

**SURAT MUNICIPAL CORPORATION
SOUTH ZONE (UDHANA)-A**



Name of work : Construction of Garden developement at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana).(2nd attempt)
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**E-TENDER
TENDER (ON LINE) NOTICE NO. DMC/SZ-A/03/2026-27
WORK NO.04**

VOLUME-I : TECHNICAL BID

Start date of download of tender documents from website smc.nprocure.com	:	From Dt.19/06/2026 to 09/07/2026 upto 18.00 hrs.
Date of pre-bid Queries		Bidder shall have to post queries on Email exen.sza@suratmunicipal.org on or before 30/06/2026 up to 11.00 hrs.
Last date of submission of online tender (tender fees, emd and other documents in soft copy)	:	On or Before Dt.09/07/2026 upto 18.00 hrs
Last date of submission of tender fees, EMD and other documents in hard copy	:	Upto Dt.18/07/2026 to Chief Accountant, Surat Municipal Corporation, Muglisara, Surat by R.P.A.D./Speed Post upto 18.00 hrs.
Opening of Online Technical Bid	:	On Dt.10/07/2026 11.00 hrs. (Probable)
Opening of Tender Fee, EMD & Other Documents etc. in Hard Copy	:	On Dt.19/07/2026 (Probable)
Estimated amount	:	Rs. 1,41,21,393.70
Earnest money deposit.	:	Rs. 1,42,000.00
Document fees	:	Rs. 3600.00 + 18 % G.S.T. = Rs. 4248.00
Registratiion class	:	“C” or above

TENDER TO BE SUBMITTED TO:
THE CHIEF ACCOUNTANT,
SURAT MUNICIPAL CORPORATION, MUGLISARA
SURAT – 395 003.

**SURAT MUNICIPAL CORPORATION
TENDER DOCUMENT
I N D E X**

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SURAT MUNICIPAL CORPORATION

1.0 NOTICE INVITING TENDER

(A) RECEIPT AND OPENING OF TENDER :

Online Tenders will be received from the established and reliable contractors on or before 24.00 hours from **Dt.19/06/2026 to 09/07/2026** upto 18.00 hrs. on website smc.nprocure.com. The tender received after due time and date specified will not be accepted.

1. NAME OF WORK:- Construction of Garden development at T.P.48 (Bhestan), F.P.77 in South Zone-A (Udhana).

- | | |
|--------------------------|---|
| 2. Estimated Cost | : Rs. 1,41,21,393.70 |
| 3. Earnest Money Deposit | : Rs. 1,42,000.00 |
| 4. Time Limit | : 12 (twelve) months (Excluding monsoon) |
| 5. Document Fee | : Rs. 3600.00 + 18 % G.S.T. = Rs. 4248.00 |
| 6. Registration required | “C” or above |

(C) OPENING OF TENDERS:

The tenders will be opened online in presence of bidders and opening authority subject to receipt of **Tender Fees & EMD in hard copy in account department (Main Office)**. But tenderer has to upload relevant documents as required /mentioned in the technical bid in Soft Copy (By Scanning). The tenders will be opened in two stages i.e Technical Bid and Commercial Bid.

(D) PURCHASE OF TENDER DOCUMENTS :

Tender Documents can be downloaded from smc.nprocure.com from **Dt.19/06/2026 to 09/07/2026** up to 18.00 hrs.

Tender documents fees of **Rs. 3600.00 + 18 % G.S.T. = Rs. 4248.00** per set which is required for submission of tender towards the cost of tender documents in cash, pay order or by demand draft of any nationalized bank, in favour of "The Commissioner, Surat Municipal Corporation" payable at Surat and shall be submitted alongwith EMD and other documents. The cost of the Tender Documents will not be refunded in any circumstances. The Surat Municipal Corporation shall not be liable for any postal delay in any case.

- i. As per Commissioner Note No. C.N.129, dtd. 9/9/2016
- E.M.D & Tender Fee shall be submitted in electronic format only through online (by scanning) while uploading the bid. this submission shall mean that E.M.D and tender fee are received for purpose of opening the bid. Accordingly, offer/tenders of those tenderers whose E.M.D & tender fee is received electronically, shall be opened. However, for the purpose of realization of EMD and Tender fee, bidder shall send the EMD as well as Tender fee in required format in original through RPAD/Speed post so as to reach to Account Department (Main office) within stipulated date as mentioned in tender notice for the submission of tender FEE & E.M.D. Punitive action shall be initiated for non submission of EMD & Tender fees in original to Account Department (Main Office) by bidder including abeyance of registration and cancellation of E – tendering code for one year. all documents in supporting of bid shall be in electronic format only through online (by Scanning) during the bidding period & hard copy will not be accepted separately.
- All documents must be coloured scanned to be seen as original. Scanning in black and white or gray shall not be acceptable.

- All the documents must be notarised with clearly displaying stamp, number and name of the notary.

➤ At first instance following amount is to be paid to SMC

Sr No.	Tender Amount	Amount to be paid
1	Up to 1.00 Cr	Rs. 10,000/-
2	Above 1.00 Cr up to 10.00 Cr	Rs. 20,000/-
3	Above 10.00 Cr up to 50.00 Cr	Rs. 30,000/-
4	Above 50.00 Cr up to 100.00 Cr	Rs. 70,000/-
5	Above 100.00 Cr	Rs. 1,00,000/-

- If bidder fails to submit the said amount within 10 days for the **First instance OR** in case of **second instance** of this similar of mistake i.e. non submission of Valid original [Pay Order/ Demand Draft \(D.D.\)](#) to the Accounts Department (Main Office) within the specified time limit, punitive action of abeyance/cancellation of E-tendering code for **6 months** shall be taken.
- Any documents in supporting of bid shall be in electronic format only through online (By colored Scanning) & hard copy will not be accepted separately.”

(E) CONTRACT PERIOD :

7. The total contract period is hereby fixed as 12 (**Twelve**) months (**Excluding monsoon**)

1. from the 10th Day of issuance of work order.

(F) Tenderer must comply with and agree to all instructions & requirements in the Notice and in the Instructions to Tenderers, including requirements in the Contract Documents.

- All tenders must be submitted in the prescribed Tender form.
- Each Tender must be accompanied by the completion Schedule.
- Each tender must be accompanied by the Tender Security (EMD) **Rs. . 1,42,000.00**
- The successful tenderer shall execute the Contract Agreement within fifteen days after the date of Notice of award.
- The successful Tenderer will be required to furnish a performance bond (Security Deposit) of and amount equal to (2%) Two percent of the tendered amount.
- The successful Tenderer shall furnish insurance in accordance with the contract documents.
- The Surat Municipal Corporation may withhold issuance of the Notice of proceed for a period not exceeding fifteen days after the date of execution of the contract agreement.
- The tender and tender guarantee bond (Earnest Money Deposit) shall be submitted by the Agency in whose name tender has been issued. Transfer of tender documents to any other party is prohibited.
- All intending tenderers will have to purchase digital signatures in order to participate in the online bidding process.

- (j) **All the applicant contractors are required to have their own employers code number under EPF Act, 1952 and are required to comply the applicable provisions of said statute regularly and totally.**
- (k) **Further the contractors for services are required to produce the certified copies of paid challans in respect of employees/workers employed by said contractor in respect of work allotted by Surat Municipal Corporation, along with copies of Pay Roll and Muster Roll. If the same are not produced, the bills will not be released.**

(G) RECEIPT OF TENDER DOCUMENTS:

The following details are to be submitted online on smc.nprocure.com :

- a. Document fees and EMD Details
- b. Commercial Bid
- c. Annexure I to II along with all necessary supporting documents
- d. Bank solvency
- e. Pan Card
- f. GST Registration
- g. Power of attorney
- h. Partnership deed in case of Partnership firm.
- i. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- j. Special condition of contract on Non Judicial Stamp Paper of Rs.300/-

The following details shall be submitted in hard copy at prescribed address :

- a. Tender fees in prescribed format
- b. Earnest Money Deposit in prescribed format
- c. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- d. Special condition of contract on Non Judicial Stamp Paper of Rs300/-

Please note that commercial bid shall not be submitted in hard copy under any circumstances. This will hold the tender liable for rejection

(H) Tender Validity Period :

The validity period of the tender submitted for this work shall be of one hundred twenty (120) calendar days from date of opening of the price bid for this work and the Tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period.

(I) Rights Reserved :

Without assigning any reason, The Surat Municipal Corporation reserves the right to reject the lowest or any other or all tenders or part of its. To waive any informality or irregularity in any tender, which in the opinion of the Surat Municipal Corporation does not appear to be in its best interest and the tenderer shall have no cause of action or claim against the Surat Municipal Corporation or its officers, employee, successors or assignees for rejection of this tender.

The Surat Municipal Corporation further reserves the right to withhold issuance of the notice to proceed, after execution of the contract agreement by the successful Tenderer. The Surat Municipal Corporation is not obliged to give reasons for any such action.

During Tender validity period, if any Tenderer withdraws or makes any modifications or additions in the terms and conditions on his own in this tender, then The Surat Municipal Corporation shall without prejudice to any right or remedy be at liberty to reject the tender and forfeit the Earnest Money Deposit in full. Such Tenderer may be disqualified from tendering for further works under the jurisdiction of The Surat Municipal Corporation.

The Surat Municipal Corporation reserves the right to increase or decrease the scope of work and split the tender in two or more parts without assigning any reason even after the award of contract.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION.

Signature of the Contractor:

ANNEXURE-I TO II FOR PRE-QUALIFICATION TO BE FILLED IN BY TENDERER

ANNEXURE-I

Performa for list of works of similar nature already completed by the Tenderer during last 7 years.

Sr. No.	Name of work and Place	Cost on Completion	Time taken in months to complete the work	Client name	Date of completion
1	2	3	4	5	6

Note: Bidder shall give completion certificate from client. In absent of such completion certificate, experience shall not be considered for evaluation. If completion certificate covers "Similar work (as per IT-04) with other work" then bidders shall have to submit copied of final bill indicating similar work or certificate of amount including "Similar work" from relevant authority.

Please Fill above details attached separate sheet.

Signature of the Contractor
With seal.

Place:

Date

ANNEXURE-II

Performa for declaration regarding work on hand with the tender:

Sr. No.	Name of work with place	Estimated Cost	Date of Issue of work order	Stipulated period of completion	Amount of work done	Brief details of delay if any	Name of client
1	2	3	4	5	6	7	8

Present liability = Total of column 3 - Total of column-6

Signature of the Contractor
with seal

Place

Date:

Note: Amount of work done in Column 6, should be given up to the month previous to the month in which tender are invited.

Please Fill above details attached separate sheet.

ANNEXURE-A

AFFIDAVIT

Name of Work: **Construction of Garden development at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana). (2nd attempt)**

- I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct. I also understand that in case of wrongful/false information, corporation is entitled to take any civil & criminal punitive action against me / us.
- The undersigned also hereby certifies that neither our firm M/s _____ nor any of its constituent partners have abandoned any work in India nor any contract awarded to us has been rescinded during last five years, prior to the date of this bid.
- The undersigned hereby authorize(s) and request(s) any bank, person, authorities, government or public limited institutions, firm or corporation to furnish pertinent information deemed necessary and requested by the SMC to verify our statements of our competence and general reputation etc.
- The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the SMC.
- The SMC and its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents, and information submitted in connection with this bid and to seek clarification from our bankers and clients regarding any financial and technical aspects. This Affidavit will also serve as authorization to any individual or authorized representative to any institution referred to in the supporting information, to provide such information deemed necessary and requested by representative of Surat Municipal Corporation to verify statements and information provided in the Tender or with regard to the resources, experience and competence of the Applicant.

Signed by the Authorize signatory of the firm

Title of the office

Name of the firm

Date:

Note:- The affidavit format as indicated above to be furnished on non-judicial stamp paper of Rs.300 and duly notarized

ANNEXURE- B

UNDER TAKING BY THE TENDERER FOR NOT BLACK LISTED

I/We Address
..... Solemnly affirm and state that on oath that..... (Name of
Tenderer) has not been black listed by any Government/Semi Government/Public Sector
Undertaking/Public limited and not has been banned/suspended business dealings with the said firm.
The information given above is true to the best of my knowledge.
I/We agree that if any notice in future, my/our bid/tender shall be rejected/terminated

SIGNATURE AND SEAL OF THE CONTRACTOR:

Name:

Address:
.....

Date :

Place :

Note:- The affidavit format as indicated above to be furnished on non-judical stamp paper of Rs.300 and
duly notarized

SURAT MUNICIPAL CORPORATION
SOUTH ZONE-A (UDHANA)
CONTRACTOR TO PLEASE READ THIS CAREFULLY

- (1) If the tender is taken in favour of the company, a company of attorney in favour of the person who may have signed the tender for the company, must accompany the tender.
- (2) Solvency certificate of current year Bank or a Revenue Officer of an amount upto 20% of the tender cost plus works on the hand still to be executed will have to be produced by the contractor.
- (3) Voucher for earnest money must accompany the tender. Tenderer may pay earnest money in form of a crossed demand draft of a local Bank drawn in favour of the Municipal Commissioner. Earnest Money by cheque shall not be accepted.
- (4) In view of the latest circular of IT Department IT clearance certificate is not required. However the contractor shall give zerox copy of the PAN card. Also provide GST Number and necessary documents as per Govt- resolution..
- (5) **Copies of certificate as regards previous experience of Govt. or Semi Govt. Dept., if any must accompany the tender.**

An attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.

- (6) Declaration showing all works on hand with the contractor and the value of works that remains to be executed in each case must accompany the tender.
- (7) All pages of Schedule: 'A & B' & specification should be initialed by the contractor.
- (8) All corrections, errasures & over writing should be initialed by the contractor.
- (9) Descripancies and adjustment of errors:-Any error in quantity or amount in Schedule-'B' showing item of words to be carried out shall be adjusted in accordance with the following rules:-

- (a) In the event of a discrepancy between description in works and figures quoted by a tenderer in the 'rates' column, the descriptions in words shall prevail.
- (b) In the event of and error occuring in the amount column of the Schedule- 'B' showing items of works as a result of worng multiplication of the unit rate and quantity, the units rate shall be regarded as firm and multiplication shall be amended on the basis of the rate.
- (c) All the errors in totalling in amount column and in carrying forwarded total shall be corrected.
- (d) Any rounding of amounts against item' or in totals' shall be ignored.

The tendered sum so altered shall, for the purpose of the tenders, be substituted for the sum originally tendered and considered for accetpance.

- (10) (i) It may please be noted that the tender shall be considered as invalid specially, if the requirements as per insiruction No.1 to 9 above are not compleied with before submitting the tender. Also please read carefully the face sheet and "General Rules and Direction for the suidence of contractor" of his form.
(ii) Right is reserved to reject any or all tender (s) without assigning any person (s) thereof.
- (11) In addition to the above the tender will also be liable to rejected outright if :-
 - (i) The tenderer proposes any alteration in the works specified or in the time allowed for carryin out the work or any conditions or correction made in any code or made of Schedule-'B' or specifications.
 - (ii) Any of the page or pages of the tender is removed or replaced.
 - (iii) All corrections, additions or pasted slips are not initialed by the tenderer.
 - (iv) Any erasures is made by him in the tender

- (v) The tenderer or in the case of a firm, each partner or person holding the power of attorney thereof does not sign or the signature/s is/are not attested by a witness on page-9 of the tender in the space for the purpose
- (12) In respect of the tenders from the co-operative society, a solvency certificate of an amount equal to 20% of the amount of the work put to tender will have to be produced along with the tender or a certificate regarding the borrowing capacity if the society issued by the legal Assistant, Directorate of Cottage Industries will have to be produced along with the tender.
- (13) (1) The several documents forming the contract are the essential part of the contract and requirement occurring in one is as binding as through occurring in all, they are intended to be mutually explanatory and complementary and to describe and provide for a complete work.
- (2) In the event of any discrepancy, the several documents forming the contract or in any the document, the following order or precedence should apply:-
- (a) Dimension & quantities :-
- (i) Drawings.
- (ii) Schedule-B of the tender form.
- (iii) Specification.
- On drawings, figures, dimensions, unless obviously incorrect will be followed in preference to stated dimensions.
- (b) Description :
- (i) Schedule-B of the tender form.
- (ii) Drawings.
- (iii) Specifications.
- In case of defective description or ambiguity, the Engineer-in-charge should issue further instructions in the direction in which the work is to be carried out it being understood that the best modern practice is to be followed. The contractor should forthwith comply with such instructions.
- (3) The contractor should take no advantage of any apparent error or omission in drawings or specification and the Engineer in charge shall make such corrections and interpretation as necessary to fulfil the intent of the Plans and specifications.
- (4) Notwithstanding that all proper precautions may have been taken by contractor at all the times during the progress of the work, the contractor shall be held responsible for all damages whether to the work under execution or to any other property or to lives of persons during the progress of the work and the period of maintenance.
- (5) Plans are for rough guidance only when detailed plans are received from the Architect of corporation during the course of execution the same will supersede previous plans
- (14) The contractor should appoint a qualified engineer and he must remain present on site during working hours.
- (15) The Quantity mentioned in the scheduled "B" is Tentative (indicative) for each item. Tenderer shall have to execute the concerned work/item as per the site condition and payment shall be made accordingly as per the actual measurement of the particular item.

Contractor Signature with
Address:
Date :

EXECUTIVE ENGINEER,
SOUTH ZONE (UDHANA)-A,
SURAT MUNICIPAL CORPORATION.

DECLARATION FORM

(1) I/We hereby declare that I/We have visited the site and fully acquainted myself/ourselves with the local situation regarding Materials, labour and other factors pertaining to the work before submitting this tender.

(2) I/We hereby declare that I/We have carefully studied the conditions of contract, special condition for this contract ,specifications and other tender documents of this work and agree to execute the same accordingly.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION

Contractor Signature with
Address:
Date :

INSTRUCTION TO TENDERERS

IT-01 GENERAL :

The Contract documents may be secured in accordance with the notice Inviting Tender for the work called. The work shall include supply of Materials necessary for construction of the work.

IT-02 INVITATION TO TENDER:

1. The Surat Municipal Corporation hereinafter referred to as the Corporation will receive tenders for the work of **Construction of Garden developement at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana) (2nd attempt)** as per the specifications in the tender documents. The tenders shall be opened in presence of opening authority Surat in the presence of tenderers or their representatives who are present. The Corporation reserves the right to reject the lowest or any other or all tenders or part of it which in the opinion of the Corporation does not appear to be in its best interest, and the tenderer shall have no cause of action or claim against the corporation or its officers, employees, successors or assignees for rejection of his tender.

IT-03 LANGUAGE OF TENDER :

Tenders shall be submitted in English, and all information in the tender shall also be in English, Information in any other language shall be accompanied by its translation in English. Failure to comply with this may make the tender liable to reject.

IT-04 QUALIFICATIONS OF TENDERERS:-

Sr. No.	Criteria	Documents required for complete submission
1.0 Financial		
1.1	Average Annual financial turnover during the last 3 years, ending 31/03/2025, should be at least 30% of the estimated cost (30% of estimated cost i.e. Rs.42.36 Lacs)	Copy of certificate from Chartered Accountant along with copy of Balance sheets.
1.2	Solvency Certificate Fresh Solvency certificate from bankers of schedule bank / nationalized bank. Minimum value of solvency shall be 20% of estimated cost of the Tender (Solvency certificate should not be older than One year from Last date of online Tender submission.) (20% of estimated cost i.e. Rs. 28.24 Lacs)	from bankers of schedule bank / nationalized bank
2.0 Registration		
2.1	Minimum “C” Registration Class with any government, semi government organization	Registration Certificate
2.2	power of attorney, partnership deed or registration deed.	Attested copy should be submitted

3.0 Relevant Experience		
3.1	Similar works during last 7 years. Similar work shall mean Construction or Redevelopment work of Garden/Lake-garden civil work project done for Govt. or Semi Govt./P.S.U.s/Govt undertaking only.	Attested copies of certificates from head of the office concerned for completion of the works. Only Govt. or Semi Govt./P.S.U.s/Govt undertaking Works shall be considered for Similar Works.
3.1.1	Three similar completed works, each costing not less than amount equal to 40% of the estimated cost put to the tender(40% of estimated cost i.e. Rs. 56.48 Lacs)	
	Or	
3.1.2	Two similar completed works, each costing not less the amount equal to 50% of the estimated cost put to the tender(50% of estimated cost i.e. Rs.70.61 Lacs)	
	Or	
3.1.3	One similar completed works, each costing not less the amount equal to 80% of the estimated cost put to the tender. (80% of estimated cost i.e. Rs. 112.97 Lacs)	
4.0 Other details		
4.1	Black list. The Bidders shall note that in case the Bidder is blacklisted / stated as defaulter / barred participating in tenders by any of government agencies / semi government agencies or any other equivalent agencies during last 5 years then in that case, the Bidders will be disqualified and will not be allowed to participate in the bidding process, though bidder satisfies all the qualification conditions mentioned above. In this regard, the decision of the Surat Municipal Corporation will be final and binding to Bidder.	UNDERTAKING (ANNEXURE-B)
4.2	Affidavit The Bidder shall Providing to certify that All the Statements made in the Required attachments are true and correct.	Affidavit (ANNEXURE-A)
4.3	Works on hand & Litigation The Bidder including any Member shall provide details of all their on-going projects along with stage of litigation, if so, against the Employer / Governments.	ANNEXURE-I & II

- (a) Turnover during last 3 years, ending 31st March of previous financial year should be atleast 30% of Estimated Cost. An attested copy of annual turnover for last 3 years should be enclosed.
- (b) Solvency certificate from bankers of schedule bank / nationalized bank for the 20% of tender amount. Tenderer has to submit higher amount of bank solvency if so desired by Commissioner, SMC (**Solvency certificate should not be older than One year from Last date of online Tender submission.**)
- (c) An attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.
- (d) List of the works already completed in last 7 years in prescribed proforma as per Annexure-I and attested copies of certificates from head of the office concerned for completion of the works.

Following enhancement factors will be used for the cost of works executed and financial figures to amount base for the value of the works completed in India.

Financial Year	Multiplying factor
Immediate last year of the assessment year*	1.10
Second	1.21
Third	1.33
Fourth	1.46
Fifth	1.61
Sixth	1.77
Seventh	1.95

- Here assessment year shall be reckoned from year and month in which tender is submitted.
 - Bidder should indicate actual figures of cost and the amount for the work executed in Statement-A without accounting for the above mentioned factors.
- (e) Declaration regarding the work on hand with the tenderer should also be given in prescribed performa as per Statement-B. Attested copies of work orders, interim certificates if any shall also be attached as supporting documents.
- (f) Attested copy of partnership deed, power of attorney etc.
- (g) Application Received from joint venture / consortium shall not be considered.**
- attested copy of partnership deed, power of attorney etc.
 - passport size photographs of partner / all partners on relevant page of technical bid.
 - Tenderer shall submit only one tender for the work put to this tender.
 - Tenderer shall submit the certificate of Employers code number under EPF Act.
- (h). Even though the Bidder meets the above criteria, they are subject to be disqualified if they have**
- Made misleading or false presentations in the forms, statements and attachments submitted in proof of the qualification requirements; and /or
 - During verification if it is found from client that of poor performance such as abandoning the works, for financial failure or abnormal delay in work etc.
 - Regarding Litigation, in case where Bidder is involved in illegal practice like any activities of corruption, coercive practice or debarred/blacklisted in last 05 years by Any Govt. / Organization in respect of performance of Bidder, SMC authority requires that bidders under this contracts, observe the highest standard of ethics during the procurement and execution of such contracts.
1. Will reject a proposal for award if it determines that the bidder has engaged in any corrupt or fraudulent practices in competing for this contract or in past history and
 2. Will reject a proposal if it found debarred/blacklisted by any State Govt. /Govt. of India/ Semi Government/ PSU in last 05 years.

IT-05 TENDER DOCUMENTS :

Printed and online documents and set of drawings shall comprehensively be referred to as Tender documents. The several sections forming the documents are the essential parts of the contract and a requirement occurring in one shall be binding as though occurring in all. They are to be taken as mutually explanatory and describe and provide for complete works.

IT-06 EXAMINATION BY TENDERERS :

A. At his own expenses and prior to submitting his tender, each tenderer shall (a) examine the contract Documents, (b) visit the site and determine local conditions which may effect the work including the prevailing wages and other pertinent cost factors, (c) familiarize himself with all CENTRAL, State and local laws, ordinance, rules, regulations and codes affecting the material supply including the cost of permits and licenses required for the work and (d) correlate his observations, investigations, and determinations with the requirements of the Tender Documents.

B. The tender quantity is approximate and may increase or decrease. Any increase or decrease in quantity will not entitle tenderer to claim any extra over the quoted rate.

C. Tender Documents be completed by legible ink, checked in a responsible manner, signed, stamped and returned together with the Tender Security Bond by the stipulated date, which shall form the Tender.

The Tenderer is required to complete :

(i) The form of tender, including the Appendices thereto Tender Security Bond and the Tender summary duly signed and stamped.

All the pages in which entries are required to be made by the tenderer are contained in the tender documents and the tenderer shall not take out or add to or amend the text of any of the documents except in so far as may be necessary to comply with any addenda issued pursuant to Clause IT-17 hereof.

IT-07 EARNEST MONEY DEPOSIT:

A. The Tender shall be accompanied by of Earnest Money Deposit **Rs.1,42,000.00** The tenderer shall pay Earnest Money Deposit by pay order/demand draft issued in favour of Commissioner, Surat Municipal Corporation, Surat of below mentioned banks only. The Earnest Money Deposit in the form of FDR or cheque shall not be accepted. The tenderer shall have to mention details of Earnest Money Deposit on the seal cover of Earnest Money Deposit. The tender received without Earnest Money Deposit shall be out rejected.

The instruments for Earnest Money Depository shall be issued by or payable/encashable at Surat Branch of the said banks only.

(A) Guarantees issued by following banks will be accepted as SD/EMD on permanent basis

1. All Nationalized Banks

(B) Guarantees issued by following Banks will be accepted as SD/EMD for the period up to March 31, 2026 as per GR NO. FD/MSM/c-file/04/2024/2859/D.M.O. Dt. 01/05/2025. The Validity cut-off date in the GR is with respect to the date of issue of Bank Guarantee irrespective of the date of termination of Bank Guarantee.

1	AXIS Bank	22	South Indian Bank
2	AU Small Finance Bank	23	Standard Chartered Bank
3	Bandhan Bank	24	Tamilnadu Mercantile Bank
4	Barclays Bank	25	Utkarsh Small Finance Bank
5	City Union Bank	26	YES Bank
6	CSB Bank	27	Ahmedabad Mercantile Co.op.bank
7	DBS Bank India Limited	28	Nutan Nagarik Sahakari Bank Ltd.
8	DCB Bank	29	Rajkot Nagarik Sahakari Bank.Ltd.
9	Equitas Small Finance Bank	30	Saraswat Co-Operative Bank Ltd.
10	ESAF Small Finance Bank	31	SBPP Co-operative Bank Ltd.
11	FEDERAL Bank	32	SVC Co-Operative Bank LTD.
12	HDFC Bank	33	The Cosmos Co-op Bank Ltd.
13	HSBC Bank	34	The Gujarat State Co-operative Bank

14	ICICI Bank	35	The Mehsana Urban Co-op.Bank Ltd.
15	IDBI Bank	36	The Surat District Co-Operative Bank Ltd.
16	IDFC First Bank	37	The Surat People's Co-OP.Bank Ltd.
17	Jammu and Kashmir Bank	38	The Kalupur Commercial Co-op. Bank
18	Jana Small Finance Bank	39	The Panchmahal District Co-operative Bank
19	Karnataka Bank	40	The Baroda District Co-operative Bank
20	Karur Vysya Bank	41	Baroda Gujarat Gramin Bank
21	Kotak Mahindra Bank	42	Saurashtra Gramin Bank

B. The Earnest Money Deposit (Tender guarantee) will be forfeited in the event, the successful tenderer fails to accept the contract and fails to submit the Performance Guarantee Bond to the owner as stipulated in this tender documents within ten days after receipt of notice of award of contract. In such case owner may disqualify the tenderer from tendering for further works, under the jurisdictions of the Corporation (S.M.C.).

C. The Earnest Money Deposit of the successful tender shall be returned after the performance guarantee bond, as required, if furnished by the contractor.

D. No interest shall be paid by the owner on any tender guarant

IT-08 INCOME TAX CLEARANCE CERTIFICATE

In view of the latest circular of IT Department IT clearance certificate is not required. However the contractor shall give zerox copy of the PAN card.

IT-09 PREPARATION OF TENDER DOCUMENTS

Tenderers are requested to note the following while preparing the Tender Documents:

A. Technical bid, EMD and Tender fees shall be submitted on the Tender Form bound herein in English. All tender items and statements shall be properly filled in. Numbers shall be stated both in words and in figures where so indicated, and signatures of all persons signing shall be in longhand.

B. Technical Bid shall be accompanied by the prescribed tender security bond and other required documents and drawings. All witnesses and sureties shall be persons of status and probity and their full names, occupations and address shall be stated below their signatures. All signatures in the Tender Documents shall be dated.

C. Variations to the Contract Documents requested by the tenderer may be affixed to the Tender Document in the space available and duly signed and stamped. Such variations may be approved or refused by the Engineer at the time of adjudications of Tenders, and in either case the Engineer is not obliged to give reasons for his decisions.

