried out as he may consider necessary. If the Urgent Work shall be such as in the opinion of the Engineer in charge the contractor is liable under the contract to carry out at his expenses. All expenses incurred on it by the department shall be recoverable from the contractor, and be adjusted or sets off against any sum payable to him.

36 HANGE OF CEMENT CONTENT ETC. : (Applicable for OPC Cement only)

THEORETICAL CONSUMPTION OF CEMENT FOR THE CONCRETE WORK:

SR.No.	Grade of concrete	Consumption of cement in bags / Cum
1	M-10	4.40 bags
2	M-15	6.27 bags
3	M-20	7.10 bags
4	M-25	7.50 bags

Note : (i) The weight per bag of Cement is considered as 50 Kg.

(ii) If contractor desires to use any other type of cement, he should obtain permission for same from Executive Engineer in charge. In the event he is permitted to do so, contractor should obtain mix design for the same from the laboratory approved by Engineer in charge. No payment will be made to contractor for obtaining the mix design. No extension will be given to contractor for the time lost in getting mix design.

The rate of consumption of cement for various grades of concrete referred above is a theoretical rate of consumption assumed for the estimate purpose. The contractor will have to obtain an economic mix design for grades of concrete M-20 and above and get it approved from the Engineer-in-charge. The specification for controlled cement concrete shall be as per standard specification No. B-7 Page 38, and IS 456-2000 (with latest amendments).

Immediately upon the receipt of the award of the contract, the contractor shall inform the Engineer the exact location of the sources of the acceptable material. The concrete mix to be used shall be got designed by P.W.D. laboratory or any other laboratory fully approved by Engineer in charge, by the contractor with a optimum quantity of cement to give the specified strength in the preliminary tests and the proportion got approved by the engineer in writing. These proportions shall be used so long as the materials continue to be of the same quality and from the same sources subject only to slight changes in the relative quantities of fine and course aggregate for the purpose of promoting workability provided the work tests also shows the required strength.

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If such Mix design involve change in cement consumption upto 2 % on the higher or lower side, no adjustment in the cost of the item to be paid to the contractor shall be made. If such alterations, changes, theoretical consumption of cement by more than 2 % on the higher or lower side, the sources and quality of aggregate remaining the same, payment will be adjusted for or against the contractor in whatever amount the total cost of cement to the contractor has been increased or decreased by more than 2 %. The amount of such increase or decrease shall be calculated on the basis of quantity of cement determined and prescribed in the above table. In adjusting the cost only the cost of cement shall be considered and not handling or other charges, which shall be treated as incidental to the item for working out the cost towards adjustments in cement consumption the basic for cement shall be star rate as indicated in clause 54. If during the progress of work the contractor wishes to change the material, the proportions shall be fixed on the basis of fresh preliminary tests to give the required strength after the Engineer is satisfied that the material satisfy the specifications. No adjustment of the cost shall be made for a change of proportions of cement fixed in the original preliminary tests. For all concrete items only trap metal shall be used.

37. CONTRACTOR TO INFORM HIMSELF FULLY :

The contractor shall be deemed to have carefully examined the work and site conditions including labours, the general and the special conditions, the specifications schedule and drawing and shall be deemed to have visited the site of the work and to have fully informed himself regarding the local conditions and carried out his own investigations to arrive at the rates quoted in the tender. In this regards he will be given necessary information to the best of the knowledge of Department but without any guarantee about it. If he shall have any doubt as to the meaning of any portion of these general conditions, or the special conditions to the scope of working of the specification and drawings, or any other matter concerning the contract, he shall in good time before submitting his tender set forth the particulars thereof and submit them to the Engineer in writing in order that such doubt may be clarified authoritatively before tendering. Once a tender is submitted the matter will be decided in accordance to the tender conditions in absence of such authentic clarification.

38. ERRORS, OMISSION & DISCREPANCIES :

- a) In case of errors, omissions and / or disagreement between written and scaled dimensions in the drawing or between the drawing and specifications etc., the following order of preference shall apply.
 - (i) Between actual scaled and written dimensions or description on a drawing the latter shall be adopted.
 - (ii) Between the written description or dimensions in the drawing and the corresponding one in the specifications, the latter shall apply.
 - (iii) Between the quantities shown in the schedule of quantities and those arrived at from the drawing the latter shall preferred
- b) In all cases of omissions and/or doubts or discrepancies in the dimensions or of any item or specification a reference shall be made to the engineer, whose elucidation, elaboration or decision shall be considered as authentic. The contractor shall be held responsible for any errors that may occur in the work through lack of such reference and precautions.
- c) The contractor should not sublet any part of work without written permission of the Engineer in charge.

39. SAMPLES AND TESTING OF MATERIALS :

- (i) All materials to be used on work, such as cement, steel, stones, bricks, aggregates, asphalt, wood, tiles, etc. shall be got approved in advance from the Engineer-in-charge and shall pass the tests and analysis required by him.

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- (ii) The contractor shall at his risk and cost make all arrangement and / or shall provide for all such facilities as the Engineer in charge may require for collecting, preparing and forwarding required number of samples for tests or for analysis to the nearest approved laboratory and bear all charges and cost of testing. Such samples shall also be deposited with the Engineer-in-charge till sent for testing. Out of total number of tests as per frequency requirement 30% of these tests shall be carried out in P.W. Department Laboratory.
- (iii) The contractor shall if and when required submit at his cost the samples of materials to be tested or analysed and if so directed shall not make use or incorporate in the work any material represented by the samples until the required tests or analysis have been made after the test of the materials finally accepted by the Engineer-in-charge.
- (iv) **Testing of Material :**
- (1) Frequency of testing of the construction material and the percentage of the testing from the Government laboratory shall be as under :
 - (a) Where the field laboratory certified by the concerned Executive Engineer is established at the work site 70% test as per total frequency required shall be carried out in the said field laboratory and 30% tests shall be carried out at the Vigilance and Quality control laboratory of P.W.D. Maharashtra for the materials mentioned in **Annexure IV** attached herewith on for the material not covered in the **Annexure IV** 50% tests shall be carried out in the field laboratory and remaining 50% tests need to be carried out in the vigilance and quality control laboratory of P.W.D. Maharashtra. The entire responsibility of the sample testing as per required frequency including testing charges will be borne by the agency
 - (b) Where field laboratory is not established at the works site 100% tests as per frequency shall be carried out in the Vigilance and quality laboratory, Nagpur
 - (c) Testing of cement and steel 100% in Vigilance and quality laboratory, Nagpur is compulsory.
 - (2) Mixing of concrete shall be done with concrete mixers
 - (3) The Contractor shall make field arrangements for testing of all materials for cement concrete i.e. slump test, bulkage test, etc. The concrete cube mould 3 Nos. of 15cm x 15cm x 15 cm. size shall be kept at site during concreting operation. One set of six 15 cm. (about 6" cubes shall be prepared from the concrete to be used in work for compression test on the first three days operation and thereafter for every 60 cubic metre of concrete of three days work whichever is less. If source of aggregate or grading is changed, one set of six test cubes shall be taken for each changed batch. Three cubes shall be tested for test at 7 days age and 3 at 28 days in Regional Testing Lab of P.W.D. at Nagpur. All the testing charges shall be paid by the contractor. The entire responsibilities of the testing of materials will be borne by the contractor.
 - (4) For providing Electric Wiring, Duct tubes of the required diameter and length shall be provided through walls, beams and floors, slabs as and when directed without any extra cost.
 - (5)
 - (a) The contractor shall make his own arrangement for receiving all materials, tools, etc. required for the work.
 - (b) No extra charges for carriages of water will be allowed.
 - (c) The rates for all items are inclusive of all charges such as carting, lifting, etc. No extra payment for any lead and lift will be paid for any items.
 - (d) A frequency of testing shall be as per relevant works specification. In case such frequency is not specified in the works specification then the IS code will be referred and for other cases where IS code do not stipulated the frequency of testing, it will be as directed by Engineer in charge and should be furnished in specified test abstract **Annexure IV**,

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(e) The Contract should not be sublet without written permission of Executive Engineer.

(f) Tender condition of tender notice will be binding on contractor and etc tender notice will form a part of agreement.

40. **WEIGH BATCHING** : The following instructions shall be followed as regards to preliminary designs of mix and methods of batching of plain cement concrete and reinforced cement concrete. The preliminary mix design and batching for various grades of concrete shall be governed by the guidelines as per I.S. 456-2000. It will be the responsibility of the contractor to obtain the mix design for various cement concrete grades at his cost from the P.W.D laboratory.

41. **MISCELLANEOUS** :

41.1 **ERASER** :

Person tendering are informed that no erasers or any alteration by them in the text of the documents set herewith will be allowed and any such eraser or an alteration will be disregarded. If there is any error in writing no overwriting should be done but the wrong words or figures should be struck out and the correct one written above or near it in an unambiguous way. Such correction should be initialed and dated.

41.2 **ACCEPTANCE** :

Intimation of acceptance of tender will be given by a telegram or a letter sent by registered post to the address given below the signature of the tenderer in the tenders. The tenders which do not fulfill any of the above conditions or those in the form and which are incomplete in any respect shall be liable for rejection.

41.3 **COMPETENCY OF TENDERERS** :

The work will be awarded only to those contractors who are considered to be responsive bidders, capable of performing the class of work to be completed. Before passing the final award any or all bidders may have to show that he has the necessary experience, facilities, ability and financial resources to execute the work in satisfactory manner and also within the stipulated time. The bidders may also be required to furnish to the Department a statement in respect of their experience and financial resources.

41.4 **PRECAUTIONS TO BE TAKEN BY THE CONTRACTOR TO PREVENT ACCIDENT** :

- 1) No live electric line should be allowed to run along the ground in the blasting zone and they should be at least 3 m above ground if not more.
- 2) The wiring cable should not be taken near the live electric line and it should be preferably shot firing cable as supplied by the supplier of explosives. If such a cable is not available a substitute cable made up of several pieces jointed and tapped should be used.
- 3) The blasting shed from where the exploder is to finally operate should be at least 150 m. away from the area to be blasted. It should have a strong roof, which can withstand the impact of flying stones at this range.
- 4) Only trained hands shall be allowed to handle explosive cable detonators etc.

41.5 **POLICE PROTECTION** :

For the police protection of the camp of the contractor's work, the department will help the contractors as far as possible to arrange for such protection with the concerned authorities the cost shall be borne by the contractor.

41.6 For providing electric line and water line etc. recesses shall be provided. If necessary, through walls, slabs, beams, etc., and later on refilled it with a bricks or stones, chipping cement mortar without any extra cost.

41.7 In case it becomes necessary for the due fulfillment of the contractor for contractor to occupy land outside the department limits, the contractor will have to make his own arrangement with the land owners and pay such a rents, if any, which are payable as mutually agreed between them.

Contractor

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Executive Engineer

- 41.8 The contractor shall duly comply with the provisions of the Apprentices Act. 1961 (iii of 1961) and the rule and orders made there under 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 Rules.
- 41.9 It is presumed that the contractor has gone carefully through the standard specification (Vol. I & II 1981 edition) and the schedule of rate of the Division, and studied of site conditions before arriving at rates quoted by him. The special provisions and detailed specification of wording of any item shall gain precedence over the corresponding contrary provisions (if any) in the standard specification given without reproducing the details in contract. Decision of Engineer-in-charge shall be final in case of interpretation of specification.
- 41.10 If the standard specifications fall short for the items quoted in the schedule of this contract reference shall be made to the latest Indian Standard Specifications, I.R.C. codes, and MOST specification if any of items of this contract do not fall in reference quoted above, the decision and specifications as directed shall be final.

42. **LOAD TESTING**

The Engineer in charge is empowered to order load testing of the building or its component wherever there is a doubt about the workmanship or the safety of the bridge component or whenever there is a need to confirm the workmanship and the safety of the structure by carrying the load test. The load testing shall be carried out as per specifications B.R. 58 of the book of standard specifications published by B & C Department, Govt. of Maharashtra, with such specifications as ordered by Engineer in charge.

- (1) The load for such load test shall be full dead load (excluding self load of the member under test) plus 125 % maximum design live load (including impact) in case of R.C. bridges.
- (2) The load testing will be carried out by the department through a suitable competent agency. Test results from such agency as will be fixed by department will be binding on the contractor.
- (3) If the result of the load test is not found to be satisfactory, the contractor shall strengthen the already cast member or reconstruct the members at his cost and also bear the cost of load test. The decision of the Engineer in charge will be final in this case.

43. **SPECIAL CONDITIONS :**

- 43.1 The contractors should ensure that all safety precautions are observed by their labours, working closed to the State Highway and while closing the state Highway precautions are taken including insurance etc., for their labour at the cost of the contractor etc. if any accident occur to the labour etc., no claim in this regard on whatsoever account shall be entertained and the decision of the Department will be final and conclusive.

43.2 **During the execution if there is any change in:**

- (i) Span Arrangement.
- (ii) Height of substructure and superstructure above ground level.
- (iii) Change in the depth of foundation, tendered rate for respective items will hold good and no extra claims shall be entertained on this account.

- 43.3 Contractor shall observe the rules and regulations empowered by traffic police for smooth flow of traffic on the diversion road and shall not be entitled for claim any compensation arising thereof.

44. **DEFINITIONS:**

- (a) Government : Unless included by or repugnant to the contents the expression "Government" as used in the tender documents shall mean the Public Works Department of the Government of Maharashtra.
- (b) Chief Engineer: The expression 'The Chief Engineer' as used in the tender papers shall mean Chief Engineer P.W .Region Nagpur

Contractor

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Executive Engineer

- (c) Superintending Engineer : The expression 'Superintending Engineer' as used in the tender papers shall mean the officer of Superintending Engineer's ranks (by whatever designation he may be known) under whose control the work lies for the time being.
- (d) Engineer-in-charge : The expression Engineer or Engineer-in-charge as used in the tender paper shall mean the Engineer-in-charge of the work.
- (e) Contractor : The expression 'Contractor' as used in the tender papers shall mean the successful tenderer that is the tenderer whose tender has been accepted and who has been authorised to proceed with the work.
- (f) Contract : The expression 'Contract' as used in the tender papers shall mean the deed of contract together with all its original accompaniments and those later incorporated in it by mutual consent.
- (g) Plant : The expression 'Plant' as used in the tender papers shall mean every temporary accessory necessary or considered necessary by the Engineer to execute, construct, complete and maintain the work and all altered, modified, substituted and additional works ordered in the time and the manner herein provided and all temporary materials and special and other articles and appliance of every sort kind and description whatsoever intended or used therefore.

45. MIX DESIGN :

45.1 The following instructions shall be followed as regards preliminary design of mix and methods of batching of plain cement concrete and reinforced cement concrete. These instructions should be treated as supplementary to the relevant provision in the specifications for the respective items contained in the book of standard specifications and will override the provisions contained therein wherever they are contrary to the following instructions.

The preliminary mix design and batching for various grades of concrete shall be governed by the following guidelines.

Concrete Grade

Guidelines

- 1) Upto M-15: This should only be ordinary concrete. No change may be prescribed in the present practice as regards preliminary design of mix and permitting volume batching. Only cement to be weight batched.
- 2) M-20 to M-25 : Preliminary mix design must be carried out for these mixes. However, weight batching shall be insisted for cement .only for concrete M-20 and above
- 3) M-25 and above : Preliminary mix design must be prepared for such mixes Weight batching shall be insisted for cement fine aggregate and course aggregate.

45.2 For the grades of concrete M-20 and above the preliminary mix design shall be carried out from the approved laboratory.

(1) The charges for preliminary design, of concrete mix shall be entirely borne by the contractor.

(2) For grades of concrete M-20 and above where cement is to be used by weight, the cost of extra cement required to make-up the under-weight bags shall be borne by the contractor.

(3) For the items of concrete of grades lower than M-20 and other items in the agreement, where cement is not to be used by weighment, the cement bags as received from the manufacturer and supplied to the contractor under Schedule 'A' shall contain cement of 50 Kg. net weight.

45.3 The admixtures such as plasticizers/super plasticizers for concrete grade M-20 and above shall be used as directed by Engineer in charge depending upon specific requirements. No extra payment on this account will be admissible.

Contractor

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Executive Engineer

ADDITIONAL TENDER CONDITIONS

(1) SUPPLY OF COLOUR RECORDS PHOTOGRAPHS AND ALBUM.

The Contractor shall arrange to take Color Photograph at various stage / facets of the work including interesting and novel features as desired by the Engineer in charge. Photographs shall be of and taken to the standard post card size marked in album of acceptable quality. Also the negative film in 35 mm size shall be supplied for each photograph in the Album shall be suitably captioned. The Contractor shall arrange for taking video films of important activities of the work as directed by the Engineer in charge during the currency of the project & editing them to a video film of playing time not less than 60 minutes & upto 180 minutes as directed by Engineer in charge. It shall contain narration of the activities in English / Marathi by a competent narrator. Videocassette shall be of acceptable quality & film shall be capable of producing color picture. It shall be considered as incidental to the work and no additional payment whatsoever will be made for the same.

(2) After award of contract, contractor will have to provide and fix the information boards showing name, tender cost, period of completion, name and telephone number of agency and Executive Engineer and other details as directed by Engineer in charge. No extra payment is admissible on this account.

(3) Insurance of Contract Work :

Contractor shall take out necessary insurance Policy/Policies (viz Contractor's all risk Insurance Policy, Erection all risk 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. Kalamagar, Bandra (E), Mumbai 400051 (Telephone Nos. 26590403 / 26590690 and Fax No. 26592461 / 26590403). Similarly all workmen's appointed to completed the contract work are required to insure under workmen's compensation Insurance policy. Insurance Policy/Policies taken out from any other company will not be accepted. If any Contractor has effected Insurance with any insurance company, the same will not be accepted and the amount of premium calculated by the Government Insurance fund will be recovered directly from the amount payable to the contractor for executed contract work and paid to the Directorate of Insurance Fund, Maharashtra State, Mumbai. The Director of Insurance reserves the right to distribute the risk of Insurance among the other insures.

Contractor

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Executive Engineer

(4) A board 0.90 m x 0.60 m showing following information shall be provided by contractor at no extra cost to the Government.

महाराष्ट्र शासन

१. सार्वजनिक बांधकाम विभागाचे नांव
 २. कामाचे नांव
 ३. कि.मी
 ४. कामाची किंमत
 ५. कंत्राटदाराचे नांव
 ६. काम सुरु झाल्याचा दिनांक
 ७. काम पूर्ण करण्याचा कालावधी
 ८. दोष निवारण कालावधि
- वर्ष
(अ) पासून दिनांक
(ब) पर्यंत दिनांक

Contractor

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Executive Engineer

SPECIAL CONDITIONS

(1) Construction Machinery / Equipments:

- 1.1 The methodology and equipments to be used on the project shall be furnished by the Contractor to the Engineer-In-Charge well in advance of commencement of work and approval of the Engineer-In-Charge obtained prior to its adoption and use.
- 1.2 The Contractor shall give, a trial run of the equipment for establishing its capability to achieve the laid down specifications and tolerance to the satisfaction of the Engineer-in-Charge before commencement of work, if so desired by the Engineer-In-Charge.
- 1.3 All equipments provided shall be of proven efficiency and shall be operated and maintained at all times in the manner acceptable to the Engineer-In-Charge.
- 1.4 No equipment or personnel shall be removed from the site without permission of the Engineer-In-Charge.

(2) Work Programme and Methodology of construction:

The Contractor shall furnish his programme of construction, for execution of the work within the stipulated time schedule together with methodology of construction of each item or work and obtain the approval of the Engineer-In-Charge to the revised programme, if necessary/

(3) Revised Programme of Work in case of slippage:

In case of slippage from the approved work programme at any stage, the contractor shall furnish revised programme to make up slippage within the stipulated time schedule and obtain the approval of the Engineer-in-charge to the revised programme.

(4) Action in case disproportionate progress:

In case of extremely poor progress of the work or any item at any stages of work which in the opinion of the Engineer-In-Charge can not be made good by the Contractor considering his available resources, the Engineer-In-Charge will get it accelerated to make up the lost time through any other agency, and recover the additional cost incurred, If any, in getting the work done from the Contractor after informing him about the action envisaged by him.

- (5) The responsibility of assuring the quality of work shall be on the contractor who shall take actions as stipulated in standard specification as per "Schedule C".

(6) **Labour Licence :** It shall be obligatory on the part of the contractor to obtained the necessary labour License from the labour Department within fortnight of issue of work order.

(7) **Setting out :** Setting out the works as spelt out in clause 109 of Ministry's specifications for Road and Bridge works (2nd Revision) will be carried out by the Contractor.

(8) **Public Utilities :** Action in respect of public utilities will be taken by the Contractor as envisaged in Clause 110 of Ministry's Specifications for Road and Bridge work (2nd Revision).

(9) **Arrangement for traffic during construction :** Action for arrangement for traffic during construction will be taken by the Contractor as envisaged in the contract documents and spelt out in clause 112 of MORTH Specification for Road and Bridge Work (2001)

(10) It shall be responsibility of the contractor to achieve quality of work as stipulated in section 900 of MORTH Specification for Road and Bridge Work (2001)

(11) MORTH Specification for Road and Bridges Work latest edition with all amendments) :

MORTH Specification for Road and Bridge Work (2001) shall form part of the contract documents and the contractors shall be legally bound to the various provisions made therein unless and otherwise specifically relaxed or waived wholly or partly by any special clauses in the contract documents.

(12) It is the responsibility of the contractor to maintain the road in good trafficable condition during entire period of contract. It is incidental to the work and no extra claim will be entertained on this account.

(13) Contractor shall have to submit the design of Rigid Pavement after examining field C.B.R. and subgrade modules at his own cost and same shall be got approved from competent authority before start of the work. It is incidental to the work and no extra claim will be entertained on this account.

Contractor

No. of Corrections

Executive Engineer

ADDITIONAL SPECIFICATION

For Earthwork, Drain work, and Road work Contractor shall engage an experienced survey agency in consultation with Engineer-in charge with all necessary modern instruments, equipments, tools etc. The Agency shall help departmental Engineers in carrying out survey work, collection of data plotting of "L" section, Cross section, Road plan, drainage plan, estimation of quantities etc. before start of the road work. If required and as directed by Engineers-in charge, surveying, plotting, estimation etc. shall be done again and again for whole or part portion of the work till final solution to the satisfaction of the Engineers-in charge is worked out. Contractor shall submit all surveyed data, plotting, plans & estimate in sort as-well-as in hard copy to the department. All submission in soft & hard copies shall be departmental property, under intellectual property rights. Contractor can not put any claims over it.