D. Delivery of Tenders shall comply with Notice inviting tenders as to place, date and time.

E. Price Bid shall be submitted online. Tenderers are requested to quote for all four parts of the tender.

IT 10 SUBMISSION OF TENDERER DOCUMENT

Following documents shall be submitted in hard copy to Surat Municipal Corporation:

- Earnest Money Deposit as mentioned in the Tender.
- Tender Fees as mentioned in the tender

- Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- Special condition of contract on Non Judicial Stamp Paper of Rs.300/-
- Under taking by the Bidder for not black listed on Non Judicial Stamp Paper of Rs.300/-
- Addenda-Corrigendum (if any) duly signed by Contractor.

Technical bid and price bid are not to be submitted in physical form. Please note that non submission of Technical Bid as well as price bid does not absolve the bidders from any liability created from the bid condition and bidding process. Technical-Bid and Price Bid in hard copy shall be submitted by Successful bidder upon intimation from Surat Municipal Corporation.

Note : -

Demand draft for E.M.D & Tender Fee shall be submitted in electronic format only through online(by scanning) while uploading the bid. this submission shall mean that E.M.D and tender fee are received for purpose of opening the bid .Accordingly offer of those shall be opened whose E.M.D and tender fee is received electronically. However for the purpose of realization of D.D bidder shall send the D.D in original through RPAD/Speed post so as to reach to Account department (Main office), SMC within stipulated date as mentioned in tender notice for the submission of tender FEE & E.M.D.

Penalative action for not submitting D.D in original to Account Department (Main Office)by bidder shall be initiated and action shall be taken for abeyance of registration and cancellation of E – tendering code for one year.

Any documents in supporting of bid shall be in electronic format only through online (by Scanning) & hard copy will not be accepted separately.

All necessary documents mentioned in Technical bid (if any). shall be submitted online.

(i) COVER-1 : Technical Bid

2. E.M.D and Tender Fees for the work of **Construction of Garden development at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana).** along with other Documents in Hard Copy upto **Dt.18/07/2026** up to 18:00 hrs. Also mention the name of tenderer, address, tender notice number etc. on the cover.

(ii) PRICE BID

1. Price bid for the work of **Construction of Garden development at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana).**

shall be submitted online.

1. The name of work to be written on cover shall be **Construction of Garden development at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana).** Also mention the name and the address of tenderer, tender notice number on the cover and to be submitted to the **Chief Accountant, Surat Municipal Corporation, Muglisara, Surat – 395 003.**
2. Tenderer shall be required to submit the enlisted documents as mentioned below in Cover-1. If necessary document founds insufficient then the Price Bid of the tenderer shall not be opened.
 - (a) The tender shall be accompanied by Earnest Money Deposit of **Rs. 1,42,000.00** The tenderer will pay **Earnest Money Deposit by Pay Order/Demand Draft** issued in favour of "Commissioner, Surat Municipal Corporation, Surat" by Nationalized Bank.

- (b) A covering letter detailing various considerations considered in tender shall invariably be given.
 - (c) Passport size photographs of all the partners (incase of partnership firm) to be fixed on relevant Page of the tender documents.
- 3.
- (a) List of tools, plants and equipments with tenderer in detail.
 - (b) Technical establishment/staff of the tenderer in required Performa with their names, qualifications and experience.
 - (c) Tenderer shall furnish along with the tender, information regarding Income tax circle of the district in which he is assessed for income tax with PAN No.
4. Submission of a tender by a tenderer shall mean that he has read this notice and contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and nature of required quantities of Materials stores, tools and plants etc. that may be required by him in carrying out the work and of local conditions and laws and bylaws of the Government, Surat Municipal Corporation and other factors bearing influence on the execution and cost of the works.
5. E.M.D., Tender Fee and other necessary document in hard copy shall be received by Registered Post A.D. or by Speed Post through Postal Authority only by the "Chief Accountant, Surat Municipal Corporation, Muglisara, Surat-395003 upto 18/07/2026 up to 18:00 hrs.

The same will be opened probably on the 10/07/2026, 11:00 hrs (Technical Bid- Soft Copy)(Probable) & 19/07/2026, (Technical Bid-Hard copy) onwards (Probable) in the presence of the tenderers, who shall remain present in the office of "Tender opening officer, Surat Municipal Corporation, Surat. Late tenders (i.e. tenders received after the specified time of opening), delayed tender (i.e. tenders received before the time of opening but after due date and the time of receipt of tender) shall not be considered at all. Tenders received by Registered Post A.D./ Speed Post after the time and the date specified in the tender notice shall not be received by the client from the postman. Such tenders if received will not be opened and will stand rejected.

6. Tender shall stand rejected if:
- 1. Any eraser is made in the tender unauthenticated or any page or pages is/are removed or replaced.
 - 2. The tenderer shall submit the tender which satisfied each and every conditions laid down in the notice tender documents, failing which the tender will be liable for rejection.
 - 3. Tenderer's tender/quotation containing conditions shall be liable for rejection out rightly without assigning any reason for the same.
 - 4. Stipulates the validity period less than what is stated in the form or tender.
 - 5. Stipulates his own conditions.
 - 6. Does not quote his rates inclusive of Octroi duty and other terminal or sales tax or CENTRAL taxes in his rates.
 - 7. Does not disclose the full names and address of all his partners in the case of partnership firm.
 - 8. Does not pay the Earnest Money Deposit by Demand Draft/Pay order and Tender Fees with Technical Bid (Cover-1).
 - 9. Does not submit the tender before the stipulated time and specified date in the Account Office as directed.
 - 10. Does not attached the document mentioned.

11. The tenderer proposes any alteration in the work specified in the tender or in the time limit allowed for carrying out the work or any other condition.
7. All corrections, additions or posted slips to be initialed by the tenderer.
8. All page of tender documents including specifications should be initialed by the contractor.
9. The tenderer shall submit the tender which satisfies each and every conditions laid down in this notice and tender documents failing which the tender is liable for rejection.
10. Notice of inviting tenders shall be a part of the contract documents.
11. Acceptance of tenderer/quotation will rest with the competent authority of Surat Municipal Corporation who does not bind himself to accept the lowest and reserves the right to accept or to reject any or all quotations/tenders and no reasons will be given for acceptance or rejection thereof.
12. The contractor shall also attach list of machineries, tools, plants, equipments which he propose to deploy for this work.
13. All octroi duty and other taxes chargeable by the Municipal Corporation shall be payable by the Contractor.
14. Tender once accepted shall be binding on the contractor even if the formal agreement is not signed.
15. Tender once offered can not be withdrawn except with the permission of head of the concerned department, Surat Municipal Corporation, Surat.
16. The successful tenderer shall be required to enter in to agreement with Municipal Corporation after placing the work order for the said work from SMC.
17. The successful tenderer may be required to furnish surety of 20% of the contract value on stamp paper if so desired by the Municipal Commissioner.
18. The tenderers are requested to give complete specification of work quoted.
19. Unless specifically mentioned by the tenderer for the extra payment of taxes on price quoted by them it will be presumed the prices quoted are inclusive of the all taxes and no claim will be entertained for payment of extra taxes on the bills submitted by them.
20. The Price-bid will be opened only after technical clarifications are clarified.
21. Surat Municipal Corporation reserves the right to open or not to open any or all Price-bid without assigning any reason thereof.

IT-11 TENDER VALIDITY PERIOD

The validity period of the tender submitted for this work shall be of one hundred twenty (120) Calendar day from the date of opening of price bid and that the tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period. The tenderer will not be allowed to withdraw the tender or make any modifications or additions in the terms and conditions of his own in his tender. If this is done then the owner shall, without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the Earnest Money Deposit in full.

IT-12 SIGNING OF TENDER DOCUMENTS

If the Tender is made by an individual it shall be signed with his full name above his current address. If the tender is made by a Proprietary firm it shall be signed by the proprietor above his name and the name of his firm with his current address.

If the tender is made by a firm in partnership it shall be signed by all the partners of the firm above their full names and current addresses, or by a partner holding the power of attorney for the firm signing the Tender in which case a certified copy of the power of attorney shall accompany the Tender. A certified copy of the partnership deed, current addresses of all the partners of the firm shall also accompany the tender.

If the tender is made by a limited company or a limited Corporation, it shall be by a duly authorised person holding the power of attorney for signing the Tender in which case a certified copy of the power of attorney shall accompany the Tender. Such limited company or Corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.

All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be stated below their signatures. All signatures in the Tender document shall be dated.

IT-13 WITHDRAWAL OF TENDERS

If, during the Tender validity period, the Tenderer withdraws his Tender, the Tender Security (Earnest Money) shall be forfeited and the Tenderer may be disqualified from tendering for further works under the jurisdiction of SURAT MUNICIPAL CORPORATION

IT-14 INTERPRETATIONS OF TENDER DOCUMENT

Tenderers shall carefully examine the tender documents and fully inform themselves as to all the conditions and matters which may in any way effect the work or the cost thereof. Should a tenderer find discrepancies or omission from the specifications or other documents, or should be in doubt as to their meaning, he should at once address query to the Divisional Head provided for concerned authority as referred in the Tender Document in Clause GC-01 (Definitions and interpretations) of the (General Condition of Contract). Any resulting interpretation of the Tender documents will be issued to all Tenderers as an addenda corrigendum. Verbal clarification and / or information given by the SMC / Consulting Engineer shall not be binding on the Municipal Corporation.

IT-15 ERRORS AND DISCREPANCIES IN TENDERS

In case of conflict between the figures and words in the rates, the rates expressed in words shall prevail and apply in such cases.

IT-16 MODIFICATION OF DOCUMENTS

Modification of specifications and extension of the closing date of the tender, if required, will be made by an addendum. Copies of each addendum will be sent to all tenderers. These shall be Signed and shall form a part of tender. The tenderer shall not add to or amend the text of any of the documents except in so far as may be necessary to comply with any addenda.

IT-17 ADDENDA

Addenda form part of the contract documents & full consideration shall be given to all addenda in the preparation of tenders. Tenderers shall verify the number of addenda issued, if, any and acknowledge the receipt of all Addenda in the Tender. Failure to acknowledge may cause the Tender to be rejected.

A. The Engineer of the owner may issue Addenda to advise Tenderers of changed requirements. Such addenda may modify previously issued Addenda.

B. No Addendum may be issued after the time stated in Notice Inviting Tenders.

IT-18 TAXES AND DUTIES ON MATERIAL

GST (Goods & Service Tax) has come in existence from 1st July, 2017. Contractor/ Successful Bidder is bound to pay any amount of GST proscribed by the govt. of India as per the Terms of Contract agreed upon during the course of execution of this contract.

During the course of execution of Contract, if there is any change in Rate of GST (Goods & Service Tax) by the Government, the same shall be reimbursed/ recovered separately by SMC, subject to the submission of Original Receipt/ Proof for the amounts actually remitted by the successful Tenderer/ Contractor to the competent Authority along with a Certificate from Chartered Accountant of Contractor/ Successful Bidder certifying that the amount of GST paid to

the Government and the same shall be intimated/ submitted/ claimed within 30 (thirty) Days from the date of payment Remittance of GST within stipulated period shall be the sole responsibility of the successful Bidder/ Contractor, failing which, SMC may recover the amount due, from any other payable dues with SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard Further, non-payment of GST to the Government may lead to the termination of contract and forfeiture of Security Deposit/ Performance Guarantee Amount.

If imposition of any other new Taxes/ Duties/ Levies/ Cess or any other incidentals etc. or any increase in the existing Taxes/ Duties/ Levies/ Cess or any other incidentals etc. (Excluding GST) are imposed during the course of the contract, the same shall be borne by the Contractor/ Successful Bidder only, in no case SMC shall be liable for the same.

As per the central goods and Service Tax Act-2017 Any Government department, local bodies and government undertaking public adventures published tenders amounting more than Rs. 2,50,000 & which commodities / services are comes under taxation than 2% TDS (1% for SGST & 1% for CGST) should be deducted. And if commodities/Services are provided from interstate then 2% TDS should be deducted of IGST.

1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

IT-19 EVALUATION OF TENDERS

As per IT (04), Experience of the Contractor shall be considered for Similar kind of works.

IT-20 EVALUATION OF TIME REQUIRED FOR COMPLETION

The time required for completion of work shall be considered as indicated by the tenderer in the completion schedule attached with the tender. The completion period mentioned in this schedule is to be reckoned from 15th day from the date of work order to proceed. Total completion period is calendar months from 15th day from date of issue of work order and tenderers should adhere to this delivery time.

IT-21 POLICY FOR TENDER UNDER CONSIDERATION

Tenders shall be termed to be under consideration from the opening of the tender until such time an official announcement of award is made.

While tenders are under consideration, tenderers and their representative or other interested parties are advised to refrain from connecting by any means Municipal Corporation or representatives on matters related to the tenders under study. The Engineer's representative if necessary will obtain clarification on tenders by requesting information from any or all the tenderers either in writing or through personal contact, as may be necessary. The tenderers will not be permitted to change the substance of his tender after price submission. Non-compliance with this provision shall make the tender liable for rejection.

IT-22 PRICES AND PAYMENTS

The tenderer must understand clearly that the price quoted are for the total works or the part of the total works quoted for and include all costs due to Materials labour, equipment, supervisions, other services, royalties and Octroi etc. and to include all extras to cover the cost. No claim for additional payment beyond the prices quoted will be entertained and the tenderer will not be entitled subsequently to make any claim on any ground excepting for the condition laid down in GC-35 (Price Adjustment).

IT-23 PAYMENT TERMS

The terms of payment are defined in the General Conditions of Contract. The Municipal Corporation shall not under any circumstances relax, their terms of payment and will not consider any alternative payment terms. Tenderers should therefore in their own interest note this provision to avoid rejection of their tenders.

IT-24 AWARD :

Award of the Contract or the rejection of tenders will be made during the Tender validity period stated in the Notice Inviting Tenders.

- A. After all contract contingencies are satisfied and the Notice of Award is issued, the successful Tenderer shall execute the Contract Agreement within the time stated in the Notice Inviting Tenders and shall furnish the Bond as required herein. The Contract Agreement shall be executed in the form stipulated by the owner. A copy of the required form is included in the contract documents.
- B. If the Tenderer receiving the Notice of Award fails or refuses to execute the Contract Agreement within the stated time limit or fails or refuses to furnish the Bond as required herein, the SMC may annul his award and declare the tender security forfeited.
- C. A Corporation, Partnership firm or other consortium acting as the Tenderer and receiving the Award shall furnish evidence of its existence and evidence that the officer signing the Contract Agreement & Bonds for the Corporation, partnership firm or other consortium acting as the Tenderer is duly authorised to do so.

IT-25 SIGNING OF CONTRACT :

The successful tender shall be required to pay the security deposit and to execute the contract within 10 days of receipt of intimation to execute the contract, failing which the Municipal Corporation will be entitled to annul the award and forfeit the Earnest Money Deposit. The person to sign the contract document shall be person detailed in Article IT-12.

IT-26 DISQUALIFICATION :

A tender shall be disqualified and will not be taken for consideration if :-

- (a) The outer envelope does not show on the outside the reference of bid and thus get opened before the due date of opening (as per Article IT-10 i.e. Submission of Tender Document).
 - (b) The tender Security Deposit is not deposited in full and in the manner i.e. Earnest Money Deposit.
 - (c) The tender is in a language other than English or does not contain its English Translation in case of other language adopted for tender preparation.
 - (d) The tender documents are not signed by an authorised person.
 - (e) The general performance data for qualification not submitted fully.
 - (f) The tenderer does not agree to deposit security amount as specified (as per Article IT-25 i.e. Signing of Contract).
 - (g) The tenderer does not agree to payment terms defined as per Article IT-23 i.e. Payment Terms.)
 - (h) Conditional tender.
- A. Tenderer may further be disqualified if :
- (a) Price variation is proposed by the Tenderer on any principles other than provided in the Tender Documents.
 - (b) Completion schedule offered is not consistent with the completion schedule defined and specified in tender documents.
 - (c) The validity of tender is less than that mentioned in Article IT-11 i. e. Tender Validity Period.
 - (d) Any of the page or pages of tender is/are removed or replaced.
 - (e) All corrections or pasted slips are not initialed by tenderer.
 - (f) Any erasure is made in the tender.

IT-27 PERFORMANCE GUARANTEE (SECURITY DEPOSIT)

As a contract security the tenderer to whom the award is made shall furnish a performance guarantee (Security Deposit) for amount equal to Two percent (2%) of the contract price to guarantee the faithful performance completion and maintenance of the works of the contract in accordance with all the conditions and terms specified herein and to the satisfaction of the Engineer and ensuring the discharge of all obligations arising from the execution of contract, in one of the forms mentioned below.

(a) Initial Security Deposit of 2% (Shall be Released after completion of final bill & on completion of audit related procedure)

(b) 5% Retention money to be deducted from each running bills (Shall be Released with final bill) + 2% Security deposit to be deducted from each running bills (Shall be Released after completion of final bill as well as defect liability period & on completion of audit related procedure)

Note: 2% Initial Security deposit shall be deposited in the form of Cash/DD/Pay order only.

Security deposit shall be paid in time and if it is paid after ten (10) days from the date of preliminary work order then the penalty of 0.065 % per day of the amount of security deposit shall be recovered from the contractor while receiving the security deposit. On due performance and completion of the contract in all respects, the performance guarantee (security deposit) will be returned to the contractor after the defect liability period and on completion of audit related procedure. It is clarified that the amount of security deposit shall be collected on the basis of Contract Price and not on the basis of estimated amount put to tender. As initial Security Deposit Two percent (2%) of the tendered amount accepted by the competent authority shall have to be paid towards security deposit at the time of execution of agreement. This will be known as initial security deposit which will be released after the total completion of contract after completion of final bill & on completion of audit related procedure.

Five percent (5%) shall be deducted from running bills as retention money.

IT-28 STAMP DUTY

The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of **Rs.4.90%** of S.D. Amount, if S.D. Amount in FDR and otherwise as per the form of the agreement approved by the Municipal Corporation, Surat.

The agreement shall be executed on stamp paper worth **Rs.4.90%** of S.D. Amount.

The surety shall be executed on stamp paper worth **Rs. 300/-**

IT-29 BRAND NAMES :

Specific references in the specifications to any Materials by tender's name, or catalogue number shall be construed as establishing a standard or quality and performance and not as limiting competition and the tenderer in such cases, may at their option freely use any other product, provided that it ensures and equal or higher quality than the standard mentioned and meets Municipal Corporation approval.

IT-30 NON-TRANSFERABLE

Tender documents are not transferable.

IT-31 COST OF TENDERING

The owner will not defray expenses incurred by Tenderers in tendering.

IT-32 DEFECT OF TENDER

The Tender for the work shall remain open for a period of 120 calendar days from the date of receipt of the tenders for this work and that the tenderer shall not be allowed to withdraw or modify the offer on his own during the period. If any tenderer withdraws or makes any modifications or additions in the terms and conditions on his own, then the Municipal

Corporation, shall without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the earnest money in full.

IT-33 CHANGE IN A QUANTITY

The Surat Municipal Corporation reserves the right to waive any informality in any tender and to reject one or all tenders without assigning any reasons for such rejections and also to vary quantities of items or group as specified in the Schedule of price as may be necessary. Claim what so ever by the contractor on the basis of variation of quantities shall not be entertained.

IT-34 NEW EQUIPMENT AND MATERIAL

All Materials, equipment and spare parts thereof shall be new, unused and originally coming from manufacturer's plant to the Corporation. The rebuilt or overhauled equipment/Materials will not be allowed to be used on work.

IT-35 RIGHTS RESERVED

The SMC reserves the right to reject any or all tenders, to waive any informality or irregularity in any tender without assigning any reasons. The SMC further reserves the right to withhold issuance of the notice to proceed, after execution of the contract agreement, for the period of time stated in the notice inviting tenders and no additional payment will be made to the successful tenderer on account of such withholding. The SMC is not obliged to give reasons for any such action.

IT-36 Municipal Commissioner reserves the right to reduce the scope of work and split the tender in two or more parts without assigning any reason even after the award of contract.

IT-37 No mobilisation advance or advance on machinery will be given.

IT-38 The scope of work is clearly mentioned in the tender documents. The contractor shall have to carry out the work in accordance with the details specifications. No conditions will be accepted. The conditional tender will be liable to be rejected.

IT-39 The surplus excavated earth, after backfilling the trenches shall have to be removed from the site as directed. After compaction and consolidation, if any short fall of earth is found then contractor has to bring the same to the required quantity in order to meet shortfall at his own cost. Moreover, if any settlement of road after reinstatement is observed during the defect liability period of the work. Contractor shall be fully responsible for the defective work and patches/ depression / settlement shall be repaired with quarry spoil or metal at contractor's own cost. If contractor fails to repair the patches / depression / settlement in time, corporation will repair it at all risk and cost of contractor.

Surplus earth shall not be disposed off in a way that leads to nuisance to the public or SMC.

IT-40 TAXES

GST CLAUSE FOR CONSTRUCTION / ERECTION / COMMISSIONING / INSTALLATION /

REPAIRS / MAINTENANCE / RENOVATION / FABRICATION OF STRUCTURE INCLUDING BUILDING (MEANS ALL WORKS CONTRACT / TURN KEY PROJECTS / SUPPLY OF MATERIAL /GOODS).

GST (Goods & Service Tax) has come in existence from 1st July, 2017. Contractor / Successful Bidder is bound to pay any amount of GST prescribed by the Govt. of India as per the Terms of Contract agreed upon during the course of execution of this Contract.

During the course of execution of Contract, if there is any change in Rate of GST (Goods & Service Tax) by the Government, the same shall be reimbursed / recovered separately by SMC, subject to the submission of Original Receipt / Proof for the amounts actually remitted by the Successful Tenderer / Contractor to the Competent Authority along with a Certificate from Chartered Accountant of Contractor / Successful Bidder certifying that the amount of GST paid to the Government and the same shall be intimated / submitted / claimed within 30 (Thirty) Days

from the date of payment. Remittance of GST within stipulated Period shall be the sole responsibility of the Successful Bidder / Contractor, failing which, SMC may recover the amount due, from any other payable dues with SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard. Further, the non-payment of GST to the Government may lead to the termination of contract and forfeiture of Security Deposit / Performance Guarantee Amount.

If imposition of any other new Taxes / Duties / Levies / Cess or any other incidentals etc. or any increase in the existing Taxes / Duties / Levies / Cess or any other incidentals etc. (Excluding GST) are imposed during the course of the contract, the same shall be borne by the Contractor / Successful Bidder only, in no case SMC shall be liable for the same.

The Contractor will submit the invoice to the SMC having GSTIN of SMC mentioned therein and the taxes shall be shown separately on the face of the Invoice so as to claim as ITC by SMC.

IT-41 No escalation charge/rates shall be paid by SMC in anycase.

IT-42 Contractor must be submitted The cement/steel/Chemical Bill (Original Bill) billwise.

IT-43 Contractor must be submitted royalty pass(zerox).

IT-44 All the taxes should be bear by agency & it should be applicable as per government resolution (of change periodically) & No compensation/Reimbersion should be given to theagency.

IT-45 TAX INVOICE FOR PAYMENT OF WORK (AS PER GST RULES)

The contractor shall submit all bills on the Prescribed format, include in Tender for purpose of payment of the work to the office of the Engineer-in-charge.

IT-46 TESTING OF CEMENT AND STEEL

It should be specifically noted that the cement and steel brought by the contractor at site of work shall be used only after the same is tested at the approved laboratory as per the direction of the Engineer-in-charge. Such approved laboratory may be located at Surat, Baroda, and Ahmedabad or Mumbai.

All the charge for the transport and testing of the samples shall have to be borne by the contractor. The frequency of testing such material shall be in accordance to the relevant Indian Standards as directed by Engineer-in-charge.

SIGNATURE OF THE CONTRACTOR.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION

SURAT MUNICIPAL CORPORATION

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS :-

- (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 Engineer & signed by the Engineer.

This form will state the work to be carried out as well as the date/or submitting and opening tenders and the time allowed for carrying out work, also the amount of earnest money to be deposited with the tender and the amount of the Security Deposit to be paid by the successful tenderer and the percentage, if any, to be deducted from bills. It will also state whether a refund of quarry fees, royalties, octroi dues and ground rent will be granted. Copies of the specifications, designs and drawings and estimated rated scheduled rates and any other documents required in connection with the work which shall be signed by the Engineer-in-charge for the purpose of identification shall also be open for inspection by contractors at the office of the Engineer-in-charge 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 corporation, such specifications with designs and drawings shall form part of the accepted tender.

- (2) In the event of the tender being submitted by a firm, it must be signed separately by each partner thereof, or 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.
- (3) Receipts for payments made on account of any work, when executed by a firm, shall also be signed by all the partners, except where the contractor 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 persons having authority to give effectual receipts for the firm.
- (4) Any persons, who submit tender shall fill up the usual printed form including the 'Column' total according to estimated quantities, stating at what rate he is willing to undertake the each item of the works, Tenders which proposal any alterations 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 liable to be rejection No. single tender include more than one will liable to be rejection No. single tender include more than one work but contractors who wish to tender for each. Tender shall have (to which they refer) written outside the envelope.
- (5) The Commissioner or his duly authorised assistant shall open tender in the presence of any intending contractors who have submitted tender or their representatives who may be present at the time. In the event of a tender being accepted, the contractor shall there upon for the purpose of identification, sign the copies of the specifications and other documents mentioned in this tender. In the event of the tender being rejected, the divisional officer shall authorised the accountant to refund the amount of earnest money deposited to the contractor making the tender on his giving a receipt for the returned of the money.
- (6) The officer competent to dispose of the tender shall have the right of rejecting all or any of the tenders.
- (7) No receipts for any payment alleged to have been made by a contractor in regard to any matter to this tender shall be valid and binding on corporation unless it is signed by the Engineer-in-charge.
- (8) The memorandum of work to be tendered for and the schedule of Materials to be supplied by the concern department and their rates shall be filled in and completed by the officer of the Engineer-in-charge before the tender form is issued. If a form issued an intending tenderer has not been so filled in and completed, he shall request the said officer to have this done before he completes and delivers his tender.
- (9) All works 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 circumstances shall any contractor be entitled to claim enhanced rates for any items in this contract.
- (11) Every contractor Instructed to Provide a solvency certificate of his financial stability from the Balance Mention in the Tender . If he fails to produce such a certificate, his tender may not be considered.
- (12) All corrections and additions or pasted slips should be initiated.
- (13) The measurement of work will be taken according to the usual method in use in the public works department and no proposals to adopt alternative methods will be accepted. The Engineer-in-charge decision as to what is "the usual method in use in the public works department" will be final.
- (14) A.The Insurance Company's bond will not be accepted against the Security Deposit.
- (15) The contractor shall have to attach to his tender Income Tax Clearance Certificate to be obtained from the Income Tax Officer.
- (16) The Contractor will have to construct a shed for storing control and valuable Materials issued to him under Schedule-'A' of the agreement at work site having double locking arrangement. The Materials will then be taken for use in the presence of the department person. No Materials will be allowed to be removed from the site of work except with the written permission from Engineer- in-charge.
- (17) No foreign exchange will be released by the Corporation for the purpose of plant and machineries required for the execution of the work contracted for.
- (18) Controlled Materials (Essentiality certificate)
 - (i) As regard controlled Materials the Corporation will help to arrange for the permit as far as possible and help the contractor in securing for the permit as far as possible and help the contractor in securing the same. All incidental charges met with in procuring these Materials shall be borne by the contractor himself. Though the Corporation will help to arrange for the permit as far as possible and help the contractor in obtaining the Materials it shall not accept any responsibility for any delay or loss on account of delay caused to the contractor while obtaining the same.
 - (ii) The contractor shall submit to Engineer-in-charge on Close of every calender months, the monthly returns in the prescribed forms as to the receipt and actual use of the controlled Materials during the month.
 - (iii) The contractor shall permit the Engineer- in- charge or his representatives to inspect the stock of the controlled Materials stored by him at any time, whenever the Engineer-in- charge or his representatives so desired (s).
- (19) The tender for work shall remain open for a period of 120 days from the date of opening of the price bid for this works and that the tenderer shall not be allowed to withdraws or modify the offer on his own during this period. If any tenderer withdraws or makes any modifications or addition/s in the terms and conditions of his tender, not acceptable to the corporation them the corporation shall without prejudice to any right or remedy be at liberty in full the said earnest money absolutely (in figures as well as in words). This Blank Space should be filled in while preparing the draft tender papers.
- (20) The contractor shall employ only such labourer who shall produce a valid certificate of having been vaccinated against small pox within a period of last 3 years.
- (21) Tenderer should submit True Copy of the Certificate of Registration alongwith the tender without which the tender will not be considered.

- (22) The contractor shall have to give in writing the date completion of the work within a fortnight from the date of work completed by him. Otherwise the date noted on the record by the department shall be reawakened as final and no excuse or representation in that behalf shall be entertained at later date.
- (23) "What ever sales tax is levied by the Government on works contract and if paid by the contractor in the first instance, shall be refunded to the concerned contractor by Corporation.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION

SIGNATURE OF THE CONTRACTOR.

GENERAL CONDITION OF CONTRACT

SECTION-I

GC-01 DEFINITIONS AND INTERPRETATIONS

1.0 In the contract documents, as herein defined the following words and expression used shall, unless, repugnant to the subject or context thereof, have the following meanings assigned to them.

1.1 The "Owner/Municipal Corporation, Surat represented by Municipal Commissioner/Add.City Engineer, any officer authorised by the Municipal Corporation.

1.2 The "Contractor" shall mean the person or the persons, firm of company whose tender has been accepted by the owner and includes his legal representative successors and permitted assignees.

1.3 The "Engineer-in-charge" shall mean the person designated as such by the owner from time to time and shall include those who are expressly authorised by the Municipal Corporation to act for and on its behalf for the operation of this contract.

1.4 "Engineer - in - charge's Representative" shall mean any Engineer or Asstt. to the Engineer-in-charge designated from time to time by the Engineer-in-charge to perform duties set forth in the Tender documents whose authority shall be notified in writing to the Contractor by the Engineer-in-charge.

1.5 "Tender" The offer or proposal of the Tenderer submitted in the prescribed form setting forth the prices for the work to be performed, and the details thereof.

1.6 "Contract Price shall mean total money payable to the Contractor under the contract documents.

1.7 "Addenda" shall mean the written or graphic notices prior to submission of tender which modify or interpret the contract documents.

1.8 "Contract Time" - The number of consecutive calendar months for the completion of work as stated in the executed contract agreement.

1.9 "Contract" shall mean agreements between the parties for the execution of works including therein all contract documents.

1.10 "Tender document" shall mean Designs, Drawings, specifications, agreed variations, if any, and such other documents constituting the tender and acceptance thereof.

1.11 "The Sub-Contractor" means any person, firm or company (other than the contractor) to whom any part of the work has been entrusted by the Contractor with the written consent of the Engineer-in-charge and the legal personnel representative, successors and permitted assignees of such person, firm or company.

1.12 "The Specifications" shall mean all directions' the various technical specifications provisions and requirements attached to the contract which pertain to the method and manner of performing the work to the quality of the work and the Materials to be furnished under the contract for the work and any order(s) or instruction (a) thereunder. It shall also mean the latest Indian Standards Institution Specifications for or relative to the particular work or part thereof, so far as they are not contrary to the Tender specifications or I.S.I. specifications, and in absence of any tender specifications, the specifications of any other country applied in India as a matter of Standard Engineering practice and approved in writing by the Engineer-in-charge with or without modifications.

1.13 The "Drawing" shall include maps, plans, tracings or prints thereof with any modifications approved in writing by the Engineer-in-charge and such other drawings, as may, from time to time, be furnished or approved in writing by the Engineer-in-charge in connection with the work.

1.14 The "Work" shall mean the works to be executed in accordance with the context or the part thereof as the case may be and shall include extra, additional altered or substituted works as required for the purpose of the Contract. It shall mean the totality of the work by expression or implication envisaged in the contract and shall include all material, equipment and labour required for

or relative or incidental to or in connection with the commencement, performance and completion of any work and/or for incorporation in the work.

1.15 The "Permanent work" means works which will be incorporation in and form part of the work to be handed over to the owner by the contractor on completion of the contract.

1.16 The "Temporary Work" shall mean all temporary works of every kind required in or about the execution, completion and maintenance of the work.

1.17 "Site" shall mean the land and other place on, under, on or through which the work is to be carried out and any other lands or places provided by the Municipal Corporation for the purpose of the Contract together with any other places designated in the Contract as forming part of the site.

1.18 "The Construction Equipment" means all appliance/equipments of whatever nature required in or for execution, completion or maintenance of work or temporary works (as hereinafter defined) but does not include Materials or other things intended to form or forming part of the permanent work.

1.19 "Notice in Writing or Written Notice" means a notice written, types or printed form delivered personally or sent by Registered post to the latest known private or business address at Registered Office of the Contractor.

1.20 The "Alteration/Variation order" means an order given in writing by the Engineer-in-charge to effect additions to or deletion from and alterations in the work.

1.21 "Final Test Certificate" shall mean the final test Certificate issued by the owner within the provisions of the Contract.

1.22 The "Completion Certificate" shall mean a certificate to be issued by the Engineer-in-charge when the work has been completed to his satisfaction.

1.23 The "Final Certificate" shall mean the final certificate issued by the Engineer-in-charge after the work is finally accepted by the owner.

1.24 "Defect Liability Period" shall mean the specified period between the issue of completion Certificate and the final certificate as specified in the tender.

1.25 "Approved" shall mean approved in writing including subsequent modification in writing of previous verbal approval and "Approval" means approved in writing including as aforesaid.

1.26 "Letter of Acceptance" shall mean an intimation by a letter to tenderer that the tender has been accepted in accordance with provisions contained therein.

1.27 "Order" and "Instruction" shall respectively mean any written order or instruction given by the Engineer-in-charge within the scope of his powers in terms of the Contract.

1.28 "Running Account Bill" shall mean a Bill for the payment of "On Account" money to the contractor during the progress of work on the basis of work done and the non-perishable Materials to be incorporated in the work supplied by the Contractor.

1.29 "Security Deposit" shall mean the deposit to be held by the owner as security for the due performance of contractual obligations.

1.30 "The appointing authority" for the purpose of Arbitration shall be the Municipal Commissioner, Surat Municipal Corporation, Surat.

1.31 Retention Money shall mean the money retained from R.A. Bill for due completion of "NET WORK".

1.32 Unless otherwise specifically stated, the masculine gender shall include the feminine and natural genders and viceversa and the singular shall include the plural and vice-versa.

GC-02 LOCATION OF SITE AND ACCESSIBILITY

The site of works is within the limits of Surat Municipal Corporation. It is served by all weather roads and Western Railway Broad Gauge line, Government Irrigation Canal Crossing. The intending Tenderer should inspect the site and make himself familiar with site conditions and available communication facilities. Non availability of access/roads shall in no case be the cause to condon any delay in the execution of the work or be the cause for any claims or extra compensation.

GC-03 SCOPE OF WORK

The scope of work is defined broadly in the special conditions of Contract and specifications. The Contractor shall provide all necessary Materials equipment and labour etc. for the execution and of the work till completion. All Materials that go with the work shall be approved by the Engineer-in-charge prior to procurement and use.

Owner at his discretion may endeavour to provide water to the Contractor at the owner's source of supply at one point at the rate charged for such works.

The contractor shall make his own arrangement for the distribution pipe net works from the source of supply after getting prior permission for the same from the Engineer-in-charge. Supply of water shall not be free and the necessary charges as fixed by the Local Body shall have to be paid by the contractor.

However, owner does not guarantee the supply of water and this does not relieve the contractor of his responsibility in making his own arrangements and for the timely completion of the work as stipulated.

POWER SUPPLY

The Contractor shall have to make his own arrangement for power supply.

LAND FOR CONTRACTOR'S FIELD OFFICE, GODOWN & WORKSHOP

Owner will not be a position to provide land required for Contractors shall have to make his own arrangement for the same. No land will be provided by S.M..C. to the contractor for constructing his labour and supervisory comp and other service facilities.

GC-04 RULLING LANGUAGE

The language according to which the contractor shall be constructed and interpreted shall be English. All entries in the contract documents and all correspondence between the contractor and the Municipal Corporation or the Engineer shall be in English. All dimensions for the Materials shall be given in metric units only.

GC-05 INTERPRETATION OF CONTRACT DOCUMENT

1. The provisions of the General Conditions of Contract and special conditions of contract shall prevail over those of any other documents of the contract unless specifically provided otherwise. Should there be any discrepancy, inconsistency error or omission in the several documents forming the contract, the matter may be referred to the Engineer-in-charge for his instructions and decision. The Engineer-in-charge's decision in such case shall be the final and binding to the contractor.

2. Works shown upon the drawings but not described in the specifications or described in the specific specifications without showing on the drawings shall be taken as described in the specifications and shown on the drawings.

3. The heading and the marginal notes to the clauses of those general conditions of contract or to the specifications or to any other part of tender documents are solely for the purpose of giving a concise indication and not a summary of contents thereof or be used in the interpretation or construction thereof of the contract.

4. Unless otherwise stated specifically, in this contract documents the singular shall include the plural and vice versa wherever the context so requires. Works implementing persons shall include relevant corporated companies/ registered associations / body of individual / firm of partnership.

5. Not with standing the sub-divisions of the documents into separate sections and volumes every part

of each shall be supplementary to and complementary of every other part and shall be read with and into the context so far as it may be practicable to do so.

6. Where any portion of the General Conditions of contract is repugnant to or at variance with any provisions of the special conditions of contract, then, unless a different intension appears, the provisions of the special conditions of contract shall be deemed to override the provisions of General conditions of Contract and shall to the extent of such repugnancy or variance prevail.

7. The Materials, Design and Workmanship shall satisfy the relevant I.S.S. and Codes referred to. If Additional requirements are shown in the specifications, the same shall be satisfied over and above I.S.S. and Codes.

8. If the specification mentions that the contract shall perform certain work or provide certain facilities, it will mean that the contractor shall do so at his own cost.

9. The correctness of the details given in the tender documents is not guaranteed. The contractor shall independently obtain all necessary information for making the tender. The contractor shall be deemed to have examined the Contract Documents, to have generally obtained his own information in all matters that might affect the carrying out of the work or the Tenderer's rates. Any error in description of quantity or commission therefrom shall not vitiate the contract or release the contractor from executing the work comprised in the contract according to the Drawings and specifications at the tendered rates. He is deemed to have known the scope, nature and magnitude of the work and the requirements of Materials and labour involved and as to what all works he has to complete in accordance with the contract whatsoever be the defects, omissions, or errors that may be found in the contract documents. The contractor shall be deemed to have visited the site and the surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of railways, roads, bridges and culverts, means of transport and communications, whether by land, air or water and as to possible interceptions thereto and the access and egress from the site, to have made inquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other Materials, the sites for disposal of surplus Materials, the available accommodation as to whatever required, the depots and such other buildings as may be necessary for executing and completing the work, to have local independent inquiries as to the subsoil, subsoil water and variation thereof, storms, prevailing winds, climatic conditions and all other similar matters affecting the work. He is deemed to have acquainted himself as to his liability for payment of Government taxes, custom duty and other charges.

Any neglect or failure on the part of the contractor in obtaining necessary and reliable information upon the foregoing or any other matters affecting the contract shall not relieve him from any risks or liabilities or the entire responsibility from completion of the work at the tendered rates and time in strict accordance with the contract documents.

No verbal agreement or inference from conversation with any officer or employee of the owner either before or after the execution of the Contract Agreement shall in any way effect or modify any of the terms of obligations herein contained.

GC-06 CONTRACTOR TO UNDERSTAND HIMSELF FULLY

The contractor by tendering shall be deemed to have satisfied himself, as to consideration and circumstances affecting the tender price, as to the possibility of executing the works as shown and described in the contract and to have fixed his prices according to his own view on these matters and to have understood that no additional allowances except as otherwise expressly provided, will afterwards be made beyond the contract price. The contractor shall be responsible for any misunderstanding or incorrect information given in writing by the Engineer.

GC-07 ERROR IN SUBMISSION

The contractor shall be responsible for any errors or omissions in the particulars supplied by him. Whether such particulars have been approved by the Engineer or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or particulars furnished in writing to the Contractor by the Municipal Corporation or the Engineer.

GC-08 SUFFICIENCY OF TENDER

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness of the tender rates which rates shall, except as or other wise provided for, cover all the Contractor's liabilities and obligation set forth or implied in the contract for the proper execution of work for compliance with requirements of Article GC-19 thereof.

GC-09 DISCREPANCIES

The drawings and specifications are to be considered as mutually explanatory of each other, detailed drawings being followed in preference to small scale drawings and figures dimension in preference to scale and special conditions in preference to general conditions. Special direction or dimensions given in the specifications shall supersede all else. Should any discrepancies however, appear or should any misunderstanding arise as to the meaning and intent of the said specifications or drawings, or as to the dimensions or the quality of the Materials or the due and proper execution of the works, or as to the measurement or quality and valuation of the works executed under this contract or as extra there upon the same shall be explained by the Engineer-in-charge and his explanation shall subject to the final decision of the Additional City Engineer, in case reference be made to him, be binding upon the contractor shall execute the work according to such explanation (subject to aforesaid) and without addition to or deduction from the contract and shall also do all such works and things necessary for the proper completion of the works as implied by the Drawings and specifications, even though such works and things are not specially shown and described in said specifications. In cases where not particular specifications are given for any article to be used under the contract, relevant specifications of the Indian Standard Institution shall apply.

GC-10 PERFORMANCE GUARANTEE : (Security Deposit)

The total Security Deposit is 4% (Four) percent of contract value and shall be as under:

The successful tenderer shall have to pay initial security deposit at 2% (two) percent of the tendered amount.

- Initial Security Deposit (2%) shall be paid in form of Cash or Demand Draft/ Pay Order if the Tender Amount of work is **less than Rs. 2.00 crore.**
- Initial Security Deposit (2%) shall be paid in form of Cash or Demand Draft/ Pay Order / bank Guarantee (encashable at Surat city)/ FDR if the tender Amount of work is **more than Rs. 2.00 crore & 2.00 crore.**

The person/persons whose tender may be accepted [here-in after called the Contractor, which expression shall unless excluded by or repugnant to the context include his heirs, executors, administrators and assignees shall (within 15 days of the receipt by him of the notification of the acceptance of his tender) deposit with Municipal Commissioner cash or Government securities endorsed to the Commissioner sum sufficient which will make up the full security deposit specified in the tender.

If the amount of the security deposit to be paid in lump sum within the period specified above is not paid the tender contract already accepted shall be considered as cancelled. The security deposit lodged by Contractor shall be refunded after the expiry of the Defects Liability period as shown in the attached Memorandum after deducting dues, if any, which become liable to be recovered from the Contractor under the terms and conditions of this Agreement.

Regarding remittance and release of Security Deposit (SD), Retention money deposit (RMD) following clause will supersede over and above all the clauses depicted in the tender document.

Tender costing Less than Rs.2.00 Crore.

(a) Remittance of SD/RMD

(i) The total security deposit shall be recovered at the rate of 4% from contractor. Out of which, 50% of amount as Initial Security Deposit shall be payable at the rate of 2% of approved tender cost in form of Cash or Demand Draft/ Pay Order of any Nationalised Bank (encashable at Surat city).

(ii) 7% Retention Money (Remaining 2% SD + 5% Additional Retention Money) Deposit To The Retained From Each Running Bill.

(b) Release of SD/RMD

(i) Initial security deposit of 2% shall be released after completion of final bill as well as defect liability period & completion of audit related procedure.

(ii) 7% Retention money (2%SD + 5% additional Retention money) Depotide to be deducted from running bills (shall be released with final bills)

Tender costing Rs.2.00 Crore. & more than Rs.2.00 Crore.

(a) Remittance of SD/RMD

(i) The total security deposit shall be recovered at the rate of 4% from contractor. Out of which, 50% of amount as Initial Security Deposit shall be payable at the rate of 2% of approved tender cost in form of in Cash or Demand Draft/ Pay Order / FDR / Bank Guarantee of any Nationalised Bank (encashable at Surat city).

(ii) The remaining amount of the Security Deposit i.e. 2% to be deducted from each running account bill.

(iii) 5% Retention money deposit (RMD) to be retained from each running account bill.

(b) Release of SD/RMD

(i)The 2% Initial security deposit shall be released after clearance of Final bill by Audit Dept.

(ii)Whereas, the 2% security deposit recovered from the each running account bills Shall be released only after clearance of Final bill by Audit Dept. & completion of defect liability period.

(iii) 5% Retention money deposit (RMD) to be released along with final bill.

The amount recovered from the running bills as security deposit shall not be allowed to the transferred in the form of Bank Guarantee. However, the remaining 50% (2% of Security Deposit) of the amount so, deducted from running bills will be allowed for conversion in the form of interest bearing fixed deposit receipt, (FDR) issued in favour of the Municipal Commissioner, Surat Municipal Corporation, Surat by a Nationalized Bank located at Surat only. Additional stamp duty payable as per government prevailing rule shall be paid by contractor for remittance of this FDR.

It is clarified that the amount of security deposit shall be collected on the basis of contract price and not on the basis of Estimated Amount put to tender. As initial Security Deposit as mentioned above, accepted by the competent Authority shall have to be paid toward Security Deposit at the time of execution of agreement.

Interest will be payable on FDR (that is deducted from Running Bill and converted in to FDR for initial SD) for One year, after completion of work. After that no further interest shall be paid for any extended period what so ever.

If the Security Deposit is not paid within 15 days from the date of L.O.I. / Work Order than penalty at the rate of

0.065% per day of the amount of Security Deposit will charged. If the Security Deposit is not paid within one month with interest, necessary actions as per condition of contract will be taken.

If initial Security deposit is paid in form of Fixed Deposit, additional stamp paper amounting As per government's prevailing rule of Security Deposit shall be used to execute the agreement.

The undertaking shall be executed on stamp paper worth Rs. 300/-.

The Surety shall be executed on stamp paper worth Rs. 300/-.

GC-11 INSPECTION OF WORK

1. The Engineer in charge will have full power and authority to inspect the work at any time wherever in progress either on the site or at the contractor's any other manufacturers workshops or factories wherever situated and the contractor shall afford for Engineer-in-charge every facility and assistance to carry out such inspection. Contractor or his authorised representative minimum (B.E Civil) shall, at all time during the usual working hours and all other times when so notified or rehabilitation work in progress ,(no work allowed without engineer from contractor and also without engineer from department) , contractor engineer remain present to receive orders and instructions, orders given to Contractor's representative shall considered to have the same force as if they had been given to the contractor himself. Contractor shall give not less than 7 days notice in writing to the Engineer-in- charge before covering up or otherwise placing beyond reach of inspection and measuring any work in order that the same may be inspected and measured. In the event of breach of the above, the same shall be recovered at Contractor's expenses for carrying out such inspection or measurement.

2. No material shall be despatched from contract store on site of work before obtaining approval in writing of the Engineer-in-charge, Contractor shall provide at all time during the progress of work and maintenance period proper means of access with ladders, gangways, etc. and the necessary attendance to move and adopt as directed for inspection or measurement of work by Engineer-in-charge.

GC-12 DEFECT LIABILITY

1. Contractor shall guarantee the work for **a period of 12 months** from the date of issue of completion certificate. Any damage or defect that may arise or that may remain undiscovered at the time of issue of completion certificate connected in any way with the equipment or Materials supplied by him or in the Workmanship be rectified or replaced by contractor at his own expenses as desired by Engineer-in-charge or in default may cause the same to be made good by other agency and deduct expenses of which the certificate of Engineer-in-charge shall be final from any sums that may then or any time thereafter become due to contractor of sale thereof or of a sufficient portion thereof.

2. From the commencement to completion of work contractor shall take full responsibility for the case of the work including all temporary works and in case any damage, loss or injury shall happen to work or any part thereof or to any temporary works from any cause whatsoever and shall at his own cost repair and make good the same so that at completion work shall be in good order and in conformity in every respect with the requirements of contract and as per the instructions of the Engineer-in-charge.

3. If at any time before the work is taken over, the Engineer-in-charge shall -

(a) Decide that any work done or Materials used by the contractor are defective or not in accordance with contract or that work of any portion thereof is defective or do not fulfill the requirements of contract (all such Materials being hereinafter called defects in this clause and (b) as soon as reasonably practicable given to contractor notice in writing of the said defect specifying particulars of the defects alleged to exist or to have occurred, then contractor shall at his own expenses and with all speed make good the defects so specified.

(b) In case contractor fails to do so, owner may take at the cost of the contractor, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by S.M.C. will be recovered from the amount due to contractor. The decision of Engineer-in-charge with regard to the amount to be recovered from contractor will be final and binding on the contractor.

GC-13 POWER OF ENGINEER TO GIVE FURTHER INSTRUCTIONS

The Engineer shall have the power and authority from time to time and at all times to give further instructions and directions as may appear to him necessary or proper for the guidance of contractor and the works and efficient execution of the works according to the terms of the specifications, and the contractor shall receive, execute, obey and be bound by the same, according to the true intent and

meaning thereof, as fully and effectually as though the same had accompanied or had been mentioned or referred to in the specifications. No work which radically changes the original nature of the contract shall be ordered by the Engineer and in the event of any deviation being ordered, which in the opinion of the contractor changes the original nature of the contract, the contractor shall nevertheless carry it out and any disagreement as to the nature of the work & the rate to be paid thereof shall be resolved. The time of completion of works, in the event of any deviations, resulting in additional cost over the contract sum being ordered, then be extended or reduced reasonable by the Engineer. The Engineer's decision in the case shall be final and binding.

GC-14 PROGRAMME

The time allowed for execution of works shall be essence of the contract. The contract period shall commence from date of Notice of intimation to proceed. The tenderer at the time of submitting his tender shall indicate the construction or pipeline schedule, the month-wise programme, daily work schedule or bar chart required for the execution of the works and shall confirm the same within fourteen (14) days of the acceptance of his Tender. The contractor shall provide to the Engineer-in-charge a detailed programme of time schedule for execution of the works in accordance with the specifications & the completion date. The entire programme to be finalised by the Contractor, has to confirm to the execution period mentioned alongwith the Bill of Quantities in the Tender Documents. The Engineer upon scrutiny of such submitted programme by contractor, shall examine suitability of it to the requirement of contract and suggest modifications, if found necessary.

GC-15 SUBLETTING OF WORKS

No part of the contract nor any share or interest thereon shall in any manner or degree be transferred, assigned or sublet by the contractor directly or indirectly to any firm or Corporation whatsoever except as provided for in the succeeding subclause without the consent in writing of the owner.

GC-16 SUB-CONTRACTORS FOR TEMPORARY WORKS ETC.

The owner may give written consent to sub-contractors for execution of any part of the work at the site being entered upon by the contractors provided each individual's contractor is submitted to the Engineer-in-charge before being entered into and is approved by him. List of Sub-Contractors is to be supplied. Notwithstanding any subletting with such approval as aforesaid and notwithstanding the Engineer-in-charge shall have received copies of any sub-contractors, the contractors shall be and shall remain solely responsible for the quality and proper expenditures and execution of the works and the performance of all the conditions of contract in all respects as if such submitting or sub-contracting had not taken place and as if such work had been done directly by the Contractor.

GC-17 TIME FOR COMPLETION

1. The work covered under this contract shall be commenced from the date of contract is served with a notice to proceed with the work and shall be completed before the date as mentioned in the time schedule of work. The time is the essence of the contract and unless the same is extended as mentioned in clause No. GC-18 (Extension of time) the contractor will be penalised for the delay.
2. The general time schedule for work is given in the tender document. Contractor shall prepare a detailed weekly or monthly programme of work in consultation with Engineer-in-charge soon after the agreement and the work shall be strictly executed accordingly. The time for construction of road given includes, the time required for testing, rectification if any, retesting and completion in all respects to the entire satisfaction of the Engineer-in-charge.

GC-18 EXTENSION OF TIME

Time shall be considered as the essence of the contract. If however, the failure of the Contractor to complete the work as per the stipulated dates referred to above arises from delays on the part of Municipal Corporation in supplying the Materials of equipment it has undertaken to supply under the contract or from delays in handing over sites or from increase in the quantity of work to be done under the contract, or force Majeure an appropriate extension of time will be given. The Contractor shall request such extension within one month of the cause of such delay and in any case before expiry of the contract period.

GC-19 CONTRACT AGREEMENT

The successful tenderer shall when called upon to do so, enter into and execute the Contract Agreement within (15) fifteen days of the Notice of Award, in the form shown in tender documents with such modifications as may be necessary in the opinion of the Municipal Commissioner. It should be incumbent on the contract to pay the stamp duty and the legal charges for the completion of the contract agreement.

GC-20 A.PENALTY FOR DELAY

If the contractor fails to complete the work within the stipulated completion date for the work or he shall pay liquidated damages at one tenth of Two percent of contract value per day of delay in completion and handing over the work or part thereof as the case may be to the Municipal Commissioner. The amount of liquidated damages shall, however, be subjected to a maximum of ten (10) percent of the contract value. Delays in excess of one hundred days will be a cause for termination of the contract and forfeiture of all security for performance.

B.BAR CHART

The successful tenderer shall have to submit the progress bar-chart within fifteen days after the contract, and the contractor should work as per the approved bar-chart, failing the contractor shall have to pay the compensation for delay as per the decision of Municipal Commissioner.

GC-21 FORFEITURE OF SECURITY DEPOSIT

Whenever any claim arises against the contractor for the payment of a sum of money out of or under the contract, the owner shall be entitled to recover such sum by appropriating in part or whole, the security deposit of the contractor. In case the Security deposit is insufficient the balance recoverable shall be deducted from any sum then due or which at any time thereafter may become due to the contractor shall pay to the owner on demand the balance remaining due.

GC-22 ACTION OF FORFEITURE OF SECURITY DEPOSIT

In any case in which under any clause or clauses of the contract, the contractor shall have forfeited the whole of his Security deposit or have committed a breach of any of the terms contained in this contract, the owner shall have power to adopt any of the following courses as he may deem best suited to his interest -

- (a) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the owner shall be conclusive evidence) in which case, the security deposit of the contractor shall stand forfeited and be absolutely at the disposal of the owner.
- (b) To employ labour and to supply Materials to carry out the balance work debiting contractor with the cost of labour employed and the cost of Materials supplied for which a certificate of the Engineer-in-charge shall be final and conclusive against the contractor and 10% costs on above to cover all departmental charges and crediting him with the value of work done at the same rates as if it has been carried out by the contractor under the terms of his contract. The certificate of Engineer-in-charge as to the value of the work done shall be final and conclusive against the contractor.
- (c) To measure up the work of the contractor and to take such part hereof as shall be unexecuted out of his hand to give it to another contractor to complete. In this case the excess expenditure incurred than what whole have been paid to the original contractor, if the work had been executed by him, shall be earned and paid by the original contractor and shall be deducted from any money due to him by the owner under the contract or otherwise and for the excess expenditure, the certificate of the Engineer-in-charge shall be final and conclusive.

In the event any of the above course being adopted by the owner, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any Materials or entered into any agreement so or made by advance on account of or with a view to the execution of the work or the performance of the contract. In such case the contractor shall not be entitled to recover or be paid by sum for any work actually performed under this contract unless the Engineer-in-charge will certify in writing the performance of such work and the value payable in respect thereof and shall only be entitled to be paid the value so certified. In the event of the owner

putting in force the powers as stated in a, b, c, above vested in him under the preceeding clause, he may, if he so desire, take possession of all or any tools and plant, Materials and stores in or upon the work or the site thereof 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 to be certified by the Engineer-in-charge whose certificate thereof shall be final otherwise the Engineer-in-charge may give notice in writing to the contractor or his representative requiring him to remove such tools plant Materials or stores from the premises within the time specified in the notice and in if the contractor fails to comply with any such notice, the Engineer-in-charge may remove them at the Contractor's expenses or sell them by auction or private sale on account of the contractor and his risks in all respects without any further notice as to the date, time to place of the sale and the certificate of Engineer-in-charge as to the expenses of any such removal and the amount of the proceeds and the expenses of any such sale shall be final and conclusive against the contractor.

GC-23 NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK

If at any time from the commencement of work, the owner shall for any reasons whatsoever not require the whole or part thereof a specified in the tender to be carried out, the Engineer-in-charge shall give notice in writing of the contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from execution of work in full, but which he did not derive in consequence of the full amount of the work not having been carried neither shall he have any claim for compensation by reason if any alternations having been made in original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originally contemplated.

When the contractor is a partnership firm, the prior approval in writing of the S.M.C. shall be obtained before any change is made in the constitution of the firm, where the contractor is an individual or a Hindu Undivided Family business concern, such approval as aforesaid shall, likewise be obtained before sub-contractor enters into any agreement with other parties whereunder the reconstituted firm would have the right to carry out the work hereby undertaken by the contractor. In either case if prior approval as aforesaid is not obtained, the contract shall be deemed to have been allotted in contravention of sub-letting clause hereof and the same action may be taken and the same consequence shall ensue as provided in the sub-letting clause.

GC-24 IN EVENT OF DEATH OF CONTRACTOR

Without prejudice to any of the right or remedies under the contract, if the contractor dies, the owner shall have the option of terminating the contract without compensation to the contractor.

GC-25 MEMBER OF THE OWNER NOT INDIVIDUALLY LIABLE

No official or employee of the owner shall in any way be personally bound or liable for the acts or obligations

of the owner under the contract or answerable for any default or omission in the observance or performance of the acts, matters or things which are herein contained.

GC-26 OWNER NOT BOUND BY PERSONAL REPRESENTATIONS

The contractor shall not be entitled to any increase on the Schedule of rates or any other rights or claims whatsoever by reason of representation, explanation or statement or alleged representation, promise or guarantees given or alleged to have been given to him by any person.

GC-27 CONTRACTOR'S OFFICE AT SITE

The Contractor shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall be opened at all reasonable hours to receive instructions, notice or other communications.

GC-28 CONTRACTOR'S SUBORDINATE STAFF AND THEIR CONDUCT

1. The contractor on award of the work shall name and depute a qualified Engineer, having experience of carrying out work of similar nature, to whom equipments, Materials, if, any, shall be issued and instructions for work given. The contractor shall also provide to the satisfaction of Engineer in-charge sufficient and qualified staff to superintend the execution of the work, competent sub- agents, foremen and leading hands including those specially qualified by previous expeditions to a supervise the type of works comprised in the contract in such manner as will ensure work of the best quality and expeditions working, it, in the opinion of the Engineer-in-charge, additional properly qualified supervision staff is considered necessary, if shall be employed by the contractor without additional charge on account thereof. The contractor shall ensure to the satisfaction of the Engineer- in-charge that sub - contractors, if any shall provide competent and efficient supervision over the work entrusted to them.