Contractor

No. of Corrections

Executive Engineer

STATEMENT SHOWING (APPROXIMATELY) THE MATERIAL TO BE SUPPLYING TO THE CONTRACTOR FROM
DEPT. STORES AND RATES AT WHICH THE MATERIAL S ARE TO BE SUPPLIED

[illegible]

Executive Engineer

APPENDIX "A"

STATEMENT SHOWING (APPROXIMATELY) QUANTITY TO BE BROUGHT BY THE CONTRACTOR AT HIS OWN COST FOR THE WORK

NAME OF WORK :- CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON
GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA
HINGNA, DISTRICT NAGPUR

Sr. No.	Name of Material	Approximate Quantity to be stipulated	unit	
1	2	3	4	5
1	Cement	494.78 MT	One Metric Tonne	<ol style="list-style-type: none">1) All the materials are to be procured and brought by the contractor at the site at his own risk and cost.2) Physical properties shall be confirmed with M.O.S.T./I.S./I.R.C specification.3) Stipulated test shall be carried out by the contractor at his own cost as per the frequency.4) Custody of material shall be sole responsibility of the contractor.5) The proof of purchase of all materials should be produced during the execution of work and along with bill6) The grade of cement shall be got approved from the Engineer – in- Charge
2	Mild Steel	12.48 MT	One Metric Tonne	

Contractor

No. of Corrections

Executive Engineer

CONDITIONS FOR THE MATERIALS TO BE PROCURED BY THE CONTRACTOR

(1) Cement :

Cement to be used for the work shall comply the following and shall be used with the prior approval of Engineer –in -charge

(a) Ordinary Portland cement confirming to the I.S.: 8112 shall be used. Independent testing of cement used shall be done by the contractor at site and in the laboratory approved by the Engineer before use. Any cement with lower quality than that shown in the manufactures certificate shall be debarred from use. In case of finally ground cement or imported cement, the Engineer may direct the contractor to satisfy him as to the acceptability of such cement, especially with regard to creep and shrinkage effect. Any consignment or part of a consignment of cement, which has deteriorated in any way, shall not be used in the works and shall be removed from the site by the contractor without charge to the employer. Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration and contamination. Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which is delivered at site.

The contractor shall prepare and maintain proper records on site in respect of the delivery, handling storage and use of cement and these records shall be available for inspection by the Engineer at all times.

(2) T.M.T Steel

TMT bars shall comply with IS: 1786 and “Mild Steel” bars shall comply with IS: 432.

All reinforcement shall be free from rust loose mill scale or coats of Oil, Paints etc. which may destroy bond and protected by anti corrosive treatment before placing in position for concreting.

The agency should use the steel manufactured by the Main Producers only. No re-rolled steel shall be permitted to be used for this work. Decision about the main producers of the steel will be given by Engineer in charge and his decision shall be final & binding on all parties.

(3) Rejection of Materials not conforming to specification:

Any Stock or batch of material(s) of which sample(s) does not confirm to the prescribed test and quality, shall be rejected by the Engineer or his representative and such materials shall be removed from site by the contractor at his own cost. Such rejected materials shall not be made acceptable by any modifications.

Materials not corresponding in character and quality with approved samples will be rejected by the Engineer or his representative and shall be removed from the site immediately and will not be allowed to use for any component of work.

Contractor

No. of Corrections

Executive Engineer

ADDITIONAL CONDITIONS FOR CEMENT, STEEL, BITUMEN BROUGHT BY THE CONTRACTOR

- 1) All the materials required for construction of work shall be arranged by the contractor at his own cost. The samples of material to be procured shall be got approved by the Engineer-in-charge and material as per approved samples shall only be procured.
- 2) The contractor shall submit periodically as well as on completion of work, an account of all materials brought by him in a manner as directed by Engineer-in-charge. The contractor shall also furnish monthly account of materials; a separate register shall be maintained on site for recording daily item wise receipt and consumption of Cement, Steel and Asphalt used by him, also item wise consumption of other materials used. This register shall be signed daily by the contractor or his representative and representative of Engineer-in-charge.
- 3) All the materials required for the work shall be brought by the contractor at his own cost. In each case, certificate for its quality and quantity shall be produced by the contractor at his own cost and the test results of samples shall be supplied to the Department. The material not confirming to the required standard shall be removed at once from the site of the work by the Contractor at his own cost.
- 4) Testing of all construction material shall be carried out as per required frequency and specifications and the charges for testing shall be borne by the contractor
- 5) All the testing charges for mix design etc. if necessary on construction work shall be borne by the contractor.
- 6) The contractor shall construct shed / sheds as per direction of the Engineer-in-charge of the work for storing the materials brought at site. The material shall be taken out for use in the presence of the departmental representative only.
- 7) The contractor shall make his own arrangement for the safe custody of the materials which are brought for construction of work.
- 8) The contractor shall not transfer any material once brought at work site without prior written permission from Engineer-in-charge and for bonafied reasons only.
- 9) In case the materials brought by the contractor become surplus owing to the change in the design of the work, the materials should be taken back by the contractor at his own cost after prior permission of the Engineer-in-charge.
- 10) The charge for conveyance of materials from the place of delivery to the site of work and the actual sport on work site shall be entirely borne by the contractor. No claims on his account shall be entertained.
- 11) The contractor shall furnish the account of cement, steel, asphalt brought by him at each time before placing orders for further supply. Also the same should submit on completion of the work, final account of the materials used by him to the Department. This account will be scrutinised by the Engineer-in-charge.
- 12) All empty cement bags or empty asphalt drums shall be the property of contractor and the same shall be removed immediately after completion of work.
- 13) The contractor shall procure the pipes if required for this work from M.S.S.I.D.C. only. Proof of purchasing of pipe should be submitted.

Contractor

No. of Corrections

Executive Engineer

DECLARATION

I / we hereby declare that, I / we have made myself/our selves thoroughly conversant with the local conditions regarding all materials and labour on which I/we have based my / our rates for this tender. The specification to condition and lead of materials for this work have been carefully studied and understood by me /us before submitting the tender. I/we undertake to use only the best material approved by the Engineer- in- charge or his duly representative before starting the work and to abide by his decision. I/We shall maintain /rectify the entire work as per as per standard specification of P.W.D (Red Book) I.R.C. Codes and M.O.R.T. & H. specification as soon as damage occurs up to the expiry defect liability period without putting forth any reasons.

I hereby undertake to pay the labourers engaged on the work as per minimum wages Act. 1948 applicable to the zone concerned.

CONTRACTOR'S SIGNATURE

Contractor

No. of Corrections

Executive Engineer

FINANCIAL RULE - FORM 2 A
(See Rule 51-4)
GUARANTEE BOND FOR SECURITY DEPOSIT

In consideration of the Governor of Maharashtra (herewith referred to as 'THE GOVERNMENT') having agreed to exempt (herewith referred to as 'THE CONTRACT') from depositing with the Government in cash, the sum of Rs. _____ (Rs. _____ only) being the amount of security deposit payable by the contract to the Government under terms and conditions of the agreement dated the _____ day of _____ and made between the Government on the one part and the contractor on the other part (hereinafter referred to as the "the observance and performance by the Government a Guarantee in the prescribed form from a scheduled Bank in India being in fact these present in the like sum of Rs. _____ (Rs. _____). We _____

_____ Bank / Limited registered in India under _____ Act and having one or our local head office at _____ do hereby -

1. Guarantee of the Government -
 - a) Due performance and observance by the contractor of the terms, covenants and conditions on the part of the contractor contained in the said agreement and
 - b) Due and punctual payment by the contractor to the Government of all sums of money losses, damage, costs, charges, penalties and expenses payable to the Government by the contractor under or in respect of the said agreement.

2. Under to pay to the Government on demanded and without demure and notwithstanding any court or tribunal relating there to the said sum of Rs. _____ (Rs. _____ only) or such less sum may be demanded by the Government from us our liability hereunder being absolute and unequivocal and agree that -

(A) The guarantee herein contained shall remain in full force and effect during the subsistence of the said agreement and that same will continue to be enforceable till and all the dues of the Government under or by virtue of the said agreement have been duly paid and its claims satisfied or discharged and till the Government certifies that the terms and conditions of the said agreement have been fully properly carried out by contractor.

(B) We shall not be discharged or released from the liability under this Government by reasons of -

- (i) Any change in the constitution of the Bank or the Contractor or ,
- (ii) Any arrangement entered into between the Government and the Contractor with or without our consent.
- (iii) Any forbearance or indulgence shown to the Contractor.

Contractor

No. of Corrections

Executive Engineer

(iv) Any variation in the terms covenants or conditions contained in the said agreement.

(v) Any time given to the contractor or -

(C) Our liabilities hereunder shall be joint and several with that of the contract as if we were the principal debtors in respect of the said sum of Rs. _____

(Rs. _____ only.)

(D) We shall not revoke this guarantee during its currency except with the previous consent in writing of the Government IN WITNESS WHERE OF The Common Seal of _____ has been here into affixed this day of _____. The common seal of _____ was pursuant to the resolution to of the Board of Directors of the company dated the _____ day of _____ herein affixed in the presence of who in token have here to set their respective hands in the presence of -

(1)

(2)

Contractor

No. of Corrections

Executive Engineer

FORM - 1
LIST OF MACHINERY AVAILABLE WITH TENDERER WHICH WILL BE USED ON THIS WORK

NAME OF TENDERER :- _____

CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON
 SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

Sr. No.	Name of Equipment	No. of Unit	Kind of Make	Capacity	Age of machinery	Present Conditions	Present location with name & address of organisation where machinery under use at present	Whether machinery is hypothecated to any division / Bank or other institution etc.	Remarks
1	2	3	4	5	6	7	8	9	10

Notes :- The above machineries are readily available with me / us for use on this work

Contractors :- _____

Name :- _____

Address :- _____

Contractor

No. of Corrections

Executive Engineer

FORM - 2
LIST OF TECHNICAL PERSONNEL OF THE TENDERER LIKELY TO BE APPOINTED ON THIS WORK

NAME OF TENDERER :- _____

CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON
 SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

Sr. No.	Designation	Name	Qualification	Professional Experience of work carried out	Remarks
1	2	3	4	5	6

Contractors :- _____

Name :- _____

Address :- _____

Contractor

No. of Corrections

Executive Engineer

FORM - 3

DETAILS OF WORKS TENDERED FOR IN HAND AS ON THE DATE OF SUBMISSION OF THE THIS TENDER

NAME OF TENDERER :- _____

NAME OF WORK :- CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR

Sr. No.	Name of Work	Name & address of organisation for whom the work was done	Place and country	Works in hand			Works tendered for			Remarks
				Tendered cost	Cost of remaining work	Anticipated date of completion	Estimated cost	Date when decision is expected	Stipulated date or period of completion	
1	2	3	4	5	6	7	8	9	10	11

Contractors :- _____

Name :- _____

Address :- _____

Certificates from Heads of officers under whom the work are in progress should be enclose

Contractor

No. of Corrections

Executive Engineer

ANNEXURE I

(Format of affidavit to be given on Rs. 100 Non-Judicial stamp
paper sworn before Executive Magistrate/Notary Public.)

AFFIDAVIT

I, (Name of Contractor/Authorized person),
Aged about years, residing at
..... (Postal Address) do hereby swear this affidavit that, I am the proprietor/Partner
of.....(Name of company/firm) Registered at.....

I do hereby swear that, the documents submitted in envelope No. 1 of the tender document for
the work of **CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON
SHIWANGAON GUMGAON SALAIDHABA BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN
TALUKA HINGNA, DISTRICT NAGPUR** are true, correct and complete. In case the contents of envelope
No. 1 and other *document* pertaining to the tender submitted by me are found to be incorrect or false, I
shall be liable for action under the relevant provision of Indian Penal Code and other relevant laws.

Signature of Authorised person
Applicant/Contractor Name.....
Address.....

Place :-

Date :-

.....
E-mail.....
Mobile No.....
Website.....

Contractor

No. of Corrections

Executive Engineer

ANNEXURE II
FINANCIAL RULE - FORM 2 A
(See Rule 51-4)

GUARANTEE BOND FOR SECURITY DEPOSIT

In consideration of the Governor of Maharashtra (herewith referred to as 'THE GOVERNMENT') having agreed to exempt (herewith referred to as 'THE CONTRACT') from depositing with the Government in cash, the sum of Rs. _____ (Rs. _____ only) being the amount of security deposit payable by the contract to the Government under terms and conditions of the agreement dated the _____ day of _____ and made between the Government on the one part and the contractor on the other part (hereinafter referred to as the "the observance and performance by the Government a Guarantee in the prescribed form from a scheduled Bank in India being in fact these present in the like sum of Rs. _____ (Rs. _____). We _____ Bank / Limited registered in India under _____ Act and having one or our local head office at _____ do hereby -

1. Guarantee of the Government -
 - a) Due performance and observance by the contractor of the terms, covenants and conditions on the part of the contractor contained in the said agreement and
 - b) Due and punctual payment by the contractor to the Government of all sums of money losses, damage, costs, charges, penalties and expenses payable to the Government by the contractor under or in respect of the said agreement.
2. Under to pay to the Government on demanded and without demure and notwithstanding any court or tribunal relating there to the said sum of Rs. _____ (Rs. _____ only) or such less sum may be demanded by the Government from us our liability hereunder being absolute and unequivocal and agree that -
 - (B) The guarantee herein contained shall remain in full force and effect during the subsistence of the said agreement and that same will continue to be enforceable till and all the dues of the Government under or by virtue of the said agreement have been duly paid and its claims satisfied or discharged and till the Government certifies that the terms and conditions of the said agreement have been fully properly carried out by contractor.

(B) We shall not be discharged or released from the liability under this Government by reasons of -

- (i) Any change in the constitution of the Bank or the Contractor or,
- (ii) Any arrangement entered into between the Government and the Contractor with or without our consent.

Contractor

No. of Corrections

Executive Engineer

- (iii) Any forbearance or including shown to the Contractor.
 - (iv) Any variation in the terms covenants or conditions contained in the said agreement.
 - (v) Any time given to the contractor or –
- (C) Our liabilities hereunder shall be joint and several with that of the contract as if we were the principal debtors in respect of the said sum of Rs. _____
(Rs. _____ only.)
- (D) We shall not revoke this guarantee during its currency except with the previous consent in writing of the Government IN WITNESS WHERE OF The Common Seal of _____ has been here into affixed this day of _____. The common seal of _____ was pursuant to the resolution to of the Board of Directors of the company dated the _____ day of _____ herein affixed in the presence of who in token have here to set their respective hands in the presence of -
- (1)
- (2)

ANNEXURE - III

- i) The contractor shall have to make his own arrangement for bringing the water from outside.
- ii) For R.C.C. items, the wording, finishing the formed surface with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface is meant only for repairing the honeycombed surfacces and it does not include plastering of the whole of the surface.
- iii) Claim for change in (i) depth of foundation (ii) height of storey (iii) plinth height shall not be paid to the contractor.

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ANNEXURE - IV
QUALITY CONTROL TESTS & THEIR FREQUENCIES.

Sr. No.	Material	Test	Frequency of Testing	Remarks.
1	Sand	i) Fineness Modules ii) Silt Content	At the beginning & if there is change in source.	
2	Metal	i) Crushing Value ii) Impact Value iii) Abrasion value iv) Water Absorption v) Flakiness Index vi) Stripping value vii) Gradation	One test per 200 cum or part thereof.	PWD hand book I.S.2386 Part-IV
3	Cement Concrete	Comp. Strength	Upto 5 cum - 1 set 6 - 15 - 2 sets 16 - 30 - 3 sets 31 - 50 - 4 sets 51 & Above - 4 sets + 1 additional set for each 50 cum or part thereof.	M.O.R.T H. specification 1716 (Fourth revision 01)
4	Cement	i) Comp. Strength ii) Initial setting time iii) Final setting time iv) Specific Gravity v) Soundness vi) Fineness	One test for each consignment of 50 MT (1000 bags) or part thereof.	I.S. 8112 -1989
5	Steel	i) Weight per meter ii) Ultimate Tensile stress iii) Yield stress iv) Elongation	One test for every 5.0 METRIC TONNE or part thereof for each diameter.	I.S. 432 IS 1786-1985
6	Granular Sub Base	i) Gradation ii) Atterberg limits iii) Moisture content prior to compaction. iv) Density and compacted layer	One test per 200 cum. One test per 200 cum. One test per 250 cum. One test per 500 cum	M.ORTH.specification Table 900-3 (fourth revision 01)

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Sr. No.	Material	Test	Frequency of Testing	Remarks.
7	Water bound macadam	i) Aggregate Impact value ii) Gradation iii) Flakiness Index & Elongation Index. iv) Atterberg limits of binding material. v) Atterberg limits of portion of aggregates passing 425 Micron.	One test per 200 cum. One test per 100 cum. One test per 200 cum. 1 test per 25 cum of binding material. One test per 100 cum. of aggregate	MORTH specification Table 900-3. (fourth revision 01)

Contractor

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Annexure V

TESTING STATEMENT

Annexure									
Sr No	Items	Qty as per execution	Specified frequency	Required test as per frequency	Test actual taken at		Total test	Deficiency in testing	Remarks
					Site office	Labortory			
1	2	3	4	5	6	7	8	9	10

Contractors :- _____

Name :- _____

Contractor

No. of Corrections

Executive Engineer

**NAME OF WORK : CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA BUTIBORI
TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR**

SCHEDULE "B"

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
1)	Excavation for road way by mechanical means including dressing section to the required grade, camber and side slopes and conveying the excavated materials with all lifts and spreading for embankment or stacking etc. as directed by Engineer in charge.	1319.710 Cubic Metre	59.00	Rs. Fifty Nine & Paise Nil only	One Cubic Metre	77863.00
2)	Watering and compacting the embankment with approved materials obtained from departmental land or other sources including all lifts, laying in layers of 20 cm. to 30 cm. thickness breaking clods, dressing to the required lines, curves, grade and section, watering and compacting with power roller complete.	393.230 Cubic Metre	10.00	Rs. Ten & Paise Nil only	One Cubic Metre	3932.00
3)	Transportation of material obtained from debris of various sorts including necessary loosing including loading, unloading and conveying and disposing as directed.	4638.240 Cubic Metre	164.74	Rs. One Hundred Sixty Four & Paise Seventy Four only	One Cubic Metre	764104.00
4)	Construction granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method at OMC, and compacting with vibratory roller having static weight 8-10 MT to achieve the desired density, etc. complete as per clause 401.(Grading –II Material)	505.880 Cubic Metre	990.80	Rs. Nine Hundred Ninety & Paise Eighty only	One Cubic Metre	501226.00

Contractor

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Executive Engineer

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
5)	Providing, Laying, Spreading and compacting crushed stone aggregates of specific sizes to Water Bound Macadam specification including spreading in uniform thickness, hand packing, rolling with vibratory roller having static weight 8 to 10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the interstices of coarse aggregate, watering and compacting to the required density, etc. complete. - For metal grade I, using stone screening type A	337.250 Cubic Metre	1623.30	Rs. One Thousand Six Hundred Twenty Three & Paise Thirty only	One Cubic Metre	547458.00
6)	Providing, Laying, Spreading and compacting crushed stone aggregates of specific sizes to Water Bound Macadam specification including spreading in uniform thickness, hand packing, rolling with vibratory roller having static weight 8 to 10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the interstices of coarse aggregate, watering and compacting to the required density, etc. complete. - For metal grade II, using stone screening type A	252.940 Cubic Metre	1578.05	Rs. One Thousand Five Hundred Seventy Eight & Paise Five only	One Cubic Metre	399152.00
7)	Providing, Laying, Spreading and compacting crushed stone aggregates of specific sizes to Water Bound Macadam specification including spreading in uniform thickness, hand packing, rolling with 3-wheeled steel/vibratory roller having static weight 8 to 10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the interstices of coarse aggregate, watering and compacting to the required density, etc. complete. - For metal grade III, using stone screening type B	278.250 Cubic Metre	1643.10	Rs. One Thousand Six Hundred Forty Three & Paise Ten only	One Cubic Metre	457193.00
8)	Providing, Laying, Spreading and compacting sand & best available murum in 30:70 proportion including mixing & spreading in uniform layers on a prepared surface & compacting with static roller having weight 8 to 10 MT including necessary artificial watering, all materials, labour, machinery, guarding, barricating complete with all leads & lifts of all materials etc. complete	712.500 Cubic Metre	786.15	Rs. Seven Hundred Eighty Six & Paise Fifteen only	One Cubic Metre	560132.00

Contractor

No. of Corrections

Executive Engineer

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
9)	Providing and laying in situ C.C.1:3:6 of trap metal in foundation as levelling course including necessary bailing out water, including plywood / steel form work, steel centering, compaction by vibrating finishing etc. complete. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering/ formwork will not be allowed).	371.000 Cubic Metre	3144.15	Rs. Three Thousand One Hundred Forty Four & Paise Fifteen only	One Cubic Metre	1166480.00
10)	Providing and laying in situ, cement concrete M-15 of trap metal for foundation and bedding including bailing out water, plywood / steel formwork, compacting, finishing uneven and honeycombed surface, curing etc. complete. The Cement Mortar 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering will not be allowed.)	204.750 Cubic Metre	3778.75	Rs. Three Thousand Seven Hundred Seventy Eight & Paise Seventy Five only	One Cubic Metre	773699.00
11)	Providing and laying impermeable membrane of plastic sheet 125 micron thick including over lapps not less than 300 mm etc. complete.	6650.000 Square Metre	10.00	Rs. Ten & Paise Nil only	One Square Metre	66500.00

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
12)	Providing and laying ready mix cement concrete (RMC) pavement of M-40 grade with 25% fly ash of trap metal including mixing in ready mix plant of approved make including transportation of concrete mix for wearing course, placing through slip form paver including plywood / steel formwork, steel centering and compaction by vibrating using plate, needle and screed vibrator as required grooming the concrete surface to get serrations leveling to the surface as directed & curing etc. complete including use of plastisizers and retarders as directed by engineer in charge (excluding cost of reinforcement). Newly laid concrete shall be covered by gunny bag, plastic, tarpolin, etc. (Wooden centering / formwork will not be allowed) as per specification given and directed by Engineer in charge. Item includes cement vata in C.M. 1:8 at 0.60 m x 0.60 m centre to centre admeasuring 80 mm at bottom and 40 mm at top & depth of 75 mm and maintaining the same throughout 28 days curing period and removing the same thereafter by using light tool without damaging pavement	1995.000 Cubic Metre	5750.50	Rs. Five Thousand Seven Hundred Fifty & Paise Fifty only	One Cubic Metre	11472248.0 0
13)	Providing and fixing in position mild steel dowel bars precoated with anticorrosive epoxy paint of 32 mm. Dia. 60 cms. Long and at 30.00 cm. C/C & wherever directed including handling, straightening, necessary cutting supported by HYSD chairs with proper alignment by using properly designed assembly of Bulkheads lubricating half length with bituminous paint as directed etc. complete.	683 Number	215.00	Rs. Two Hundred Fifteen & Paise Nil only	One Number	146804.00
14)	Providing and fixing in position TMT tie bars precoated with anticorrosive epoxy paint of 12 mm dia. 70 cms.long and at 30.00 cm. C/C & wherever directed including handling, straightening wrapping with paper of approved quality for half length, necessary cutting, handling, straightening, supported by assembly of HYSD chairs with proper alignment etc. complete.	3,500 Number	26.00	Rs. Twenty Six & Paise Nil only	One Number	91000.00