2. If and whenever any of the contractor's or sub-contractor agents, sub-agents, assistance, foremen or other employees shall, in the opinion of Engineer-in-charge, be guilty of any misconduct or be incompetent or insufficiently qualified or intelligent in the performance of their duties or that in opinion of the owner or Engineer-in-charge, it is undesirable for administrative or any other reason for person or persons to be employed in the works, the contractor, if so directed by the Engineer-in-charge, shall at once remove person or persons from employment thereon. Any person or persons so removed shall not again be reemployed in connection with the works without the written permission of the Engineer-in-charge. Any person so removed from the works shall be immediately replaced at the expenses of the contractor by acqualified and competent substitute. Should the contractor be required to repatriate any person removed from the works he shall do so and shall bear all costs in connection therewith.

3. The contractor shall be responsible for the proper behaviour of all the staff, foremen, workmen and others shall exercise proper control over them and in particular and without prejudice to the same. Generally, the contractor shall be bound to prohi-bit, and prevent any employee from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neigh-bourhood and in the event of such employees so trespassing, the contractor shall be responsible therefore and relieve the owner of all consequent claims, actions for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-charge upon any matter arising under this clause shall be final.

4. If and required by the owner, the contractor's personnel entering upon the owner's premises shall be properly identified by badges of a type acceptable to the S.M.C. which must be worn at all times on owner's premises.

GC-29 TERMINATION OF SUB-CONTRACTOR BY OWNER

If any sub-contractor engaged upon the works at the site executes any work which in the opinion of Engineer-in-charge is not in accordance with the contract documents, the S.M.C. may give written notice to the contractor request his to terminate such sub-contract and the contractor upon the receipt of such notice shall terminate such sub-contract and the letter shall forthwith leave the works failing which the owner shall have the right to remove such sub-contractors from the site.

No action taken by the owner under the above clause shall relieve the contractor of his liabilities under the contract or give rise to any right to compensa-tion, extension of time or otherwise.

GC-30 POWER OF ENTRY

If the contractor shall not commence the work in the manner previously described in the contract documents or if he shall, at any time, in the opinion of Engineer-in-charge.

- (i) Fail to carry out works in conformity with the documents or
- (ii) Fail to carry out the works in accordance with the time schedule.
- (iii) Substantially suspend work or the works for a period of fourteen days without authority from Engineer-in-charge or
- (iv) Fail to carry out and execute the work to the satisfaction of the Engineer-in-charge or
- (v) Fail to supply sufficient or suitable construc-tion plant temporary works, labour Materials or things or

- (vi) Commit breach of any other provisions of the contract on his part to be performed or observed or persist in any of the above mentioned breached of the contract for fourteen days after notice in writing shall have been given to the contractor by the Engineer-in-charge requiring such breach to be remedied or
- (vii) Abandon the work or
- (viii) During the continuance of the contract becomes bankrupt, make any arrangement or compromise with his creditors, or permit any execution to be levied or go into liquidation whether compulsory or voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction then in any such case.

The owner shall have the power to enter upon the works and take possession thereof and of the Materials, temporary works, constructional plant and stock therein, and to revoke the contractor's licence to use the same and to complete the works by his agents, other contractor or workman or to relate the same upon any terms and to such other person, firm or corporation as the owner in his absolute discretion may think proper to employ, and for the purpose aforesaid to use or authorise the use of any Materials, temporary works, constructional plant, and stock as aforesaid, without making payment or allowance to the Contractor for the said Materials other than such as may be certified in written by the Engineer-in-charge to be reasonable and without making any payment or allowance to the contractor for the use of said temporary works, constructional plant and stock or being liable for any loss or damage thereto. If the owner shall be reason of his taking possession of the works or of the work being got completed by other contractor incur excess certified by the Engineer-in-charge shall be deducted from any money which may be due for the work done by the contractor under the contract and not paid for. Any deficiency shall forthwith be made good and paid to the owner by the contractor and the owner shall have power to sell in such manner and for such price as he may think fit all or any of the constructional plant, Materials etc. constructed by or belonging to and recoup and retain the said deficiency or any part thereof out of the proceeds of the sale.

GC-31 CONTRACTOR'S RESPONSIBILITY WITH THE OTHER CONTRACTOR & AGENCIES

Without repugnance to any other condition, it shall be the responsibility of the contractor executing the work of civil construction to work in close co-operation and co-ordinate the work with other contractors or their authorised representative and the contractor will put a joint scheme with the concurrence of other contractors showing the arrangements for carrying his portion of the work to the Engineer-in-charge and get the approval. The Engineer-in-charge before approving the joint scheme will call the parties concerned and modify the scheme if required. No claim will be entertained on account of the above. The contractor shall conform in all respects with the provisions of any statutory regulations, ordinances or by laws of any local or locally constituted authorities or public bodies which may be applicable from time to time to works or any temporary works. The contractor shall keep the owner indemnified against all penalties and liabilities of every kind arising out of non-adherence to such statutes, ordinances, laws, rules, regulations, etc.

GC-32 OTHER AGENCIES AT SITE

The Contractor shall have to execute the work in such place and condition where other agencies will also be engaged for other works, such as site grading, filling and levelling, electrical and mechanical engineering works, etc. No claim shall be entertained for works being executed in the above circumstances.

GC-33 NOTICES

Any notice under this contract may be served on the contractor or his duly authorised representative at the job site or may be served by registered post direct to the official address of the contractor proof of issue of any such notice could be conclusive of the contractor having been duly informed of all contents therein.

GC-34 RIGHT OF VARIOUS INTERESTS

The owner reserves the right to distribute the work between more than one contractor. Contractor shall co-operate and afford reasonable opportunity to other contractors for access to the works for the carriage and storage of Materials and execution of their works.

Wherever the work being done by any department of the owner or by other contractor employed by the owner is contingent upon work covered by this contract, the respective rights of the various interests shall be determined by Engineer-in-charge to secure the completion of various portions of the work in general harmony.

GC-35 PRICE ADJUSTMENT

No Price adjustment in price shall be paid.

GC-36 TERMS OF PAYMENT

The payment of Bills shall be made progressively according to the rules and practice followed by the Municipal Corporation. The progressive payment unless otherwise provided in the Contract Agreement or sub-sequently agreed to by the parties, shall be made generally monthly on submission of a bill by the Contractor in prescribed form in an amount according to the value of the work performed less the aggregate of previous progressive payments and as required by clause GC-37 (Retention money) herein. All such progressive payment shall be regarded as payment by way of advance against final payment.

Payment for the work done by the contractor will be based on the measurement at various stages of the work, in accordance with the conditions at Clause GC-77 (Measurement of Work in Progress)

GC-37 RETENTION MONEY

Pursuant to Clause GC-36 Terms of Payment on all money due to the contractor for work done, **Municipal Corporation will hold as retention money of Seven percent (7%) of the value of work.** The retention money will not normally be due for payment until the completion of the entire work and till such period the work has been finally accepted by the Municipal Corporation and completion certificate issued by the Municipal Corporation in pursuant to Clause No.GC-83 (Completion Certificate).

However, after the assurance of completion certificate, and Municipal Commissioner may at its own discretion and having considered the Contractor's performance and diligence during the contract time allow the retention money to be converted into a Bond as stipulated in the Clause GC-10 (Performance Bond Security Deposit).

GC-38 PAYMENT DUE FROM THE CONTRACTOR

All costs, damages or expenses, for which under the Contract the Contractor is liable to the Municipal Corporation deducted by the Municipal Corporation from any money due or becoming due to the Contractor under the contract or from any other contract with the Municipal Corporation or may be recovered by action at law or otherwise from the Contractor.

GC-39 CONTINGENT FEE

1. The Contractor warrants that he has not employed any person to solicit or secure the contract upon any agreement for a commission, percentage, brokerage or contingent fee. Breach of this warranty shall give the Municipal Commissioner the right to cancel the contract or to take any other measure as the Municipal Commissioner may deem fit. The warranty does not apply to commissions payable by the contractor to establish commercial or selling agent for the purpose of securing business.

2. No officer, employer of the Municipal Corporation be admitted to any share or part of this contract or to any benefit that may rise therefrom.

GC-40 BREACH OF CONTRACT BY CONTRACTOR

If the contractor fails to perform the work under the contract with due diligence or shall refuse or neglect to comply with instruction given to him by the Engineer-in-charge in accordance with the contract, or shall contravene the provisions of the contract, the S.M.C. may give notice in writing to the contractor to make good such failure, neglect or contravention. Should the Contractor fail to comply with such written notice within twenty eight (28) days of receipt, if the Municipal Commissioner shall think fit, it

shall be lawful for the Municipal Corporation, without prejudice to any other rights, the contractor may have under the contract, to terminate the contract for all or part of the works, and to make any other arrangements it shall deem necessary to complete the work outstanding under the contract at the time of termination. In this event Article GC-15 (Subletting of work) and GC-16 (Sub-Contracts for Temporary Works etc.) hereof shall be invoked and the performance Bond shall immediately become due and payable to the Municipal Commissioner the value of the work done on the date of termination and not paid for shall stand forfeited to the Municipal Corporation and the Municipal Corporation shall have free use of any works which the contractor may have at the site at the time of termination of the contract.

GC-41 DEFAULT OF CONTRACTOR

1. The Municipal Corporation may upon written notice of default to the contractor terminate the contract in circumstance detailed hereunder :

(a) If in the judgement of the Municipal Corporation the contractor fails to make completion of works within the time specified in the completion schedule or within the period for which extension has been granted by the Municipal Corporation /Engineer to the Contractor.

(b) If in the judgement of the Municipal Corporation the contractor fails to comply with any of the provisions of this contract.

2. In the event the Municipal Commissioner terminates the contract in whole or in part as provided in Article GC-48 (Termination of Contract), the Municipal Corporation reserves the right to purchase upon such terms and in such manner as it may deem appropriate, plant similar to that terminated and the contractor will be liable to the Municipal Corporation for any additional costs for such similar and / or for liquidated damages for delay until such reasonable time as may be required for the final completion of works.

3. If this contract is terminated as provided in this paragraph GC - 30 (Power of entry) (1) the Municipal Corporation in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Municipal Corporation under any of the following cases in the manual and as directed by the Municipal Corporation. (a) Any partially completed information and contract rights as the contractor has specifically produced or acquired for the performance of the contract so terminated.

4. In the event the Municipal Corporation does not terminate the contract as provided in the paragraph GC- 48 (Termination of Contract) the Contractor shall continue performance of the contract, in which case the shall be liable to the Municipal Corporation for liquidated damages for delay until the works are accepted.

GC-42 BANKRUPTCY

If the Contractor shall become bankrupt or insolvent or have a receiving order made against him, or compound with the creditors, or being the Municipal Corporation commence to be wound up, not being a member's Voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a receiver for the benefit of his creditors or any of them, the owner shall be at liberty to either (a) terminate the contract forthwith by giving notice in writing to the contractor or to the receiver or liquidator or to any person or organisation in whom the contract may become vested and to act in the manner provided in Article GC-41 (Default of Contractor) as though the last mentioned notice had been the notice referred to in such Article of (b) to give such receiver liquidator or other person in work the contract may become vested the option of carrying out the contract subject to his providing a satisfactory guarantee for the due and faithful performance of the contract subject to his providing a satisfactory guarantee for the due and faithful performance of the contract upto an amount to be agreed. In the event that the Municipal Corporation terminates the Contract in accordance with this article, the performance Bond shall immediately become due and payable on demand to Municipal Corporation.

GC-43 OWNERSHIP

Works supplied pursuant to the Contract shall become the property of the Municipal Corporation from whichever is the earlier of the following times, namely,

(a) When the works are completed pursuant to the Contract.

(b) When the Contractor has been paid any sum to which he may become entitled in respect thereof pursuant to clause GC-36 (Terms of Payment).

GC-44 DECLARATION AGAINST WAIVER

The condonation by the Municipal Corporation of any breach of branches by the stipulations and conditions contained in the contract shall in no way prejudice or effect to the constructed as a waiver of the Municipal Corporation rights, powers and remedies under the contract in respect of any breach or breaches.

GC-45 LAWS GOVERNING THE CONTRACT

The contract shall be constituted according to and Subject to the laws of India and the State of Gujarat and under the jurisdiction of the courts of Gujarat at Surat.

GC-46 OVERPAYMENT AND UNDERPAYMENT

Whenever any claim forths payment of a sum to the Municipal Corporation arises out of or under this Contract against the contractor the same may be deducted by the Municipal Corporation from any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that under any other contract with the Municipal Corporation or from any sum due to the contractor with the Municipal Corporation (which may be available with Municipal Corporation), or from his retention money, or he shall pay the claim on demand. The Municipal Corporation reserves the right to carry out post payment audit and technical examination of the final bill including all supporting vouchers, abstracts, etc.

The Municipal Corporation further reserves the right to enforce recovery of any over payment when detected notwithstanding the fact that the amount of the final bill may be included by the Contractor.

If as a result of such audit and technical examination any over payment is discovered in respect of any work done by the Contractor or alleged to have been done by him under the contract, it shall be recovered by the Municipal Corporation from the contractor by way of all the means prescribed above or if any under payment is discovered by the Municipal Corporation, any amount due to the contractor under this contract or under payment may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the contractor from him to the Municipal Corporation on any other contract account whatsoever.

GC-47 SETTLEMENT OF DISPUTES

Except or otherwise specifically provided in the contract, all disputes concerning question of fact arising under the contract shall be decided by the Engineer-in-charge, subjected to a written appeal by the Contractor to the Engineer and these decisions shall be final and binding on the parties hereto. Any disputes or difference including those considered as such by only one of the parties arising out of or in connection with this contract shall be to the extent possible settled amicably between the parties. If amicable settlement cannot be reached then all dispute issues shall be settled as provided in (a).

(a) DISPUTES OR DIFFERENCE TO BE REFERRED TO:

If at any time, any question, disputes or differences of any kind whatsoever shall arises between the Engineer-in-charge and the Contractor upon or in relation to or in connection with this contract, either party may forthwith give to the other, notice in writing of the existence of such question, dispute of difference as to any decision, opinion, instruction, direction certificate or evaluation of the Engineer.

The question or difference shall be settled by the Municipal Commissioner, who shall state his decision in writing and give notice of same to the Engineer and to the Contractor such decision shall be final and binding upon both parties to the contract and work on contract if not already breached or abandoned shall proceed normally unless and until the same shall be revised (or upheld) due to any judicial proceeding.

Should the Municipal Commissioner fail to give a decision within three (3) calendar months after issuance of notice of a question, dispute or difference or if the Contractor is dissatisfied with any such decision of the Municipal Commissioner, then the matter may be referred to Standing Committee. Then also, if the said question of difference or dispute remains unsolved / unsettled and if the contractor is

dissatisfied with any such decision of the Standing Committee, then the matter may be referred to the court of law subject to SURAT JURISDICTION.

GC-48 TERMINATION OF THE CONTRACT

1. If the Contractor finds it impracticable to continue operation owing to Force Majeure reasons or for any reason beyond his and/or the Municipal Commissioner find site impossible to continue operation when prompt notification in writing shall be given by the party affected to the other.

2. If the delay or difficulties so caused can not be expected to cease or become unavoidable or if operations can not be resumed within six(6) months the party shall have the right to terminate the contract upon Ten (10) days written notice to the other. In the event of such termination of the contract, payment to the Contractor will be made as follows :

a) The Contractor shall be paid for all works approved by the Engineer and for any other legitimate expenses due to him.

b) If the Municipal Commissioner terminates the contract owing to Force Majeure or due to any cause beyond its control, the contractor shall additionally be paid for any work done during the said Six (6) months period including any financial commitment made for the proper performance of the Contract and which are not reasonable defrayed by payment under (a) above;

c) The Municipal Commissioner also release all bonds and guarantees at its disposal except is cause where the total amount of payments made to the contractor exceeds the final amount due to him in which case the contractor shall refund the excess amount within Sixty (60) days after termination and the Municipal Commissioner thereafter shall release all bonds and guarantees, should the contractor fail to refund the amount received in excess within the said period such amounts shall be deducted from the bonds or guarantees provided.

3. On the termination of the contract for any cause the contractor shall see the orderly suspension and termination of operations, with due consideration to the interests of the Municipal Corporation with respect to completion, safeguarding or storing of Materials procured for the performance of the contract and the salvage and resale thereof.

GC-49 CHANGES IN CONSTITUTION

Where the contractor is a partnership firm, the prior approval in writing of the Municipal Commissioner shall be obtained any change is made in the constitution of the firm. Where the contractor is an individual or an undivided family business concern such approval as aforesaid shall like wise be obtained before the contractor enters into any partnership agreement whereunder the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If prior approval as aforesaid is not obtained the contract shall be deemed to have been assigned in contravention of Article thereof.

GC-50 SUB-CONTRACTUAL RELATIONS

All work performed for the contract by sub-contractor shall be pursuant to an appropriate agreement between the contractor and sub-contractor which shall contain provisions to :

a) Protect and preserve the rights of the Municipal Corporation and the Engineer with respect to the work to be performed under the sub-contract so that the sub-contractor thereof will not prejudice such rights.

b) Require that such work be performed in accordance with requirements of the Contract documents.

c) Require under such contract of which the contractor is a party, the submission to the contractor of application for payment and claims for additional costs, extension of time, damages for delay or otherwise with respect to the sub-contracted portions of the work in sufficient time, that the contractor may apply for payment and comply in accordance with the contract Documents for like claim by the Contractor upon the Municipal Corporation.

d) Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance except such rights as they may have to the proceeds so such insurance held by the Municipal Corporation as trustee and,

e) Obligate each sub-contractor specifically to consent to the provisions of this Article.

GC-51 LIEN

If, at any time, there should be evidence of any lien or claim for which owner might have become liable and which is chargeable to the contractor, the owner shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the owner against such lien or claim or if such lien or claim be valid the owner may be or become due and payable to the contractor. If any lien or claims remaining, unsettled after all payments are made, the contractor shall refund or pay to the owner all money that the latter may be compelled to pay in discharging such lien or claim including all cost and reasonable expenses.

GC-52 EXECUTION OF WORK

The whole work shall be carried out in strict conformity with the provisions of the Contract Documents, detailed drawings, specifications and the instructions of the Engineer-in-charge from time to time. The Contractor shall ensure that the whole work is executed in the most substantial, proper and best Workmanship using Materials of best quality in strict accordance with the specifications to the entire satisfaction of the Engineer-in-charge.

GC-53 WORK IN MONSOON

When the work continues in monsoon, the contractor shall maintain minimum labour force required, for the work and plan and execute the construction and erection work according to the prescribed schedule. No extra rate will be considered for such work in monsoon. During monsoon and entire constructing period the contractor shall keep the site free from water at his own cost.

GC-54 WORK CLOSED ON SUNDAYS & HOLIDAYS & BETWEEN SUNSET AND SUNRISE

No work shall be carried out on Sundays and Corporation Holidays and no work shall be carried out between sunset and sunrise. Except with the special permission of Engineer-in-charge in writing perviously obtained and with holding such permissions shall be no ground of complaint on the part of contractor or cause for compensation to them. Working period shall be maximum eight (8) hours per days.

GC-55 EXTRA SUPERVISION CHARGES TO BE BORNE BY CONTRACTOR

Further to clause No.GC-54 when Engineer-in-charge feels necessary to give permission to contractor for carrying out work for period of more than Eight hours working period in a day and/or to continue work on sunday and Corporation holidays. Extra Supervision charges arising due to overtime working of Corporation's staff shall be borne by the contractor at prevailing rates from time to time. Such extra supervision charges shall be deducted by Corporation from the running bill/s of the contractor at Surat Municipal Corporation's description.

GC-56 DRAWING TO BE SUPPLIED BY THE OWNER

The drawings attached with the tender documents shall be for general guidance of the contractor to enable him to visualize the type of work contemplated and scope of work involved. Detailed working drawings according to which the work is to be done shall be furnished from time to time as the work progresses. The contractor shall study the drawings thoroughly in connection with other connected details and discrepancy if any bring to the notice of the Engineer-in-charge before actually carrying out the work.

GC-57 DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR

Where drawings, date are to be furnished by the contractor they shall be as enumerated in special condition of contract and shall be furnished within the specified time. Where approval of drawings has been specified it shall be the Contractor's responsibility to have these drawings got approved before any work is taken up with regard to the same. Any changes becoming necessary in these drawings during the execution of the work shall have to be carried out by the contractor at no extra cost.

All final drawings shall bear the certification stamp as indicated below duly signed by both the contractor and Engineer-in-charge.

"Certified true for _____ project Agreement

No. _____ Signed _____
Contractor Engineer-in-charge Drawings will be approved within three (3) weeks of the receipt of the same by the Engineer-in-charge.

GC-58 SETTING OUT WORK

The contractor shall set out the work on the site handed by the Engineer-in-charge and shall be responsible for the correctness of the same. The work shall be carried out to the entire satisfaction of Engineer-in-charge. The approval thereof or partaking by Engineer-in-charge in setting out work shall not relieve contractor of any of his responsibilities.

The contractor shall provide at his own cost all necessary level posts, pegs, bamboos, flage, ranging, rods, strings and other Materials and labourers required for proper setting out of the work. The Contractor shall provide, fix and be responsible for the maintenance of all stakes, temples level marks profiles and similar other things and shall take and necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence for such removal or disturbance. The contractor shall also be responsible for the maintenance of all existing Survey Marks, Boundary Marks, Distance Marks and Centre line marks either existing or fixed by the Contractor. The Centre, longitudinal or face lines and cross lines shall be marked by small masonry pillars. Each pillar shall have distance mark at the centre for setting up the theodolite. The work shall not be started unless the setting out is checked by Engineer-in-charge in writing but such approval shall not relive the contractor of his responsibilities. The contractor shall provide all Materials, labour and other facilities necessary for checking at his own cost.

Pillars bearing geodetic marks on site shall be protected by the Contractor. On completion of the work the contractor shall submit the Geodetic documents according to which the work has been carried out.

GC-59 RESPONSIBILITIES OF CONTRACTOR FOR CORRECTNESS OF WORK

The contractor shall be entirely and exclusively responsible for the correctness of every part of the work and shall rectify completely and errors thereon at his own cost when so instructed by Engineer-in-charge.

1. Materials to be supplied by Contractor

Contractor shall procure and provide all the Materials required for the execution and maintenance of work including M.S. rods, all tools, tackle, construction plant and equipment except the Materials to be supplied by the owner detailed in the contract documents and for the transport thereof, owner, shall made recommendations to the respective authorities if designed by the contractor but assumes no responsibility or any nature. Owner shall insist for procurement of Materials with ISI Marks supplied by reputed firms on the DGS & D List. 2. If however the Engineer-in-charge feels that work is likely to be delayed due to contractor's inability to procure the Materials, the Engineer-in-charge shall have the right to procure Materials from the market and the contractor will accept these Materials at the rates decided by Engineer-in-charge

GC-60 MATERIALS TO BE SUPPLIED BY THE OWNER

1. If the contract provides certain Materials or stores to be supplied by the S.M.C. such Materials and stores shall be transported by the contractor at his cost from S.M.C's stores or Railway Station. The sum due from contractor for the value of Materials supplied by the owner will be recovered from the R.A. Bill on the basis of actual consumption of Materials in the work covered and for which R.A. Bill has been prepared. After completion of the work contract has to account for the full quantity of Materials supplied to him.

2. The value of store Materials supplied by the S.M.C. to the contract shall be charged at rates shown in the contract document and in case any other material not listed in the schedule of Materials is supplied by the S.M.C., the same shall be charged at cost price including carting and other expenses included in procuring the same. All Materials so supplied shall remain the property of the

owner and shall not be removed from the site on any account. Any material remaining un-used at the time of completion of work or termination of contract shall be returned to S.M.C.'s store or any other place as directed by the Engineer-in-charge in perfectly good condition at contractor's cost. When Materials are supplied free of cost for use in work and surplus and unaccounted balances thereof are not returned to the Municipal Corporation, recovery in respect of such balance will be effected at double the applicable issue rate of the Materials or the market rate whichever is higher.

GC-61 CONDITIONS OF ISSUE OF MATERIALS BY THE S.M.C.

- a) The Materials specified to be issued by the S.M.C. to the contractor shall be issued by the S.M.C.'s store or at Railway Station and all expenses for its shifting to site shall be borne by the contractor. The Materials will be issued during working hours and as per rules of S.M.C. from time to time.
- b) Contractor shall bear all expenses for storage and safe custody at site of Materials issued to him before use in work.
- c) Material shall be issued by the S.M.C. in Standard/non-standard sizes as obtained from manufacturer.
- d) Contractor shall construct suitable godowns at site for storing the Materials to protect the same from damage due to rain, dampness, fires, theft etc.
- e) The contractor should take the delivery of the Materials issued by the S.M.C. after satisfying himself that they are in good conditions. Once the Materials are issued, it will be the responsibility of the Contractor to keep them in good condition and in safe custody. If the Materials get damaged or if they are stolen, it shall be the responsibility of the contractor to replace them at his own cost according to the instructions of the Engineer-in-charge.
- f) For delay in supply or for non supply of Materials to be supplied by the S.M.C., on account of natural calamities, act of enemies, other difficulties beyond the control of the S.M.C., the S.M.C. carries non-responsibilities. In no case the contractor shall be entitled to claim any compensation for loss suffered by him on this account.
- g) None of the Materials issued to the contractor, shall be used by the Contractor for manufacturing items which can be obtained from manufacturer. The Materials issued by the owner shall be used for the work only and no other purpose.
- h) Contractor shall be required to execute indemnity bond in the prescribed form for the same custody and account of Materials issued by the owner.
- i) Contractor shall furnish sufficiently in advance a Statement of his requirements of quantities of Materials to be supplied by the S.M.C. and the time when the same will be required for the work, so as to enable Engineer-in-charge to make arrangements to procure and supply the Materials.
- j) A daily account of Materials issued by the owner shall be maintained by the Contractor showing receipt, consumption and balance in hand in the form laid down by Engineer-in-charge with all connected paper and shall be always available for inspection in the site office.
- k) Contractor shall see that only the required quantities of Materials are got issued and no more. The contractor shall be responsible to return the surplus Materials in good condition at S.M.C.'s store at his own cost.

GC-62 MATERIALS PROCURED WITH ASSISTANCE OF THE OWNER

Notwithstanding anything contained to the contrary in any of the clauses of this contract, where any Materials for the execution of the contract are procured with the assistance of the S.M.C. either by issue from S.M.C. stock or purchase made under orders or permits or licences issued by the Government, the contractor shall hold the same Materials as trustees for owner and use such Materials economically and solely for the purpose of contract and not dispose them off without the permission of S.M.C. and return, if required by Engineer-in-charge, all surplus or unserviceable Materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on his

being paid or credited such prices as Engineer-in-charge shall determine having due regard to the conditions of the Materials. The price allowed to contractor shall not exceed the amount charged to him excluding the storage charges if any. The decision of Engineer-in-charge shall be final and conclusive in such matters. In the event of breach of the aforesaid condition, the contractor shall in terms of licence of permits and/or for criminal breach of trust be liable to compensate S.M.C. at double rate or any higher rates. In the event of these Materials at that time having higher rate or not being available in the market then any other rate to be determined by the Engineer-in-charge and his decision shall be final and conclusive.

GC-63 MATERIALS OBTAINED FROM DISMANTLING

If the contractor, in the course of execution of work is called upon to dismantle any part for reasons other than on account of bad or imperfect work, the Materials obtained from dismantling will be the property of the S.M.C. and will be disposed of as per instruction of Engineer-in-charge in the best interest of the S.M.C.

GC-64 ARTICLE OF VALUE OR TREASURE FOUND DURING CONSTRUCTION

All gold, silver and other minerals of any description and all precious stones, coins, treasures, relics, antiquities and other similar things which shall be found in under or upon site shall be the property of the owner and the contractor shall properly preserve the same to the satisfaction of Engineer-in-charge and shall hand over the same to the owner.

GC-65 DISCREPANCIES BETWEEN INSTRUCTIONS

If there is any discrepancy between the various stipulations of the contract documents of instructions to the contractor or his authorised representative or if any doubt arises as in the meaning of such stipulation or instructions, the contractor shall immediately refer in writing to the Engineer-in-charge whose decision shall be final and conclusive and no claim for losses caused by such discrepancy, shall in any event be admissible.

In case there is any discrepancy in measurements shown in drawings and specifications, the same shown in drawing shall be considered as final and will be binding upon the contractor.

GC-66 SCHEDULE OF QUANTITIES AND EXTRA ITEMS

A. Schedule of Quantities

Variations in the quantities of work in schedule of quantities shall not vitiate the contract. The rates quoted for the individual items shall apply for the quantities of work increased or decreased by not more than twenty percent for each of the items, should the quantities of work actually involved under any item vary by more than twenty (20%) percent, the rate for such item of work shall be revised in accordance with the procedures indicated under clause "Extra Items". The payment for the items will, however, continue to be at the original rate till the revised rate decided.

B. Extra Items

Extra Items of work shall not vitiate the contract. The contractor shall be bound to execute extra items

of work as directed by the Engineer-in-charge. The rates for extra items shall be derived from the S.O.R. (R&B Division) Year 2024-2025 and quoted premium of tender. If the rate of extra item is not available in S.O.R. it will be derived on prevailing market rate.

GC-67 ACTION WHEN NO SPECIFICATION IS ISSUED

In case of any class of work for which no specification is supplied by the S.M.C. in the tender documents, such work shall be carried out in accordance with I.S.S. do not cover the same, the work should be carried out as per standard Engineering practice subject to the approval of Engineer-in-charge.

GC-68 ABNORMAL RATES

Contractor is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and conditions of contract. This will

avoid loss of profit or gain in case of curtailment or change or specification for any item. In case it is notice that the rates quoted by a tenderer for any item is usually high or unusually low, it will be sufficient cause for rejection of tender unless the S.M.C. is convinced about the reasonableness of the rates on scrutiny of the analysis for such rate to be furnished by the tenderer or demand.

GC-69 ASSISTANCE TO ENGINEER-IN-CHARGE

Contractor shall make available to Engineer-in-charge free of cost all necessary instruments and assistance in checking of any work made by the contractor for taking measurement of work.

GC-70 TEST OF QUALITY OF WORK

1. All Workmanship shall be of the best kind described in the contract document and in accordance with the instructions of Engineer-in-charge and shall be subjected from time to time to such test at contractor's cost as the Engineer-in-charge may direct at the place of manufacture of fabrication or on site or at any such place. Contractor shall provide assistance, instruments labour and Materials as are normally required for examining measuring and testing any work. Workmanship as may be selected and required by Engineer-in-charge.
2. All tests will be necessary in connection with the execution of work as decided by Engineer-in-charge shall be carried out at an approved laboratory at contractor's cost.
3. The contractor shall furnish to Engineer - in - charge for approval when requested or if required by the specification adequate samples of all Materials and finished goods to be used in work and sufficiently in advance to permit test and examination thereof. All Materials furnished and finished goods applied in work shall be exactly as per the approved samples.
4. All the testing charges shall be borne by the Contractor.

GC-71 ACTION AND COMPENSATION IN CASE OF BAD WORKMANSHIP

If it shall appear to the Engineer-in-charge that any work has been executed with Materials of inferior description, or quality or are unsound or with unsound imperfect or unskilled Workmanship or otherwise not in accordance with the contract, the contractor shall, on demand in writing from Engineer-in-charge or his authorised representative specifying the work, Materials or articles complained of, not with standing that the same may have been inadvertently passed, certified and paid for forthwith rectify or remove and reconstruct the work, specified and in the event of failure to do so within a period to be specified by Engineer-in-charge in his aforesaid demand, contractor shall be liable to pay compensation at the rate of one (1) percent of the tendered cost of work for every Ten (10) days limited to a maximum of Ten (10%) Percent of the value of work while his failure to do so continues and in the case of any such failure the Engineer-in-charge may on expiry of the notice period rectify and remove and re-execute the work or remove and replace with other at the risk and cost of the Contractor. The decision of the Engineer-in-charge as to any question arising under this clause shall be final and conclusive.

GC-72 SUSPENSION OF WORK

Contractor shall, if ordered in writing by Engineer-in-charge or his representative temporarily suspended the

work or any part thereof for such time (not exceeding two months) as ordered and shall not after receiving such written order proceed with the work until he shall have received a written order to proceed therewith the contractor shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of work as aforesaid. An extension of time for completion of work will be granted to the contractor corresponding to the delay caused by such suspension of work if the contractor applied for the same provided the suspension was not consequent upon any default or failure on the part of the contractor.

GC-73 OWNER MAY DO PART OF THE WORK

When the contractor fails to comply with any instructions given in accordance with the provisions of this contract, the S.M.C. has the right to carry out such parts of work as the S.M.C. may designate whether by purchasing Materials and engaging labour or by the agency of another contractor. In such case the S.M.C. shall deduct from the amount which otherwise might become due to contractor the cost of such work and Materials with Ten (10%) percent added to cover all departmental charges and

should the total amount thereof exceed the amount due to contractor, contractor shall pay the difference to S.M.C.

GC-74 POSSESSION PRIOR TO COMPLETION

The Engineer-in-charge shall have the right to take possession of or to use any completed or partly completed work or part of work, such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the contract. If such prior possession or use by Engineer-in-charge delays the progress of work, equitable adjustment in the time of completion will be made and the contract shall be deemed to be modified accordingly.

GC-75 Deleted

GC-76 SCHEDULE OF RATES

1. The price/rates quoted by the contractor shall remain firm till the issue of final certificate and shall be subject to price ADJUSTMENT CLAUSE GC-35. Schedule of rates shall be deemed to include and cover all costs expenses and liabilities of every description and all risks of every kind to be taken in executing, completing and handling overwork to owner by contractor. Contractor shall be deemed to have known the nature, scope, magnitude and the extent of work and Materials required through contract documents may not fully and precisely furnish them. He shall make such provision in the schedule of rates as he may consider necessary to cover the cost of such items of work and Materials as may be reasonable and necessary to completion work. The opinion of Engineer-in-charge as to the item of work shall be final and binding on Contractor although the same may be not shown on or described specifically in contract documents.

2. The Schedule of rates shall be deemed to include and cover the cost of all constructional plant, temporary work, pumps, Materials, labour and all other Materials in connection with each item in schedule of rates and the execution of work or any portion thereof furnished complete in every respect and maintained as shown or described in the contract document or as may be ordered in writing during the continuance of the contract.

3. The Schedule of rates shall be deemed to include and cover the cost of all royalties and free for the articles and processes, protected by letters patent or otherwise incorporated in or used in connection with work, also all royalties, and other payments in connection with Materials of whatsoever kind for work and shall include an indemnity to owner which contractor hereby gives against all action, proceeding, claims, damages, costs and expenses arising from the incorporation in use of work of any such articles, processes or Materials. Octroi of other Municipal or Local Board charges if levied on Materials equipment of machineries to be brought to site for use on work shall be borne by the contractor.

4. No exemption or reduction of custom duties excise duties, sales-tax or any other taxes or charges of the Central or State Government any local body whatsoever will be granted to be obtained. All of such expenses shall be deemed to have been included in and covered by schedule of rates. Contractor will also obtain and pay for all permits or other privileges necessary to complete work.

5. The schedule of rates shall be deemed to include and cover risk on account of delay or interference with contractor's conduct of work which may occur from any cause including orders of S.M.C. in the exercise of his power and no account of extension of time granted due to various reasons.

6. For work under unit rate basis no alteration will be allowed in the schedule of rates by reason of work or any part of them being field, altered, extended, diminished or omitted.

GC-77 PROCEDURE FOR MEASUREMENT OF WORK IN PROGRESS

1. All measurements shall be in metric system. All the work in progress will be jointly measured by the representative of Engineer-in-charge and contractor's authorised agent. Such measurements will be got recorded in the measurement book by the Engineer or his authorised representative and signed by contractor or his authorised agent in token of acceptance. If the contractor or his authorised agent fails to be present when even required by the Engineer-in-charge for taking measurements for any reasons whatsoever, the measurement will be taken by the Engineer - in - charge or his authorised representative notwithstanding the absence of contractor and these measurements will be deemed to be correct and binding on contractor.

2. Contractor will submit a bill in approved proforma in duplicate to the Engineer - in - charge of the work giving abstract and detailed measurements of various items executed during a month as mutually agreed. The Engineer-in-charge shall verify the bill and the claim, far as admissible, adjusted if possible, within 10 days of presentation of the bills.

3. In case of Tenders for completed items of work, contractor may be allowed 'Secured Advance' on the Security of Materials brought to site for execution of the constructed items of work the extent of 75% of the value of Materials of unperishable nature and an agreement bedrawn up with contractor under which the owner secured a lien on these Materials and is safe guarded against losses due to any reasons whatsoever. Recoveries of advance paid would not be post-poned till the whole work is completed but shall be adjusted from his work done or the Materials used, the necessary deductions being made when the items of work in which they are used and are billed for. When the mode of measurement is not covered by contract for any item of work it shall be as per latest I.S.I.

GC-78 RUNNING ACCOUNT PAYMENT TO BE RECOVERDED AS ADVANCES

1. All running account payments shall be regarded as payments by way of advance against the final payment only and not as payment for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or to be considered as an admission of the due performance of contract or any part thereof.

GC-79 NOTICE FOR CLAIM FOR ADDITIONAL PAYMENT

If the contractor considers that he is entitled to extra payment or compensation or any claim whatsoever in respect of work, he shall forthwith give notice in writing to the Engineer-in-charge about his extra payment and/or compensation. Such notice shall be given to the Engineer-in-charge within Ten (10) days from the happening of any event upon which contractor basis such claims and such notice shall contain full particular of the nature of such claim with full details and amount claimed. Failure on the part of the contractor to put forward any claim with the necessary particulars as above within the time above specifed shall be an absolute waiver thereof. No commission by S.M.C. to reject any such claim and no delay in dealing therewith shall be waiver by S.M.C. of any rights in respect thereof.

GC-80 PAYMENT OF CONTRACTOR'S BILL

1. The price to be paid by the S.M.C. to contractor for the work to be done and for the performance of all the obligations under taken by the contractor under contract shall be based on the contract price and payment to be made accordingly for the work actually executed and approved by the Engineer-in-charge.

2. No payment shall be made for work costing less than Rs.5,000/-till the work is completed and a certificate of completion given. But in case of work estimated to cost more than Rs.5,000/- contractor on submitting the bill thereof will be entitled to receive a monthly payment, proportionate to the part thereof, approved and passed by Engineer-in-charge whose certificate of such approval and passing of the sum so payable shall be final and conclusive against contractor. This payment will be made after making necessary deductions as stipulated elsewhere in the contract documents for Materials, security deposit, etc. The payment shall be released to the contractor within Thirty (30) days of submission of the bill in case of running bill and with in two (02) months in case of final bill, contractor shall present the bill duly pre-receipted on proper revenue stamp.

Payment due to Contractor shall be made by the by crossed Accounts payee cheque in Indian currency forwarding the same to the registered office of the contractor. Owner shall not be responsible if the cheque is mislaid or misappropriated by unauthorised person.

GC-81 FINAL BILL

The final bill shall be submitted by Contractor within two (02) month of the date of physical completion of work, Otherwise the Engineer-in-charge certificate of the measurement and of total amount payable for work shall be finalised binding on all parties.

GC-82 RECEIPT FOR PAYMENT

Receipt for payment made on account of work when executed by a firm must be signed by a person holding power of attorney in this respect on behalf of contractor except when described in the tender as

a limited company in which case the receipt must be signed in the name of the company by one of its principal officers or by some other person having authority to give effectual receipt for the Company.

GC-83 COMPLETION CERTIFICATE

1. When the contractor fulfil his obligation as per terms of contract he shall be eligible to apply for completion certificate. Contractor may apply for separate completion certificate in respect of each such portion of work by submitting the completion documents alongwith such application for completion certificate.

The Engineer-in-charge shall normally issue to contractor the completion certificate within 2 (Two) month after receiving an application thereof from contractor after verifying from the complete documents and satisfying himself that work has been completed in accordance with and as set out in the construction and erection drawings and the contract document. Contractor after obtaining the completion certificate is eligible to present the final bill for work executed by him under the terms of contract.

2. Within 2 (Two) month of completion of work in all respect contractor shall be furnished with a certificate by the Engineer-in-charge of such completion but no certificate shall be given nor shall work be deemed to have been executed, until all (1) scaffolding, surplus Materials and rubbish is clearing off site completely (2) until work shall have been measured by the Engineer-in-charge whose measurement shall be binding and conclusive and (3) until all the temporary works, labour and staff colonies etc. constructed are removed and the work site cleaned to the satisfaction of the Engineer-in-charge. If contractors shall fail to comply with the requirements as aforesaid or before date fixed for the completion of work, the Engineer-in-charge may at the expenses of contractor remove such scaffolding, surplus Materials and rubbish and dispose of the same he thinks fit.

3. The following documents will form the completion documents :

- (a) Technical documents according to which work was carried out.
- (b) Construction drawings showing therein the modifications and corrections made during the course of execution signed by Engineer-in-charge.
- (c) Completion certificate for "Embedded" or "Covered" up work.
- (d) Certificate of final levels as set out for various works.
- (e) Material appropriation statement for the Materials issued by owner for work and list of surplus Materials returned to S.M.C.'s store duly supported by necessary documents.

4. Upon expiry of the period of defects liability and subject to Engineer-in-charge being satisfied that work

Has been duly maintained by contractor during the defects liability period as fixed originally, or as external subsequently and the contractor has in all respects made up by subsidence and performed all his obligations under contract, the Engineer-in-charge shall (without prejudice to the rights of owner in any way) give final certificate to that effect. The Contractor shall not be considered to have fulfilled the whole of his obligation until final certificate shall have been given by the Engineer-in-charge notwithstanding previous entry upon and taking possession, working or using of the same or any part thereof by owner.

5. Final Certificate only Evidence of Completion

Except the final certificate no other certificate or payments against a certificate or an general account shall be taken to be an admission by owner of the due performance of contract or any part thereof or of occupancy validity of any claim by the contractor.

GC-84 TAXES, DUTIES, OCTROI, ETC.

The Contractor shall be liable to payment of all the Central/ State/Local Bodie's Levies,/ GST/ taxes or duties etc. The SMC shall neither bear it nor reimburse at any time but will ensure deduction of Central/State/Local levies/GST and taxes at Source at the rate provided under the relevant statutes from time to time inforce.

1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

GC-85 INSURANCE

Contractor shall at his own expenses carry and maintain with reputable Insurance Companies to the satisfaction of owner as follows :

1. Employees State Insurance Act

Contractor agrees to and does hereby accept full and exclusive liability for compliance with all obligations imposed by the Employees' State Insurance Act 1948, and Contractor further agree to defend, indemnify and hold owner harmless from any liability or penalty which may be imposed by the Central or State Government of Local authority by reasons of any asserted violation by contractor or Sub-Contractor of the Employees' State Insurance Act, 1948 and also from all claims, suits or proceedings that may be brought against owner arising tender, growing out of or by reasons of the work provided for by this contract whether brought by employees of Contractor, by third parties or by Central or State Government authority or any administrative Sub-division thereof. Contractor agrees to fill in with the Employees State Insurance Corporation, the declaration form and all forms which may be required in respect Contractor's or Sub-contractor's employees these aggregate remuneration is Rs. 400/-p.m.or less and who are employed in work provided for or those covered by E.S.I from time to time under the agreement. The Contractor shall deduct and secure the agreement of the Sub-contractor to deduct the employees' contribution as per the first Schedule of the Employees' State Insurance Act from wages. Contractor shall remit and secure the agreement of Sub-contractor to remit to the State Bank of India Employees' State Insurance Corporation Accounts, the employees contribution as required by the Act Contractor agrees to maintain all cares and record as required under the Act in respect of employees and payments and contractor shall secure the agreements of the sub-contractors to maintain such records, any expenses incurred for the contributions or maintaining records shall be to contractor's or sub-contractor' account. Owner shall retain such sum as may be necessary from the contract value until contractor shall furnish satisfactory proof that all contribution as required by the Employees' State Insurance Act 1948 have been paid.

2. Workman's Compensation And Employees Liability Insurance

Insurance shall be effected for all contractors employees engaged in the performance of this contract. If any part of work is sublet, contractor shall require the sub-contractor to provide workmans' compensation and employer's liability insurance which may be required by owner.

3. Other Insurance required under law or regulation by owner

Contractor shall also carry and maintain any and all other insurance which may be required under any law or regulation from time to time. He shall also carry and maintain any other insurance which may be required by

owner.

GC-86 DAMAGE TO PROPERTY

1. Contractor shall be responsible for making good to the satisfaction of owner any loss of and any damage to all structures and properties belonging to owner or being executed or Procured by owner or of other Agencies within the premises of all work of owner, if such loss or damage is due to fault and / or the negligence or will full act or ommission of contractor, his employees, agent representatives or Sub- contractors.

2. Contractors shall indemnify and keep owner harmless of all claims for damage to properties other than S.M.C's property arising under or by reasons of this agreement if such claims result from the fault and / or negligence or wilful act of ommission of contractor,his employees, agents, representatives or sub-contractors.

GC-87 OUR LAWS AND REGULATIONS

1. The contractor shall be reponsible for the strict compliance of and shall ensure strict compliance by his sub contractor employees and agents of all labours and others laws, rules or

regulations having the force of law affecting the relationship of employer and employee between the contractor/ sub-contractor and their respective employees.

2. No labour below the age of eighteen (18) year be employed on work.

3. Contractor shall pay to the labours engaged on work according the law.

4. The Contractor and sub-contractors of the contractor shall obtain proper authority designated in this behalf under any application law, rules or regulations (including but not restricted to the factories Act and Contract Labour Abolition and Regulation Act 1970,) in so far as applicable) any and all such licences, consents, Registration and / or other authorisation as shall from time to time be or become necessary for relatint to the execution of work or any part of portion thereof or the storage or supply of any Materials or otherwise in connection with the performance of the contract and shall at all times observance by the sub- contractors, employees and agents of all terms and conditions of the said licences, consents, regulation and other authorisa- tion and laws, rules and regulations applicable thereto.

GC-88 CONTRACTOR TO INDEMNIFY OWNER

1. The Contractor shall indemnify and keep indemnified the owner and every member, officer and employee of owner from and against all action, claims, demands and liabilities whatsoever and in respect of the breach of any of the above clauses and/or against any claim, action or demand by any workman/ employee of the contractor or any sub-contractor and or from any liability and way to any workman / employee of the contractor or any sub-contractor under any law, rule or regulations having the force of law, including but not limited to claims against the owner under the workman compensation Act 1923. The employees' Provident Funds Act 1952 and/or the Contract Labour (Abolition and Regulations) Act, 1970.

2. Payment of claims and damages

If owner has to pay any money in respect of such claims or demands as aforesaid, the amount so paid and the cost incurred by the owner shall be charged to and paid by contractor without any dispute notwithstanding the same may have been paid without the consent or authority of the Contractor.

3. In every case in which by virtue of any provision applicable in the workman's Compensation Act 1923 or any other Act, be obliged to pay compensation to workman employed by Contractor the amount of compensation so paid, and without prejudice to the rights of S.M.C. under sec.(12) Sub-section (2) of the said Act, S.M.C. shall be at liberty to recover such amount from any surplus due to the contractor or the security deposit. S.M.C. will not be bound to contest any claim made under section (12) Sub-section (2) of the said Act except or written request of Contractor and upon the contesting of such claim.

4. The Contractor shall protect adjoining sites against structural decorative and other damages that could be caused to adjoining premises by the execution of these works and made good at his cost, any such damage, so caused.

GC-89 IMPLEMENTATION OF APPRENTICE ACT 1964

Contractor shall comply with the provisions of the Apprentice Act 1964 and the orders issued thereunder from time to time. If the fails to do so, it will be a breach of contract. Contractor shall also be liable for any particular liability arising on account of any violation of the provisions of the Act by him.

GC-90 HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS

Contractor shall comply with all the rules and regulations of the local sanitary authorities or as framed by owner from time to time for the protection of health and sanitary arrangements of all labour directly or indirectly employed on the work of this contract.

GC-91 SAFETY CODE

GENERAL

Contractor shall adhere to safe construction practice and gurard against hazardous and unsafe working conditions and shall comply with owner's safety rules and set fourth herein.

1. First Aid and Industrial Injuries

1.1 Contractor shall maintain first aid facilities for its employees and those of his sub-contractor.

1.2 Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Name of those providing these services shall be furnished to Engineer-in-charge prior to start of construction, and their telephone numbers shall be prominently posted in contractor's field office.

1.3 All injuries shall be reported promptly to Engineer-in-charge, and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to owner.

2. General Rules

2.1 Carrying, striking, matches, lighters inside the project area & smoking within the job site is strictly prohibited. Violators of smoking rules shall be discharged immediately. Within the operation area, not hot work shall be permitted without valid gas safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-contractors/ employees in this regard.

3. Scaffolding

3.1 Suitable scaffolding shall be provided for workmen for all works that can not safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra mazzdoor shall be engaged for holding the ladder and if the latter is used for carrying Materials as well, suitable foothold and handholds shall be provided on the ladder and the same shall be given inclination not steeper than 1 to 4 (1 horizontal and 4 vertical).

3.2 Scaffolding or staging more than 3.6 M (12') above the ground or floor, swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise fixed at least 1.0 M (3') high above the floor or platform of scaffolding or staging and extending along the entire length of the outside ends thereof with only such openings as may be necessary for the delivery of Materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

4. Maintenance of Safety Devices

4.1 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in some conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near place of work.

5. Display of Safety Instructions

5.1 These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named

therein by the Contractor.

6. Enforcement of Safety Regulations

6.1 To ensure effective enforcement of the rules and regulations relating safety precautions, the arrangements made by the contractor shall be open to inspection by the welfare Officer, Engineer-in-charge of safety Engineer of the owner or their representatives.

7. No Exemption

7.1 Notwithstanding the above clause 1.0 to 13.0 there is nothing to exempt the contractor from the operations of any other Act or rules in force in the Republic of India.

7.2 In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. Safety Code framed from time to time.

GC-92 ACCIDENTS

It shall be the contractor's responsibility to protect against accidents on the work. He shall indemnify the Municipal Corporation against any claim for damage or for injury to persons or property resulting from, and in the course of work and also under the provision of the Workman's Compensation Act. On the occurrence of an accident arising out of the works which results in death or which is so serious as to be likely to result in death, the contractor shall within twenty four hours of such accident, report in writing to the Engineer-in-charge, the facts stating clearly and in sufficient details the circumstances of such accident and the subsequent action. All other accidents on the works involving injuries to persons or damage to property other than that of the contractors shall be promptly reported to the Engineer-in-charge stating clearly and in sufficient details and facts and circumstances of the accidents and the action taken. In all cases the contractor shall indemnify the Municipal Corporation against all loss of damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fine consequence of failure to give notice under the workman's compensation Act or failure to conform to the provisions of the said Act in regard to such accidents.

In the event of an accident in respect of which compensation may become payable under the workmen's compensation Act VIII of 1923 including all modification thereof whether such compensation may become payable by the contractor or by the Municipal Corporation as principal employer, the Engineer-in-charge may retain out of money due and payable to the contractor such sum or sums of money as may, in the opinion of the Engineer-in-charge be sufficient to meet such liability. On receipt of award from the labour commission in regard to quantum of compensation, the difference in amount will be adjusted.

GC-93 It is clarified that if the contractor makes his own arrangements for water required for construction and labour camp etc. by drilling bore. No water charges will be recovered from the contractor. On the otherhand, even if the contractor is not taking connection and makes other arrangement to use Municipal water by tanker or tapping water from near private connection even so water charges shall be recovered as per relevant condition of the tender. **As per City Engineer Note No.386, dtd.30/7/2012**

GC-93 (A) PRICE VARIATION CLAUSE:

No Price Variation difference will be paid to the contractor for Labour, Materials, P.O.L. (Fuel) or any other material for the work

GC-93 (B) STAR RATE & DIFFERENCE FOR REINFORCEMENT STEEL & CEMENT:

No star rate or basic rate difference will be paid to the contractor for cement, steel reinforcement or any other material for the work.

GC-94 GOODS AND SERVICE TAX (GST)

GST CLAUSE FOR CONSTRUCTION / ERECTION / COMMISSIONING / INSTALLATION / REPAIRS / MAINTENANCE / RENOVATION / FABRICATION OF STRUCTURE INCLUDING BUILDING (MEANS ALL WORKS CONTRACT / TURN KEY PROJECTS / SUPPLY OF MATERIAL / GOODS)

GST (Goods & Service Tax) has come in existence from 1 July 2017. Contract / Successful Bidder is bound to pay any amount of GST prescribed by the Govt. of India as per the Terms of Contract agreed upon during the course of execution of this Contract.

During the course of execution of contract, if there is any change in Rate of GST (Goods & Service Tax) by the Government the same shall be reimbursed / recovered separately by SMC subject to the submission of Original Receipt / proof for the amounts actually remitted by the successful Tenderer / Contractor to the competent authority along with a certificate from Chartered Accountant of Contractor / Successful Bidder certifying that the amount of GST paid to the Government and the same shall be intimated / submitted / claimed within 30 Days from the date of payment Remittance of GST within stipulated period shall be the sole responsibility of the Successful Bidder / Contractor, failing which SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard Further the non-payment of GST to the Government may lead to the termination of contract and forfeiture of security Deposit / Performance Guarantee Amount.

If imposition of any other new Taxes / Duties / Levies / Cess or any other incidentals etc. or any increase in the existing Taxes / Duties / Levies / Cess or any other incidentals etc. (Excluding GST) are imposed during the course of the contract the same shall be borne by the Contractor / Successful Bidder only in no case SMC shall be liable for the same.

The Contractor will submit the invoice to the SMC having GSTIN of SMC mentioned therein and the taxes shall be shown separately on the face of the invoice so as to claim as ITC by SMC.

Note :- The Rates mentioned in BOQ are excluding GST. GST will be reimbursed separately (if applicable as per the opinion of Account department of SMC / GST Consultant of SMC) as per the prevailing GST Rates decided by the Government. The contractor is invariably bound to any changes in GST Rates made during the course of the work. The payment (if applicable) for GST will be only released only after the applicable Amount reflects on Government portal. Decision of Account Department of SMC regarding applicable GST Rates will be final.

GC-95 SECURED ADVANCES:

No Secured advances shall be paid.

GC-96 SUBMISSION / COMPULSION BY CONTRACTOR

The contractor registered with S.M.C. or any other Govt. organisation is required to employ minimal technical staff as detailed in the certificate issued to him. If contractor does not employ same technical staff over works entrusted to him, should submit photo-identity and education qualification of technical staff appointed at site.

"The contractor shall have to keep the record of the labourers employed for the concerned work. The contractor should provide attendance card, identification card, pay slip etc to the labourers employed. Further, the amount of E.S.I. & Provident Fund should be deducted from the salary of the labourers employed and such amount should invariably be deposited to the concerned Government Departments. In addition, the amount of social security under E.P.F. & M.P. act 1952 shall be recovered every month & such amount should invariably be deposited directly to the concern Government Departments. In the same context, the details regarding such amount deposited to the concern Govt. Deptt. and labourers employed shall be furnished to the office of Traffic Cell Department of S.M.C. every month. In case of failure, such amount shall be deducted/recovered from the running bill directly in accordance with the details given by contractor regarding labourers employed and as per the prevailing rules of Government. In absence of detail, an adhoc suitable amount of the total amount of work done shall be recovered directly from the running bills. On submission of evidence of recovery of such amount, the amount recovered/deducted shall be released in the next bill after due sanction of Competent Authority of S.M.C."

GC-97 SPECIAL RISK

If during the contract, there shall be outbreak of war (whether war is declared or not), major epidemic, earthquake, or similar occurrence in any part of the world beyond the control of either party to the contract which whether financially or otherwise materially affects the execution of the contract, the contractor shall unless and until, the contract is terminated under the provisions of this article, use his best endeavors to complete the execution of the contract, provided always that the Corporation shall be entitled at any time after the onset of such special risks, to terminate the contract by giving written notice to the contractor and upon such notice being given this contract shall terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof. If any of the works, or materials to be delivered subjected to damage or destruction by reasons for the special risks, the contractor shall be entitled to payment for such damage or destroyed materials and to any costs involved in making good damages or destroyed materials as may be required by the Municipal Corporation.

The contractor shall not be liable for payment of compensation for delay or for failure to perform the contract for reasons of Force Majeure such as acts of public enemy, acts of Government fires, floods, cyclone, epidemics, quarantine restrictions, lockouts, strikes, freight embargoes and provided that the contractor shall within Ten (10) days from the beginning of such delay notify the Engineer-in-charge in writing the cause of delay. The Municipal Commissioner shall verify the facts and grant such extension as the facts justify.

GC-98 SECURITY DEPOSIT

The person/persons whose tender may be accepted (hereinafter called the contractor, which expression shall unless excluded by or repugnant to the context include his heirs, executors, administrators and assignees) shall (within 15 days of the receipt by him of the notification of the acceptance of his tender otherwise 0.065% per day of S.D. amount will be charged as penalty) deposit with Municipal Commissioner in cash or Government securities endorsed to the Commissioner sum sufficient which will make up the security deposit specified in the tender.

If the amount of the security deposit to be paid in lump sum within the period specified above is not paid the tender contract already accepted shall be considered as cancelled. The security deposit lodged by contractor shall be refunded after the expiry of the Defects Liability period as shown in the attached Memorandum after deducting dues, if any, which become liable to be recovered from the contractor under the terms and conditions of this Agreement.

GC-99 COMPENSATION OF THE DELAY

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be reckoned from the date on which the order to commence work is given to the contractor. The work shall through out the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the absence of the contract on the part of the contractor) and the contractor shall pay as compensation a percentage amount (shown in the attached Memorandum) of the tendered cost of the whole work as shown by the tender for every day that the work remains uncommenced or unfinished after the proper days, And further to ensure good progress during the execution of the work the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month, to complete parts of the work during the period shown in the attached Memorandum.

In the event of the contractor failing to comply with these conditions he shall be liable to pay as compensation, the amount mentioned above for every day that the due quantity of work remained incomplete provided always that the total amount of compensation to be paid under the provision of this clause shall not exceed 10 percent of the Tendered cost of the work as shown in the tender.