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
15)	Providing and fixing in position high density polyethylene (HDPE) pipes of approved quality 40 mm dia. & 30 cm. in length to fit around dowel bars of 32 mm dia. At the end of expansion joint fully greased inside the pipe with cotton waste in the pipe & around dowel bar and the pipe duly caped at the end etc. complete.	1,366 Number	30.00	Rs. Thirty & Paise Nil only	One Number	40969.00
16)	Cutting transverse contraction joints 3 to 4 mm wide and depth 60mm. .in concrete slab using concrete cutting machine with diamond studded saw within 48 hours of casting of bay / slab etc. complete including subsequent widening of the groove 8 to 10 mm. wide at top having depth of 15 mm. as directed by Engineer incharge.	3116.670 Running Metre	65.00	Rs. Sixty Five & Paise Nil only	One Running Metre	202584.00
17)	Providing to contraction joints polysuphide sealent (Pouring grade) confirming to BS : 5212 - 1989 into sawed groove widened at top for sealent reservoir of specified size and shape as per detailed drawing including fixing Polyethylene foam back up rod of required diameter (appraox. 25% larger than the initial 3 mm.to 4 mm. joint) overlaid with bond breaking tape as per detailed drawing. Item includes cleaning the joints with water jet / air compressor & allowing joint to become thoroughly dry before sealent is applied and applying primer. (A) Contraction & longidudinal joints (15 mm.deep x 8 mm.wide)	3116.670 Running Metre	195.00	Rs. One Hundred Ninety Five & Paise Nil only	One Running Metre	607751.00
18)	Providing expansion joints with 25 mm thick bitumenous pad as per detailed drawings.	55.780 Square Metre	725.00	Rs. Seven Hundred Twenty Five & Paise Nil only	One Square Metre	40441.00
19)	Providing and laying cement concrete pipe of I.S. 458 / 2003 N.P. class of required diameter in proper line, level and slope including providing, fixing collars or spigot and socket joint by rubber ring and in C.M.1:2 etc. complete.					0.00

Contractor

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Executive Engineer

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
	(A) 450 mm dia. NP2 pipes	120.000 Running Metre	909.20	Rs. Nine Hundred Nine & Paise Twenty only	One Running Metre	109104.00
	(B) 1000 mm dia. NP3 pipes	12.500 Running Metre	5314.75	Rs. Five Thousand Three Hundred Fourteen & Paise Seventy Five only	One Running Metre	66434.00
20)	Providing and fixing informatory sign boards in square or rectangular shape of any size made out 16 guage (1.6 mm) thick mild steel sheet painted with one coat of zinc chromate - stoving primer and two coats green back ground white border / messages, symbols etc. and back side in grey stove enamel paint including M.S. angle frame of 35 mm x 35 mm x 3 mm and two M.S.angle iron post of size 50 mm x 50 mm x 5 mm, 3.65 m long properly cross braced with angle iron of size 50 mm x 50 mm x 5 mm duly painted with alternate black and white bands of 25 cm width including G.I.fixtures etc. and fixing the board in 1:4:8 concrete block of size 60 cm x 60 cm x 75 cm including transportation etc. complete. The nut bolts of board with angle iron post / supporting structure after fixing at site has to be electrically welded.	6.480 Square Metre	4650.00	Rs. Four Thousand Six Hundred Fifty & Paise Nil only	One Square Metre	30132.00

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
21)	Providing and fixing Cautionary / Warning sign board having shape of an equilateral triangle of 90 cm sides made out of 16 guage (1.6 mm) thick mild steel sheet painted with one coat of zinc chromate – stoving primer and two coats of white stove enamel paint and red border symbols etc. back side in grey stove enamel paint including one M.S.angle iron post of size 50 mm x 50 mm x 5 mm, 3.65 m long duly painted with alternate black and white bands of 25 cm width including G.I. fixtures etc. and fixing the boards in 1:4:8 concrete block of size 60 cm x 60 cm x 75 cm including transportation etc. complete. The nut bolts of board with angle iron post / supporting structure after fixing at site has to be electrically welded. Retroreflective sheeting should be with five years written warrenty from the manufacture & authorised distributor / convertor for satisfactory field performance, durability & stipulated retroreflectance of retroreflective sheeting. This certificate in original should be submitted to the Engineer in charge by the contractor/supplier.	8 Number	1850.00	Rs. One Thousand Eight Hundred Fifty & Paise Nil only	One Number	14800.00
22)	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes etc. complete.	241.000 Square Metre	330.00	Rs. Three Hundred Thirty & Paise Nil only	One Square Metre	79530.00
23)	Providing and fixing aluminium casted CAT EYE STUD of size 10 cm x 10 cm at base with M.S. Zinc coated nails of size 12 mm dia. of 12 cm long having both sides (Dual Direction) high impact ABC 3 Nos. of eyes of 16 mm dia. on both sides containing 7 beads each i.e. 42 beads in retroreflective etc. complete.	80 Number	350.00	Rs. Three Hundred Fifty & Paise Nil only	One Number	28000.00

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
24)	Providing and fixing 60mm thick factory made hydraulically pressed mechanically vibrated and compacted precast inter locking cement concrete paving blocks in M-40 grade of approved size and shape as specified 50 mm in gray cement and top surface 10 mm in white cement with coloured pigment including cost of all materials, manufacturing, curing, transportation of blocks to work site including loading, unloading and stacking as directed, laying paving blocks in position over prepared bed of sand of 50 mm thickness including necessary excavation in all stratas, spreading blinding of fine sand over the prepared bed, compacting blocks by plate vibrator etc. complete.	1900.000 Square Metre	580.00	Rs. Five Hundred Eighty & Paise Nil only	One Square Metre	1102000.00
25)	Excavation for foundation in earth, soils of all types, sand, gravel soft murum etc. including shoring and strutting as necessary and disposing off excavated stuff within lead of 100 m as directed etc. complete.	323.157 Cubic Metre	125.00	Rs. One Hundred Twenty Five & Paise Nil only	One Cubic Metre	40395.00
26)	Providing soling using 80 mm size trap metal in 15 cm. layer including hand packing filling voids with sand / grit, ramming, watering etc. complete.	464.040 Cubic Metre	752.20	Rs. Seven Hundred Fifty Two & Paise Twenty only	One Cubic Metre	349051.00
27)	Providing and laying in situ cement concrete of 1:4:8 proportion with trap metal in foundation including necessary compacting and curing complete. (Including plywood/ steel formwork) The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	5.091 Cubic Metre	2862.35	Rs. Two Thousand Eight Hundred Sixty Two & Paise Thirty Five only	One Cubic Metre	14572.00

Contractor

No. of Corrections

Executive Engineer

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
28)	Providing and laying in situ cement concrete of M-15 / 1:2:4 with trap metal in face wall including plywood/ steel formwork and steel centering, compaction by vibrator, finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give smooth and even surface, filling joints with bitumen, curing etc. complete. (Excluding cost of reinforcement.) The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	23.461 Cubic Metre	3943.75	Rs. Three Thousand Nine Hundred Forty Three & Paise Seventy Five only	One Cubic Metre	92524.00
29)	Removing rich mix cement concrete including stacking the spoils as directed with all leads, lifts etc. complete.	11.216 Cubic Metre	635.00	Rs. Six Hundred Thirty Five & Paise Nil only	One Cubic Metre	7122.00
30)	Providing selected murum (having PI < 6) filling including laying in layers of 15 cm to 20 cm watering and compacting etc. complete.	14.421 Cubic Metre	465.25	Rs. Four Hundred Sixty Five & Paise Twenty Five only	One Cubic Metre	6709.00
31)	Excavation for side water gutter in all sort of soils, soft murum etc. to the specified section including stacking the excavated stuff in regular bund and disposing off unsuitable or excess stuff upto a lead of 50 m and spreading as directed Engineer-in-charge.	3072.000 Cubic Metre	88.00	Rs. Eighty Eight & Paise Nil only	One Cubic Metre	270336.00
32)	Providing and laying in situ, cement concrete M-10/(1:3:6) of trap metal for foundation and bedding including plywood / steel formwork bailing out water, compacting, finishing uneven and honeycombed surface, curing etc. complete. The Cement Mortar 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering will not be allowed.)	249.600 Cubic Metre	3254.15	Rs. Three Thousand Two Hundred Fifty Four & Paise Fifteen only	One Cubic Metre	812236.00

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
33)	Providing and laying in situ cement concrete of M-20 grade of trap metal for R.C.C raft and providing vertical headers including plywood / steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing etc. complete.(Excluding reinforcement, including cover block) The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	192.000 Cubic Metre	4480.25	Rs. Four Thousand Four Hundred Eighty & Paise Twenty Five only	One Cubic Metre	860208.00
34)	Providing and laying in situ Cement concrete of M-20 grade or trap metal for RCC work of face walls, of drain etc. including scaffolding, compaction, finishing, plywood / steel formwork, steel centering. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. (Excluding reinforcement, including cover block) Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	432.000 Cubic Metre	5780.25	Rs. Five Thousand Seven Hundred Eighty & Paise Twenty Five only	One Cubic Metre	2497068.00
35)	Providing and fixing UPVC pipe of 110 mm. dia and of required length for relieving water pressure in abutment, riding returns, including necessary inverted filter etc. complete.	288.000 Running Metre	120.00	Rs. One Hundred Twenty & Paise Nil only	One Running Metre	34560.00
36)	Providing and filling in the foundation and plinth with sand of approved quality including watering, compaction complete.	432.000 Cubic Metre	617.35	Rs. Six Hundred Seventeen & Paise Thirty Five only	One Cubic Metre	266695.00
37)	Providing PRECAST M-20 R.C.C. slabs over the spans of Cross Drainage work as per drawings including reinforcement, conveyance, fixing in C.M. 1:3 and curing, finishing complete.	192.000 Cubic Metre	6330.00	Rs. Six Thousand Three Hundred Thirty & Paise Nil only	One Cubic Metre	1215360.00

Sr. No.	ITEM OF WORK	QUANTITY	RATE		UNIT	AMOUNT (Rs.)
			IN FIG.	IN WORDS		
38)	Providing and cutting, bending, hooking, laying, in position and tying TMT Steel bar reinforcement as per detailed drawing for R.C.C. works etc. complete.	12.480 Metric Tonne	54565.55	Rs. Fifty Four Thousand Five Hundred Sixty Five & Paise Fifty Five only	One Metric Tonne	680978.00
TOTAL Rs. 2,64,97,350.00						

(Rs. Two Crore Sixty Four Lakh Ninety Seven Thousand Three Hundred Fifty only)

Contractor

No. of Corrections

Executive Engineer

**NAME OF WORK : CONSTRUCTION OF CEMENT CONCRETE ROAD (7.00 M CARRIAGEWAY) SONEGAON SHIWANGAON GUMGAON SALAIDHABA
BUTIBORI TAKALGHAT ROAD, S.H. 348, KM. 2/100 TO 3/00 IN TALUKA HINGNA, DISTRICT NAGPUR**

SCHEDULE "C"

<i>Sr. No.</i>	<i>ITEM OF WORK</i>	<i>STANDARD SPECIFICATIONS</i>	<i>ADDITIONAL SPECIFICATIONS</i>
1)	Excavation for road way by mechanical means including dressing section to the required grade, camber and side slopes and conveying the excavated materials with all lifts and spreading for embankment or stacking etc. as directed by Engineer in charge.	Rd. 2 Page No. 180.	(i) As directed by Engineer in charge. (ii) Suitable excavated stuff as approved by Engineer in charge shall be stack properly for the use in embankment.
2)	Watering and compacting the embankment with approved materials obtained from departmental land or other sources including all lifts, laying in layers of 20 cm. to 30 cm. thickness breaking clods, dressing to the required lines, curves, grade and section, watering and compacting with power roller complete.	Rd.13 / Page No. 194 and Rd.16 / Page No. 195	(i) As directed by Engineer in charge. (ii) Suitable excavated stuff as approved by Engineer in charge shall be stack properly for the use in embankment.
3)	Transportation of material obtained from debris of various sorts including necessary loosing including loading, unloading and conveying and disposing as directed. Upto 4.00 km		(i) As directed by Engineer in charge. (ii) unsuitable excavated material as identified by Engineer incharge shall be disposed properly as directed.
4)	Construction granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method at OMC, and compacting with vibratory roller having static weight 8-10 MT to achieve the desired density, etc. complete as per clause 401.(Grading -II Material)	MORT & H 2001 Clause 401 Page No. 101	(i) As directed by Engineer in charge. (ii) Design mix of the GSB shall be obtained of stipulated material from Govt. approved laboratory and same shall be got approved Engineer in charge before use.

Contractor

No. of Corrections

Executive Engineer

<i>Sr. No.</i>	<i>ITEM OF WORK</i>	<i>STANDARD SPECIFICATIONS</i>	<i>ADDITIONAL SPECIFICATIONS</i>
5)	Providing, Laying, Spreading and compacting crushed stone aggregates of specific sizes to Water Bound Macadam specification including spreading in uniform thickness, hand packing, rolling with vibratory roller having static weight 8 to 10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the interstices of coarse aggregate, watering and compacting to the required density, etc. complete. - For metal grade I, using stone screening type A	M.O.R.T.& H. - 2001 Cl. 404 P.112	(i) As directed by Engineer in charge. (ii) Physical properties including gradation of the metal shall be conforming to the specifications and same shall be got approved from Engineer in charge before use.
6)	Providing, Laying, Spreading and compacting crushed stone aggregates of specific sizes to Water Bound Macadam specification including spreading in uniform thickness, hand packing, rolling with vibratory roller having static weight 8 to 10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the interstices of coarse aggregate, watering and compacting to the required density, etc. complete. - For metal grade II, using stone screening type A	M.O.R.T.& H. - 2001 Cl. 404 P.112	
7)	Providing, Laying, Spreading and compacting crushed stone aggregates of specific sizes to Water Bound Macadam specification including spreading in uniform thickness, hand packing, rolling with 3-wheeled steel/vibratory roller having static weight 8 to 10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the interstices of coarse aggregate, watering and compacting to the required density, etc. complete. - For metal grade III, using stone screening type B	M.O.R.T.& H. - 2001 Cl. 404 P.112	
8)	Providing, Laying, Spreading and compacting sand & best available murum in 30:70 proportion including mixing & spreading in uniform layers on a prepared surface & compacting with static roller having weight 8 to 10 MT including necessary artificial watering, all materials, labour, machinery, guarding, barricating complete with all leads & lifts of all materials etc. complete	Rd 24, 25, 28, 38A Page No. 203, 205, 210	(i) As directed by Engineer in charge. (ii) Design mix of murum : sand shall be obtained from Engineer in charge and same shall be got approved from Engineer in charge.

Sr. No.	ITEM OF WORK	STANDARD SPECIFICATIONS	ADDITIONAL SPECIFICATIONS
9)	Providing and laying in situ C.C.1:3:6 of trap metal in foundation as levelling course including necessary bailing out water, including plywood / steel form work, steel centering, compaction by vibrating finishing etc. complete. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering/ formwork will not be allowed).	BR5 / Page No. 105 / I.S.456 (2000)	As directed by Engineer in charge.
10)	Providing and laying in situ, cement concrete M-15 of trap metal for foundation and bedding including bailing out water, plywood / steel formwork, compacting, finishing uneven and honeycombed surface, curing etc. complete. The Cement Mortar 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering will not be allowed.)	Bd.E. 1 / Page No. 287 / I.S. 456 (2000)	As directed by Engineer in charge.
11)	Providing and laying impermeable membrane of plastic sheet 125 micron thick including over lapps not less than 300 mm etc. complete.		As directed by Engineer in charge.
12)	Providing and laying ready mix cement concrete (RMC) pavement of M-40 grade with 25% fly ash of trap metal including mixing in ready mix plant of approved make including transportation of concrete mix for wearing course, placing through slip form paver including plywood / steel formwork, steel centering and compaction by vibrating using plate, needle and screed vibrator as required grooming the concrete surface to get serrations leveling to the surface as directed & curing etc. complete including use of plastisizers and retarders as directed by engineer in charge (excluding cost of reinforcement). Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin, etc. (Wooden centering / formwork will not be allowed) as per specification given and directed by Engineer in charge. Item includes cement vata in C.M. 1:8 at 0.60 m x 0.60 m centre to centre admeasuring 80 mm at bottom and 40 mm at top & depth of 75 mm and maintaining the same throughout 28 days curing period and removing the same thereafter by using light tool without damaging pavement		(i) As directed by Engineer in charge. (ii) Design mix of concrete with fly ash (25%) shall be obtained of stipulated material from Govt. approved laboratory and same shall be got approved Engineer in charge before use.

Contractor

No. of Corrections

Executive Engineer

<i>Sr. No.</i>	<i>ITEM OF WORK</i>	<i>STANDARD SPECIFICATIONS</i>	<i>ADDITIONAL SPECIFICATIONS</i>
13)	Providing and fixing in position mild steel dowel bars precoated with anticorrosive epoxy paint of 32 mm. Dia. 60 cms. Long and at 30.00 cm. C/C & wherever directed including handling, straightening, necessary cutting supported by HYSD chairs with proper alignment by using properly designed assembly of Bulkheads lubricating half length with bituminous paint as directed etc. complete.		As directed by Engineer in charge.
14)	Providing and fixing in position TMT tie bars precoated with anticorrosive epoxy paint of 12 mm dia. 70 cms.long and at 30.00 cm. C/C & wherever directed including handling, straightening wrapping with paper of approved quality for half length, necessary cutting, handling, straightening, supported by assembly of HYSD chairs with proper alignment etc. complete.		As directed by Engineer in charge.
15)	Providing and fixing in position high density polyethylene (HDPE) pipes of approved quality 40 mm dia. & 30 cm. in length to fit around dowel bars of 32 mm dia. At the end of expansion joint fully greased inside the pipe with cotton waste in the pipe & around dowel bar and the pipe duly caped at the end etc. complete.		As directed by Engineer in charge.
16)	Cutting transverse contraction joints 3 to 4 mm wide and depth 60mm. .in concrete slab using concrete cutting machine with diamond studded saw within 48 hours of casting of bay / slab etc. complete including subsequent widening of the groove 8 to 10 mm. wide at top having depth of 15 mm. as directed by Engineer incharge.		As directed by Engineer in charge.
17)	Providing to contraction joints polysuphide sealent (Pouring grade) conforming to BS : 5212 - 1989 into sawed groove widened at top for sealent reservoir of specified size and shape as per detailed drawing including fixing Polyethylene foam back up rod of required diameter (appraox. 25% larger than the initial 3 mm.to 4 mm. joint) overlaid with bond breaking tape as per detailed drawing. Item includes cleaning the joints with water jet / air compressor & allowing joint to become thoroughly dry before sealent is applied and applying primer. (A) Contraction & longitudinal joints (15 mm.deep x 8 mm.wide)		As directed by Engineer in charge.

Contractor

No. of Corrections

Executive Engineer

<i>Sr. No.</i>	<i>ITEM OF WORK</i>	<i>STANDARD SPECIFICATIONS</i>	<i>ADDITIONAL SPECIFICATIONS</i>
18)	Providing expansion joints with 25 mm thick bitumenous pad as per detailed drawings.	BR. 43 / Page No. 138	As directed by Engineer in charge.
19)	Providing and laying cement concrete pipe of I.S. 458 / 2003 N.P. class of required diameter in proper line, level and slope including providing, fixing collars or spigot and socket joint by rubber ring and in C.M.1:2 etc. complete.	MORT & H 2001 Clause - 2901 Page No. 663	As directed by Engineer in charge.
20)	Providing and fixing informatory sign boards in square or rectangular shape of any size made out 16 guage (1.6 mm) thick mild steel sheet painted with one coat of zinc chromate - stoving primer and two coats green back ground white border / messages, symbols etc. and back side in grey stove enamel paint including M.S. angle frame of 35 mm x 35 mm x 3 mm and two M.S.angle iron post of size 50 mm x 50 mm x 5 mm, 3.65 m long properly cross braced with angle iron of size 50 mm x 50 mm x 5 mm duly painted with alternate black and white bands of 25 cm width including G.I.fixtures etc. and fixing the board in 1:4:8 concrete block of size 60 cm x 60 cm x 75 cm including transportation etc. complete. The nut bolts of board with angle iron post / supporting structure after fixing at site has to be electrically welded.	As per IRC-67, 1977 & M.O.R.T & H Circular No. RW / NH-33023 / 31 / 88 D.O.III Dated 2-5-1994	As directed by Engineer in charge.
21)	Providing and fixing Cautionary / Warning sign board having shape of an equilateral triangle of 90 cm sides made out of 16 guage (1.6 mm) thick mild steel sheet painted with one coat of zinc chromate – stoving primer and two coats of white stove enamel paint and red border symbols etc. back side in grey stove enamel paint including one M.S.angle iron post of size 50 mm x 50 mm x 5 mm, 3.65 m long duly painted with alternate black and white bands of 25 cm width including G.I. fixtures etc. and fixing the boards in 1:4:8 concrete block of size 60 cm x 60 cm x 75 cm including transportation etc. complete. The nut bolts of board with angle iron post / supporting structure after fixing at site has to be electrically welded. Retroreflective sheeting should be with five years written warrenty from the manufacture & authorised distributor / convertor for satisfactory field performance, durability & stipulated retroreflectance of retroreflective sheeting. This certificate in original should be submitted to the Engineer in charge by the contractor/supplier.	As per IRC-67, 1977 & M.O.R.T & H Circular No. RW / NH-33023 / 31 / 88 D.O.III Dated 2-5-1994	As directed by Engineer in charge.

Contractor

No. of Corrections

Executive Engineer

<i>Sr. No.</i>	<i>ITEM OF WORK</i>	<i>STANDARD SPECIFICATIONS</i>	<i>ADDITIONAL SPECIFICATIONS</i>
22)	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35 .The finished surface to be level, uniform and free from streaks and holes etc. complete.	M.O.R.T. & H. 2001, Clause No. 803 P. No. 320	As directed by Engineer in charge.
23)	Providing and fixing aluminium casted CAT EYE STUD of size 10 cm x 10 cm at base with M.S. Zinc coated nails of size 12 mm dia. of 12 cm long having both sides (Dual Direction) high impact ABC 3 Nos. of eyes of 16 mm dia. on both sides containing 7 beads each i.e. 42 beads in retroreflective etc. complete.	As per IRC-67, 1977 & M.O.R.T & H Circular No. RW / NH-33023 / 31 / 88 D.O.III Dated 2-5-1994	As directed by Engineer in charge.
24)	Providing and fixing 60mm thick factory made hydraulically pressed mechanically vibrated and compacted precast inter locking cement concrete paving blocks in M-40 grade of approved size and shape as specified 50 mm in gray cement and top surface 10 mm in white cement with coloured pigment including cost of all materials, manufacturing, curing, transportation of blocks to work site including loading, unloading and stacking as directed, laying paving blocks in position over prepared bed of sand of 50 mm thickness including necessary excavation in all stratas, spreading blinding of fine sand over the prepared bed, compacting blocks by plate vibrator etc. complete.		(i) As directed by Engineer in charge. (ii) Precast blocks shall be of approved make & same shall be got approved from engineer in charge before use. (III) Contractor shall have to submit _____ test result as per the lot received on the work site.
25)	Excavation for foundation in earth, soils of all types, sand, gravel soft murum etc. including shoring and strutting as necessary and disposing off excavated stuff within lead of 100 m as directed etc. complete.	BR.3 / Page No. 102	(i) As directed by Engineer in charge. (ii) Unsuitable excavated stuff shall be disposed off properly as directed by Engineer in charge.
26)	Providing soling using 80 mm size trap metal in 15 cm. layer including hand packing filling voids with sand / grit, ramming, watering etc. complete.		As directed by Engineer-in-charge.