GC-100 ACTION WHEN WHOLE OF SECURITY DEPOSIT IS FOREFITED

In any case in which under any clause of or clauses this contract the contractor shall have tendered himself liable to pay compensation amounting to the whole of this security deposit (whether paid in one sum or deducted by instalments) or in the case of abandonment of the work owing to serious illness or death of the contractor or any other causes, the Commissioner on behalf of the Corporation shall have power to adopt of the following courses, as he may deem best suited to the interest of Municipal Corporation .

(a) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the Commissioner shall be conclusive evidence) and in that case that security deposit of the contractor shall stand forfeited and be absolutely at the disposal of Municipal Corporation .

(b) To employ labour paid by the related Zone and to supply material to carry out the works, or any part of the work debiting, the contractor with correctness of which cost and price the certificate of Executive Engineer shall be final and conclusive against the contractor and crediting him with the value of the work done, in all respects in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract, and in that case the certificate of the Executive Engineer as to the value of the work done shall be final and conclusive against the contractor.

(c) To order that the work of the contractor be in 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 any expenses which may be incurred in excess of the sum which would have been paid to original contractor, if the whole work had been executed by him (as to the amount of which excess expenses the certificate in writing of the Executive Engineer shall be final and conclusive) be borne & paid by the original contractor shall be deducted from any money due to him by Municipal Corporation under the

contract or otherwise from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.

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

In the event of any of the above courses be adopted by the Commissioner the contractor shall have no claim to compensation for any loss sustained by him by reason of his purchased or procured any materials or entered into any engagements, or made any advances on account of or with a view to the execution of the work or the performance of the contract. And in case the contract shall be resealed under provision aforesaid, 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, and he shall only be entitled to paid the Particular amount so certified.

GC-101 COMPENSATION TO LOSS

Contractor remains liable to pay compensation in form of liquidated damages if action not taken under clause(3) If the progress of any particular portion of the work is unsatisfactory the Commissioner shall notwithstanding 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 day's notice in writing and contractor will have no claim for compensation for any loss sustained by him owing to such action.

GC-102 Power to take possession of require to removal of, or self contractor's plan

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

In the event of the Commissioner taking action under sub-clause (a) or (c) of clause 3, he may, be he so desire to take possession of all or any tools, 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 work of any part thereof, paying or allowing for the same in account at the contract rates, or in the case of contract rates not being applicable, at current market rates, to be certified by the Executive Engineer whose certificate thereof shall be final. In the alternative the Commissioner may by notice in writing to the contractor or his clerk of the works. Foremen or other authorised agent require him to remove such tools, plant, materials, or stores from the premises within a time specified in such notice; & in the event of the contractor failing to comply with any such requisition, the Commissioner may remove them at the contractor's expense or sell them by action or private sale at the risk and account of the contractor in all respects, and certificate of the Executive Engineer as to the expense of any such removal, and the amount of the proceeds and expense of any of any sale shall be final and conclusive against the contractor.

GC-103 EXTENSION OF TIME

If the Contractor shall desire an extension of the time for completion of the work on the ground of his having been unavoidably hindered in its execution or on any other ground, he shall apply in writing to the Commissioner within 30 days from the date on which he was hindered as aforesaid on or which the cause for asking for extension occurred and the Commissioner 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 Commissioner in this matter shall be final.

GC-104 FINAL CERTIFICATION

On completion of the work the contractor shall be furnished with a certificate by the Executive Engineer (hereinafter called the Engineer-in-charge) of such completion, but no such certificate shall be given nor shall the work be considered to 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 woodwork, doors, windows, walls, floors or other parts of any building,

in or upon which the work has been executed, or of which he may have had possession for the purpose of executing the work, nor until the work shall have been measured by the Engineer-in-charge or where the measurement 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 shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials and rubbish. And cleaning off dirt on or before the date fixed for the completion of the work, the Engineer-in-charge may, at the expense of the contractor remove such scaffolding surplus material and rubbish, and dispose off the same as he thinks fit and clean off such dirt as aforesaid; and contractor shall forthwith pay the amount off 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.

GC-105 PAYMENT ON INTERMEDIATE CERTIFICATE TO BE REGARDED AS ADVANCE.

No payment shall be made for any work, on estimated to cost less than rupees one thousand, till after the whole of the said work shall have been completed & a certificate of completion given. But in the case of works estimated to cost more than rupees one thousand, the contractor shall, on submitting a monthly bill therefore be entitled to receive payment proportionate to the percentage shown in the attached Memorandum of the part of the works than approved and passed by the Engineer-in-charge, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor.

All such intermediate payment shall be regarded as payment by way of advance against the final payments only & not as payments for work actually done and completed and shall not preclude the Engineer-in-charge from requiring bad, unsound imperfect or unskilful work to be removed & taken away & reconstructed, or re-erected. nor shall any such payment be considered as an admission of the due performance of the contract or any part thereof in any respect of the accruing of and claim; nor shall it conclude, determine or affect in any way the Powers of the Engineer-in-charge as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the contract. The final bill shall be submitted by the contractor within one month of the date fixed for the completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work shall be final and binding on all parties.

GC-106 PAYMENT AT REDUCED RATE ON ACCOUNT OF ITEM OF WORK NOT ACCEPTED AS COMPLETED TO BE THE DISCRETION OF THE ENGINEER-IN-CHARGE

The rates for several items of the work 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 cases where the items of works are not accepted as so completed the Engineer-in-charge may make payment on account of such items at such reduced rates as he may consider reasonable in the preparation of final or on account bills.

CLAUSE-10 Time for Bills to be submitted

A bill may be submitted by the contractor once in each month on or before the date fixed by the Engineer-in-charge for all works executed in the previous months, 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 fifteen days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid, 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.

GC-107 BILLS TO BE ON PRINTED FORMS

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 rates hereinafter provided for such work.

GC-108 STORES SUPPLIED BY SMC

If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the Municipal Store or if it is required that the contractor shall use certain stores to be provided by the Engineer-in-charge (such materials and stores and the prices to be charged thereof as hereinafter mentioned being so far as practicable for the convenience of the contractor but not so as in any way to control meaning or effect of the contract 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 contract only and the value of the full quantity of materials and stores so supplied shall be set off deducted from any sums then due, or thereafter to become due to the contractor under the contract, or otherwise or from the security deposit, or the proceeds of sale thereof shall be deposited in Government securities the same or a sufficient portion thereof shall in that case be sold for the purpose. All material supplied to the contractor shall remain the absolute property of Municipal Corporation and shall on no account be removed from the site of the work, and shall at all times be opened to inspection by the Engineer-in-charge. Any such materials unused and in perfectly good condition at the time of completion or determination of the contract shall be returned to the related zone store, 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 materials supplied to him as aforesaid but remaining unused by him or for any wastage in or damage thereto.

GC-109 WORKS TO BE EXECUTED IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS ORDERS ETC.

The contractor shall execute the whole and every part of the work in the most substantial and workman like manner, and both as regards materials and in every other respect in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to 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 on the site of the work during office hours, and the contractor shall, if he so requires, be entitled at his own expense to make or cause to be made copies of the specifications and of all such designs, drawings and instruction on aforesaid.

GC-110 ALTERATION ON SPECIFICATIONS AND DESIGN NOT TO INVALIDATE CONTRACTORS. RATES FOR WORKS NOT ENTERED IN ESTIMATE OR SCHEDULE TO RATES OF THE SMC

The Engineer-in-charge shall have power to take any alteration in, or addition to the original specifications, drawings, designs and instruction 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 part of the work shall be carried out by the contractor on the same conditions in all respect on which he agreed to do the main work and at the same rates as are specified in the tender for the main work. And if the additional and altered work includes any class of work for which no rates is specified in this contract then such class of work shall be carried out at the rates entered in the schedule of rates of Municipal Corporation or at the rates 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 Municipal Corporation 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 the order to carry out the 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 the work or incur any expenditure in regards thereto before the rates shall have been determined as lastly herein before mentioned, then in such case he shall only be entitled to be paid in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the 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 Commissioner will be final.

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

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

GC-111NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORKS TO BE CARRIED OUT

If at any time after the execution of the contract documents the engineer-in-charge shall for any reason whatsoever, require the whole or any part of the work as specified in the tender to be stopped for any period or shall not require the whole or part of the work to be carried out at all or to be carried out by the contractor, he shall give notice in writing of the fact to the contractor who shall thereupon suspend or stop, the work totally or partially, as the case may be. In any such case, except as provided hereunder, the contractor shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not so derive in consequence of the full amount of the work nor having been carried out, or on account of any loss that he may be put to on account of materials purchased or agreed to be purchased, or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alteration having been made in the original specifications, drawings, designs and instructions may involve any curtailment of the work as originals contemplated. Where which however, materials have already been purchased or agreed to be purchased by the contractor, before receipt by him of the said notice, the contractor shall be paid for such materials at the rate determined by the Engineer-in-charge, provided they are not in excess of requirements and are of approved quality and/or shall be compensated for the loss, if any that he may be put to in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the Engineer-in-charge, whose decision shall be final. If the contractor suffers any loss on account of his having to pay labour charges during the period during which to stoppage of work has been ordered under this clause the contractor shall on application be entitled to such compensation on account of labour charges as the Engineer-in-charge, whose decision shall be final, may consider reasonable, provided that the contractor shall not be entitled to any compensation on account of labour charges if, in the opinion of the Engineer-in-charge, the labour could have been employed by the contractor elsewhere for the whole or part of the period during which the stoppage of the work has been ordered as a foresaid.

GC-112ON CLAIM TO COMPENSATION ON ACCOUNT OF LOSS DUE TO DELAY IN SUPPLY OF MATERIALS BY SMC.

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

- (1) Difficulties relating to the supply of Railway wagons & availability of Government controlled materials-
- (2) Force Majeure.
- (3) Act of God.
- (4) Act of the Nation's enemies or any other reasonable cause beyond the control of Municipal Corporation .

In the case of such delay in the supply of material the Municipal Corporation shall grant such extension of time

for the completion of the work as shall appear to the Commissioner to be reasonable in accordance with the circumstances of the case. The decision of the Commissioner as to the extension of time shall be accepted as final by the contractor.

GC-113

The contractor is to set out and level the work & will be responsible for the accuracy of same. He is to provide and maintain measuring and surveying instruments including steel tapes, theodolite and dumpy level at all times for proper carrying of the work and for the use of Executive Engineer and his representative including skilled attendance.

GC-114

The Contractor is to cover up and protect the works from the weather, and is to suspend all 'wet' operations during weather which, in the Executive Engineer opinion, will be detrimental to the work.

GC-115

Samples of each class of material and workmanship shall be submitted by the Contractor for the approval of Executive Engineer and after such approval these samples shall be deposited at any place the Executive Engineer may appoint and the Contractor shall be required to perform all the works of this contract in accordance with the samples.

GC-116

On completion, all work must be cleaned down; rubbish removed and the works and land cleaned of rubbish; surplus materials and other accumulations, and everything left in a clean and ordinary condition.

GC-117

The contractor shall provide, erect and maintain proper sheds and temporary buildings for the storage and protection of materials and goods and for the execution of work which may be fabricated or brought on the site.

GC-118

The contractor is to set out and level the works and will be responsible for the accuracy of the same. He shall also be responsible for the correctness of the positions, levels, dimensions and alignment of all parts of the structures as shown in the drawings supplied to him. If at any time any error shall appear during the progress of any part of the work, the contractor shall at his own expense rectify such error if called upon to the satisfaction of the Executive Engineer.

GC-119

The contractor shall permit the execution of the work not provided for in the tender by artists; tradesman, or others engaged by the Municipal Corporation. The contractor shall allow all reasonable facilities and the use of his scaffolding and water for the execution of such work, but is not required to provide any special scaffolding for the execution of such work except by special arrangement with Municipal Corporation.

GC-120 TIME LIMIT FOR UNFORESEEN CLAIM

Under no circumstance whatsoever shall the contractor be entitled to any compensation from Municipal Corporation on any account unless the contractor shall have submitted a claim in writing to the Engineer-in-charge within one month of cause of such claim occurring.

GC-121 ACTION AND COMPENSATION PAYABLE IN CASE OF BAD WORK:

If at any time before the security deposit is refunded to the contractor, it shall appear to the Engineer-in-charge or his subordinate in charge of the work that any work has been executed with unsound imperfect, or unskillful workmanship or with materials of 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 otherwise not in accordance with the contract, it shall be lawful for the Engineer-in-charge to intimate this fact

in writing to the contractor and them 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 specified in whole or in part as the case may require, or if so required shall remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost; and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in the written intimation aforesaid, the contractor shall be liable to pay compensation at the rate of one percent on the amount of the tender for every day not exceeding ten days, during which the failure so continue and in the event of any such failure as aforesaid the Engineer-in-charge may rectify or remove and execute the work or remove and replace the materials or articles complained or 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 along with the appropriate penalty as the Commissioner may deem fit.

The period to be counted from that date of final completion and handing over of the work to the Municipal Corporation during which the contractor is so liable for any defects in the work shall be the Defects Liability Period shown in the attached Memorandum.

GC-122 WORK TO OPEN BE INSPECTION

Contractor is responsible agent to be present. All works under in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the Engineer-in-charge and his subordinates, and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his subordinate to visit the work shall have been given to the contractor, either himself be present to receive orders 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.

GC-123 NOTICE TO BE GIVEN BEFORE WORK IS COVERED UP

The contractor shall give not less than five day's notice in writing to the Engineer-in-charge or his subordinate in charge of the work before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured; and correct dimensions thereof taken before the same is so covered 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 contractor's expense, and in default thereof no payment or allowance shall be made for such work or for the materials with which the same was executed.

GC-124 Contractor Liable For Damage Done, And Or Imperfection For Three Months After Certificate.

If the contractor or his workmen; or servants shall break, deface injure or destroy any part of a building in which they may be working, or any building, road, fence enclosure or grass land or cultivated ground continuous to the premises on which the work of any part thereof is being executed; or if any damage shall be done to the work for any cause whatever while it is in progress or if any imperfection become apparent in it within the Defect liability period mentioned above by Engineer-in-charge the contractor shall make good the same at his own expense, or in default the Engineer in charge may cause the same to be made good by other workmen and deduct the expenses (of which certificate of Engineer-in-charge shall be final) from any sum that may be due or thereafter become due to the contractor or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof.

GC-125 CONTRACTOR TO SUPPLY PLANT, SCAFFOLDING ETC

The contractor shall supply at his own cost all materials (except such special materials, if any, as may be supplied from the Public works department Stores in accordance with the contract). plant tools, appliances implements, ladders, cordage, scaffolding and any temporary works which may be required for the proper execution of the work, in the original; altered or substituted from, and whether included in these specifications 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 the requirements of the Engineer-in-charge as to any matter on which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage thereof. 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 expense may be deducted from any money due to the contractor under the contract, or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof. The contractor shall provide all necessary fencing and lights required to protect the public from accident; and shall also be bound to bear the expenses of every suit. Action or other legal proceedings, at law, that may be brought by any person for Injury sustained owing to negligence of the above precautions, and to pay damages and costs which may be awarded in any such suit action or proceedings, to any such person, or which may with the consent of the contractor be paid in compromising any claim by any such person.

GC-126

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

GC-127 LIABILITY OF CONTRACTOR FOR ANY DAMAGE DONE IN OR OUTSIDE WORK AREA

Compensation for all damage done intentionally or unintentionally or by contractor's labourers whether in or beyond the limits of municipal property shall be estimated by the Engineer-in-charge or such other office as he may appoint & estimates of Engineer-in-charge subject to the decision of the Commissioner on appeal be final & the contractor shall be bound to pay the amount of the assessed compensation of demand failing which the same will be recovered from the contractor as damage from the security deposit or deducted by the Engineer-in-charge from any sum that may be due or become due from Mahanagar Seva Sadan to the contractor under this contract or otherwise.

The contractor shall bear the expenses of defending any action or other legal proceedings that may be brought by any person from injury sustained by him owing to negligence of precautions to prevent the spread of fire & he shall also pay any damages and cost that may be awarded by the court in consequence.

GC-128 WORK ON SUNDAY

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

GC-129

Contract may be rescinded by and security deposit forfeited for subletting it without approval or for being a public officer or if contractor becomes insolvent:

The contract shall not be assigned or subject without the written approval of the Engineer-in-charge, and if the contractor shall assign or sublet his contract or attempt to do so or become insolvent or commence any proceedings to be adjudicated an insolvent or make any composition with his creditors, or attempt to do the Engineer-in-charge may, by notice in writing rescind the contract. Also if any bribe, gratuity gift, loan, perquisite, reward or directly advantage, pecuniary or otherwise, shall either or indirectly be given, promised, or offered by the contractor, or any of his servants agents to any public officer or person in the employ of Municipal Corporation in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract the Engineer-in-charge may be notice in writing rescind the contract. In the event of contract being rescinded, the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the deposit of the Mahanagar Seva Sadan & the same consequences shall ensue as if the contract had been rescinded under clause-3 hereof and in addition the contractor, shall not be entitled to recover or be paid for any work thereto for, actually performed under the contract.

GC-130SUM PAYABLE BY WAY OF COMPENSATING TO BE CONSIDERED AS REASONABLE COMPENSATION WITHOUT REFERENCE ACTUAL LOSS

All sums payable by a contractor by way of compensation under any of these conditions shall be considered as a reasonable compensation to be applied to the use of Municipal Corporation without reference to the actual loss

or damage sustained and whether any damage has or has not been sustained.

GC-131 CHANGES IN THE CONSTITUTION OF FIRM TO BE NOTIFIED.

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

GC-132 WORKS TO BE UNDER THE DIRECTION OF EXECUTIVE ENGINEER

All works to be executed under the control shall be executed under the directions and subject to the approval in the respects of the Executive Engineer who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

GC-133 DECISION OF THE COMMISSIONER TO BE FINAL

Except where otherwise specified in the contract decision of the Commissioner shall be final conclusive and binding on all parties to the contract upon all questions relating to the meaning of the specification designs, drawings and instructions here in before mentioned and as to the quality of workmanship, or materials used on the work, or as to any of her question, claim, right, matter, or thing whatsoever in any way arising or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions, or otherwise concerning the works or the execution or failure to execute the same, whether arising, during the progress of the work or after the completion or abandonment thereof.

GC-134 LUMP SUM IN ESTIMATES:

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

GC-135 ACTION WHERE NO SPECIFICATION

In the case of any class of work of which there are on such specifications as are mentioned in Rule 1 such work shall be carried out in accordance with the Municipal or Gujarat Government P.W.D. specifications, and in event of there being no Municipal or Government P.W.D. specifications, then in such case the work shall be carried out in all respects in accordance with the instructions & requirement of the Engineer-in-charge.

GC-136 DEFINITION OF WORKS

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

GC-137 REFUND OF QUARRY FEES AND ROYALTIES

All quarry fees and royalties shall be paid by the contractor All octroi taxes shall also be paid contractor according to the Municipal rules in force at the time and no refund shall be given Certificate for refund of quarry fees and royalties in admissible under existing rules shall be given by the Municipal to the contractor after successful completion of the contract. For the levy of water charges for construction work, please see the attached Memorandum.

GC-138COMPENSATION UNDER WORKMEN'S COMPENSATION ACT

The contractor shall be responsible for and shall pay any compensation to his workmen payable under the workmen's Compensation Act 1923 (VIII of 1923) or any statutory modification thereof for injuries caused to workmen.

GC-139 CLAIM FOR QUANTITIES OF WORK ENTERED IN THE TENDER ESTIMATE

Quantities shown in the tender are approximate and no claim shall be entertained for quantities of work executed being either more or less than those entered in the tender of estimate.

GC-140 CLAIM FOR COMPENSATION DELAY IN STARTING THE WORK

No. compensation shall be allowed for any delay caused in the starting of the work on account of any acquisition of land and in the case of clearance work, for any delay in accordance to estimate.

GC-141 CLAIM FOR COMPENSATION FOR DELAY IN THE EXCAVATION OF WORK

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, sub-soil water or water standing in borrow pits, and no claim for an extra rate shall be entertained, unless otherwise expressly specified.

GC-142 ENTERING UPON OR COMMENCING ANY PORTION OF WORK

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 for payment of work,

GC-143 MINIMUM AGE OF PERSONS EMPLOYED THE EMPLOYMENT OF DONKEYS AND OR OTHER ANIMALS & THE PAYMENT OF FAIR WAGES

- (i) No contractor shall employ any person who is under the age of 12 years.
- (ii) No contractor shall employ donkeys or other animals with breching of string or thin rope. The breeching must be atleast three inches wide and should be of tape (Nawar).
- (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 is authorised to remove from the work any person or animal found working which does not satisfy these conditions and no responsibility shall be accepted by Municipal Corporation for any delay caused in the completion of the work by such removal.
- (v) The contractor shall pay fair & reasonable wages to the workmen employed by him in the contract undertaken by him in the event of any dispute arising between the contractor and his workmen on the grounds that the wages paid are not fair and reasonable, the dispute shall be referred without delay to the Executive Engineer who shall decide the same.

The decision of the Executive Engineer shall 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 Municipal Corporation at the sanctioned tender rates.

GC-144 METHOD OF PAYMENT

Payment to contractors shall be made by cheques drawn on any Bank in Surat, provided the amount exceeds Rs.10. Amounts not exceeding Rs.10 will be paid in cash.

GC-145 ACCEPTANCE OF CONDITION COMPULSORY BEFORE TENDERING FOR WORK.

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

GC-146 CLAUSE HEADINGS

The clause headings in these conditions are for purposes of reference only and are not to be deemed to form part of this contract.

GC-147

Disputes if any, shall be discussed and mutually settled and in case of disagreement the same shall be referred to Commissioner/Standing Committee. After referring to Commissioner/Standing Committee if the said dispute is not solved, the same shall be referred to the court subject to Surat Jurisdiction only.

GC-148 THE FOLLOWING CONDITION ARE BEING INCLUDED IN THIS TENDER AND SHALL BE CONSIDERED AS A PART OF TENDER DOCUMENT.

(i) In case the total amount of work done is less than 5% of the contract value, prorata S.D. to that extent may be refunded to the contractor while releasing the payment of final bill. In short, the S.D. to be retained by the Corporation after payment of final bill shall be equal to 2% of the amount of final bill as per the prevailing norms or as per the norms decided from time to time.

(ii) If there is increase in amount of work more than 5% of the Contract value. The Additional S.D. shall be recovered from the running bill. When the total of any of work done by the Contractor up to running bills under consideration is more than 5% of the contract value. However, such S.D. shall be recovered in the round figure of Rs. 1000/- i.e. the amount of work done when it exceeds 5% of the contract value it shall be refunded of to the nearest multiple of Rs.25000/- such additional S.D. shall be recovered for the works amount to Rs. 5 Lacs or more at the rate of 4% of the additional amount.

(iii) In many cases, the contractors are stopping the work half-way due to number of reason and when the department has to take actions in accordance to clause 3(a) or (b) or (c) of the contract the remaining work has to be carried out by advertising the tender for the remaining work and the whole administrative process right from inviting tenders to finalising the tender etc.

In such cases a fixed amount of Rs.1000/- should be reversal from the original contract towards the cost of advertisement and other administrative charges incurred by the department in finalising the contract for the remaining work. In case a separate advertisement is issued for a single work actual cost of advertisement shall be recovered such recovery shall be in addition to the recovery to be made under clause-3 or such other relevant clauses.

GC-149

In continuation of clause No.46(i) if any contractor found employing person or persons under the age of 12 years, during course of the construction at any stage, legal actions shall be taken against him as stipulated in Child Labour (Prohibition & Regulation) Act 1986 and also, a penalty of Rs.20,000/- (Rupees Twenty thousand) shall be imposed which shall be deposited with District Collector in Child Labour Rehabilitation cum Welfare Fund.

GC-150 EVALUATION OF SUBMITTED QUALIFICATION OFFER BASED ON SUBMISSIONS MADE BY THE TENDERER

The tenderer shall be fully responsible for correctness of submissions made whether same has been examined and approved by employer or not. In the event of misrepresentation or suppression of the matter/ fact by the tenderer, the action will be taken on the wrong tenderer as per procedure/ provision outlined in the tender document. Price bid will be opened of those tenderers, whose post qualification bids meet requirements of the qualifying criteria as laid down in tender.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL
CORPORATION.

SIGNATURE OF THE CONTRACTOR.

Responsibility of contractor under Construction And Demolition Waste (C & D Waste) Rules 2016

Contractor shall remove All Construction and Demolition Waste (C & D Waste) and clean the area every day, or depending upon (1) The type & schedule of the work, (2) The quantity and type of waste generated, appropriate storage and collection facility shall be developed at site. Reasonable time frame shall be worked out in consultation with engineer in charge of the project, for storage & usage of C & D Waste.

If it's found that contractor is irregular and showing negligence to management of C & D Waste, than If deem fit, Engineer-in-charge would arrange to dispose the said C & D Waste through an Authorized C & D Waste Contractor/agency of Surat Municipal Corporation and All the expenditure made towards disposal of this C & D Waste shall be recovered from the contractor as per the prevailing charges.

Contractor shall have to bear the expenses towards management of C & D Waste as per the prevailing norms, no extra payment shall be entertained for the same.

Contractor shall keep record of the generation and disposal of Construction and Demolition waste (C & D Waste) and proof of its disposal as per the provision of C & D Waste rules and he has to submit along with running bills

If contractor fails to upkeep and maintain records of C & D Waste generation- Disposal records etc. than it shall be calculated as per the provision of the Standing Committee Resolution no. 1621/2016, Dt:01/10/2016 and charges shall be recovered from due of contractor with Surat Municipal Corporation.

Contractor shall also ensure use of recycled products made from SMC authorized C & D Waste agency as far as possible to promote the C & D Waste management project.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL
CORPORATION.

SIGNATURE OF THE CONTRACTOR.

SPECIAL CONDITIONS OF CONTRACT

1. The basic nature of work is repair, rehabilitation and reconstruction, requiring special skill and experience of executing similar works in the past. While carrying out proposed scheme of rehabilitation, the contractor shall exercise due care to protect remaining structure from any damage arising due to said work. If any part of the building gets affected due to the said work, it shall be reinstated by the contractor to its original condition without claiming any extra cost for the same.
2. The contractor will appoint at least one qualified civil engineer(minimum qualification B.E. Civil), who will continuously supervise the work, assure the quality and soundness of the work being executed. This engineer shall have at least five years experience of similar work. Their profiles with necessary details like qualification, experience, etc. and supporting documentation shall be submitted with the tender documents, failing which the tender shall be subjected to rejection.
3. The contractor will perform visual inspection and delamination survey for the entire building under consideration with specific purpose of preparing detail distress mapping Autocad drawings before starting any work of repair, rehabilitation and reconstruction.

Various signs of distresses like cracks in RCC beam, column, slab, cracks in brick walls, cracks between RCC and brick joint, areas of loose plaster to RCC work, areas of loose cover concrete in beam, column, slab, spalling of concrete in RCC work, spots of dampness/leakages in brick walls, spots of dampness/leakages in RCC work, etc. shall be carefully observed and recorded in such a way that it gives clear idea about their (location identification on drawing, alignment on particular member, etc.) extent (approximate length, area) and nature of distress. Light hammer tapping shall be used for delamination survey of all RCC elements and areas of loose plaster/cover concrete shall be identified based on hollow/damped sound of tapping. Appointed engineers of the contractor shall carry out all fieldwork for distress mapping. The work shall be carried out in presence of representative of consultant and the Engineer-in-charge of SMC. Their suggestions for correction, modification shall be complied by the contractor.

The contractor will prepare full Autocad drawings of distress mapping, including necessary plan, section, elevation, etc. clearly indicating positions of various distresses before start of repair, rehabilitation, reconstruction work and get it certified by the consultant and SMC. The contractor will have to submit three copies of each drawing.

The entire procedure shall be executed under guidance of the consultant. The contractor will deploy manpower, material, equipment, etc. necessary for satisfactory completion of the said work, no extra payment for the same shall be made. The contractor shall not start any other work till satisfactory completion of distress mapping, submission of field book and submission of drawings in required number.

4. The contractor will appoint one “clerk of work” for building, who is qualified civil engineer (Minimum qualification B.E. Civil). The clerk of work shall duly record receipt of all materials on site and get it certified by the Engineer-in-charge. Chalan of all materials received on site shall be deposited with the Engineer-in-charge. It shall clearly indicate quality, make, quantity of material, date and time of supply and name of supplier. The chalan shall be verified and duly certified by the Engineer-in-charge and recorded in the material register by the clerk of work. The contractor will also make arrangement for cement godown, reinforcement yard, and areas for storage of fine aggregates, coarse aggregates and bricks. A separate godown shall be made for storage of all chemicals, admixtures and related accessories to be used for the said work. Once the materials are received on site, it shall not be taken out without permission of the Engineer-in-charge. Also, no material shall be taken out from the storage and used for the work without prior permission of the Engineer-in-charge. Any material taken out from the storage, if remains excess at the end of days work shall be redeposited in the storage. The clerk of work will maintain daily register for record of materials received, materials issued for work, materials redeposited, etc. which shall be daily got certified by the Engineer-in-charge. The “clerk of work” shall also maintain classified Itemwise material consumption record for all items of work and shall submit such statement at every 15 days interval to the consultant and SMC. Any pilferage's, loss, damage of material due to any reason on site shall be sole responsibility of the contractor and no claim for the same shall be entertained. Profile of person, who shall work as clerk of works along with necessary details like qualification,

experience, etc. and supporting documentation shall be submitted with the tender documents, failing which the tender shall be subjected to rejection.

5. The contractor shall strictly follow the quality assurance plan given in the tender. All necessary tests as mentioned in the quality assurance plan shall be carried out in approved laboratory and copy of results shall be submitted to the consultant and SMC . Before using any material on site, it shall be duly tested as mentioned in quality assurance plan. Materials, which do not give desired results, shall be rejected. All such rejected material shall be immediately removed from the site. All test samples shall be taken/made in presence of The Engineer-in-charge from SMC.

The contractor will also maintain a register to record all test results with related necessary information like location of test sample, type of test, date of sampling, number and frequency of sampling, date of testing, name of laboratory, expected test result, actual test result, remarks, etc. Any item of work, which does not give desired results shall be rejected. It shall be demolished and reconstructed by the contractor at no extra cost.

6. The contractor shall give guarantee on Rs.100 stamp paper, regarding quality and soundness of repair, rehabilitation, reconstruction work being executed by him, for a minimum period of three years from the date of satisfactory completion of work. During such period of guarantee if any distresses are observed in the work executed by him and in the opinion of building committee and consultant, it is due to improper quality/soundness of the work, the same shall be again repaired, rehabilitated, reconstructed and the contractor shall not claim any extra for the said work.
7. Along with tender documents the tenderer will submit tentative completion schedule clearly indicating his approach for timely completion of work. The successful tenderer shall prepare detail Itemwise bar chart and get it approved by the consultant within 15 days of award of work. Large copy (A0 size) of approved Itemwise bar chart shall be clearly displayed at appropriate location on site during execution of work. Expected and actual progress of work shall be indicated by different colour on daily basis, so as to monitoring proper timely progress of work. Any lag between expected and actual progress shall be duly supplemented by reason thereof and shall be got approved by the Engineer-in-charge.
8. If required and suggested by the consultant, the contractor will conduct non-destructive UPV test during pre-repair and / or post repair period to prove quality/efficiency of repair, rehabilitation, reconstruction, work executed by him. Such tests shall be executed by approved agency, in presence of the Engineer-in-charge and copy of test results shall be submitted to the consultant and SMC. If desired results are not obtained; the contractor will redo the work executed by him till satisfactory results are obtained. All expenses for such tests and necessary redoing shall be borne by the contractor and no extra payment shall be made for the same.
9. Following special materials are proposed to be used for tendered work
 - a) Rust removing chemical
 - b) Anti – corrosive coating
 - c) Expanding grout additive
 - d) Super plasticizer
 - e) Polymer bonding agent
 - f) Polymer to modify mortar
 - g) Curing agent
 - h) Epoxy grout
 - i) Epoxy putty

The tenderer shall clearly provide following information about all above materials that he propose to use for the tendered work, and submit the same in tabulated form along with the tender documents.

1. Name of the manufacturing company
 2. Brand name / trade name of the material
 3. Name and address of the manufacturing plant
 4. Name and address of the authorised supplier
 5. Standard material specifications provided by the manufacturer
 6. Standard procedure of application provided by the manufacturer with proportion of material proposed to be used
 7. Manufacturer's test certificate shall be appended
10. The tenderer shall also clearly mention the quality and make of all other materials like cement, reinforcement, aggregates, bricks, etc. along with the name-address of supplier. He shall stick to the same throughout the project and no deviation in the same shall be permitted during execution of work.
11. All member of temporary frame work (props, braces, spans etc.) used by the contractor to support RCC members during execution of repair, rehabilitation and reconstruction work shall be of steel and adjustable in nature. Steel props shall have base fixture and top fixture with jacking arrangements and provision for proper bracing arrangements, while steel spans shall be of adjustable length with arrangements for proper bearing and fixing on steel props at their ends.
12. The contractor shall not claim any escalation in quoted price due to any reason. No such claim shall be accepted.
13. The quantities for various items of work mentioned in the tender documents are approximate and likely to vary. The contractor shall not claim any extra amount or compensation for any increase or decrease in the quantities mentioned in the tender document. No such claim of the contractor shall be accepted.

NOTE:

Wherever Engineer-in-charge is mentioned it shall mean Engineer of SMC appointed for the said work.

SIGNATURE AND SEAL OF THE CONTRACTOR:

NAME AND ADDRESS:

DATE:

SCHEDULE – A

ADDITIONAL INSTRUCTION FOR CEMENT AND STEEL :

Surat Municipal Corporation shall not issued cement and reinforcement steel to be used for this work.

The cement and reinforcement steel required for the above said work shall be procured by contractor at its own cost.

The brands for cement shall be be **Ambuja, Ultratech, Sanghi, Hathi, Sidhdhi, JK Laxmi**, company confirming to IS-12269/87 latest amendment ISO-9000 of 53 grade OPC only.

Approved make of TMT reinforcement steel:-**TATA, SAIL, Rastriya Ispat, Electrotherm (ET), Ramswaroop, National, Mono Steel India Ltd., Gallantt metal Ltd., JSW, bhagyaLaxmi Rolling mill Pvt. Ltd., Zalanani "polaad"** as per confirming to IS 1786/2008 with latest amendments TMT Fe-415/Fe-500. TMT Steel shall be purchased by only manufacturing company/Authorised dealer/Distributor/ Stockist only shall be allowed to use 6 mm plain steel shall be as per IS 2062/99 with latest emendment of any brand/make.

Any of the above mentioned brands of Cement and Reinforcement steel shall only be used by the contractor at the time of execution.

The brands for structural steel to be used shall be of make TATA, Jindal, SAIL or Asian.

All structural steel shall conform to I.S. 226-1975. The steel shall be free from the defects mentioned in I.S. 226- 1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. Rivet bars shall conform to I.S. 1148-1992.

When the structural steel is supplied by the contractor test certificates of the manufacturers shall be obtained according to **I.S. 226-1975 and other relevant Indian Standards.**

Coloured galvanized Roofing sheet shall be of TATA or Jindal make trafford sheet

WASTAGE OF CEMENT AND REINFORCEMENT STEEL

As the contractor is to bring the cement and steel, the question of considering the wastage on the basic of issue rate does not arise i.e.no separate payment shall be made for any kind of wastage in the Materials. The payment for reinforcement bar will be made on theoritical weight basis. The weight shall be computed on the basis of the length of the steel used in the work multiplied by the standard unit weight of MS/HYSD/TMT bar as mentioned in IS code No.1786.

The steel consumption eighter less than 7.5% of the standard consumption shall be penalised either at the double existing corporation issue rate or the prevailing market rate, whichever is more. Currently corporation Issue rate of TMT Steel is **Rs. 50,500.00** per M.T. (Without GST) Currently corporation Issue rate of TMT CRS Steel is **Rs. 53,000.00** per M.T(Without GST).

Similarly, for cement also, the less consumption beyond 5% shall be penalised at the double existing corporation issue rate or the prevailing market rate, whichever is more. Currently corporation Issue rate of Cement is **Rs. 5,600/-** per M.T(Without GST).

It should be specifically noted that the cement and steel brought by the contractor at site of work shall be used only after the same is tested at the approved laboratory as per the direction of the Engineer-in-charge. Such approved laboratory may be located at Surat, Baroda, Ahmedabad or Mumbai.

All the charge for the transport and testing of the samples shall have to be borne by the contractor. The frequency of testing such material shall be in accordance to the relevant Indian Standards as directed by Engineer-in-charge.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA)
SURAT MUNICIPAL CORPORATION.

Signature of the Contractor:

MEMORANDUM

I/We _____ the undersigned do hereby Tender for carrying out the work described in the schedule subject to the condition annexed in schedule attached herewith in Tender documents.

1.	General Description of work	:	Construction of Garden developement at T.P.48 (Bhestan),F.P.77 in South Zone-A (Udhana). (2nd attempt)
2.	Estimated Cost	:	Rs. 1,41,21,393.70
3.	Earnest Money Deposity	:	Rs. 1,42,000.00
4.	Security Deposit	:	Rs. 2% of Tender Amount
	(i) Initial Security Deposit	:	
	(ii) To be deducted for current bills	:	Rs. 2% of Work done in each running bills
5.	Time allowed for the completion of work from date fixed in written order to commence	:	12 (twelve) months (Excluding monsoon)
6.	Compensation for delayed work under Clause 2	:	Zero Point two percent (0.2%) of the contract price per day maximum upto ten percent (10%) of the contract price.
7.	The progress of work should confirm to the following schedule		
	1/4 of the work in	:	1/4 of the time.
	1/2 of the work in	:	1/2 of the time.
	3/4 of the work in	:	3/4 of the time.
8.	Percentage to be retained from running Account Bills	:	7% Retention Money (2% SD + 5% Additional retention Money)
9.	Defect Liability Period	:	12(Twelve) Months From the actual date of Completion of work.
10.	Water Charges	:	CONDITION FOR THE WATER SUPPLY & ELECTRIC SUPPLY on next page.
11.	Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.	:	1% of Work Done Amount in R.A. Bills.
12	Goods and Service Tax (GST)	:	As per GC 94

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION

Signature of the Contractor:

SURAT MUNICIPAL CORPORATION

SOUTH ZONE(UDHANA)

CONDITION FOR THE WATER SUPPLY & ELECTRIC SUPPLY

FOR WATER CHARGE (As per City Engineer Note No.386, dtd.30/7/2012)

In case of Municipal Network or distribution center available or not at near by area

OPTION-1:

Contractor has to make his own arrangement for construction work whether from private boring or tankers. Contractor has to submit test report of water whether it is of good quality for construction work or not and contractor has to inform about it within 30 days of starting the work.

OPTION-2:

If contractor wants to use Municipal Water he has to follow procedure within below:

1.Contractor has to apply for water connection by Municipal Licenced plumber in prescribed form.

2.Contractor has follow all procedure with his own expenses.

3.According to rule Municipal Corporation issue bill to contractor for consumption of water and contractor has to paid it within stipulated time and contractor has submit one copy of bill and payment receipt to concern department. If contractor fail to pay the bill the amount of bill/paid receipt can be recover from contractor's bill.

4.If Municipal Corporation network is not available then Contractor can make arrangement of water tanker from nearby distribution center after depositing required amount.

5.After completion of work contractor has to cancelled the water connection and inform the concern department.

6.If network and distribution center/network are both not available in that case contractor has to make his own arrangement for good quality construction water and has to follow the option-1.

7.If contractor is taking water connection or even if the contractor is not taking connection and makes other arrangement to use Municipal Water by tanker or tapping water from near private connection, water charges shall be recovered at the rate of 3% (Three Percent) of the civil items in which water consumed.

(2) The contractor shall make his own arrangement at his cost for electric supply required for operating various plants and machineries required for the works and for general lighting purpose for site, office, labour

colony etc.

The energy bills shall also be paid by the contractor.

**EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL
CORPORATION**

SIGNATURE OF THE CONTRACTOR.

IMPORTANT INSTRUCTION-A TO THE CONTRACTOR

- (1) This tender document containing Page No.01 to ... duly signed by the tenderer, should be furnished to Corporation treasury along with the amount of earnest money deposit as mentioned in tender notice. If any of the drawings or papers removed from the tender, the tender shall be rejected and E.M.D. shall be forfeited.
- (2) The tenderer who wants to propose something in written, he should write it on his letter pad or another paper. Anything written on tender papers shall not be considered by Corporation and Contractor shall not be intended to do so.
- (3) Following Certificate shall be enclosed with tender.
 - (a) Solvency Certificate amounting of 20% of tender amount.
 - (b) **Registration Certificate of required class given by Government or Semi-Government firm.**
 - (c) List of work done by Contractor with its volume.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL
CORPORATION

SIGNATURE OF THE CONTRACTOR.

IMPORTANT INSTRUCTION-B TO TENDERER

1.

Affix Latest Passport Size Photo of tenderer

Specimen Signature of the Bidder.

[2] AFFIX LATEST PASSPORT SIZE PHOTOGRAPH OF ALL PARTNERS IN CASE OF PARTNERSHIP AGENCY.

1	2	3	4
---	---	---	---

Specimen Signature of all partners incase of partnership agency.

1. ----- Submission of Registered Agreement
2. ----- is compulsory in case of partnership
3. ----- agency.
4. -----

- [3] Submission of sale tax certificate, with proof of residence is compulsory for tenderer.
- [4] In case of Government royalty applicable to tenderer, it is compulsory to submit a receipt of royalty payment with tender.
- [5] The Photograph and specimen signature of bidder will be cross checked, whenever he receives payment in account section of SMC.
- [6] The specimen signature of contractor will be cross checked by Account Department of SMC, in case of representative of Contractor alongwith letter of authority of a person who signed an agreement, receives payment.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL
CORPORATION

SIGNATURE OF THE CONTRACTOR

SPECIAL NOTE

- (1) The work shall be carried out strictly according to the specifications given in Bombay Public Works Department Hand Book Vol.1 and II (The latest edition) whenever applicable as directed by Executive Engineer.
- (2) The work shall have to be started by the contractor at as many places as ordered by the Executive Engineer.
- (3) If during excavation or carrying out of any item of the work, any electric pole, electric cable, telephone cables, telegraph cable, gas line, drain connection pipeline, water service pipeline, sewer main, water mains, etc. is/are damaged by the contractor shall be liable to pay the full expenditure required and to repair the same or charges for the same (as the case may be) decided by the electric company, Gas Company, Government Authority or the Surat Municipal Corporation which ever may be.
- (4) The work shall be carried out in workman like manner, and best skilled worker should be employed. If any defect in the work is found out the contractor shall have to rectify within the time fixed by Executive Engineer. If he fails to rectify the defect Executive Engineer after giving due notice shall rectify the defect at the risk and cost of the contractor.
- (5) All the work shall be done strictly according to the instruction of Executive Engineer.
- (6) No compensation shall be paid if the work is stopped due to defective work or as per the instruction from Engineer-in-charge due to any reasons.
- (7) The rates given in the schedule shall hold good for all works done under this contract without reference to quantities or location of work.
- (8) The contractors are particularly directed to observe from the specification what is to be included in the items and rates for the several portion of the work frame out all their rates for items accordingly.
- (9) The date of starting of the work is considered to be the date specified in the final work order.
- (10) If any Clause of Arbitration is there in tender document is deleted here with.
- (11) The project under this tender may be executed under strict supervision of P.M.C. if deployed by S.M.C. Contractor shall carry out the instructions of P.M.C.
- (12) Third Party Inspection shall be deployed by S.M.C.
- (13) The contractor shall submit the advance Pour Card in prescribed form for the type of work which he planned to carry out with the skilled / unskilled labour deployed by him for the work.
- (14) The contractor shall establish concrete cube testing machine and other equipments required for quality checking of materials as per instructions of PMC/ Engineer-In-charge.
- (15) The contractor shall use the materials of the specified brands only. Request for equivalent brands will be considered only if specified brand is not available in market.
- (16) **ACCIDENT LIABILITIES:**

The Contractor shall be responsible for all liabilities under workman compensation act, as under:

- (a) On occurrence of accident, resulting in death of workman employed by the Contractor which is so serious as is likely to result in death of such workman who meet with accident, the Contractor shall within 24 hours of accident, will intimate in writing to Engineer-in-charge of such incidence. The Contractor shall indemnify client, against all losses/damages sustained by the client resulting directly or indirectly from his failure to give such intimation to client including penalties/fines if any,

payable by client as a consequence of client's failure to give notice under workman's compensation act or otherwise to conform the provision of this act in regard to such accidents.

(b) In case when such compensations as above becomes payable under workman's compensation act, whether by contractor or by client as principal employer, it shall be law full for the Engineer-in-charge to retain out of money due and payable to the Contractor, such sum or sums of money as may in the opinion of the Engineer-in-charge be sufficient to meet such a liability, the opinion of the Engineer-in-charge shall be final in regard to all matters arising under this clause.

(17) INSURANCE:

The Contractor shall take "All Contract Risk Insurance Policy" for the estimated cost of this work "Work's Man Compensation Policy" for all workers and labours of contractor and client working at site and "Third Party Insurance Policy" to fully cover all third party type risk. The insurance policy so taken by the

Contractor for such purposes shall be in the joint name of the Contractor and the client and the policy shall be deposited with the client.

Contractors shall have to use maximum machinery for the work as per the direction of Engineer-In-Charge. If possible, space for stacking the surplus excavated earth will be provided by SMC. Otherwise the contractor shall arrange for the same at no extra cost to SMC.

(18) Contractor has to fixed display board describing the necessary information / particulars of work at specific location and shall submit the evidence to engineer-in-charge along with photographs. otherwise , 0.25% to 1.0% of tender amount as per description of engineer-in-charge shall be kept hold, while making payment to the contractor until the evidences as stated above is submitted. No extra payment shall be payable for fixing display boards.

(19) The Contractor shall paint building numbers & Flat numbers as per guideline of SMC without any extra payment.

(20) PLEASE READ CAREFULLY

Following details pertaining to work progress is mandatory.

(A) Bar chart: Contractor shall submit barchart showing schedule of execution of various activities within stipulated time limit

(B) Material Management : Contractor shall provide following details

- Source of materials i.e. yellow earth, Coarse aggregate, Grit, fine aggregates, bricks, cement, steel etc.
- Supply schedule : According to bar chart, the flow diagram of materials.

(1) Man power management :

The contractor shall submit details of manpower of various categories (skilled & unskilled labours) to be deployed for the work as under.

- Minimum no. of skilled and unskilled labors to be deployed on the work
- List of supervisors & engineers for supervision & quality control of the work.

- (21) All the applicant contractors are required to have their own employers code number under EPF Act, 1952 and are required to comply the applicable provisions of said statute regularly and totally.
- (22) Further the contractors for services are required to produce the certified copies of paid challans in respect of employees/workers employed by said contractor in respect of work allotted by Surat Municipal Corporation, along with copies of Pay Roll and Muster Roll. If the same are not produced, the bills will not be released.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL
CORPORATION

SIGNATURE OF THE CONTRACTOR

SPECIFICATIONS OF MATERIALS

M-1 WATER

- 1.1 Water shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil and injurious alkalies, salts, organic matter and other deleterious material which will either weaken the mortar or concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S. 456-2000.
- 1.2 If required by the Engineer-in-charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269-1989. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing mortar, concrete or masonry should not be too acidic or too alkaline. It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.4 Hard and bitter water shall not be used for curing.
- 1.5 Portable water shall generally be found suitable for curing mortar or concrete.

M-2 LIME

- 2.1 Lime shall be hydraulic lime as per I.S. 712-1984. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1995.
- 2.2 The following field tests for limes are to be carried out ---
 - a] A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour, indicates quick lime, and solid lumps the unbrunt lime stone.
 - b] Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.
- 2.3 Storage shall comply with I.S. 712-1984. The slaked lime, if stored, shall be kept in a weather proof and damp proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous Materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected Materials shall be removed from site of work.
- 2.4 Field testing shall be done according to I.S. 162-1989 to show the acceptability of Materials.

M-3 CEMENT

- 3.1 Cement shall be ordinary portland slag cement as per I.S. 269-1989 or Portland slag cement as per I.S. 455-1976 and revised latest I.S.

M-4 WHITE CEMENT

- 4.1 The white cement shall conform to I.S. 8042-1989.

M-5 COLOURED CEMENT

- 5.1 Coloured cement shall be with white or grey portland cement as specified in the item of the work.
- 5.2 The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties as to provide for durability under exposure to sun-light and weather.
- 5.3 The pigment shall have the property such that it is neither affected by the cement nor detrimental to it.

M-6 SAND :

- 6.1 Sand shall be natural sand, clean, well graded, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, alkali, salts, organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-charge. The sand

shall not contain more than 8% of silt as determined by field tests. If necessary the sand shall be washed to make it clean.

- 6.2 **Coarse Sand** : The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall be as under ---

I.S. Sieve Designation	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
4.55 mm	100	600 Micron	30-100
2.36 mm	900-100	300 Micron	5-70
1.18 mm	70-100	150 Micron	0-60

- 6.3 **Fine Sand** : The finess modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under ---

I.S. Sieve Designation	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
4.55 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	75-100	150 Micron	0-10

M-7 STONE DUST

- 7.1 This shall be obtained from crushing hard black tray or equivalent, it shall not contain more than 8% of silt as determined by field test with measuring cylinder. The method of determining silt contents by field test is given as under.
- 7.2 A sample of stone dust to be tested shall be placed without drying in 200 mm measuring cylinder. The quantity of the sample shall be such that it files the cylinder upto 100 mm mark. The clean water shall be added upto 150 mm mark. The mixture shall be stirred vigorously and the content allowen to settle for 3 hours.
- 7.4 The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the silt content within the allowable limit.
- 7.5 The fineness modulus of stone dust shall not be less than 1.80.

M-8 STONE GRIT

- 8.1 Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean, of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flaky elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1990. Unless a special stone of a particularly quarry is metnioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious reaction with cement.

- 8.2 The grit shall conform to the following gradation as per sieve analysis :

I.S. Sieve Designation	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
12.50 mm	100%	4.75 mm	2.20%
10.00 mm	80-100%	2.36 mm	0.25%

- 8.3 The crushing strength of grit will be such as to allow the concrete in which it is used to build-up the specified strenght of concerte.
- 8.4 The necessary tests for grit shall be carried out as per the requirements of I.S. 2338 (Parts I to VIII) 1988, as per instruction of the Engineer-in-charge. The necessity of test will be decided by the Engineering-in-charge.

M-9 CINDER

- 9.1 Cinder is well brunt furnace residue which has been fused or ssintered into lumps of varying sizes.
- 9.2 Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only. It shall be sound clead and free from clay, dirt, ash or other deleterious matter.

9.3 The average grading for cindar aggregates shall be as mentioned below :

20 mm	100
10 mm	86
5.75 mm	70
2.36 mm	52

M-10 LIME MORTAR

10.1 **LIME** : Shall conform to specification M-2. **WATER** : Water shall conform to specification M-1. **SAND** : Sand shall conform to specification M-6.

10.2 **Proportion of Mix** : Mortar shall consist of such proportions of slaked lime and sand as may be specified in the item. The slaked lime and shall shall be measured by volume.

10.3 **Preparation of Mortar** : Lime mortar shall be prepared by wet process as per I.S. 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

10.4 **Storage** : Mortar shall always be kept damp, protected from sun and rain till used up, covering it by trapaulin or open sheds.

10.5 **Use**: All mortar shall be used as soon as possible after grinding. It should be used on the day on which it is prepared. But in no case mortar made earlier than 36 hours shall be permitted for use.

M-11 CEMENT MORTAR

11.1 Water shall conform to specification M-1. Cement shall conform to specification M-3. Sand shall conform to M-5.

11.2 Proportion of Mix

11.2.1 Cement and sand shall be mixed to specified proportions, sand being measured by measuring boxes. The proportion of cement shall be by volume on the basis of 50 Kg./Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed as directed.

11.3 Preparation of Mortar

11.3.1 In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over atleast 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed.

11.4 The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

M-12 STONE COARSE AGGREGATE FOR NOMINAL MIX CONCRETE

12.1 Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

12.2 The aggregate shall generally be cubical in shape. Unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement concrete shall generally be as per the table given below. However, in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6mm. less than the cover whichever is smaller.

TABLE

I.S. Sieve Designation	Percentage Passing for single sized aggregates of nominal size	I.S. Sieve Designation	Percentage Passing for single sized aggregates of nominal size
------------------------	--	------------------------	--

	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 mm	-	-	-	12.5 mm	-	-	-
63 mm	100	-	-	10 mm	0.5	0.20	0.30
40 mm	80-100	100	-	4.75 mm	-	0.50	0.50
20 mm	0-20	85-100	100	2.75 mm	-	-	-
10 mm	-	-	85-100				

NOTE:- This percentage may be varied somewhat by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

- 12.3 The grading test shall be taken in the beginning and at the change of source of Materials. The necessary tests indicated in I.S. 383-1990 and I.S. 456-2000 shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean.

M-13 BLACK TRAP OR EQUIVALENT HARD STONE COARSE

- 13.1 Aggregate for Design Mix Concrete : Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 13.2 The aggregates shall generally be cubical in shape, unless special stones of particular quarries are mentioned, aggregates shall be machine crushed from the best, black trap or equivalent hard stones as approved. Aggregate shall have no deleterious reaction with cement.
- 13.3 The necessary tests indicated in I.S. 383-1990 and I.S. 456-2000 shall have to be carried out to ensure the acceptability of the material.
- 13.4 If aggregate is covered with dust it shall be washed with water to make it clean.

M-14 BRICK BATS AGGREGATE

- 14.1 Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign material. The brick bats shall be of 40 mm to 50 mm size unless otherwise specified in the item. The underburnt or overburnt brick bats shall not be allowed.
- 14.2 The brick bats shall be measured by volume by suitable boxes as directed.

M-15 BRICKS

- 15.1 The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws not nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colour. The bricks shall be moulded with a frog of 100mm x 40 mm and 10mm to 20mm deep on one of its flat sides. The bricks shall not break when dropped on the ground from a height of 600 mm.
- 15.2 The size of modular bricks shall be 190mm x 90mm x 90mm.
- 15.3 The size of conventional bricks shall be as under ---
225 x 110 x 75mm.
- 15.4 Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.
Length : 3.00 mm
Width : 1.50 mm
Height : 1.50 mm
- 15.5 The crushing strength of the bricks shall not be less than 35 Kg./Sq.Cm. The average water absorption shall not be more than 20% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part I to IV)-1992.

M-15A FLYASH BUILDING BRICKS

The Flyash building bricks shall conform to Grade-5 of IS-13757. The frog of the 80 to 100 mm x 40 mm x 10 to 20 mm size.

The size of modular bricks shall be 190 mm x 90 mm x 90 mm.

The size of conventional brick shall be 230 mm x 110 mm x 70 mm.

Only bricks of one standard size shall used on one work. The following tolerances shall permitted in the conventional size adopted in a particular work:

Length : ± 4 mm

Width : ± 2 mm

Height : ± 2 mm

The physical characteristic of bricks shall be as follows.

The minimum compressive strength of Flyash building bricks shall not be less than 35 Kg/Sq.Cm. and the test shall be conform to IS-3495 (Part-I).

The averages water absorption not more than 20 percentage by weight and the test shall conform to IS-3495(Part-3). Sampling of Flyash building bricks and criteria for conformity shall be as per I.S.:5454.

M-16 STONE

- 16.1 The stone shall be of the specified variety such as Granite/Trap stone/Quartzite or any other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and free from defects like cavities, cracks, sand holes, flaws, injurious viens, patches of loose or soft Materials etc. and weathered portions and other structural defects or imperfections tending to affect their soundness and strength. The stone with round surface shall not be more than 5% of dry weight. When tested in accordance with I.S. 1134-1985. The minimum crushing of the strength of the stone shall be 200 Kg./Sq.Cm. unless otherwise specified.
- 16.2 The samples of the stone to be used shall be got approved before the work is started.
- 16.3 The khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm nor shall it have depressions more than 10 mm from the average wall surface.

M-17 LATERITE STONE

- 17.1 Laterite stone shall be obtained from the approved quarry. It shall compacted in texture, sound, durable and free from soft patches. It shall have a minimum crushing strength of 100 Kg/Sq.Cm. in its dry condition. It shall not absorb water more 20% of its own weight, when immersed for 25 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.
- 17.2 The stone shall be dressed into rectangular blocks so that all faces are from waviness and unevenness and the edges true and square.
- 17.3 Those type of stone in which white clay occurs should not be used.
- 17.4 Special corner stones shall be provided where so directed.

M-18 MILD STEEL BARS/TMT/CRS BARS

- 18.1 Mild steel bars reinforcement TMT/CRS Bars for R.C.C. work shall conform to I.S. 432 (Part-II)-1982 and shall be of tested quality. It shall also comply with the relevant part of I.S. 456-1978 and revised latest I.S. Code.
- 18.2 All the reinforcement shall be clean and free form dirt, paint, grease, mill scale or loose or thick rust at the time of placing.
- 18.3 For the purpose of payment the bar shall be measured correct upto 10 mm length and weight payable worked out as per the rate specified below :

(i)	6 mm	0.22 Kg/Rmt.
(ii)	8 mm	0.39 Kg/Rmt.

(iii)	10 mm	0.62 Kg/Rmt.
(iv)	12 mm	0.89 Kg/Rmt.
(v)	14 mm	1.21 Kg/Rmt.
(vi)	16 mm	1.58 Kg/Rmt.
(vii)	18 mm	2.00 Kg/Rmt.
(viii)	20 mm	2.47 Kg/Rmt.
(ix)	22 mm	2.98 Kg/Rmt.
(x)	25 mm	3.85 Kg/Rmt.
(xi)	28 mm	4.38 Kg/Rmt.
(xii)	32 mm	6.32 Kg/Rmt.
(xiii)	36 mm	8.00 Kg/Rmt.
(xiv)	40 mm	9.86 Kg/Rmt

M-19 HIGH YIELD STRENGTH STEEL DEFORMED BARS

- 19.1 High yield strength steel deformed bars shall be either cold twisted or hot rolled and shall conform to I.S. 1739-1978 and I.S. 1139-1966 respectively.
- 19.2 Other provision and requirements shall conform to specification No. M-18 for Mild Steel Bars.

M-20 HIGH TENSILE STEEL WIRES

- 20.1 The high tensile wires for use in prestressed concrete shall conform to I.S. 2090-1983.
- 20.2 The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength and minimum strength shall be taken as per para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.
- 20.3 The high tensile steel shall be free from loose mill scale, rust, oil, grease or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing carborundum.
- 20.4 The high tensile wire shall be obtained from manufactures in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled.