Sr. No.	ITEM OF WORK	STANDARD SPECIFICATIONS	ADDITIONAL SPECIFICATIONS
27)	Providing and laying in situ cement concrete of 1:4:8 proportion with trap metal in foundation including necessary compacting and curing complete. (Including plywood/ steel formwork) The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	CD.3 / Page No. 160	As directed by Engineer-in-charge.
28)	Providing and laying in situ cement concrete of M-15 / 1:2:4 with trap metal in face wall including plywood/ steel formwork and steel centering, compaction by vibrator, finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give smooth and even surface, filling joints with bitumen, curing etc. complete. (Excluding cost of reinforcement.) The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	CD.3 / Page No. 160 / I.S.456 (2000)	As directed by Engineer-in-charge.
29)	Removing rich mix cement concrete including stacking the spoils as directed with all leads, lifts etc. complete.		As directed by Engineer-in-charge.
30)	Providing selected murum (having PI < 6) filling including laying in layers of 15 cm to 20 cm watering and compacting etc. complete.	CD.14 / Page No. 167	As directed by Engineer-in-charge.
31)	Excavation for side water gutter in all sort of soils, soft murum etc. to the specified section including stacking the excavated stuff in regular bund and disposing off unsuitable or excess stuff upto a lead of 50 m and spreading as directed Engineer-in-charge.	Rd.9 / Page No. 187	As directed by Engineer-in-charge.
32)	Providing and laying in situ, cement concrete M-10/(1:3:6) of trap metal for foundation and bedding including plywood / steel formwork bailing out water, compacting, finishing uneven and honeycombed surface, curing etc. complete. The Cement Mortar 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering will not be allowed.)	Bd.E. 1 / Page No. 287 / I.S. 456 (2000)	As directed by Engineer-in-charge.

Contractor

No. of Corrections

Executive Engineer

<i>Sr. No.</i>	<i>ITEM OF WORK</i>	<i>STANDARD SPECIFICATIONS</i>	<i>ADDITIONAL SPECIFICATIONS</i>
33)	Providing and laying in situ cement concrete of M-20 grade of trap metal for R.C.C raft and providing vertical headers including plywood / steel formwork, steel centering, compaction by vibrating finishing uneven and honeycombed surface with C.M.1:3 of sufficient minimum thickness to give a smooth and even surface or roughening the surface if special finish is to be provided, curing etc. complete.(Excluding reinforcement, including cover block) The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	BR.5 / Page No. 105 I.S. 456 /2000	As directed by Engineer-in-charge.
34)	Providing and laying in situ Cement concrete of M-20 grade or trap metal for RCC work of ballast walls, dirt walls, kerbs, box returns box cell etc. including scaffolding, compaction, finishing, plywood / steel formwork, steel centering. The C.M. 1:3 plaster is considered for rendering uneven and honeycombed surface only. (Excluding reinforcement, including cover block) Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering / formwork will not be allowed).	BR.50 / Page No. 143 / I.S.456 /2000	As directed by Engineer-in-charge.
35)	Providing and fixing UPVC pipe of 110 mm. dia and of required length for relieving water pressure in abutment, riding returns, including necessary inverted filter etc. complete.		As directed by Engineer-in-charge.
36)	Providing and filling in the foundation and plinth with sand of approved quality including watering, compaction complete.	Bd.A. 13 / Page No. 264	As directed by Engineer-in-charge.
37)	Providing PRECAST M-20 R.C.C. slabs over the spans of Cross Drainage work as per drawings including reinforcement, conveyance, fixing in C.M. 1:3 and curing, finishing complete.	CD.12 / Page No. 166 / I.S.456 (2000)	As directed by Engineer-in-charge.
38)	Providing and cutting, bending, hooking, laying, in position and tying TMT Steel bar reinforcement as per detailed drawing for R.C.C. works etc. complete.	BR.35 / Page No. 134	As directed by Engineer-in-charge.

Contractor

No. of Corrections

Executive Engineer

ANNEXURE – VI
SPECIFICATIONS FOR RIGID PAVEMENT

1. Scope

- 1.1 The work shall consist of construction of un reinforced dowel jointed plain cement concrete pavement in accordance with the requirement of these specifications, and in conformity with the fines, grades and cross section shown on the drawing or as directed by the Engineer-in-Charge. The work shall include furnishing of all plants and equipments, materials and labour and performing all operations in connection with the work as approved by the Engineer-in-Charge.
- 1.2 The design parameters viz. thickness of pavement slab, grade of concrete, joint details etc. shall be as stipulated in the drawings.

2 Materials

2.1 Source of Materials:

The Contractor shall indicate to the Engineer-in-Charge the source of all materials to be used in the concrete work sufficiently in advance, and the approval of the Engineer-in-Charge for the same shall be obtained before the scheduled commencement of the - work. If the Contractor later proposes to obtain materials from a different source, he shall notify the same to Engineer-in-Charge for his approval before such materials are to be used

2.2 Cement:

Ordinary Portland Cement for use on the works shall comply in every respect with the requirements of the IS-8112 amended from time to time. The cement used in the works shall be manufactured in India and shall be of a make and quality approved by the Engineer-in-Charge. Only 43 grade Ordinary Portland Cement shall be used. The Contractor shall provide and maintain proper and sufficient storage sheds for the cement on the worksite. The floor of the stores shall be raised at least 23 cm from the ground in order to protect the bags from moisture. Cement damaged by exposure or otherwise will not be allowed to be used in the. Work and same shall be removed from the site at once.

2.3 Admixtures:

Admixtures conforming to IS : 9103 and IS : 6925 shall be permitted to improve workability of the concrete or extension of setting time on satisfactory evidence that it will not have any adverse effect on the properties of concrete with respect to strength,

volume change, durability and has no deleterious effect on -steel bars. The particulars of the admixture and the quantity to be used, must be furnished, to the Engineer-in-Charge in advance to obtain his approval before use.

2.4 **Coarse Aggregate:**

(i) Aggregates for pavement concrete shall be natural material complying with IS : 383 with a Los Angeles Abrasion Test limits not more than 35 percent. The limits of deleterious materials shall not exceed the requirements set out in IS : 515. No aggregate having water absorption more than 2 shall be used.

(ii) Coarse aggregate shall consist of clean, hard, strong, dense, non porous and durable pieces of crushed stone or crushed gravel and shall be devoid of pieces of disintegrated stone, soft, flaky elongated, very angular or splintery pieces. The maximum size of coarse aggregate shall be 20 mm. for M-40 grade pavement concrete and for dense lean concrete (DLC) it shall be 25 mm. continuously graded or gap graded aggregates may be used as stipulated in IRC 44 and IRC 59 respectively, depending on the grading of the fine aggregate.

The aggregate shall not be alkali reactive. Dumping and slacking of aggregates shall be done in an approved manner. In case the Engineer-in-Charge considers that the aggregate are not free from dirt, the same may be washed and drained for at least 72 hours before batching as directed by the Engineer-in-Charge in such situation the absorbed moisture content shall be carefully monitored for controlling water cement ratio.

(iii) Fine Aggregate :

The fine aggregate shall consist of clean, natural sand conforming to IS:383. Fine aggregate shall be free from soft particles, clay, shale, loam, cemented particles, mica and organic and other foreign matter.

(iv) Sand shall be of approved quality with fineness modulus between screened to remove the oversize particles and washed to reduce the silt contents below 4 by volume after 24 hour and to bring it within the permissible range of fineness modulus. Blending of sand of fine and coarse quality may be permitted to achieve the required FM if it is found necessary to give desired results. The fine aggregates will be tested and retested as directed by the Engineer-in-Charge till they satisfy the required norms as per IS and as specified above,

2.5 **Water:**

Water used for mixing and curing of concrete shall be clean and free from injurious amount of oil, salt, acid, vegetable matter, or other substances harmful to the finished concrete. It shall meet the requirements stipulated in IS : 456-2000,

- (i) The rate proposed in this tender for all concrete and allied works are inclusive of water cost. The Contractor shall have to make their own arrangements at their cost for bringing adequate water of potable quality for mixing concrete, curing purposes and for this no extra payment will be made.
- (ii) The water brought for concreting and curing etc. shall be got tested from the laboratory as approved by Engineer-in-Charge to verify whether it is suitable for above purposes whenever directed, this testing will be done at Contractor's cost.

2.6 **Premoulded Joint Filler :**

Premoulded joint filler for expansion joint shall be of thickness shown in the drawing with tolerance of + 1.5 mm. It shall be 25 mm. less in depth than the thickness of the slab with tolerance of + 3 mm. and provided to the full width between side forms. Holes to accommodate dowel bars shall be accurately bored or punched out to give a sliding fit on the dowel bars. The joint filler shall comply with the requirements of IS: 1838 part I and II "Specifications for premoulded fillers for Expansion joint in concrete".

2.7 **Joint sealing compound:**

Cold applied sealant Polysulphide base (Pouring Grade) conforming to BS-5212 Part II and IS : 11433 shall be used. If primers are recommended by the manufacturer, they shall be applied neatly with an appropriate brush.

2.8 **Steel :**

The Mild steel shall conform to the requirement of IS : 432, IS : 1139 and IS : 178G as relevant. The dowel bars and Tie bars shall conform to Grade S 240 . If steel mesh is used, it shall conform to IS @ 1566. The steel shall be coated with epoxy paint for protection against corrosion.

3. **Proportion of concrete mix**

- 3.1 Immediately upon the receipt of work order, the Contractor shall inform the Engineer-in-Charge the exact location of source of the accepted materials. After approval of all the materials to be used in Pavement Quality Concrete, the Contractor shall submit the mix design based on proportion by weight of all ingredients for the approval of Engineer-in-Charge, The Mix design shall be submitted to the Engineer-in-Charge at least one month in advance of commencing the paving operation

For design of cement concrete mixes guidance may be had from IRC-44 "Tentative guidelines for cement concrete mix design for road pavement and IS-10262 and IS-SP-23 Hand book on concrete mixes".

- 3.2 The minimum cement content for Dry Lean Concrete and Pavement Quality Concrete shall be as follows :

Dry Lean Concrete (DLC)	Grade M-10	220 Kg. per Cum.
Pavement Quality Concrete (PQC)	Grade M-40	350 Kg. per Cum.

If this minimum cement content is not sufficient to produce in the field, concrete of the strength specified in the design, it shall be increased as necessary without additional compensation under the Contract. The maximum cement content shall, however, not exceed the limits as specified in relevant IRC Codes.

- 3.3 Specification criteria for mix design.

a)	Cement content	350 Kg to 425 Kg per cum
b)	W/C ratio	Not more than 0.45 & as per mix design
c)	Cement	Ordinary portland cement, 43 grade confirming to IS - 8112
d)	MSA	25 mm for DLC 20 mm for PQC
e)	Flexural strength	4.5 N / mm in field at 28 days for concrete of grade M-40
f)	Compressive strength	40 N / mm in field at 28 days for concrete of grade M-40

Note :- The mix design shall be based on flexural strength of concrete for Pavement Quality Concrete.

3.4 **Concrete Strength :**

- 3.4.1 While designing the mix in the laboratory, correlation between flexural and compressive strengths of concrete shall be established on the basis of at least thirty tests on samples. However, quality control in the field shall be exercised on the basis of flexural strength. It may, however be ensured that the materials and mix proportions remain substantially unaltered during the daily concrete production. The water content shall be the minimum required to provide the agreed workability for full compaction of the concrete to the required density as determined by the that mixes or other means approved by the Engineer and maximum free water cement ratio shall be 0.45.
- 3.4.2 The ratio between the 7 and 28 days strengths shall be established for the mix to be used in the slab in advance, by testing pairs of beams and cubes at each stage on at least six batches of trial mix. The average strength of the 7 day cured specimens shall be divided by the average strength of the 28 day specimens for each batch, and the ratio "R" shall be determined. The ratio "R" shall be expressed to three decimal places.
- 3.4.3 If during the construction of the trial length or during normal working, the average value of any four consecutive 7 day test results fall below the required 7 day strength as derived from the value of "R" then the cement content of the concrete shall, without extra payment, be increased by 5 percent by weight or by an amount agreed by the Engineer, The increased cement content shall be maintained at least until the four corresponding 28 day strengths have been assessed for its conformity with the requirements as per MORTH Clause 602.3.1. Whenever the cement content is increased, the concrete mix shall be adjusted to maintain the required workability.
- 3.4.4 **Acceptance criteria for concrete :-**
Average 28 days flexural strength of the batch of 4 beams should not be less than the specified characteristic strength plus 0.3 MPa. any concrete that fails to meet the strength specified shall be removed and replaced at Contractor's expense.
- 3.4.5 Sampling and testing of beam and cube specimens : At least two beam and two cube specimens, one each 7 day and 28 day strength testing shall be cast for every 150 cum (or part there of) of concrete placed during construction. On each day's work, not less than three pairs of beams and cubes shall be made for each type of mix from the concrete laid in pavement. Each pair shall be from a different delivery of concrete and a place to be designated by the Engineer in accordance with the procedure as outlined in

MORTH Clause 602.3.3 Groups of four consecutive results from single specimens tested at 28 days shall be used for assessing the strength for compliance with the strength requirements. The specimens shall be transported in an approved manner to prevent sudden impact, causing fractures or damage to the specimen. The flexural strength test results shall prevail over compressive strength tests from compliance.

- 3.4.6 A quality control chart indicating the strength values of individual specimens shall be maintained for continuous quality assurance. Where the requirements are not met with, or where the quality of the concrete or its compaction is suspect, the actual strength of the concrete in the slab shall be ascertained by carrying out tests on cores cut from the hardened concrete at such locations. The cores shall be cut at the rate of 2 cores from 150 cum. of concrete. The results of crushing strength tests on these cores shall not be less than 0.8 times the corresponding crushing strength of cubes, where the height to diameter ratio of the core is two. Where height to diameter ratio is varied, then the necessary corrections shall be made in calculating the crushing strength of cubes in the following manner:

The crushing strengths of cylinders with height to diameter ratio between 1 and 2 may be corrected to correspond to the standard cylinder of height to diameter ratio of 2 by multiplying with the correction factor obtained from the following equation:-

$$f = 0.11 n + 0.78$$

Where

f = Correction factor and

n = height to diameter ratio

- 3.4.7 The corrected test results shall be analysed for conformity with the specific requirements for cube samples. Where the core tests are satisfactory, they shall have precedence for assessing concrete quality over the results of moulded specimens. The diameter of cores shall not be less than 150 mm.

If however, the tests on cores also confirm that the concrete is not satisfying the strength requirements, then the concrete corresponding to the area from which the cores were cut should be replaced, i.e. at least over an area extending between two transverse joints where the defects could be isolated or over larger areas, if necessary,

as assessed by additional cores and their test results. The equivalent flexural strength at 28 days shall be estimated in accordance with MORTH Clause 602 3.3.2

- 3.4.8 In order to ensure that the specified minimum strength at 28 day is attained in 99 per cent of all test beams, the mix shall be proportioned to give an average strength at 28 days exceeding the specified strength by 2.33 times the standard deviation calculated first from the flexural strength of test beams made from the trial mix and subsequently from the accumulating result of flexure! strengths of job control test beams.

The standard deviation shall be re-calculated from the test result obtained after any change in the,, source or quality of materials and the mix shall be adjusted as necessary to comply with the requirements.

- 3.4.9 An individual 28 day test strength below the specified strength shall be evidence for condemnation of the concrete concerned if the average 26 day strength of this beam plus the preceding 5 and succeeding 4 beam exceeds the specified strength by 2.33 times the standard deviation and provided that these is no other evidence that the concrete mix concerned is substandard.

- 3.4.10 Beams shall be made day in pairs at intervals, each pair being from a different batch of concrete. At the start of the work, and until such time as the Engineer may order a reduction in the number of beams, required, at least six pairs of beams and cubes shall be made each day, one of each pair for testing at 28 days for determination of the minimum permission flexural strength and the other for testing at an early age for the Engineer to assess the quality of the mix When the first thirty number of 28 days results are available, and for so long as the Engineer is satisfied with the quality of the mix, he may reduce the number of beams and cubes required.

- 3.4.11 During the course of construction, when the source of any material is to be changed or if there is any variation in the quality of the materials furnished, additional test and necessary adjustments in the mix shall be made as required to obtain the specified strength.

- 3.4.12 The flexural strengths obtained on beams tested before 28 days shall be used in conjunction with a correlation between them and he 28 day flexural strengths to detect any degeneration in the quality of the concrete being produced. Any such deterioration

shall be remedied without awaiting the 28 day strengths but the earlier strengths shall not constitute sole evince of no compliance of the concrete from which they were taken.

3.4.13 Concrete shall not comply with the Specification when more than one test beam in a batch has a 28 day strength less than the specified strength and the average 28 day flexural strength of the batch of beams is less than the specified strength plus 2.33 times the standard deviation of the batch. Should the concrete fail to pass the Specification for strength as described above the Contractor may, all at his own expense, elect to cut from the suspect concrete as the Engineer shall direct. From the relation between cube strength and flexural strength, the core strength shall be converted to flexural strength.

3.4.14 The equivalent flexural strength at 28 days shall be the estimated insitu strength multiplied by 100 and divided by the age-strength relation obtained from Table 900-5 given in MORTH Specification 2001 on page No. 357 & 358. Any concrete, that fails to meet the strength Specification shall be removed and replaced at Contractor's expense.

3.4.15 In-situ density : the density of the compacted concrete shall be such that the total air voids are not more than 3 percent. The air voids shall be derived from the difference between the theoretical maximum dry density not the concrete calculated from the specific gravities of the constitutes of the concrete mix and the average value of three direct density measurements made on cores at least 150 mm diameter. Three core shall be taken from trial lengths and in first two km length of the pavement while the slab is being constructed during normal working, The proportion of the mix and the vibratory effort imparted i.e. the frequency and magnitude of vibration shall be adjusted to achieve the maximum density.

All cores taken for density measurement in the trial section shall be checked for thickness. The same cores shall be made use of for determining in situ strength. In case of doubt, additional cores may be ordered by the Engineer and taken at locations decided by him to check the concrete slab or the position of dowel / tie bars without any compensation being paid for the same. In calculating the density, allowance shall be made for any steel in the cores.

Cores removed from the main carriageway shall be reinstated with compacted concrete with mix proportions of 1 part of Portland cement, 2 of fine aggregate, 2 parts

of 10 mm nominal size single coarse aggregate by weight. Before filling the fine mix, the sides shall be hacked and cleaned with water. Thereafter cement- sand slurry shall be applied to the sides just prior to filling the concrete mix.

- 3.4.16 **Thickness** : Thickness shall be controlled by taking levels as indicated in MORTH Clause 902.3. Thickness of the slab at any point checked as mentioned above shall be within a tolerance of 5 mm to + 25 mm of the specified thickness as per Drawing. Thickness deficiency more than 5 mm may be accepted and paid for at a reduced rate given in MORTH Clause 602.15.2. In no case, However, thickness deficiency shall be more than 25 mm.

3.5.1 **Workability** :

The workability of the concrete at the point of placing shall be adequate for the concrete to be full compacted and finished without undue flow. The optimum workability for the mix to suit the paving operation shall be determined by the Contractor and approved by the Engineer-in-Charge. The control of workability in the field shall be exercised by Slump test (IS- 1199) and shall be further confirmed / controlled by Compaction Factor equipment and Compaction Factor shall be in the range of 0.80 to 0.92

3.6 **Design Mix** :

- 3.6.1 The Contractor shall carry out laboratory trials of design mixes with the materials from the approved sources to be used. Trial mixes shall be made in presence of tile Engineer-in-Charge or his representative and shall be subject to the approval of the Engineer-in-charge. They shall be repeated, if necessary until the proportions that will produce a concrete which complies in all respect with this specification, and conforms to the requirement of the design / drawing has been determined.
- 3.6.2. The proportions determined as a result of the laboratory trial mixes may be adjusted if necessary during start of the construction. Thereafter, neither the materials nor the mix proportions shall be varied in anyway except with the written approval of the Engineer-in-Charge.
- 3.6.3 Any change in the source of materials or mix proportions proposed by the Contractor during the course of work shall be assessed by making laboratory trial mixes unless approval is given by the Engineer-in-Charge for minor adjustments like compensation' for moisture content in aggregates or minor fluctuations in the grading of aggregate.

4 **Separation Membrane :**

A separation membrane shall be used between the concrete slab and the DLC. Separation membrane shall be impermeable plastic sheeting 125 micron thick laid flat without creases. Before placing the separation membrane, the DLC shall be swept clean of all the extraneous materials using air compressor. Where overlap of plastic sheet is necessary, the same shall be at least 300 mm and any damaged sheeting shall be replaced. The separation membrane may be stuck to the lower layer with patches of adhesives or appropriate tape or concrete nails with washer so that sheet does not move during placement of concrete.

5. **Forms :**

5.1 **Steel Forms :**

All side forms shall be of mild steel only. The steel forms shall be mild steel channel sections of depth equal to the thickness of the pavement or a few millimetres less than the thickness of the pavement to match with the plus level tolerances specified for sub base. In the latter case, the forms shall be levelled by using metal wedges or shims. The thickness of flange and web shall not be less than 6 mm and shall be capable of resisting all loads applied in the paving process. The length of form shall not be less than 3m except in the case of installations along curves. The sections shall have a length of at least 3 m except on curves of less than 45 m radius where shorter sections may be used. When set to grade and staked in place, the maximum deviation of the top surface of any section from a straight line shall not exceed 2 mm in the vertical plane and 5 mm in the horizontal plane. The method of connection between sections shall be such that the joint formed shall be free from difference in level, play of movement in any direction. The use of bent, twisted or worn-out forms will not be permitted. At least three stake pockets for bracing pins of minimum 25 mm dia or stakes shall be provided for each 3m of form and bracing and support must be ample to prevent springing of the forms under the pressure of concrete or the weight or thrust of machinery operating on the form.

5.2 **Setting of Forms :**

The forms shall be jointed neatly and shall be set with exactness to the required grade and alignment. Both before and after the form is placed and set, the subgrade or sub

base under the form shall be thoroughly tamped in an approved manner. Sufficient rigidity shall be obtained to support the form in such a position till during the entire operation of compacting and finishing of concrete they shall not at any time deviate more than 3 mm from a straight edge 3 m in length. Forms which show a variation from the required rigidity or alignment and levels shown in the drawing, shall be reset or removed as directed. The length and number of stakes shall be such as to maintain the forms at the correct line and grade. All forms shall be cleaned and oiled each time before they are used. Forms shall be set ahead of the actual placing of concrete for the entire day's work.

6. Joints :

The location and type of joint shall be as shown in the drawing. Joint shall be constructed depending upon their functional requirement as detailed in the following paragraphs. The location of the joints should be transferred accurately at the site and mechanical saw cutting of joints done as per stipulated dimensions. It should be ensured that the full required depth of cut is made from edge to edge of the pavement. Sawing of joints shall be carried out with diamond studded blades soon after the concrete has hardened to take the load of the sawing machine and personnel without damaging the texture of the pavement. Sawing operation could start as early as 6-8 hours depending upon the season.

6.1 Transverse joints :

Transverse joints shall be contraction and expansion joints constructed at the spacing described in the Drawings. Transverse joints shall be straight within the following tolerances along the intended line of joints which is the straight line transverse to the longitudinal axis of the carriageway at the position proposed by the Contractor and agreed to by the Engineer-in- Charge except at road junctions or roundabouts where the position shall be as described in the drawings.

- 6.1.1 Deviations of the filler board in the case of expansion joints from the intended line of the joint shall not be greater than + 10 mm
- 6.1.2 The best fit straight line through the joint grooves as constructed shall be not more than 25 mm from the intended line of the joint.

6.13 Deviation of the joint groove from the best fit straight line of the joint shall not be greater than 10 mm

6.1.4 Transverse joints on each side of the longitudinal joint shall be in line with each other and of the same type and width. Transverse joints shall have a sealing groove which shall be sealed in compliance with Clause 602.11 of MORT and H specifications (Fourth Revision)

6.2 Contraction joints :

Contraction joints shall consist of a mechanical sawn joint groove, 3 to 5 mm wide and 1/4 to 1/3 depth of the slab + 5 mm or as stipulated in the drawings and dowel bars complying with Clause 602.6.5 of MORT and H specifications (Fourth Revision) and as detailed in the drawings. The contraction joints shall be cut as soon as the concrete has undergone initial hardening and is hard enough to take the load of joint sawing machine without causing damage to the slab

6.3 Expansion joints :

The expansion joints shall consist of a joint filler board complying with Clause 602.2.7 of MORT and H specifications (Fourth Revision) and dowel bars complying with Clause 602.6.5 of MORT and H specifications (Fourth Revision) and as detailed in the drawings. The filler board shall be positioned vertically with the prefabricated joint assemblies along the line of the joint within the tolerances given in Clause 602.6.2.1 of MORT and H specifications (Fourth Revision) and at such depth below the surface as will not impede the passage of the finishing straight edges or oscillating beams of the paving machines. The adjacent slabs shall be completely separated from each other by providing joint filler board. Space around the dowel bars, between the sub-base and the filler board shall be packed with a suitable compressible material to block the flow of cement slurry.

6.4 Longitudinal joint:

The longitudinal joints shall be saw cut as per details of the joints shown in the drawing. The groove may be cut after the final set of the concrete. Joints should be sawn to at least 1/3 the depth of the slab + 5 mm as indicated in the drawing.

7. Dowel bars :

- 7.1 Dowel bars shall be mild steel rounds in accordance with MORT and H specifications (Fourth Revision) Clause 602.2.6 with details / dimensions as indicated in the drawing and free from oil, dirt, loose rust or scale. They shall be straight free of irregularities and burring restricting slippage in the concrete. The sliding ends shall be sawn or cropped cleanly with no protrusions outside the normal diameter of the bar. The dowel bar shall be supported on cradles/dowel chairs in pre-fabricated joint assemblies positioned prior to the construction of the slabs or mechanically inserted with vibration into the plastic concrete by a method which ensures correct placement of the bars besides full recompaction of the Concrete around the dowel bars. The dowel used in contraction joint shall be provided with plastic sheath with closed end over 60 per cent of the length. The dowels also can be coated with polyethylene. The thickness of sheath or polyethylene coating shall not exceed 0.50 mm.
- 7.2 Unless shown otherwise on the drawing dowel bars shall be positioned at mid depth of the slab within a tolerance of + 20 mm and centered equally about intended lines of the joint within a tolerance of + 25mm. They shall be aligned parallel to the finished surface of the slab and to the centre line of the carriageway and to each other within tolerance as given hereunder.
- 7.2.1 For bars supported on cradles prior to the laying of the slab
- a) All bars in a joint shall be within + 3 mm per 300 mm length of bar
 - b) 2/3rd of the bars shall be within + 2 mm per 300 mm length of bar
 - c) No bar shall differ in alignment from an adjoining bar by more than 3 mm per 300 mm length of bar in either the horizontal or vertical plane,
 - d) Cradles supporting dowel bar shall not extend across the line of joint i.e. no steel bar of the cradle assembly shall be continuous across the joint.
- 7.2.2 For all bars inserted after laying of the slab.
- a) Twice the tolerance for alignment as indicated in (a) above. Dowel bars supported on cradles in assemblies, when subject to a load of 110 N applied at either end and in either the vertical or horizontal direction (upwards and downwards and both directions horizontally) shall conform to be within the following limits.
 - i) Two thirds of the number of bars of any assembly tested shall not deflect more than 2 mm per 300 mm. length of bar.

- ii) The remainder of the bars in that assembly shall not deflect more than 3 mm per 300 mm length of bar.

Dowel bars shall be covered by a thin plastic sheath for at least 60 percent of the length from one end, for dowel bars in contraction joints or half the length plus 50 mm for expansion joints. The sheath shall be tough durable and of an average thickness not greater than 0.5 mm and shall have closed end. The sheathed bar shall comply with the following pull out test.

- 7.4 Four bars shall be taken at random from stock and without any special preparation shall be covered by sheaths as required in above Clause. The ends of the dowel bars which have been sheathed shall be cast centrally into concrete specimens 150x150x600 mm. made of the same mix proportion to be used in the-pavement, but with a maximum nominal aggregate size of 20 mm and cured in accordance with IS 516. At 7 days a tensile load shall be applied to achieve a movement of the bar of at least 0.25 mm. The average bond stress to achieve this movement shall not be greater than 0.14 MPa.
- 7.5 For expansion joints, a closely fitting cap 100 mm long with closed end consisting of GI pipe 3 mm thickness with closed ends shall be placed over the sheathed end of each dowel bar, An expansion space at least equal in length to the thickness of the joint filler boards shall be formed between the end of the cap and the end of the dowel bar by using compressible sponge to block the entry of cement slurry between dowel and cap, It may be taped all round.

8. **Tie bars :**

- 8.1 The bars in longitudinal joints shall be plain mild steel bars conforming to IS: 432 or deformed steel bars complying with IS: 1786 and in accordance with the requirements given below. The bars shall be free from oil dirt, loose rust and scale
Tie bars projecting across the longitudinal joint shall be protected from corrosion for 75 mm on each side of the joint by a protective coating of bituminous paint with the approval of the Engineer-in-Charge. The coating shall be dry when the tie bars are used.
- 8.2 Tie bars in longitudinal joints shall be made up into rigid assemblies with adequate supports and fixings to remain firmly in position during the construction of the slab. Alternatively, tie bars at longitudinal joints may be mechanically or manually inserted

into the plastic concrete from above by vibration using a method which ensures correct placement of the bars and recompaction of the concrete around the tie bars. Tie bars are also inserted mechanically or manually from sides. During side insertion in fixed form paving they may be bent so that half length remains along the form. After removal of forms, bars shall be straightened so that they extend into the concrete placed on the other side of the concrete.

- 8.3 Tie bars shall be positioned to remain within the middle third of the slab depth as indicated in the drawings and approximately parallel to the surface and approximately perpendicular to the line of the joint, with the centre of each bar on the intended line of the joints within a tolerance of + 50 mm, and with a minimum cover of 30 mm below the joint groove

9. **Weather and seasonal limitations :**

9.1 Concreting during Monsoon Months

When concrete is being placed during monsoon months and when it may be expected to rain, sufficient supply of tarpaulin or other waterproof cloth shall be provided along the line of work in addition to the portable tents. Any time when it rains, all freshly laid concrete which had not been covered for curing purposes shall be adequately protected by means of tarpaulins or other waterproof-cloth. Any damage caused to the surface or texture shall be corrected as decided by the Engineer.

9.2 Concreting in Hot Weather

As placing of concrete in air temperatures above 35⁰ C, is associated with defects, like loss of workability through accelerated setting, formation of plastic shrinkage cracks, etc. it is recommended that unless adequate precautions are taken no concreting shall be done in conditions more severe than the above. The procedures recommended for adoption in case of hot weather concreting are given in IRC:61" Tentative Guidelines for the Construction of Cement Concrete Pavements in Hot Weather

- 9.3 The execution of work shall only be allowed for ambient temperature not exceeding 35⁰C. The time for execution of C. C. pavement i.e. the laying of DLC and PQC shall be 6 P.M. to 2 AM next day. The Contractor will have to ensure, adequate lighting arrangement during the night working.

10. **Joint construction :**

The placement of concrete at construction joint is particularly critical Therefore care must be taken to ensure that only quality concrete is used in their construction. The concrete used to construct these joints should be the same as for the remainder of the slab. The practice of modifying the mix at the joints is not recommended. It should be kept in mind that load transfer across a doweled joint is greatly affected by the quality of concrete and compaction around the dowels. The placement of Dowels should be carefully verified soon after paving begins.

10.1 Sawing :

10.1.1 It is recommended that all joints be sawed. The sawing of transverse contraction and longitudinal joints should be a two phase operation The initial sawing is intended to cause the pavement to crack at the intended joint. It should be made to required depth as directed. The second sawing provides the necessary shape factor for the Sealant material.

10.1.2 When a lengthy period is anticipated between the initial saving of the joint and the final sawing and sealing, consideration should be given to filling the joint with a temporary filler. This filler material should keep any loose material out of the joint and reduce the potential for spalling.

10.2 Cleaning joints :

Air compressors, use for cleaning joints shall be equipped with suitable traps capable of removing all surplus water and oil in the compressed air. Immediately after sawing the joint the resulting slurry shall be completely removed from the joint and immediate area by flushing with a jet of water under pressure.

10.3 Installing Backup material :

A resilient rod type backup material will be installed in a manner that will produce the shape factor specified, if the sealant bonds to the backup material, a bend breaking tape is essential.

11. Surface Texture

After the final regulation of the slab and before the application of the curing membrane, the surface of Concrete slab shall be brush textured in a direction at right angles to the

longitudinal axis of the carriageway. For details reference shall be made to clause No. 9.9.4 of IRC-15-2002.

12. Surface Tolerances

The levels of the subgrade and different pavement courses as constructed shall not vary from those calculated with reference to the longitudinal and cross profile of the road shown on the drawing or as directed by the Engineer-in-charge beyond in tolerances mentioned below.

12.1 Tolerances in surface levels

1	Subgrade	+ 20 mm -- 25 mm
2	Granular Sub-base/WBM Layer	+ 10 mm -- 20 mm
3	Dry lean concrete or rolled concrete	+ 10 mm -- 10 mm
4	Cement concrete pavement.	+ 5 mm -- 6 mm

This may not exceed -8 mm at 0-30 cm from the edges.

12.2 For checking compliance with the above requirement for subgrade and base courses, measurements of the surface levels shall be taken on a grid of points placed at 6.25 m longitudinally and 3.5 m transversely or any other grid approved by the Engineer-in-charge. For any 10 consecutive measurements taken longitudinally or transversely not more than one measurement shall be permitted to exceed the tolerance as above. This one measurement being not in excess of 5 mm greater than the permitted tolerance.

12.3 For checking compliance with the above requirement for concrete pavement measurement of the surface levels shall be taken on a grid of 6.25 m x 3.5 m or 3.75 m or any other grid directed by the Engineer-in-charge. In any length of pavement, compliance shall be deemed to be met for the final road surface, only if the tolerance given above is satisfied for any point on the surface.

12.4 Surface regularity of pavement courses.

Contractor

No. of Corrections

Executive Engineer

The longitudinal profile shall be checked with a 3 metre long straight edge /moving straight-edge as desired by the Engineer-in-Charge at the middle of each traffic lane along a line parallel to the centre line of the road.

The maximum permitted number of surface irregularities shall be as per Table below.

Irregularity	Surface of Carriageways, and paved shoulders,			
	4 mm		7 mm	
Length (m)	300	75	300	75
National Highways/ Expressways	20	9	2	1
Roads of lower category	40	18	4	2

Note : Category of each section of road as described in the Contract.

12.5 The maximum allowable difference between the road surface and underside of a 3 m straight-edge when placed parallel with, or at angles to the centre line of the road at points decided by the Engineer-in-Charge shall be:

For pavement surface 4 mm

For granular sub-base/base courses and
sub-bases under concrete pavements 10 mm

12.6 Horizontal alignment

The horizontal alignment shall be checked with respect to the centre line of the carriageway as shown in (lie drawings. The edges of the carriageway as constructed shall be corrected within a tolerance of +10 mm there from.

12.7 Acceptance criteria for cracked concrete slabs:

Concrete slabs may develop cracks of minor to serious nature unless appropriate precautions are taken to prevent their occurrence either during the construction phase or post construction period. Cracks can appear generally due to the following reasons.

12.7.1 Plastic shrinkage of concrete surface due to rapid loss of moisture

12.7.2 Drying shrinkage

12.7.3 High wind velocity associated with low humidity

Contractor

No. of Corrections

Executive Engineer

12.7.4 High ambient temperature 8

12.7.5 Delayed sawing of joints

12.7.6 Rough and uneven surface of the base on which concrete slabs are constructed.

12.7.7 Combination of the above factors.

The slabs with full depth cracks are totally unacceptable as it amounts to structural failure. Besides, other cracks which are deep and are likely to progress in depth with time are also to be considered as serious in nature. Fine crazy cracks, however, are not serious. An acceptance criteria for cracked concrete slabs are

12.8 The concrete slabs can be accepted in the following situations:

12.8.1 Plastic shrinkage crack : The discrete crack which is less than 5 mm length and with its depth of penetration less than half the thickness of the slab and which does not intersect with a longitudinal edge or formed joint. The cumulative length of such cracks in each slab shall not be more than 1. M length. Cores can be cut to ascertain the depth of cracks where doubt arises.

12.8.2 Fine hairline crazy cracks

The concrete slabs are to be rejected where the cracks formed are not complying with the above stipulation. Therefore, the slabs which are to be rejected are.

- i) Slab with cracks running transversely or longitudinally penetrating to full depth and length of the slab.
- ii) Slab with cracks which are penetrating to more than half the depth.
- iii) Discrete crack which is more than 500 mm length although its depth of penetration is less than half of the depth.
- iv) When the total length of all discrete crack is more than 1.0 m whose depth of penetration is less than half the depth.

13 Clean Up :

The pavement surface shall be swept and / or washed down to remove all dirt, debris or foreign material prior to opening to traffic.

14 Opening to traffic :

Contractor

No. of Corrections

Executive Engineer

The Contractor shall not permit traffic on the cement until the concrete has attained a compressive strength of 40 N/mm²

15 Quality Control :

The tests and checks to be conducted for Q. C. And their frequency shall be as indicated in the table given below.

FREQUENCY OF QUALITY CONTROL TESTS FOR PAVING QUALITY CONCRETE.

1	Levels, Alignment and Texture	IRC 15 -2002 Reference
I	Strength	Clause 9.22.1
II	In situ density	Clause 9.22.2
III	Pavement thickness	Clause 9.22.3
IV	Surface levels	Clause 9.22.4
V	Surface Regularity	Clause 9.22.5
4	Water	
	Chemical Tests	One for approval fro source of supply subsequently only in case of doubt
5	Concrete	
	i) Strength of Concrete	2 cubes and 2 beams per 150 cum or part there if (one for 7 days and other for 28 days strength) or minimum 6 cubes and 6 beams per day work whichever is more.
	ii) Core strength on hardened concrete	As per the requirement of the Engineer only in case of doubt.
	iii) Workability or fresh concrete Slump Test	One test per dumper load at both batching plant site and paving site initially when work starts. Subsequently sampling may be done from alternator dumper
	iv) Thickness determination	From the level data of concrete pavement surface and sun base at grid points of 5/6.25 m x 3.5 m cores may be cut in case the Engineer desires
	v) Thickness measurement for trial length	3 Cores per trial length

	vi) Verification of level of string line in the case of slip form paving and steel forms in the case of fixed from paving	String line or steel forms shall be checked for level at an interval of 5.0 m or 6.25 m. The level tolerance allowed shall be +2 mm. Theses shall be got approved 1-2 hours before the commencement of the concreting activity
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16 FIELD LABORATORY

The following items of laboratory equipment shall be provided in the field laboratory to be established by the Contractor at worksite to carry out various tests. The ownership of the laboratory equipment will rest with the contractor after completion of work.

1	General	
i	Oven Electrical operated, Thermostatically controller, range	1 No
3	For Bitumen and Bitumen Mixes	
i	Penetrometer with standard needle	1 Set
ii	Rifflex Box – Small size	1 Set
iii	Centrifuge type bitumen extractor hand operated, complete with petrol / commercial benzene	1 Nos
iv	Filed density bottle along with cutting try, chisel hammer and standard sand	1 Set
v	3 m straight edge	1 Set
vi	Camber board / plate	1 Set
vii	Core cutting machine with 15 cm dia diamond cutting edge	1 Set
4	For Cement and Cement Concrete	
i	Vicat apparatus for testing setting times	1 Set
ii	Compacting factor test equipment	2 Set
iii	Scada based Compression testing machine of 200 tonne capacity with two dial gauges	1 Set

iv	Needle vibrator	2 Set
v	Air Meter	1 Set
vi	Vibrating hammer as per B.S. Specifications	1 Set
vii	Cube moulds for concrete 1) 150 mm x 150 mm x 150 mm 2) For flexure strength 150 mm x 150 mm x 700 mm	18 Nos 6 Nos
viii	Sieve shaker to accommodate 450 dia and 200 dia sieves	1 No
ix	Slump testing apparatus as per IS specifications	2 Nos
	E For Control of Profile	
i	Digital level complete with all upto 200 ⁰ C sensitivity 1 ⁰ C	1 No
ii	Platform balance 300 Kg capacity	1 No
iii	Balance 20 kg capacity	1 Nos
iv	Electronic Balance 5 kg capacity accuracy 0.5 g.	2 Nos
v	Thermometers : Mercury in glass thermometer range 0 ⁰ C to 250 ⁰ C	4 Nos
vi	Mercury in steel thermometer with 30 cm stem, range upto 300 ⁰ C	2 Nos
vii	Kerosene or gas stove or electric hot plate	1 No
viii	Glass wares, spatulas, wire gauges, steel scales, measuring tape, casseroles , Karahis, enameled trays of assorted sizes, pestle- mortar, porcelain dishes, gunny bags, plastic bags, chemical, digging tools like pickaxes, shovels etc	As per required
ix	Set of IS BRASS sieves with lid and pan 350 mm diameter : 63 mm, 53 mm, 37.5	1 Set

	mm, 26.5 mm, 13.2 mm, 9.5 mm, 6.7 mm and 475 mm size	
x	200 mm diameter : 2.36 mm, 2.0 mm, 1.18 mm, 600 micron, 425 micron, 300 micron, 150 micron, and 75 micron	1 Set
xi	Water Testing Kit	1 Set
2	For Aggregates	
i	Riffle Box	1 No
ii	Flakiness and Elongation Test Gauges	1 Set
iii	0.50 cft, 1.0 cft cylinder for checking bulk density of aggregate with tamping rod	1 Set
	accessories	
ii	Aluminium staff (4.00 m)	2 Nos
iii	3 mts. Straight edge and measuring wedge	2 Nos
iv	Camber templates two lane	2 Nos
v	Steel measuring tapes - 5 mts	2 Nos
vi	Steel measuring tapes – 15 mts	2 Nos
Vii	Steel measuring tapes – 30 mts	2 Nos

17 Other Equipment :

Other tools and plants required to earn/ out pavement concrete work are as below.

17.1 All equipment necessary for the proper preparation of the subgrade, sub base and batching, mixing, placing, finishing and curing of the concrete pavement shall be on the project in good working conditions and shall have been inspected by the Engineer-in-Charge before the paving operations are permitted to start. Throughout the construction of the project, the construction agency shall maintain adequate equipment in first class working condition to ensure proper execution of the work.

17.2 Batching Devices

All batching of materials should be by weight. Weighing equipment shall be of such design and construction that the materials for each batch can be quickly and accurately weighed. A weighing accuracy of a 1 percent may be considered satisfactory. The equipment shall conform to the requirement laid down in IS 2722-1964 'Specifications for portable swing weight Batchers for concrete (Single and Double bucket type). It shall be so constructed that the operator can readily shovel out the excess material in over charged hoppers, and the material released all at one time when the hoppers are discharged.

17.3 Mixer

Contractor

No. of Corrections

Executive Engineer

Concrete mixer of adequate capacity shall be provided and it shall be of the non tilting type, conforming to the requirements of IS 1791 "Specification for Concrete Mixer (First Revision)" and shall have a rated capacity of not less than 2 cement bags of mixed concrete. The mixer shall be equipped with an approved water measuring device capable of accurate measurement of water required per batch, the mixer shall preferably be equipped with a mechanically operated pump for filling the mixer tank

The mixer if specially specified, shall be equipped with an approved timing device which will automatically lock the discharge level during the full time to mixing and release it at the end of mixing period, the device shall also be equipped with a bell or adjusted to ring each time the lock is released. If the timing device gets broken or out of order, the mixer will be permitted to be used while the same is being repaired, provided an approved timepiece equipped with minute and second hand, is provided and that each batch is mixed for one and half minutes

17.4 Water supply equipment

The water supply equipment shall be of such capacity and nature as to ensure at all time ample supply and adequate pressure for all the requirement of sprinkling subgrade, make sub base, mixing and curing of concrete etc and all other requirement of the work.

17.5 Sub Grade Template or Strike Board :

The subgrade template or strike board shall be of a rigid construction approximately 100 mm wide and shall weigh at least 4 kg.

17.6 Hand Tamper:

The tamper shall be shaped to the cross profile of the slab and shall weigh not less than 10 Kg/m. It shall be constructed of 75 mm thick timber or of steel channel cross section two feet longer than the proposed width pavement slab and sufficiently strong and rigid to retain its shape under all working conditions. If it is of timber it shall be fitted with steel plate at bottom. The tamper shall be provided with handles which are resilient and sufficiently long to enable tamping operation to be performed by men in standing position.

17.7 Screed Board Concrete Vibrator:

Screed board vibrator used for compaction and finishing of concrete shall comprise of a wooden or mild steel screed with suitable handles. The screed shall be driven by vibrating device mounted thereon either Sally or by compressed air or by compressed air or by Petrol engine and propelled or made to travel on side forms, shall conform to IS. 2506 Specification for Screed Board Concrete Vibrators

17.8 Immersion Vibrator:

Immersion vibrator shall comprise, of a vibrating head with suitable motive power either of compressed air, electrical or of a Petrol driver engine rigid enough to ensure proper control, and manipulation in the mass of concrete. It shall conform to IS: 2505 Specification for concrete vibrators immersed type (First Revision). They shall be employed to ensure compaction of concrete along the forms and to avoid any tendency in honey combing at the edges of the slab. in case of road slab exceeding 125 mm thickness, they shall be used at suitable spacing for compacting the concrete over the entire width of the slabs in addition to screed board vibrator.

17.9 Longitudinal Float:

The longitudinal float shall not be less than 3.75m in length, 150 mm wide and shall be properly stiffened to prevent flexing and warping.

17.10 Bridges :

The bridges shall be so designed that when placed straddling the forms, no parts shall come in contact with the pavement. They shall be sufficiently rigid.

17.11 Long Handled wooden float

The blade of the float shall be at least 1500 mm long and 150 mm wide minimum of two floats shall be provided.

17.12 Belts :

The belts of canvas shall not be less than 150 mm wide and shall be at least 600 mm longer than width of the slab. A minimum of two belts shall be provided.

17.13 Push Brooms :

The push brooms shall not be less than 450 mm width and be made from good quality base fibre. The handle shall be least 300 mm longer than half the width of the slab. Minimum of four push brooms shall be provided.

17.14 Straightedge :

The straight edge shall remain true and rigid under working conditions and shall be swing from suitable handles. The size shall be 3.0 m

17.15 Edging tool:

The edging tool shall have a radius of 6 mm . The vertical limb shall extend to the required depth, A minimum two edging tools shall be provided.

17.16 Master straight edge :

The master straight edge shall be of known accuracy so that it may be used for checking other straight edges. It shall be made of steel or other suitable materials of sufficient length, and of sufficient rigidity to maintain its accuracy.

17.17 Other small tools :

Other small tools and equipment such as spades, shovel, iron pans, water pots, rods etc. necessary to complete the work in accordance with the intent and meaning of above Specification shall also be provided.

18. Curing Tank:

Curing tank shall be constructed at work site having minimum 28 compartments suitable for curing of C.C. Cubes and Beams.

The line sketches / photographs of necessary tools shuttering arrangement placement of dowel bars generally used are appended on page No. 174 to 176 for guidance.

18.01 Maintenance :

There shall be a defect liability for 2 year period 24 months for cement Concrete pavement. If during this period concrete road fails due to (1) Development of cracks (2) Spalling of edges

(3) Erosion of concrete surface etc. the action as decided for development of structural cracks, full depth cracks, the pane between two contraction joint shall be replaced. In the case of replaced slab, a defect liability period of 2 years shall be enforced from date of completion of such works. The decision of the Superintending Engineer will be final and binding to the contractor. The rectification of defects shall be earned out as directed by the Superintending Engineer, During this period dressing of joints complete, in all respect shall have to be done free of cost at east once in a year, preferably in the month of April or May or as directed by the Engineer in charge.

18.2 Every year before rainy season all joints / deteriorated joints shall be removed and duly filled new one so that there should not be seepage of rain water.

ANNEXURE –VII

B. SPECIAL CONDITIONS OF CONTRACT

B.1. Items of Work

B.1.1. Excavation : Excavation has to be carried out through existing bituminous / asphalted road, WBM, soling, murum or boulder murum etc. Minor dewatering is included in the item, if water table is below the excavation level; water from leakage from pipeline, sewer lines etc. may be met with. Selected portion of excavated material may be reused to fill inside shoulders or low lying areas along the road as directed. Surplus excavated material shall be disposed as per direction of Engineer. The Contractor will make his own arrangement for disposal of excavated materials if no direction of disposal is given. The rate, same as that for open excavation is applicable for excavation of trenches (may be deep) for the pipe to be laid or any other purpose.

After any excavation/ scarifying/scraping (or dismantling of road layers) and removal of the loosened material, the surface at bottom shall be compacted by rolling or other suitable method. Item of disposal of surplus excavated stuff shall be assumed to include the refilling with compaction in layers if required for some part in excavations.

While dismantling road or carrying out excavation or during excavating, care of service lines shall be taken. Where services like waterline, drainage, electric cables, communication lines etc. are found, Contractor will have to carry out manual excavation in such portions avoiding damage to the services and as per directions of Engineer.

B.1.1.1. The surplus (left after reuse) excavated/dismantled or waste material from the site shall be the property of the Contractor, and for its disposal it should be transported & dumped, at the dumping ground allotted or indicated by Department, at an earliest, as per instructions and as directed at the rate in contract. The Contractor has an option to use the material in labour camp, temporary approaches, diversions etc. or reuse the selected material to the extent possible in the work. The necessary transport & tipping charges at the dumping ground, as applicable, shall be borne by the contractor. Dumping ground is not available. The Contractor shall have option to dispose this material by any alternate method like giving to others etc of such material shall not be paid by Department.

B.1.2.1. Wherever granular sub base is specified, it is designed as a drainage layer, and it will consist of gravel, crushed stone, sand, crusher dust, coarse flyash/ bottom ash/ pond ash, etc, as provided in specification, in required sizes, and grading as per specification and mix proportioning and properly mixed during execution. Stone may be basalt or other rock approved by Engineer.

B.1.2.2. For items requiring murum supply or with as WBM or wet mix macadam (WMM), upto 50% of the murum requirement can be replaced by crusher dust and /or pond ash/ coarse fly ash if

Contractor

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proportioned and properly mixed. For WBM work reference shall be made to IRC19-2005. For item of murum filling, murum can be replaced up to 50% by combination of crusher dust, flyash, pond ash or bottom ash if proportioned and properly mixed. Similarly for item of stone dust or crusher dust filling, it can be replaced up to 50% by combination of fly ash, pond ash or bottom ash if proportioned and properly mixed.. Proportion of such replacement shall be obtained by laboratory trials and the approval by department and maximum limit given here may not be utilized.

B.1.3. For earth work compaction shall be done to achieve 95% (96% if specified) of Modified standard Proctor density test (standard Proctor test modified with higher compaction effort), where required. For such work, the Contractor should carryout the required laboratory and field tests as stated in Quality Manual (QM). The number and type of tests stated in QM are minimum required. The Contractor has to carryout any type of additional tests as may be required and directed by Engineer. The Contractor shall bear the cost of all such testing and no extra payment on this account is permitted.

B.1.3.1. Wherever excavation or scarifying is done, the bottom strata as obtained shall be compacted without extra cost, irrespective of whether a item provides for this compaction. Compaction will also be done after adding each layer of material. As far as possible compaction will be done by standard equipment for road works like roller, or vibratory roller if specified, or vibratory compactor as needed. Where the width of layer is small, such that roller or standard equipment can not work, compaction will be achieved by vibratory/ impact compactors etc. For such deviation in equipment for compaction, there will be no extra cost or no reduce rate payable to the Contractor, if proper compaction will be achieved.

B.1.4. Shifting of services is not included in any item of work. The Contractor may organize such work at extra cost if agreed to. Work should be got done from approved agencies having experience, permission (or license) to carry out such work. No extra payment on this account is paid to contractor.

B.1.4.1. All concrete (above M20 grade) shall be mixed in batch mixing plants, except concrete if required in small quantity at a time. For all the concrete including PCC, suitable mix design and testing of trial mixes should be done, record is to be submitted and get approval. For PCC as sub-base it is preferable to mix the concrete in Batch mixing plant, for which no extra cost or no deduction of rate will be made.

B.1.4.2. PCC shall be M10 grade, with minimum OPC 140 kg/m³ and flyash as required by mix design. Nominal maximum size of aggregate will be limited to approximately half the thickness of PCC. Wherever possible to do mechanized work, dry lean concrete or roller compacted concrete can be laid in place of PCC at the option of the Contractor without change in the rate of the item. Construction joint in PCC (or DLC) shall be staggered from the joints in PQC.

B.1.4.3. On laying of concrete not more than 80% of the item rate shall be billed for the pavement concrete, and 90% for PCC/DLC.

B.1.4.4. The branded fly ash shall be procured in bulker (bulk carrier tank truck mounted) or in bags. However the fly ash supply directly from precipitator unit of power plant shall be transported in bulker only and not in open truck or dumper.

B.1.5.1. For laying pavement quality concrete (PQC) un-bonded over a sub base, the top surface of the sub base (BT or PCC) shall be finished smooth and in profile, accuracy of which shall be similar to PQC. Evenness and smoothness is required for allowing PQC to shrink or expand due to temperature variations, thus relieve linear temperature stresses in PQC.

To facilitate this movement, over the sub base additionally a plastic (LDPE) sheet 250micron thick shall be placed which will also act as a de-bonding layer. LDPE sheet shall have elongation more than 600% and shall be tested through Dart impact test. Design or drawing will specify the use of plastic sheet with un-bonded concrete pavement. Before laying sheet the sub base shall be watered to keep it wet & cool while pavement concrete is being laid. There shall be no standing water on or under the separation membrane (plastic sheet) when concrete is being placed upon it.

B.1.5.2. For laying PQC on bituminous road the surface shall be brought to required profile by laying bituminous concrete (SDBC). Existing BT surface shall be cleaned using vacuum pump and broom, and applied with tack coat of bitumen as per specification, just before laying the bituminous concrete. Bituminous concrete (BBM) will be laid in portions where actual surface is nearly 50 mm or more below the required surface. For putting bituminous concrete over the existing bituminous pavement, scarifying of surface will be done as per the direction. For scarifying contractor may use milling equipment or any other machine. For a total surface area of a PQC concrete panel (between joints say 3.75m×4.5m or as actual) if new SDBC is already laid in proper level, the de-bonding LDPE sheet can be eliminated.

B.1.5.3. If bonded overlay is specified in design and drawing, for laying PQC bonded over sub base, the top surface of the bituminous sub base shall be roughened by milling. This shall be done using powered equipment. Milling operation shall be such that the final surface is rough and to the profile as required.

B.1.5.4. After roughening, and just before laying (proposed bonded overlay) concrete over subbase, fine dust from the surface shall be removed, and for bonding the surface shall be treated with primer spray of cement slurry applied with a suitable spray machine, in multiple passes and in minimum two coats. The slurry shall be applied at a speed such that at no time pool of slurry is formed on the surface. The slurry shall consist of total dose (all coats) of 3 kg of OPC and 2 kg of fly ash mixed in water of suitable quantity (say 15 to 20 liters) for treating each square meter of surface. For initial spray slurry will be thinner (& maybe with higher fly ash content), such that it can penetrate in to the surface. Based on the experience of working at site, the dose of fly ash being used per meter square may be varied as per the direction of Engineer. The rate of item payable shall not change, even if fly ash dose varies.

B1.5.5. Use of fixed form paver will be permitted on roads of small paved width (say <7.5m) or where slip form paver can not work. For use of fixed form paver specific permission of Executive Engineer will be required for each stretch of road under consideration.

B.1.6. The joints of concrete pavement, with other pavement (e.g. concrete block pavement, bituminous pavement, etc.) shall be treated and sealed as per designs or as per the directions of Engineer.

B.1.7. Specification for providing and applying anti-carbonate acrylic based paint to RCC anti crash barrier. The material for paint shall be from approved company e.g. Benton flair-W of Mc-Beauchamp or equivalent. The paint shall be got approved from Engineer. The specifications given by the company shall be followed strictly which shall generally be as follows. Preparation of surface:

- i) Clean the surface to remove dirt, loose particles, laitance, flaking and rub down to original hard surface.
- ii) Examine the surface. Any surface irregularities and blow-hole repairs should be effected with the material prescribed by the company.
- iii) First coat of the paint shall be applied with brush / rollers or spray as per manufacturer's directions.
- iv) 'Second coat of paint shall be applied after 8 hours or as specified by manufacturers.
- v) Approximate total thickness shall be 190 micron. Testing of paint shall be done as per manufacturer's direction. The rate shall include all labour, material, scaffolding etc. to complete the item satisfactorily. Mode of measurement: unit rate shall be as per sq. meter of the area painted.

B.1.8. The steel to be used for any item of work, shall be procured from a large manufacturer duly authorized / approved such as TATA, SAIL, RINL, SHYAM etc.

B.1.9. The poly sulphide based sealant and its primer, shall be approved after the initial test on the samples supplied by the manufacturer. The approved material shall be procured from the same manufacturer under approved sealed packs marked specially with the lot number and words on each pack "packed for concrete pavement project of P. W. Department". On each pack the manufacturer shall mention quantity, basic name of the material & formulation, date of packing, shelf life (use before – warning) and health warnings. With each lot of supply, manufacturer shall give certificates of quality, manufacturer's test reports, properties of basic material (e.g. adhesion & tension modulus, plastic deformation etc.), the method of working at the site (recommended process), a copy of excise gate pass and the bill of sale of the material.

Weight of sealant in each pack shall be such that once the pack is opened the material can be used immediately within small period as permitted by the manufacturer.

Contractor shall maintain the account of receipt, consumption, and empty packs of sealant. Register shall be maintained at site with details of type of sealant, make, size, batch/ lot number, date of dispatch from supplier, date of receipt, date of use and quantity, etc. Similar to the measurement

record, department should record the measurements of the consumption of sealant. This account will be verified and checked by Department's authorized engineers from time to time.

Before starting the work of joint cutting and sealing, the contractor shall prepare a method statement and get it approved. At the time of applying, the joint shall be clean and concrete side shall be surface dry (though concrete mass inside will be moist) by application of vacuum cleaning or compressed air.

The two part poly sulphide sealant (as per IS 12118 part 1&2) will be "AC-Poly seal" or Equivalent from a well reputed large manufacturer of construction chemical. Contractor has an option to use one part poly sulphide sealant (as per IS 11433 part 1&2) without any extra cost.

For use of sealant reference can be made to ASTM C1193 to the extent applicable.

B.1.9.1. The base material shall be off white and the curing agent shall be brownish to dark brown, and these will be mixed well in 92:8 ratio. The colors of the mixed and cured poly sulphide sealant shall be grey, black or dark brown (or shades in between) shall not be acceptable. Specific gravity shall be between 1.6 to 1.7, however after approval the

variation in specific gravity shall not be more than 2% from the average value declared by the manufacturer. After mixing pot life shall not be less than 2 hours at $27 \pm 2^\circ\text{C}$. Tack free (final setting) time shall be not more than 16 hours at laboratory temperature ($27 \pm 2^\circ\text{C}$). Base material shall not have any granular/ filler particle ($>200\mu\text{m}$ size). Manufacturer shall specify pot life at 35°C & 40°C . Material shall be stored at cool & dry place in the originally sealed container. Sealant shall have adhesion to concrete surface by using a suitable primer. Adequacy of adhesion to concrete shall be tested by frequent field test (one for each days work & not more than 500m length of joint). The surface of cured material should be smooth without any sign of grains in the material. After application the material shall be protected for 24 hours by applying a suitable tape over it or by other means. The material shall be locally tested for its pot life (initial setting). Field test for adhesion as per ASTM 1193-09 shall be performed on the completed joint and at the location of this test the joint shall be repaired without any extra cost.

B.1.9.2. The site tests are the appearance (colour & smoothness), which are part of regular inspection and supervision. The local tests will include pot life, tack free time, archeological properties at inclined position, resistance to plastic flow, % recovery, smoothness, specific gravity & loss of mass in 14 days.

B.3.0. Special Conditions for Concrete Road Work :

In addition to specifications else where in tender, the specifications given or referred in following shall apply. In general concrete shall be as per IS 456.

B.3.1.2. Existing pavement will be treated by a method specified in design & drawing. For this, different items are provided in tender, and work will be paid as per respective items.

B.3.1.3. Before laying the concrete slab, bottom surface shall be prepared even, in line- level and profile as per requirement. Unevenness within permissible limit, in this surface will require extra concrete thickness of concrete to be laid. For the pavement grade concrete to be laid, no where the thickness shall be less than the specified amount. Measurement shall be done for the specified thickness only. Cost of preparing the bottom surface and additional thickness if any shall not be paid separately.

B.3.1.4. Water proof membrane 125 micron thick plastic (LDPE) shall be used as a separation between concrete pavement slab and the sub base below it, wherever specified in design and specifications. This shall be a separate item of work. The Plastic sheet shall consist of virgin LDPE material. A suitable laboratory should test & certify the sheet of LDPE (chemically) not having recycled material or fillers. The sheet shall be nearly transparent or translucent and manufactured from virgin material without recycled polyethylene or plastic or filler materials like carbon black etc.. Sheet shall be tested by Dart impact test (850), tensile strength (28MPa) test, elongation (>600%), and specific density (0.918) etc. to qualify it to be virgin LDPE. Manufacturer shall give proof and certificate of procurement of virgin raw material for the sheet manufacturing with each delivery lot. Its extensibility in tension test before failure should be not less than 600%. Though filler material is not permitted, property enhancer may be added and in which case sheet can be opaque white and with properties: Dart impact test (1500), tensile strength (30) test and elongation (>800%), specific density (0.95 to 1.05). Sheets of black or any dark shed indicate filler material being mixed, and same will not be permitted. The sheet should be manufactured from an automatic machine having auto correction of gauge/thickness, which is confirm by the inspection of machine and the operating manual of machine. Surface of sub-base below plastic sheet shall be plain and smooth such that with the sheet, restrain is negligible for sliding of PQC layer to relieve the strains due to linear changes in initial temperature and shrinkage.

B.3.2. Coarse aggregate shall be crushed from Black Basalt (/Trap) rock. Its surface should not have brown skin. Stone should be derived from hard rock and not from soft rock. Proportion of elongated and flakey particles shall be limited to the values as in the samples used for mix design and trial mixes. These properties should be mentioned in the mix design report.

Nominal maximum size of aggregate will be 20mm, however at the option of contractor little over size may be permitted such that the nominal maximum size of aggregate is 25 mm (i.e. not more than 15% retained on 25 mm sieve) and absolute maximum size not more than 30 mm (i.e. 100% passing through 30 mm sieve).

For 10 to 20 mm size fraction, elongation index shall not be more than 40%, and flakiness index not more than 20%; however total of elongated and flakey particle should not be ore than 50%.

For size fraction 10 & below, elongation index shall not be more than 20%, and flakiness index not more than 10%. This size fraction shall be obtained from cone or impact crusher. This size fraction from the secondary jaw crusher may be acceptable, if the requirements of elongation index and flakiness index are very well within limits specified.

To have consistent (uniformity in) supply of aggregate (with least variation in particle size & shape) it is advisable for contractor to have his own or dedicated crusher, more specifically for size fraction 10 mm and below. It will be advantageous (in terms of strength) to use aggregate obtained from impact crusher or cone crusher etc., rather jaw crusher. It should be noted that the aggregate supplies as available from jaw crusher for 2 to 10 mm size fraction is usually highly flakey, which hinders the strength erratically. Hence it is advisable to have this size fraction produced in impact or cone crusher. For uniformity in the quality of aggregate, contractor should own or lease or arrange exclusive cone crusher or impact crusher. If contractor is getting supply of aggregate from multiple sources, periodicity of tests of aggregate (shape, size, elongation index & flakiness index) shall be much higher to establish uniformity in the quality of aggregate. For supplies from jaw crushers the shape & size will vary as the size of feed stone and crushing ratio changes. Hence for the supplies from a particular jaw crusher, the variation in the quality can occur for supplies on different days (day to day).

B.3.3. Sand shall be of approved quality with its particle size grading similar to that used for ix design.

The natural sand shall be screened to remove the pieces of bricks tiles, gravel particles of amorphous silica and clay balls. The fine aggregates shall be free from soft particles, clay, hale, Loam, cemented particles, mica, organic materials and other foreign matter. The fine aggregates shall also be free from chert, flint, chalcedony or varieties of amorphous silica, which can react with alkali. Screening of sand done such that particles above 10 mm size are separated, will remove most unwanted materials. Deleterious substances (excluding silt) shall not be more than 3%. The Contractor has option to use combination of coarse and fine sand to get better grading. From different quarries (different places on river or different river) sand of different fineness can be obtained. Due to problem of availability of enough sand from a source or for better blending option, contractor may have to tap alternate other sources also. No extra lead shall be paid for changes in the source. The natural sand shall have angular shape (nearly cubical) particles, and round black sand shall not be permitted. The typical sand shall have silica about 30% or more.

The Contractor also has options to use crushed sand, or a combination of crushed sand and natural sand, or natural sand only. However crusher dust can not be regarded as crushed sand. Crushed sand if to be used shall be produced in a proper crusher for the purpose and the sand produced should not be flakey, flakiness index not more than 10%.

The Contractor also has option to use crusher fines (excluding stone flour) up to 10% of the total quantity of fine aggregate. Total amount of silt plus crusher fines should not exceed 12% of total quantity of fine aggregate. If crusher fines is highly flakey (>30%) its limit shall be 5%.

Coarse fly ash can also be used as part of fine aggregate, if supply of flyash is showing consistent results (i.e. small variations) in its parameters and is approved after laboratory test of its constituents. Total amount of silt, crusher dust & flyash (fraction passing through 200 micron) shall not be more than 25% of the total fine aggregate. For all fractions constituting sand (fine aggregate), combined fineness modulus shall not be more than 3.40.

All or any of above options can be exercised only if these are taken in to account in the mix design, as well as in all trial & confirmatory mixes; and the batching plant has options to feed the many different aggregate types. If proportions of different fine aggregate (from different sources) change, the mix design has to be validated again. Sand from different sources shall be stacked separately, and batching shall be done as per tested and approved mix proportion,

B.3.4. The materials shall be tested. As far as possible, tests shall be carried out before use of materials. In case, the test results are not available before use, such use of the materials will be permitted on the satisfactory test in past of the material from the same source. Use of material will be permitted, with explicit understanding that substandard material shall be remove and work to be redone at the cost of contractor, if material is found to be sub-standard. For all the materials (e.g. cement, flyash, GGBS, steel, sealing compound etc.) contractor shall obtain and submit a copy of manufacturers test certificate for the material lot supplied for the use in work. In case of supplies of unbranded flyash for which manufacturer's certificate is not available, detailed tests shall be carried out before its use for each lot. The cement can be used immediately after receipt if accompanied with manufacturer's test certificate. However confirmatory testing will be performed as per requirement of quality manual.

B.3.4.1. Water used for mixing and curing of concrete shall be clean and free from injurious amount of oil, salt, acid, vegetable matter and other substances harmful to the concrete. If water used in mixing and curing is from a source other than municipal water supply, water from each source should be tested once to confirm its suitability as per IS 456. In no case waste water or water from a sewer shall be used. Use of ice shall also confirm to the requirements of water chemically.

B.3.5. The Contractor can use Ordinary Portland Cement (OPC) grade 43 or 53 (IS 8112 or 12269), or Portland Pozzolana Cement (PPC) -flyash based (IS4789 part1), or Portland Slag (PSC) Cement (IS 455), or any combination thereof. However for each combination of cement use detailed mix design procedure including confirmation by field trials tests, will be followed. Such mix design & field trial procedure will be followed also when source of supply of cement, or change in the characteristic property of any of the constituent of concrete takes place. If blended cement (i.e. flyash or slag) is used the

declaration of % of pozzolana in cement shall be obtained from the manufacturer.

The cement shall be procured from large and reputed manufacturer like ACC / Ambuja / Birla / Lafarge / Rajashree / Ultratech, and others as approved by PMC. For each lot of cement supply, cement will be tested for routine tests like settling time & strength. Mixing of additional flyash at batching plant will not be permitted with PPC or blended cements.

B.3.5.2. For PQC (pavement quality concrete), total quantity of OPC (without flyash addition at the plant) should not be less than 325 kg/m³, & not more than 400 kg/m³; PPC (without flyash addition at the batching plant) should not be less than 350 kg/m³, & not more than 450 kg/m³; OPC + pozzolana (flyash) should not be less than 400 kg/m³, & not more than 500 kg/m³. For OPC + flyash combination, the flyash shall be ordinarily up to 35% (however permitted only up to 20% in the rate analysis & item specifications) of the total cementitious powder, and minimum OPC content not less than 300 Kg/m³. OPC content shall not be less than 140 kg/m³.

Irrespective of the minimum & maximum cement or cementitious content specified, there will be no extra payment or deduction for the actual cementitious content required to achieve the strength and other parameters of the concrete.

B.3.5.3. The quantity of cement to be added in each batch shall be on the basis of actual weight and any loss of cement in transportation, handling, feeding etc shall have to be born by the Contractor.

B.3.6. All pavement quality concrete shall be produced in batch mixing plant only, either of contractor or of RMC. All the requirements of IS 4926 shall be complied in both cases, either of RMC supply or from contractors batch mixing plant. Requirements of IS 456 and IRC 15 clause 9.4.2 shall also be complied with. The Contractor shall install one or more batch mixing plants as may be required for the progress of work. Tilting drum mixer shall not be allowed in the plant. Mixing efficiency test shall be performed on the mixer. Samples from first 25% output of mixer, and last 25% output shall be compared for uniformity of mixing. For this test rest of details shall be as per IS 4634.

Whether concrete is supplied by RMC or by contractor's batch mixing plant, Mix proportions in all details including standard deviation assumed, along with the results of trial mix, shall be submitted to department. The Contractor as a guarantor of quality of concrete, shall get the mix designed and inform the proportions to department and get the proportion approved. Method of mix design is the option of contractor and the same need not be subjected to any approval. Mix design/ proportioning shall be suitable for presence of fibers in the concrete mix, and be such that flexural strength is maximized. Cost of all ingredients and services required for the concrete work is to be covered by the cost quoted, even if some of the conditions/ specifications for concrete are varied, relaxed or modified.

B.3.6.1. It will be the sole right of the department to disallow the ready mixed concrete from a specific plant, without assigning any reason. Handling and compaction of PQC shall be as per SP 76-2008 strictly. Each Batch mixing plant should be certified for the quality system.

B.3.6.2. Mix design will be valid till the variations in quality of each constituent material shall be in a narrow range (uniformity or consistency in quality) and also achieving satisfactory characteristic strength specified. Robustness of mix design (proportioning) shall be revalidated by trials if the quality variations are large enough. Mix design will be revised if characteristic strengths fall short of requirement.

B.3.7. Designed mix shall contain synthetic fibers (like polypropylene, acrylic, aramid, carbon, polyamide, polyolefin, etc.) of duly approved type and brand at a minimum dose of 0.10 % by volume i.e. one liter per cubic meter of concrete shall be added (i.e. 0.91 kg/m³ for specific gravity of fiber 0.91). Polypropylene monofilament fibers (triangular / circular /rectangular) can be used if it can give better performance of concrete compared to the concrete with fibrillated polypropylene fibers of same dose. Fibers having better

performance as per technical literature and test record will be acceptable with approval from Structural Design Consultant. Fibers of polyester or polyethylene will not be acceptable in any case. The type of fiber and its length shall be approved by Structural Design Consultant, based on fiber characteristics and the results of extensive tests done on concrete similar to the concrete which will be used in this project of Nagpur city. The tests should be conclusive to give data on statistical variations, and characteristic values. Results of tests done by independent third party laboratory, without & with the proposed fibers shall be submitted to both PMC and design consultant. The third party laboratory should be NABL accredited or approved by PMC as per procedure given in this tender.

Results should conclusively show that the compressive strength and flexural strength, both at 28 days & 90 days shall be above the strength of control concrete (i.e. concrete without fibers). Results indicating reduction of strength will not be acceptable. Brand of fiber will be acceptable only if the criteria for characteristic strengths are met with. Final trials shall have to be carried out with the mix proportion adopted by the Contractor for PQC. Contribution of fiber to concrete will also be judged by the residual strength test and toughness index.

B.3.7.1. As supplied, fibers shall not be it self or contain components which adversely affect the strength and quality of concrete also in long term. The constituent material of the fiber and any coating shall be declared by chemical and generic name. The resistance of the fibers to alkali environment must be established by a third party laboratory of national reput or the extensive tests done in past. Such tests are not required for fibers of steel, aramid, carbon, alkali resistant glass fibers and virgin

polypropylene, as these are known to be alkali resistant. Any admixture and coating on the fibers must be declared by the manufacturer by giving chemical/generic names and other details. It should be conclusively proved that such additive or coating is very well compatible with the concrete and does not harm it in long term.

B.3.7.2. Just before casting of cubes or beams, concrete can be remixed. For all testing, quality control, and from trial mixes, specimens (cubes/beams) shall be cast at a delay of minimum 1 hour from the time of mixing initially.

Method of dosing, dispersion and mixing fibers in concrete shall be such that the concrete is uniform, fiber population is uniformly distributed, there is no balling effect, and compressive strength of concrete shall not be reduced. Fibers must be added by dosing equipment which allows fibers to be added as a stream during mixing and not added in lots at any instant. The stream of fibers added to mixer shall be at a rate uniform rate for not less than 15 seconds while the mixer is mixing ingredients, for each batch if mixing,

The total mixing time shall not be less than 60 seconds and also not less than 30 rotations.

After the addition of the fibers in mixer mixing time should not be less than 30 seconds and also not less than 10 rotations. Higher rate of dosing, and smaller mixing time can be accepted if it is conclusively proved by enough trials of the dosing equipment and type of a mixer, that the fiber dispersion in concrete is uniform and balling does not take place.

On test, if quantity of fiber is found to be less than specified value, the concrete rate shall be reduced by 600/- per kg of deficiency in synthetic fiber, per cubic meter of concrete.

B.3.8. Concrete for pavement with approved synthetic /polymeric (/polypropylene) fibers shall be proportioned (i.e. mix designed) for not less than M40 grade i.e. 28 days characteristic compressive strength not less than 40 MPa (N/mm²) and 50 MPa for 90 days. Simultaneously characteristic flexural strength, by third point load beam test, shall not be less than 4.5 MPa at 28 days, and 5.0 MPa at 90 days. The Contractor shall be responsible to all the four characteristic values specified above, and aim of mix design shall be accordingly to meet all the limits, and there by some limits may be well exceeded. For acceptance of pavement quality concrete (PQC) all the four characteristic concrete strengths shall be verified, and the criteria is to be fulfilled. Samples for each one test of the four, shall be taken from different batches of concrete delivered at site.

All strengths specified in this clause are characteristic strength. Characteristic strength means, statistically strength of samples shall exceed the characteristic value at a probability of 95%, and only for 5% chance strength could be below characteristic value, and average of all samples must be well above characteristic value. Fiber dose higher than the minimum and use of super plasticizer as required to achieve the desired characteristics, shall not paid separately. There shall be no separate

payment for fibers. The test laboratory should specify that all specimens were cast at a delay of minimum one hour after mixing.

B.3.8.1. For concrete with approved synthetic fibers at the dose being used in the work, average residual strength tested as per ASTM-1399 (or by other suitable method), shall not be less than 0.25 MPa for average of 5 specimens and any individual value not less than 0.17 MPa. This test will be a confirmatory test on concrete mix design, to be performed three times, and need not be part of quality control / quality management regularly.

B.3.10.1. During construction if it is found that after full compaction, often the concrete can bleed, i.e. bleeding water comes to the concrete surface, water quantity in mix shall be reduced. Bleeding forms vertical channels in concrete, thus introducing weakness. Hence whenever bleeding occurs, this excess water should be removed from top surface (or allowed to evaporate) and concrete should be re-compacted to achieve dense concrete.

Normally concrete mix shall be a non-bleeding type, which can be obtained by reducing water content .

B.3.11. In the designed mix, margin shall be kept for the addition of total dose of chemical admixtures like retarded and super plasticizer in designed amount and also the provisional amount which may be added as option. Dose of admixtures which shall be added in all normal supply of concrete, has to be declared so in the mix proportion, and these doses will be called designed dose. Provisional dose is the subsequent additional dose which may be required as per the circumstances. No extra payment shall be made for the use of admixtures in concrete.

B.3.12.1. When temperature of fresh concrete as laid is higher than 25°C or air temperature is more than 30°C, setting of concrete is faster. Concrete under such circumstances may lose some of its potential strength due to time delay between mixing to compaction of concrete.

Hence under such higher temperature concrete be tested for strength by filling cubes with the time delay as required on site till compaction is done. If 28 days strength obtained is not satisfactory, mix shall be revised by increasing the dose of retarded and / or reducing water content in mix and /or cooling concrete by using chilled water for mixing or ice flaks as per requirement etc.

B.3.12.2. In hot weather if temperature of fresh concrete as produced is higher than 25°C, precautions shall be taken to reduce the temperature of concrete by cooling of aggregates. If temperature of concrete at the time of finishing, just after placing, is likely to be over 30°C the precautions as given in IRC 61 and IS 7861 part 1 shall be adopted. Such precautions are needed to reduce possible cracking at higher temperature in young concrete due to heat of hydration. This effect is in addition to marginal loss in strength of concrete. As per IRC 15 (6.4.2), temperature of the fresh concrete above 30°C shall not be permitted at the time of laying concrete. Hence temperature of concrete at batch mixing plant

should be suitably lower than 25°C. For lowering the temperature of concrete cooling of aggregates, and chilled water or ice flacks may be required.

When air temperature is 40°C or more, the concrete in place (being laid or already laid) shall be covered with tarpaulin (or any other translucent sheeting or fabric) put on a convenient arrangement during 11 am to 5 pm (as recommended in IRC 9). For such cover or tent, movable arrangement can be made. Refer IRC 61 & IRC 84. At the time of placing of concrete the temperature of the sub-base (layer below) if more

than 35°C, the action should be taken to reduce the temperature. Such action can be mist spray or fogging over the surface for about 2 hours before laying PQC and covering the surface to avoid sun rays directly.

B.3.12.3. Hotter part of the day can be avoided for laying concrete. Concrete laying job can be in evening, morning or night hours with prior information to department.

B.3.13. Concrete workability as a guidance, should be 0.75 to 0.85 by compaction factor method (IS 1199), approximately 0 to 30 mm (± 10 mm) by slum test may be permitted. At the option of concrete producer workability can be measured by any other method like flow table or inverted cone test as may be deemed to be the suitable method. Higher workability from the above values may be permitted, if contractor gives the reasons. The Contractor may choose higher workability if needed for the work, in his opinion. For workability test at site, compaction factor method will be used if target workability is less than 30 mm. At site workability of the concrete will be checked for record purpose and for judging the possible variation in the quality of concrete, however it will not directly affect the acceptance of concrete. Variation in workability indicates a possible variation in mix, and will need cube samples to be taken from the specific batch of concrete and tests to be done.

B.3.14. Mix design of concrete shall be for a minimum delay of one hour between mixing to delivery & compaction. This time of delay shall also include a margin for delay in transportation of concrete due to traffic jam or else. The Contractor can choose a higher margin of delay and use the retarder dose suitable for the same. Validity of such margin shall be verified by taking samples of concrete at site and filling cubes at such delay, and testing cubes for compressive strength. Concrete arrived at site beyond such delay (assumed in mix design) shall be rejected.

B.3.14.1. Retarder (admixture) shall be added at the batch mixing plant, if contractor chooses to use it. The Contractor will have option to use retarding plasticizer. Dose of retarder will depend upon estimated longest delay from mixing to delivery and compaction of concrete.

In addition to the admixture used at the time of mixing, if superplasticizer is proposed to be used, it should be added as late as possible, i.e. 5 minutes before the concrete is discharged from truck at site of delivery, however after adding admixture concrete must be mixed in the mixer for at least 2 minutes in the transit mixer.

B.3.14.2. If concrete does not appear to reach the site within one hour, the staff on transit mixer can add a predetermine quantity of retarder (or admixture) to the concrete drum as a second dose for which mix proportion has provision. In case of such an addition, it shall be declared by making an entry in the delivery ticket.

B.3.15. At no point of time after leaving mixer of batch mixing plant, water or any other material should not be added to the concrete, except the admixture for which provision is already kept in the mix proportioning.

B.3.16. Concrete from batching plant will be transported in transit mixers. In cases where transport time is 20 minutes or less and distance of transport is less than 6 km, transport by dumpers will be permitted if workability is not more than 30 mm slump. The body of dumper shall be smooth, watertight, equipped with gate which adequately prevents loss of cement slurry or mortar and permits control on discharge of concrete. While transporting in non-agitating equipment, concrete will be covered by tarpaulin to protect against the weather. If uniformity of concrete transported in dumper gets affected, this mode of transport shall be disallowed.

B.3.17. On receiving concrete at site, its temperature shall be noted . Record of air temperature and concrete temperature at the time of arrival of each batch of concrete at site shall be kept. Delivery ticket shall mention temperature of air & of concrete at the time of discharging from plant mixer, and also at the time of delivery at site of work.

B.3.18. Before laying concrete, the surface below it should be adequately watered on the previous day so as to keep the strata below it in moist condition, but no free surface water. Watering of surface below is also aimed at reducing the temperature of surface in hot summer days. For bonded overlay, before starting concrete laying work, cement slurry shall be sprinkled on the surface.

B.3.19. If concrete is to be laid on the side of existing concrete already laid, the surface of existing concrete should be coated with hot/cutback bitumen of 80 / 100 grade in 2 coats. This coating should be applied on dry surface. On other sides of slab for forming vertical sides formwork shall be fixed, preferably of steel channels, which should be erected and fixed perfectly in vertical position. The gaps between two channels shall be properly covered by adhesive tape or waterproof sheet. The gaps at the

bottom of form (steel channel section) shall be properly sealed in cement mortar for which no extra payment will be made.

B.3.20. Double bulkheads for keeping the dowel bars in the proper alignment shall be provided as per drawing, and as directed by the Engineer. Tie bars should be aligned exactly perpendicular to finished concrete surface of the slab by means of suitable device to be approved by the Engineer.

Chairs for dowel bars shall be provided as per the drawing and directions of the site in charge. Separate payment shall not be made for the chairs.

Unless shown otherwise on the drawing, dowel bars shall be positioned at the mid depth of the slab within the tolerance of ± 20 mm spaced equally along intended lines of the joints within tolerance of ± 25 mm. These shall be aligned parallel to the finished surface of the slab, to the centerline of the carriage way and to each other within the following tolerance. For the bars supported on bulkhead prior to the laying of the slab - All the bars in a joint shall be within ± 4.5 mm per 300 mm length of the bar.

Two third of the bars shall be within ± 3 mm per 300 mm length of the bar. No bar shall differ in alignment from adjoining bar by more than 3 mm per 300 mm length of the bar in either horizontal or vertical plane.

The Dowel bars shall be covered by a sheath of High Density Polythene pipes of approved quality for half the length plus 25 mm for expansion joints. The sheath shall be tough, durable and of an average thickness not less than 1.25 mm. The end portion of the sheath shall be plugged with suitable properly tight cap fitting. Alternately it can be covered by a wrap of suitable plastic sheet as approved by design engineer.

Accuracy in the placement of dowel shall finally be governed by their purpose to allow linear movement of slab while transferring the shear loads.

B.3.21. The contractors shall cast runner beams, manhole bay, water entrance bays etc. as required, preferably within 3 to 5 days from the date of casting slab.

B.3.22. For laying and finishing concrete mechanical pavers shall be used. The Contractor has option to use automated pavers like slip form paver. Option to use 'fixed form paver' or better equipment can be adopted in compelling case with approval of department & design consultant. Fixed form pavers unit is guided on steel channels, and these will also act as formwork. The unit should have arrangement for adjusting and controlling the profile of top surface and it also works as screed vibrator.

Other tools and equipment shall be as per the requirement of IRC 43 and as suggested in IRC 15. However contractor should have stand by arrangement of screed vibrators for emergencies. Each steel section utilized as side form, shall be checked for straightness and flatness of its surface to be used as shuttering for concrete. This also applies to top surface on which paver is guided.

B.3.23. If the concrete thickness is more than 200 mm, concrete will be laid in two layers. Bottom layer (about 60% thickness) will be compacted by rodding and plate vibrator. After laying top layer, vibration may be done by needle (immersion) vibrator wherever needed and regularly by screed vibrator. The distance as well as time lag between bottom concrete layers and top layers during concreting operation shall not exceed 2.5 meters, or 30 minutes whichever is less. The rate quoted by the Contractor shall be valid for the variation in the thickness of PQC as per design & drawing, & the thickness will usually in the range of 150 to 250 mm and 200mm being most common.

B.3.23.1. To achieve the proper consolidation of the concrete slab, the top layer of the concrete shall be compacted by needle vibrator and or plate vibrator as may be needed, and finally by screed vibrator. If any depressions are observed on the surface of the concrete, fresh concrete shall be spread on the top, surcharged and got compacted with batten (float), screed vibrator is again to be used for compaction as well as leveling. Minimum 2 skilled masons shall be deployed during PQC placing.

B.3.23.2. Wherever the needle vibrator is inserted, extra concrete should be available at top to fill the space left by the withdrawal of vibrating needle. The mason attending the work must ensure that hollow portion if left after withdrawal of needle, is filled over by fresh concrete and not by disturbing the vibrated concrete around. If need be rodding & plate vibrator may be used thereafter at such location. Wherever required, temping shall also be done, especially to sink the protruding larger size aggregates.

B.3.23.3. Care shall be taken to prevent the over vibration and appearance of water / laitance on top surface of the slab. If any excess water is noticed on the surface of the slab, the same shall be removed by moving Hessian cloth on top surface and the concrete near the surface shall be immediately rectified as directed, and subsequently the surface shall be floated. Such bleeding concrete is usually not acceptable. And the quantity of water in the mix should be reduced.

B.3.24. Floating shall be done as per 9.10.6 of IRC 15.

B.3.24.1. Finishing of concrete :

- i) The finishing of the concrete surface shall be done by using a longitudinal float traveling across the slab. Before the texture is applied, the longitudinal oscillating flat shall complete the traverse of the slab in both directions within the length of the float and shall have a total longitudinal stroke of 200 mm to 300 mm.
- ii) The longitudinal float shall be a separate machine or manually operated, closely following the concreting operation.
- iii) A minimum length of 500 mm of longitudinal float shall be within the length of the machine tracks or wheels.
- iv) Where a concrete slab is constructed in more than one width or where the edge needed to be matched for one level to another section of surface slab, and the surface levels at the edges are not

achieved, the slab shall be supported by separate side forms placed before or after the paver to ensure that edge levels meet the required tolerances.

B.3.25. The concrete surface should be checked to be even and in line level and alignment using straight edge and camber template. Refer clause 9.10.7 of IRC 15. Concrete pavement must be in proper cross profile as per camber given in design or prescribed by the Engineer.

B.3.26. For compliance with the requirements surface regularity or evenness, it shall be measured using an approved 3 m long straight edge and wedge in such a way as to reveal any and all irregularities. The maximum permitted number of surface irregularity of 3 mm to 5 mm in a length of 300 m shall be 20 numbers and such irregularities shall be properly recorded in the register.

Longitudinal irregularity shall normally be measured along any line or lines parallel to the edge of the slab.

Transverse irregularity shall normally be measured along any line with the straight edge (or camber profile tool) placed at right angles to the center line of the road.

B.3.27. After the final floating operation on the concrete, the surface shall be given burlap (or other) drag treatment preceding texture (or tinning) by brush movement in a direction perpendicular to traffic flow. NMC will have option to specify surface texturing of smaller depth. Burlap-drag type surface textures may be acceptable for low-speed city roads. Longitudinal gradient of the road surface if steeper than 1 in 40, surface texture by tinning tool should be done.

B.3.27.1. The surface texturing shall be done evenly across the slab in one direction by the use of a wire brush 0.45 m to 3.0 m wide.

The brush be made of 32 gauge tape wires grouped together in tufts spaced at 13 to 15 mm centers. The tufts shall contain an average of 14 wires and initially be 100 to 75 mm long. The brush shall have two or three rows of tufts. The rows shall be 26 to 30 mm. apart and the tufts in one row shall be aligned along the centre of gap between tufts in the adjacent rows. The brush shall be replaced when the shortest tuft wears down to 60 mm long. Groove or tining spacing 13 to 25 mm is preferable in place of a constant spacing. Alternate brush duly approved can also be used by contractor. For tinning the depth shall be about 3 to 5 mm and width 3mm.

B.3.27.2. After the application of the brush, the texture of the slab shall have a uniform appearance.

B.3.27.3. For measuring texture depth, refer IRC 15, clause 9.9.4.8.

The texture spacing and depth can be measured by Vernier calipers. Alternately measurement by sand patch method may be required, if specified by the design engineer.

The texture depth shall be determined by sand patch test as in follows. The test be taken at least once in a week or whenever the Engineer considers it necessary. Five independent measurements of the texture depth shall be taken at least 2 m apart along the diagonal lines across a lane, and such lines 50 m apart. No measurements shall be taken within 300 mm of the longitudinal edges of the concrete

slabs. The texture depth, as an average of 5 consecutive measurements, shall be between 0.6 mm to 1.0 mm. NMC has a option to specify small texture depth say 0.5 mm to 0.75 mm.

B.3.27.4. Where the texture depth requirements are found to be deficient, the Contractor shall retexturing the hardened concrete surface as per the direction of Engineer.

B.3.28. The edge of the concrete slab shall be rounded after texturing , using an edging tool to give 3 mm radius curvature to the edge. This should be done without applying high pressure, and totally avoiding edge spalling or cracking in green concrete.

Contractor shall protect the edge from developing crack or edge brake.

B.3.28.1. It will be the responsibility of the contractor to give the required finish to the riding surface by checking with the straight edge and wedge gauge and any deficiently observed, shall be rectified as specified in the general specifications for road works.

B.3.29. In addition to the qualities of concrete, attention shall be given to the quality of the pavement surface, which directly affect the user perceptions, comfort and safety. The wear resistance, surface evenness (riding quality), skid resistance, as well as freedom of the surface from structural or other blemishes (e.g. cracks, spalling at joint and breaking of edges, surface pitting/pop outs, scaling/potholes, etc.) shall need specific attention. The undesirable features shall be avoided.

The finishing and texturing of concrete should be done within 1 hour of placing of concrete, and soon there after the process of curing shall begin.

B.3.30. Initially the joints shall be cut within a time period after laying as small as possible. The joint cutting may start as early as 8 hours and finished within 20 hours of laying the concrete. This time (as age) of initiation (cutting work) shall be small (8 to 12 hours) when ambient temperature is high say above 45°C, and time gap will be more (say 16 to 20 hrs) when ambient temperature is low (say 25°C). For ambient temperature lower than 25°C the joint cutting can be done after 24 hours. Depth of cut shall be not less than one third the thickness of pavement concrete or as given in drawing. The Contractor is free to choose the width of this initial cut.

The Contractor has to keep the record of cutting joint with ambient temperature (at the time of cutting, time and date. The joint as cut shall be protected from getting filled up, by inserting 'thermo-cole' strips or sponge rod/ bar at top. This temporary protection is needed till joint is treated as per design. There shall be no separate payment for this protection. Spacing of joints shall be as per design & drawing. For joint cutting high speed cutter (16000 to 20000 rpm) should be utilized, which will permit early cutting of joint without dislodging / disturbing the large aggregate in concrete. Diesel operated machines are preferable to have freedom from voltage variations.

B.3.31. Curing shall be done in three phases, each requiring distinct action. Initial curing shall start within one to two hours of laying concrete (depending up on ambient temperature) or during texturing, by way of mist spray or fogging over the surface, and shall continue till second phase of curing starts effectively or curing compound is sprayed on the concrete..

Alternately to mist spray or fogging soon after texturing for initial curing, chemical approved as a curing compound shall be applied to all the exposed surfaces of concrete. However till texturing is done the curing by way of mist spray or fogging shall be done. Work of arrangements of second phase will start when concrete has set and hard enough to bear the load of workers without damaging the surface finish. In second phase curing shall be done by wet Hessian or gunny bags, which shall be maintained wet till third phase of curing by ponding of water is effective.

When air temperature is more ($>40^{\circ}\text{C}$), fogging/ mist spray should be done on concrete surface at an earliest (within 30 minutes of laying concrete), even while texturing is going on. Mist spray shall be done during the day time (6 am to 7 pm) till curing starts by covering with wet hessian / gunny bag, and later by ponding water on top surface. From the time concrete is laid, for the entire period of curing the surface of concrete should retain moist & saturated, and at no point of time any patch on the surface should become dry, thus concrete shall be continuously kept wet without intermittent dryness of surface.

B.3.31.1. Fogging (or mist spray) can be done by any equipment which can spray water in form of very small droplets or as mist or fog, and avoid stream or normal drops of water. Quantity & interval of such mist shall be such that evaporation loss is compensated, and concrete should not loose water from its surface and body inside.

B.3.31.2. Action for wet curing should start as soon as concrete has set, and it is able to bear the load of workers without permanent marks. Vertical sides of the concrete slab shall be covered by curing compound, as soon as the side form are removed.

As general guidance, wet curing on top surface should start 6 hours after placing of concrete if air temperature at the time of starting curing is 45°C or more; and it should start 16 hours after placing of concrete if air temperature at the time of starting curing is 30°C . Time limit in hours can be extended if starting time of curing falls in night hours after 8 pm. However in such case once water shall be sprayed on the concrete surface with the onset of night. Reference shall also be made to initial curing as per IRC 84.

B.3.31.3. Vattas shall be formed on concrete surface for ponding water for curing. This can be done by dykes in clay or cement mortar, about 75 mm high. The clear length of vatta will not be more than 1m (without vattas in cross direction). The Contractor shall prepare the method statement with planning for doing curing and get it approved from department.

Temporary vattas shall be removed soon after the curing operation is over, without damaging the texture and look of concrete. There is no separate payment for this work.

B.3.31.4. Based on maximum temperature in day time, curing shall be done for 10 days in summer & winter, and 7 days when air is saturated (relative humidity above 95%). There after for next 7 days concrete surface shall be made wet once in a day in morning hours in summer or winter season (not

necessary in rainy days). Curing period shall be extended if it is found that if the cube cured in the field condition (as at the site) gives the strength less than 85% of characteristic compressive strength when tested within 24 hours of the curing time practiced at site.

B.3.31.5. In summer season, after the period of regular curing is over, concrete shall not be allowed to dry to a relative humidity below 70% for next 7 days or till compressive strength is achieved equal to specified 28 days, whichever time is earlier. This can be done by sprinkling water on the concrete surface once a day in morning hours.

B.3.32. For each day of concrete poured at a site minimum one set of test sample shall be taken. More samples shall be taken per day as per 15.2.2 of IS 456 based on quantity of concrete laid per day; for interpretation of the clause word “each shift” will be replaced by “each day of 24 hours at a site for each source (batch mixing plant/RMC) of concrete”.

Additional samples are to be taken whenever there is doubt about variation in quality of concrete, e.g. as indicated by variation in workability of concrete, or a large time delay between mixing and laying of concrete at site etc.

For work of first 30 days one sample shall consist of 4 cubes (for a particular age of test say 28 days). Additional samples are required for 7 days and 90 days tests. If it is established that test strength of each cube is not varying by more than 15% from the average of the four, then later on one sample shall consist of 3 cubes. Normally a sample shall consist of 3 cubes for compressive strength test at 28 days and one beam (for flexural strength). Every 4th sample shall also have additionally 3 cubes for 90 days compressive strength, and one beam for 90 days flexural strength. All specimens shall not be drawn from one batch of delivery at a time, but be spread over the days work. For other details about sampling & testing refer IS 1199, IS 516 & IS 456. When a particular batch of delivery is in doubt specimens for a sample will be taken from the supply in consideration.

B.3.32.1. If any one of the four strength test (compression & flexure) is found to be less than the specified amount (characteristic value), the acceptance criteria, clause 16 of IS 456 (with amendment no. 1, 2 & 3) shall be evoked.

B.3.32.2. If the test strength of concrete indicates unacceptable concrete, contractor has an option of applying to department to conduct non-destructive testing. Such testing shall consist of rebound hammer test and ultrasonic test on stretches of concrete road under doubt of quality. Such testing shall also be supported by few tests on cores extracted from the concrete road. Cost of all such testing shall be borne by contractor. The laboratory facility and the engineer-in-charge of such testing shall be subjected to approval by department.

Concrete will be deemed to be acceptable if 80% of the characteristic strength specified is established from such tests.

B.3.32.3. The results of concrete testing will be audited by department and the report will be given to department & design consultant. If concrete quality is unacceptable or strength is found to be lower than specified reduced rate will be proposed. Rate will be reduced at least by a percentage which is twice the percentage of reduction in strength. department will decide the amount of rate reduction and penalty to be imposed or ask contractor to redo the work. As an alternate to reducing rate contractor may redo the work or suggest a remedial/ strengthening measure. If approved by design consultant, contractor shall carry out strengthening at his cost. In such a case, may decide on waving the penalty or imposing nominal penalty.

B.3.32.4. For concrete panels of doubtful quality, at least one core shall be taken from each panel. Whenever core are taken, the thickness of concrete pavement, the density of concrete, and compressive strength of concrete shall be verified, and compared with the results of normally acceptable concrete. Department strength of core test will be interpreted in terms of equivalent cube test.

B.3.33. In the stretch where deficiency of average thickness is more than one tenth of the thickness specified in design or drawing, the thickness will be identified with help of cores. Deficiency of average thickness if more than 5 mm, unit rate payable to contractor shall be reduced.

B.3.34. All places of concrete core will be applied with epoxy/polymer adhesive on surface for bonding and hole filled with polymer-cement concrete, as per the direction of Engineer.

B.3.35. For contraction joints further cut of minimum 8 mm wide and 17 mm deep (or as per drawing) shall be made. The joint shall be treated as per as per drawing and details in fig. 3a of IRC 57. Similar joint will also be provided at the junction of concrete pavement & bituminous pavement, if instructed.

B.3.35.1. The joints cut and cleaned shall be got inspected from the Engineer before filling with sealing compound as per the specifications.

B.3.35.2. The contraction joints as already cut (and also expansion joints) shall be cleaned first by using Raking tool and then air blower, so as to remove dust, sand particles and foreign matter from the joints. Such cleaning should be done immediately before the treatment of joint. Within the joint concrete surface shall be applied with primer conforming to IS 3384:1986, and next joint shall be filled with hot sealing compound ordinary grade as specified in IS 1834:1986, after. The details of applying bituminous primer and filling of sealing compound shall be as per the specified method and instructions of Engineer. At the option of contractor hot poured rubberized bitumen sealant can be replaced by Polysulphide sealant or Silicon sealant. Refer IRC 15 & IRC 57 for details.

B.3.35.3. For item requiring Polysulphide sealant, the material shall be got approved from the design engineer. With the use of Polysulphide sealant, the primer to be applied on the side surfaces of concrete should be compatible and matching to the Polysulphide sealant so as to bind it permanently to the concrete.

B.3.36. Heating of joint sealing compound (other than polysulphide) above 180 degree Celsius and also heating over long duration, both are not permitted as it will lose its properties due to overheating. Material once heated can not be reheated again for use, hence quantity of material to be heated should be such that it is used. In case of default on this account, the overheated material will be rejected. Therefore, quantity of sealing compound required for one operation of joint sealing work shall be heated.

B.3.36.1. In case of Polysulphide sealant, it will be cold poured, applied as per the instructions of supplier and duly approved by design engineer & department. Sealing of joints should be done as early as possible but not beyond one month age of PQC.

B.3.37. Within 28 days of laying of concrete and before the concrete in adjacent panel will be laid, on vertical sides shall be coated with hot/cutback bitumen of 80 / 100 grade. Before application of bitumen coat the concrete surface should dry. This bituminous coat will not be applied in top portion of joint which will receive the poly sulphide sealant.

B.3.38. Record of temperature of concrete shall be prepared for a typical concrete slab being laid, one panel every month. Temperature of a concrete pavement already laid shall be recorded at 4 locations in a panel at half the depth of slab. Temperature of air (in shed) and that of concrete will be recorded hourly up to 24 hrs (1 day) age, there after 3 hourly for next 24 hrs (2 day age), there after 6 hourly for next 24 hrs (3 day age), there after 12

hourly for next 25 days. Every day one reading will be taken at 5 pm (or time of highest temperature of concrete expected & fixed in consultation with department or design engineer). All holes shall be filled by epoxy / polymer mortar as per direction of department.

B.3.39. There shall be a defect liability for 4 years period (48 months) for concrete pavement. If during this period, concrete road fails due to (a) development of cracks, (b) spalling of edges, (c) excessive abrasion of concrete surface etc., the action as decided by the Engineer shall be taken against the contractor. In case of development of structural/full depth cracks continuous for the panel width, 20% cost of the slab panel shall be withheld per crack during the guarantee period of 4 years. After one year in existence all the cracks shall be treated (except when the concrete of panel is replaced) as per the scheme approved by department. Amount withheld will be treated as penalty, unless panel concrete is replaced. If the contractor replaces the cracked panels within the guarantee period, the said amount shall be refunded. If not, the withheld amount shall be treated as penalty and said amount shall be forfeited. It is obligatory on the part of contractors to take care of such cracks during the guarantee period.

During the defect liability period, all joints shall be inspected once in a year preferably in the month of December or January and as per need dressing of joints be done free of cost as directed by department supervision.

In case of disputed cracks, nature of cracks may be ascertained by extracting core on the crack in question by the contractor at his cost. If the depth of the penetration of the crack observed on the core

is more than 1/3 rd the depth of the slab, the crack will be considered as structural crack. Reinstatement of concrete in the core holes shall be as per in the relevant tender condition.

B.3.39.1. If it is established that crack has appeared in the panel due to weak sub base/grade (not constructed by the Contractor) which is localized, the Contractor may be absolved from the penalty & deductions for the crack development. However the Contractor shall carry out remedial measures, suggested by Engineer.

B.3.40. Following tests shall be carried out once after the start of project. Minimum test specimen for the test shall be 3, unless test method indicates more specimens.

- (i) Tests on aggregate as per IS 2386 part 1 to 8, including alkali silica reaction on sand.
- (ii) Heat of hydration of concrete (pavement grade) indicating heat evolved in first 6 hrs, 12 hrs, 24hrs, 48 hrs, 72 hrs, 7 days & 28 days. Results are to be also plotted on semi log paper. Test to be done for initial concrete temperature of 25°C, 30°C & 35°C.
- (iv) Compressive strength test on core to correlate strength of cube.
- (v) Rebound hammer test on pavement and cube from same concrete, to correlate compressive strength.
- (vi) Ultrasonic test on pavement and cube from same concrete, to correlate compressive strength.
- (vii) Beam test on fiber concrete to obtain residual strength, as per ASTM 1399, for each fiber type and dose being used.
- (viii) For each type of paving block, 3 samples of each 8 specimens for each test (including compression & flexure) as per IS 15658. Also abrasion test as per IS 9284 on 4 samples.
- (ix) Melting point of synthetic fibers.
- (x) Alkali resistance of synthetic fibers.
- (xi) Ultimate tensile strength of each steel fibers and synthetic fibers.
- (xii) After mixing concrete, specimens are cast a) immediately, b) at delay of 1 hour, c) at delay of 2 hours, d) at delay of 3 hours; Compressive & flexural strength of concrete tested, with & without fibers.
- (xii) Concrete sensitivity test, as given in B.3.40.1/2.
- (xiii) Chemical analysis of water, once for each source.
- (xiv) Workability of concrete mix designed, by slump cone, compacting factor method, Vee Bee consistometer test, and degree of compactability test (ISO 1920.2).
- (xv) Poisson's ratio of concrete as per ASTM C 469.

B.3.41. Following tests shall be carried out on concrete (pavement grade), once for every 10000 cubic meter of concrete to be laid. Each test shall have 3 specimens. All tests shall be done with & without fibers. For all tests here the samples shall be taken from similar batches of concrete produced within 5 days, & without change in source of material & cement etc.

- (i) Permeability of concrete as per IS 3085,
- (ii) Resistance to Chloride Penetration Test (RCPT) as per ASTM 1202 & ASTM 1543.

- (iii) Abrasion resistance of concrete as per IS 9284, with & without fibers, and also as per IS 1237.
- (iv) Setting time of concrete as per IS 8142.
- (v) Shrinkage of concrete up to 90 days.
- (vi) Modulus of elasticity of concrete.
- (vii) Total chlorides in concrete, each constituent wise, water soluble & acid soluble.
- (viii) Flyash chemical analysis, physical tests, particle size analysis, test on reactivity and test on particle density (specific gravity).
- (ix) Concrete compression test of 150 mm cube, at 7 days, 28 days & 90 days age.
- (x) Concrete compression test of standard cylinder, at 28 days & 90 days age.
- (xi) Concrete flexural strength test by third point loading, at 28 days & 90 days age.
- (xii) Concrete flexural strength test by central point load, at 28 days & 90 days age.
- (xiii) Split tension test on concrete cube & cylinder, at 28 days & 90 days age, IS 5816.
- (xiv) Analysis of fresh concrete, IS 1199 (density, yield, cement content, air content etc.)
- (xv) Flexural toughness as per ASTM C 1609 ;
- (xvi) Post cracking Re3 test.
- (xvii) Residual strength test as per EN 14651.
- (xviii) Impact test with & without fiber.
- (xix) For temperature gradient one panel shall be tested for maximum thickness of PQC and other of minimum thickness of PQC. To observe temperature gradient temperature of top & bottom surface shall be recorded. Temperature will be observed at such intervals so as to get maximum gradient over one year period.
- (xx) Coefficient of thermal expansion.
- (xxi) Concrete compression test at 7 days, 28 days on 150 mm cube cured in field at the atmospheric temperature in open at the pavement site.
- (xxii) Plastic shrinkage test with and without fibers.

B.3.42. Methodology of Slip Form Paving :

- (i) The PQC layer in M45 shall be laid only by slip form paver..
 - (ii) For laying PQC the operations of slip form paver shall be regulated by the instructions, guidelines and recommendations of the manufacturer of the paver. It shall also be guided by the successful implementation of processes described in the next section
- (B.3.43.)** and the specifications in the tender document to be integrated in to an operational procedural planning prepare by contractor and duly approved by department.
- (iii) The representative of the manufacturer of paver shall remain present at the time of commencement of PQC
 - (iv) The contractor shall arrange a training programme before the regular operations of paver is started. The training will be conducted by the representative of the manufacturer of the paver or by an expert having a long experience of operating the

paver for success full laying of PQC. The training will involve operators, supervisors, staff of department

B.3.43. Terminology & Processes with Slip Form Paving :

(i) Slip Form Paving : It is a process used to consolidate, form in to geometric shape and surface finish a PCC mass by pulling the form s continuously through and surrounding the plastic concrete mass.

Steps in Slip Form Paving :

- a) Rough placement of PQC by placer / spreader
- b) Final placement
- c) Consolidation
- d) Final finishing
- e) Additional finishing (Texturing)
- f) Curing

(ii) Low slump PCC : PCC with low slump (0 to 75 mm) is low slump PCC which is able to hold its shape once the slip form paver has passed. It has higher compression and flexural strength.

(iii) Slip form paving production : Production of PQC required for slip form paving can be at the rate of 30 to 100 m³ per hour for main line paving. For PQC surfaces up to 250mm thick the paving may be 25 to 90 m³ per hour for 3.7 m wide pavement. The rate of production will depend up on the capacity of slip form paver, the width of pavement, the thickness of concrete and the capacity of concrete batching plant and transport arrangements.

(iv) Smooth riding surface : The slip form paver shall produce a fairly smooth surface of concrete of the order of 0.9m/km or as directed by the design consultant. The surface should be without bumps and sudden change in profile.

(v) Placer / spreader : The placer or spreader place a metered supply of PCC in front of slip form paver using alternate from a series of conveyor belt, augur, plows, placers or dumpers and using a strike off device. It allows contractor to receive material from transport vehicles and place a uniform and adequate amount of PCC in front of the entire paver width while minimizing the segregation. They place a measured (as per requirement) supply of Concrete in front of paver, using different types of equipments and semi automatic and manual devises. The concrete received by transport arrangement shall be uniformly spread in front of paver without excessive buildup, such that the paver operation does not cause segregation.

(vi) Slip form paver : It usually performs screeding, consolidation and initial finishing. A typical paver operates at speeds between 1 to 2.5 m per minutes. Some pavers are equipped to place reinforcing steel (if needed), dowel bars and tie rods as well.

(a) The auger spreads the concrete in front of the strike of plate.

(b) The strike off plate shall be set such that after compaction the required thickness of pavement is obtained. Next the strike of plate (the screed) remove (by cutting /pushing) excess concrete to control the thickness of placement as per requirement.

(c) Then concrete is consolidated by a group of vibrators, followed by a tamping arrangement (if available) to push the protruding large size aggregate in to the concrete surface as well finally consolidating the concrete.

(d) Finally the profile pan level off slab at the right elevation and provide initial finish similar to a trowelling operation.

(v) Consolidation: Depending upon mix design (maximum size of aggregate & proportions) and slab thickness high frequency (usually 5000 to 9000 vibrations per minute) vibrators are set. The vibrators are positioned next to one another such that their zone of influence overlaps 50 – 75 mm at normal paver speed. The paver shall have adjustable vibrator spacing for different conditions and mix type. The consolidation shall be done such that the segregation is avoided. The range of frequency of vibration shall be decided by the manufacturer in consultation with department Engineer.

(vi) Initial Finishing : The initial finishing is accomplished by extruding PCC mass through a moving form made up of the –

(a) base course (bottom),

(b) the side forms (as side edges of paver), and

(c) the profile pan as top surface (flat paver piece mounted behind the vibrator).

Some Pavers are also equipped with a hydraulic tamper bar (called jitterbug) located just behind the vibrators. Hydraulic tamper bars for tamping which may be needed if concrete is not cohesive enough and has high proportion of large aggregates.

(vii) Additional finishing : This is done by floating operation. Micro texturing usually accomplished by dragging burlap or artificial turf behind the paver. Burlap / turf drag is not required if tinning is specified. Direction of drag shall be transverse unless specified otherwise. Where tinning is specified, it shall be performed with a suitable tool to achieve the specified roughness of the surface. Curing follows this operation.

(viii) Curing : The operation curing shall start immediately after initial finishing and original wet sheen has nearly disappeared. Till the additional finishing is complete the initial curing shall be done by fogging or mist spray. After finishing operation curing compound can be spread on all surfaces of concrete to prevent evaporation (desiccation) of water from the concrete. The dose of curing compound should be enough to avoid evaporation and facilitate the strength development as required by the specifications, the reliability of which shall be confirm by adequate number of core tests performed frequently. On tinned surface two passes one forward and other reverse for spaying curing compound is required. If the damage to the film of curing compound can not be ruled out, wet curing shall be done as per specifications provided in the tender.

(ix) For guidance of the contractor as a sample a broucher of a paver and its guide with various photographs are attached herewith showing the processing /working of slip form paver unit. These documents are attached at the end of this document. A guide on slip form paving can be seen at following web site.

B.4.0. Special Conditions for Bituminous Road Work

B.4.1. Bituminous Mix : The minimum bitumen content shall be as specified in respective items & other components shall be as per Specifications. It shall be mandatory to prepare detailed mix design for bituminous mix from plant, and also for job mix. The mix design shall be got approved from the Engineer. No additional payment shall be made for extra bitumen contents & other ingredients if required to be used in the mixes for proper performance. The additives to be added in the mix shall be of ISI Standard and of approved brand. In case of change of source of material (aggregate, additives) the mix design shall be redone and got approved from Engineer every time without any extra payment.

B.4.1.1. Loads of bitumen mix brought on trucks shall be covered with tarpaulin.

B.4.1.2. For the work of prime coat and tack coat, refer IRC 16 – 2008.

B.4.2. The truck loads of the bitumen mix shall be checked at random at public weight bridge including the Tare Weight for verifying the correct weight of the mix at the rate of one load out of every ten loads.

B.4.3. Delivery tickets of bitumen mix shall bear printed serial number weight and departure time from the plant. The reports of the tests conducted in the plant laboratory shall invariably accompany with the first load.

B.4.5. Field Density test shall be taken in bitumen concrete carpet, WBM, DLC, GSB and drainage layer etc.

B.4.6. The contractors shall bring the correct size of metal/material required for construction of water bound layers. The contractors will not be allowed to break stones, preparation of material for water bound layers on site.

B.4.7. The contractors should carry out if required, any minor works such as raising/lowering of manhole, attending to bad spots, bad patches etc. as may be decided by the Engineer, any where within the concerned road length or near by portions where the work is in progress under contract, at the rates applicable in the tender.

B.4.8. The Contractors shall send at least one sample asphalt mixes to the laboratory for testing as per frequency stated in Annexure II, PN 114. The contractor shall note that, 25% payment of the bitumen work will be withheld till the results are received. Tests on samples of asphalt mixing used in the work shall be carried out at approved laboratory as directed by Engineer.

B.4.9. For the item of scarifying the bitumen concrete surface, at the option of contractor the mechanized milling can be done.