M-21 MILD STEEL BINDING WIRE

- 21.1 The mild steel wire shall be of 1.63mm or 1.22mm (16 or 18 guage) diameter and shall conform to I.S. 280-1978.
- 21.2 The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust, oil, paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

M-22 STRUCTURAL STEEL

- 22.1 All structural steel shall conform to I.S. 226-1975. The steel shall be free from the defects mentioned in I.S. 226- 1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. Rivet bars shall conform to I.S. 1148-1992.
- 22.2 When the steel is supplied by the contractor test certificates of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

M-23 GALVANISED IRON SHEETS

- 23.1 The galvanised iron sheets shall be plain or corrugated sheets of gauge as specified in item. The G.I. Sheets shall conform to I.S. 277-1992. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- 23.2 The length and width of G.I. sheets shall be as directed as per site condition.

M-23-A G.I. VALLEYS GUTTER, RIDGES

- 23-A.1 The G.I. ridges and hips shall be of plain galvanised sheets class-3 of the thickness as specified in item. These shall be 600 mm width and properly bent up to shape without damage to the sheets in process of bending.
- 23-A.2 Valleys gutters and flashings shall be also of galvanised sheet of thickness as specified in item. Valleys shall be 900 mm. wide over all and flashing shall be 380 mm wide over all. They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24 ASBESTOSCEMENT SHEETS

- 24.1 Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S. 459-1970. The thickness of the sheets shall be as specified in the item. The sheet shall be free from all defects such as cracks, holes, deformities, chipped edges or otherwise damaged.
- 24.2 **Ridges and Hips**
- 24.2.1 Ridges and hips shall be of same thickness as that of A. C. sheets. The types of ridges shall be suitable for the type of sheets and locations.
- 24.2.2 Other accessories to be used in roof such as flashing pieces, eaves filler pieces, valley gutters, north light and ventilator curves, barge boards etc. shall be of standard manufacture and shall be suitable for the type of sheets and location.

M-25 MANGALORE PATTERN ROOF TILES

- 25.1 The Mangalore pattern tiles shall conform to I.S. 654-1992 for Class 'AA' or 'A' type as specified in item. Samples of the tiles to be provided shall get approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

M-26 SHUTTERING

- 26.1 The shuttering shall be either of wooden planking of 30mm minimum thickness with or without steel lining or of steel plates stiffened by steel angles. The shuttering shall be supported on battens and beams and props of vertical ballies properly cross bracked together so as to make the centering rigid. In places of ballie props, bricks pillar of adequate section built in mud mortar may be used.
- 26.2 The form work shall be sufficiently strong and shall have camber, so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of concrete, live load of men working with it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall not permit leakage of cement grout.
- 26.3 If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work. The complete form work shall be got inspected by and approved from the Engineer-in-charge, before the reinforcement bars are placed in position.
- 26.4 The props shall consist of bullies having 100mm minimum diameter measured at mid length and 80mm at thin end and shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m. laid on sufficiently hard base.
- 26.5 Double wedges shall further be provided between the sole plate and wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete.
- 26.6 The timber used in shuttering shall not be so dry so as to absorb water from concrete and swell or bulge nor so green or wet so as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.
- 26.7 As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.
- 26.8 The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution. In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.

- 26.9 The shuttering for beams and slabs shall have camber of 4mm per metre (1 in 250) or as directed by the Engineer-in-charge so as to offset the subsequent deflection. For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

M-27 EXPANSION JOINTS - PREMOULDED FILLER :

- 27.1 The item provides for expansion joints in R.C.C. frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous joint filler.
- 27.2 Premoulded bituminous joint filler, i.e. performed stirp of expansion joint filler shall not get deformed or broken by twisting, bending or other handling when exposed to atmospheric condition. Pieces of joint filler that have been damaged shall be rejected.
- 27.3 Thickness of the pre moulded joint filler shall be 25 mm unless otherwise specified.
- 27.4 Premoulded bituminous joint filler shall conform to 1.5 1838-1961.

M-28 EXPANSION JOINTS - COPPER STRIPS AND HOLD FASTS

- 28.1 The item provides for expansion joints in R.C.C. frame structure for internal joints as well as for exposed joints with the use of necessary copper strip and holdfasts.
- 28.2 Copper sheet shall be 1.25 mm thick and of 1.25 mm with 'U' shape in the middle, copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm. or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate to be embedded in the concrete work shall be 25 mm Depth of 'U' to be provided in the expansion joint, in the copper plate shall be of 25 mm.

M-29 TEAK WOOD

- 29.1 The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.
- 29.2 Teak wood shall generally be free from large, loose, dead or cluster knots, flaws, warps, twists, shakes, bends or any other defects. It shall generally be uniform in substance and of straight fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting, using any adhesive or resinous Materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.
- 29.3 All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.
- 29.4 The tolerances in the dimensions shall be allowed at the rate of 1.5 mm per face to be planed.

29.5 First Class Teak Wood

First class teak wood shall have no individual hard and sound knots, more than 6 sq.cm. in size and the aggregate area of such knots shall not be more than 1% of area of piece. The timber shall be closed grained.

29.6 Second Class Teak Wood

No individual hard and sound knots shall be more than 15 sq.cm. in size and aggregate area of such knots shall not exceed 2% of the area of piece.

M-29-A NON-TEAK WOOD

The non teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site. Fabrication of wooden members shall be started only after approval. For this purpose wood of Bio, Kalai, Sires, Saded, Behda, Jamun, Sisoo will be used for door frames whereas only Kalai, Siras, Halda, Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment.

The non teak wood shall be free from large, loose dead or cluster knots, flows, shakes, warps, bends, or any other defect. It shall be uniform in substance and of straight fibres as far as possible. It shall be free from rots, decay, harmful fungi and other defects of similar nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour of the wood shall be uniform as far as possible. The scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grain and of uniform thickness.

The department will use the Agency to produce a certificate from the Forest Department in the event of a dispute and the decision of the Department shall be final and binding to the contractor.

The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

M-30 WOODEN FLUSH DOOR SHUTTERS (SOLID CORE)

- 30.1 The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S. 2202-(Part-I)-1991. The timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross-section of the members, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross bands shall conform to I.S. 303-1298.
- 30.2 The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross bands, and face veneers. The lipping, rebating, opening of glazing, venetion etc. shall be provided if specified in the drawing.
- 30.3 All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.
- 30.4 The shutters shall be tested for ---
- i] **End Immersion Test** : The test shall be carried out as per I.S. 2202 (Part-I) 1991. There shall be no delamination at the end of the test.
- ii] **Knife Test** : The face panel when tested in accordance with I.S. 1659-1990 shall pass the test.
- iii] **Glue Adhesion Test** : The flush door shall be tested for glue adhesive test in accordance with I.S. 2202(Part-I)- 1991. The shutters shall be considered to have passed the test if no delamination occurs in the glue lines in the plywood and if no single delamination more than 80 mm. in length and more than 3 mm. in depth has occurred in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots knot, hole and other permissible wood defects shall not be considered in assessing the sample.
- 30.5 The tolerance in size of solid core type flush door as under:-
- In nominal thickness # 1.2 mm. In nominal height # 3 mm. The thickness of the shutters shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any two points.

M-31 ALUMINIUM DOORS, WINDOWS, VENTILATORS

- 31.1 Aluminium alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S.:733- 1991 and also to I.S. Designation WVG - WP OF I.S.:1285-1991. The sections shall be as specified the drawing and design. The fabrication shall be done as directed.
- 31.2 The hinges shall be cast or extruded aluminium hinges of same type as in window but of large size.
- 31.3 The hinges shall normally be of 50 mm projecting type non projecting type of hinges may also be used if directed. The handles of door shall be of specified design. A suitable lock for the door operable either from outside shall be provided. In double shutter door, the first closing shall have a concealed aluminium alloy bolt at top and bottom.

M-32 ROLLING SHUTTERS

- 32.1 The rolling shutters shall conform to I.S. 6248-1991. Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters upto 3.5 m. Width not less than 1.25 mm. thick and 80 mm. wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2 Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.15 mm.
- 32.3 Hood covers shall be made of M.S. sheets not less than 0.92 mm. thick. For shutters having width 3.5 mts. and above, the thickness of M.S. sheet for the hood covers shall be not less than 1.25 mm.
- 32.4 The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in position. The spring pipe shaft etc. shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on the or under the lintel as specified with rawl plugs and screws bolts etc.

- 32.5 The rolling shutters shall be of self rolling type upto 8 sq.m. clear area without ball bearing and upto 12 sq.m. clear area with ball bearing. If the rolling shutters are of larger then gear operated type shutters shall be used.
- 32.6 The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.
- 32.7 The shutters shall be completed with door suspension, shafts, locking arrangements, pulling hooks, handles and other accessories.

M-33 COLLAPSIBLE STEEL GATE

- 33.1 The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball bearings shall be provided in every double channel. Unless otherwise specified the particulars of collapsible gate shall be as under ---
- i] **Pickets** : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms. with an opening of 10 cms.
 - ii] Pivoted M.S. flats shall be 20 mm. x 6 mm.
 - iii] Top and bottom guides shall be from tee or flat iron of approved size.
 - iv] The fittings like stoppers, fixing hold fasts, locking cleats, brass handles and cast iron rollers shall be of approved design and size.

M-34 WELDED STEEL WIRE FABRIC

- 34.1 Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel 'as drawn' or galvanised steel conforming to I.S. 226-1975 With longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S. 4948-1974. It shall be fabricated and finished in a workman like manner and shall be free from injurious defects and shall be rust proof. The type of CHICKEN shall be oblong or square as directed. The mesh sizes and sizes of wire for square as well as oblong welded steel wire fabric shall be as directed. The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

M-35 EXPANDED METAL SHEETS

- 35.1 The expanded metal sheets shall be free from flaws, joints, welds, broken, stands, laminations and other harmful surface defects. Expanded metal steel sheet shall conform to I.S. 412 - 1992 except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 per cent.
- 35.2 Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

M-36 MILD STEEL WIRE (Wire Gauze Jali)

- 36.1 Mild steel wire may be galvanised, as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound, free from slits, surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1992.

M-37 PLYWOOD

- 37.1 The Plywood for general purpose shall conform I.S. 303-1998. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers 3, 5, 7, 9 ply etc. The plies are placed so that the grain of each layer is at right angles to the grain in the adjacent layers.
- 37.2 The chief advantage of plywood over a single board of the same thickness is the more uniform strength of the plywood along the length and width of the plywood and greater resistance to cracking and splitting with change in moisture content.
- 37.3 Usually synthetic resins are used for glueing. Phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C. to 140 degree C. and a pressure of 11 to 14 Kg./Sq.cm. on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness.

- 37.4 When water glue are used the wood absorbs so much Water that the finished plywood must be dried carefully, When synthetic resins are used as adhesive the finished plywood must be exposed to atmosphere of controlled humidity until the proper amount of moisture has been absorbed.
- 37.5 According to I.S. : 303-1998 the plywood for general purpose shall be of three grades namely BWR.WWR and CWR depending upon the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces, each face being of three kinds namely A, B and C. After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

TABLE

37.6 THICKNESS OF PLYWOOD BOARDS

Board	Thich
3 ply	3 mm
	4 mm
	5 mm
	6 mm
6 ply	5 mm
	6 mm
	8 mm
	9 mm
7 Ply	9 mm
	13 mm
	16 mm
9 Ply	13 mm
	16 mm
	19 mm
11 ply	19 mm
	22 mm
	25 mm

M-38 GLASS

- 38.1 All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provisions or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under ----
- 38.2 **Sheet Glass**
- 38.2.1 In the absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheet glass shall be weighing 7.5 Kg./Sq.m. for panes upto 600 mm. x 600 mm.
- 38.2.2 For panes larger than 600 mm. x 600 mm. and upto 800 mm. x 800 mm. glass weighing not less than 8.75 Kg./Sq.m. shall be used. For bigger panes upto 900 mm. x 900 mm. glass weighing not less than 11.25 Kg./Sq.m. shall be used.
- 38.2.3 Sheet glass shall be patent flattened glass of best quality and for glasing and framing purposes shall conform to I.S. 761-1963. Sheet glass of the specified colours shall be used, if so shown on detailed drawings or so specified. For important buildings and for panes with any dimensions over 900 mm. plate glass of specified thickness shall be used.
- 38.3.0 **Plate Glass**
- 38.3.1 When plate glass is specified it shall be "Polished Patent Plate Glass" of best quality. It shall have both the surface ground flate and parallel and polished to obtain clear undistured vision and reflection.

The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In the absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm. shall be admissible.

38.4.0 Obscured Glass

38.4.1 This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed.

38.5.0 Wired Glass

Glass shall be with wire netting embedded in a sheet of plane glass. Electrically welded 13 mm. Geogain square mesh shall be used. Thickness of glass shall not be less than 6 mm. wired glass shall be of type and thickness as specified.

M-39 ACRYLIC SHEETS

39.1 Acrylic sheets shall be of thickness as specified in the item and of a specified shape and size as the case may be. Panels may be flat or curved. It should be light in weight. It shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95%. Transparency shall not be affected for the sheets of larger thickness. It shall be extremely resistant to sunlight, weather and low temperatures. It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use.

The sheet shall be impact resistant also. Sheets should be available in complete range of standard transparent, translucent and opaque colours. Sheets should be available in complete range of standard transparent, translucent and opaque colours. Sheets shall be of such quality that they can be cut, bent and jointed as desired. Solution for the joints shall be used as per the requirement of manufacture.

M-40 PARTICLE BOARD

40.1 The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolaldehyde adhesive. The particle boards shall conform to I.S. 3087-1990. "Specification for wood particle board for general purpose." The size and the thickness of the particle board shall be as specified.

M-41 EXPANDED POLYSTYRENE OR FRAMES STYROPER SLEBS

41.1 The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of size, thickness, finish and colour as indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slab of thermocole etc.

M-42 RESIN BONDED FIBRE GLASS

42.1 The resin bonded fibre glass tiles or rools shall be of approved make and shall be sizes, thickness and finish as indicated.

42.2 For test of Mineral wool thermal insulation Blanket I.S. 3144-1965 followed.

42.3 Insulation wool blanket shall be with the following coverings on one or both sides as indicated.

- (1) Bituminised jessian kraft paper suitable for use in position where moisture has to be excluded.
- (2) Jessian cloth or Kraft paper for keeping out dust.
- (3) G. I. wire netting, suitable for surfaces to be plastered over.

M-43 FIXTURES & FASTENINGS

General ---

- i] The fixtures and fastenings, that is, butt hinges, tee and strap hinges, sliding door bolts, tower bolts, door latch, bath-room latch, handles, door stoppers, casement window fasteners, casement stays and ventilator catch shall be made of the metal as specified in the item or its specifications.
- ii] They shall be of iron, brass, aluminium, chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminium as specified.

- iii] The fixtures shall be heavy, medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensure ease of operation.
- iv] The samples of fixtures and fastenings shall be got approved as regards quality and shape before providing them in position.
- v] Brass and anodised aluminium fixtures and fastenings shall be bright finished.

Holdfasts :

- i] Holdfasts shall be made from mild steel flat 30 cm. length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. dia. holes shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in opposite directions.

Butt Hinges :

- i] Railway standard heavy type butt hinges shall be used when so specified.
- ii] Tee and strap hinges shall be manufactured from M.S. sheet.

Sliding Door Bolts (Aldrops) :

- i] The aldrops as specified in the item shall be used and shall be got approved.

Tower Bolts (Barrel Type) :

- i] Tower bolts as specified in the item shall be used and shall be got approved.

Door Latch :

- i] The size of door latch shall be taken as the length of latch.

Bathroom Latch :

- i] Bathroom latch shall be similar to tower bolt.

Handle :

- i] The size of the handles shall be determined by the inside grip length of the handles. Handles shall have a base plate of length 50 mm. more than the size of the handle.

Door Stoppers :

- i] Door stoppers shall be either floor door stopper type or door catch type. Floor stopper shall be of overall size as specified and shall have a rubber cushion.

Door Catch :

- i] Door catch shall be fixed at a height of about 900 mm. from the floor level such that one part of the catch is fitted on the inside of the shutter and other part is fixed in the wall with necessary wooden plug arrangements for appropriate fixity. The catch shall be fixed 20 mm. inside the face of the door for easy operation of catch.

Wooden Door Stop With Hinge :

- i] Wooden door stop of size 100 mm. x 60 mm. x 40 mm. shall be fixed on the door frame with a hinge of 75 mm. size and at a height of 900 mm. from the floor level. The wooden door stop shall be provided with 3 coats of approved oil paint.

Casement Window Fastener :

- i] Casement window fastener for single lead window shutter shall be left or right handed as directed.

Casement Stays (Straight Peg.Stay) :

- i] The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed.
Size of the stay shall be 250 mm. to 300 mm. as directed.

Ventilator Catch :

- i] The pattern and shape of the catch shall be as approved.

Pivot :

- i] The base and socket plate shall be made from minimum 3 mm. thick plate, and projected pivot shall not be less than 12 mm. dia. and 12 mm. length and shall be firmly riveted to the base plate case of iron pivot and in single piece base in the case of brass pivot.

M-44 PAINTS

44.1 Oil Paints

Oil paints shall be of the specified colour and shade, and as approved. The ready mixed paints shall only be used. However, if ready mixed paint or specified shade or tint is not available white ready mixed paint with approved stainer will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform.

All the paints shall meet with the following general requirements -

- i] Paint shall not show excessive setting in a freshly opened full can and shall easily be redispersed with paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking or colour separation and shall be free from lumps and skins.
- ii] The paint as received shall brush easily, possess good levelling properties and show no running or sagging tendencies.
- iii] The paint shall not skin within 48 hours in a three quarters filled closed container.
- iv] The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever.

44.2 (B) Enamel Paints

The enamel paint shall satisfy in general requirements as mentioned in specification of oil paints. Enamel paints shall conform to I.S. 2933-1991.

M-45 FRENCH POLISH

The french polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary Materials :

- i] Denatured spirit of approved quality.
- ii] Shellac.
- iii] Chandras.
- iv] Pigment.

The french polish so prepared shall conform to I.S. 348-1991.

M-46 MARBLE CHIPS FOR MARBLE MOSAIC TERRAZZO

- 46.1 The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering.
- 46.2 The size of various colours of marble chips ranging from the smallest upto 20 mm. shall be used where the thickness of top wearing layers is 6 mm. in size. The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-charge shall be used for marble mosaic tiles or works.
- 46.3 The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above the chips shall conform to I.S. 2114-1990.

M-47 FLOORING TILES

A] Plain Cement Tiles

- 47.1.1 The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.
- 47.1.2 The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to a pressure of not less than 140 Kg./Sq.cm. The proportion of cement to aggregate in the backing of the tiles shall be not leaner than 1:3 by weight.

The wearing face, though the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm size. The proportion of cement to the marble chips aggregate in the wearing layer of the tiles shall be three parts of cement to one part of chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously at least for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S. 1237-1990 requiring resistance to wear and water absorption.

- 47.1.3 The wearing face of the tiles shall be plain, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.
- 47.1.4 The tile sizes shall generally be square shape 24.85cm. x 24.85cm. or 25cm. x 25cm. The thickness of the tiles shall be 20 mm.
- 47.1.5 The tolerance of length and breadth shall be plus or minus 1 mm. The tolerance on thickness shall be plus 5 mm.
- 47.1.6 The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S. 1237-1980.

47.2 **B] Plain Coloured Tiles**

- 47.2.1 These tiles shall have the same specifications as for plain cement tiles as per (A) above except that they shall have a plain wearing surface wherein pigments are used. They shall conform to I.S. 1237-1990.
- 47.2.2 The pigment used for colouring cement shall not exceed 10% by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete.
- 47.2.3 The colour of the tiles shall be specified in the item or as directed.

47.3 **C] Marble Mosaic Tiles**

- 47.3.1 These tiles have the same specifications as per plain cement tiles except the requirements as stated below ---
- 47.3.2 The marble mosaic tiles shall conform to I.S. 1237-1990. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free of projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.
- 47.3.3 Chips used in the tiles be from smallest upto 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be laid on the wearing face, a few samples with or without their full size photographs as directed shall be presented to the Engineer-in-charge for approval.
- 47.3.4 Any particular samples, if found suitable shall be approved by the Engineer-in-charge, of he may ask for particular sized chips to be more or less in the sample presented. The samples shall have to be made by the contractor till a suitable sample finally approved for use in the work. The contractor shall ensure that the tiles supplied for the work shall be in conformity with the approved sample only, in terms of its dimensions, thickness of backing layer and wearing surface, Materials, ingredients, colour shade, chips, distribution etc. required.
- 47.3.5 The tiles shall be prepared from cement conforming to Indian Standards or coloured portland cement generally depending upon the colour of tiles to be used or as directed.

47.4 **D] Chequered Tiles**

- 47.4.1 Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentioned below.
- 47.4.2 The tiles shall be of nominal size of 250mm. x 250mm. or as specified. The centre to centre distance of the chequer shall not less than 25mm. and not more than 50mm. The overall thickness of the tile shall be 22mm.
- 47.4.3 The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3mm. The chequered tiles shall be plain, coloured or mosaic as specified. The thickness of the

upper layer measured from the top of the chequers shall not be less than 6mm. The tiles shall be given the first grinding with machine before delivery to site.

47.4.4 Tiles shall conform to relevant I.S. 1237-1990.

47.5 E] Chequered Tiles for Staircases

47.5.1 The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :

- i] The length of a tile including nose shall be 330 mm.
- ii] The minimum thickness shall be 28 mm.
- iii] The nosing shall have also the same wearing layer at the top.
- iv] The nosing edge shall be rounded.
- v] The front portion of the tile for a minimum length of 75mm. from and including the nosing shall have grooves running parallel to nosing and at centres not exceeding 25mm. Beyond that the tiles shall have normal chequer pattern.

M-48 ROUGH KOTAH STONE

- 48.1 The kotah stones shall be hard, even, sound and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured stones shall not be allowed for use. They shall be without any soft veins, cracks or flaws.
- 48.2 The size of the stones to be used for flooring shall be size 600mm. x 60mm. and/or size 600mm. x 450mm. as directed. However, smaller sizes will be allowed to be used to the extent of maintaining the required pattern. Thickness shall be as specified.
- 48.3 Tolerance of minus 30 mm. on account of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be plus 3mm.
- 48.4 The edges of stones shall be truly chiselled and table rubbed with coarse sand before paving. All angles and edges of the stone shall be true, square and free from chipping and the surface shall be true and plain.
- 48.5 When machine cut edges are specified, the exposed edges and the edges at joints shall be machine cut. The thickness of the exposed machine cut edges shall be uniform.

M-49 POLISHED KOTAH STONES

- 49.1 Polish kotah stone shall have the same specifications as per rough kotah stone except as mentioned below.
- 49.2 The stone shall have machine polished smooth surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. the stones to be used for dado, skirting, platforms sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

M-50 DHOLPUR STONE SLAB

- 50.1 Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even, sound and durable, regular in shape and uniform colour.
- 50.2 The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provisions in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of stone slab shall be fine chiselled or polished as specified in the item of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.
- 50.3 The sample of stone shall be got approved from the Engineer-in-charge for shade and tint for a particular work. It shall be ensured the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

M-51 MARBLE SLAB

Marble slabs shall be white or of other colour and of best quality as approved by the Engineer-in-charge. Slab shall

be hard, close, uniform and in texture. They shall also be free from defects and cracks. The surface shall be machine polished to an even and perfectly plane surface and the edges, machine cut true and square. The rear face shall be rough enough to provide key for the mortar.

Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slabs shall be minimum 450mm. x 450mm. and preferably 600mm. x 600mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.

The slab shall not be thinner than the specified thickness at its thinnest part. A few specimen of finished slab to be used shall be deposited by the contractor in the office for reference.

Except as above, the marble slabs shall conform to I.S. 1130-1993 or as revised from time to time.

M-52 GRANITE STONE SLAB

52.1 Granite shall be of approved colour and quality. The stone shall be hard even, sound and regular in shape and generally uniform in colour. It shall be without soft veins, cracks or flaws.

52.2 The thickness of the stone shall be specified in the item.

52.3 All exposed faces shall be double polished to tender truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

M-53 P.V.C. FLOORING

53.1 P.V.C. sheets for P.V.C. floor covering shall be homogenous flexible type, conforming to I.S. 3462-1991. The P.V.C. covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.

53.2 Thickness of flexible type covering or tiles shall be as specified in the description of the item.

53.3 The flexible type shall be backed with hessian or other woven fabric. The following tolerance shall be applicable on the nominal dimensions of the sheet rolls or tiles :

- (a) Thickness +/- 0.15 mm
- (b) Length or width
 - 1. 300 mm Square tiles +/- 0.20 mm
 - 2. 600 mm Square tiles. +/- 0.40 mm
 - 3. 900 mm Square tiles. +/- 0.60 mm
 - 4. Sheets and rolls. +/- 0.10 percent.

53.4 Adhesive

53.4.1 The adhesive for PVC flooring shall be of the type and make recommended by the manufacturers of PVC sheets tiles.

M-54 FACING TILES

54.1 The facing tiles (burnt clay facing bricks) shall be free from cracks, flaws, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces. The texture of the finished surface that will be exposed when in place, shall conform to an approved sample consisting not less than four stretcher bricks each representing resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S. 2691-1995.

54.2 The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 1077-1992.

54.3 The permissible tolerance in dimensions specified above shall be as follows.

Size	Tolerance for	
	1st Class Brick	2nd Class Brice
19 cm	+/- 6 mm	+/- 10 mm
9 cm	+/- 2 mm	+/- 7 mm
4 cm	+/- 1.5 mm	+/- 3 mm

The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows :

Facing dimensions.	Permissible tolerance.
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Max. below 19 cms.	Max. 2.5 mm.
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Max. above 19 cms.	Max. 3.0 mm
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- 54.5 The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure as per I.S. 1077-1992 shall be not less than 175 Kg/Sq.cm. The average compressive strength of any individual brick shall not be less than 160 Kg/Sq.cm.
- 54.6 The average water absorption for five brick tiles shall not exceed 12 percent of average weight of brick before testing. The absorption for each individual brick shall not exceed 25 percent.
- 54.7 The brick tiles when tested in accordance with I.S. 1077-1992 the rate of efflorescence shall not be more than "Slightly effloresced".

M-55 WHITE GLAZED TILES

- 55.1 The tiles shall be of best quality as approved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing shall be of uniform shade.
- 55.2 The tiles shall be of nominal size of 150mm. x 150mm. unless otherwise specified. The maximum variation from the stated sizes, other than the thickness of tile, shall be plus or minus 1.5mm. The thickness of the tile shall be 6mm. except as above the tiles shall conform to I.S. 777-1988.

M-56 GALVANISED IRON PIPES AND FITTINGS

Galvanised iron pipe shall be of the medium type and of required diameter and shall comply with I.S. 1239-1990. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps, screw and all galvanised iron fittings shall be of the standard 'R' or equivalent make.

M-57 BIB COCK AND STOP COCK :

- 57.1 A bib cock is a draw off tap with a horizontal inlet and a free outlet. A stop cock is a valve with a suitable means of connection for insertion in a pipe line for controlling or stopping the flow.
- 57.2 They shall be of screw down type and or brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1990 and they shall be of best Indian make. They shall be polished bright.
- 57.3 The minimum finished weight of bib cock and stop shall be as given below--
- | | | | | | |
|--------|----------|-----------|--------|----------|-----------|
| Dia. | Bib Cock | Stop Cock | Dia. | Bib Cock | Stop Cock |
| 8 mm. | 0.25 Kg. | 0.25 Kg. | 15 mm. | 0.40 Kg. | 0.40 Kg. |
| 10 mm. | 0.30 Kg. | 0.35 Kg. | 20 mm. | 0.75 Kg. | 0.75 Kg. |

M-58 GUN METAL WHEEL VALVE

- 58-1 The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These shall conform to I.S. 778-1990.

M-59 WHITE GLAZED PORCELAIN WASH BASIN

- 59.1 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556-(Part-IV)-1994 and I.S. 771-1990. The size of the wash basin shall be as specified in the item. The wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or bevelled internally with 65 mm. dia. at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.
- 59.2 White glazed pedestal of the quality and colour as that of the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and water pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

M-60 EUROPEAN TYPE WATER CLOSET/WITH LOW LEVEL FLUSHING

- 60.1 The European type water closet shall be white glazed conforming to I.S. 2556-1994 and I.S. 771-1692.
- 60.2 'S' trap shall be provided as required with water seal not less than 50 mm. The solid plastic seat and cover shall be of the best Indian make conforming to I.S. 2548-1996. They shall be made of moulded synthetic Materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and other surface defects and shall have chromium plated brass hinges and rubber butter of suitable size.

M-61 ORISSA TYPE WATER CLOSET

- 61.1 The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1994 and relevant specification of Indian type water closet except that pan will be with the integral squaring pan of size 580 mm x 440 mm. with raised footrest.

M-62 INDIAN TYPE WATER CLOSET

The Indian type white glazed water closet of first class quality, size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556-(Part-II)-1994. Each pan shall have integral flushing ring of suitable type with adequate number of holes all around as directed to have satisfactory flushing. It shall also have an inlet at back of front for connecting flush pipe as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and the surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. water seal and 50 mm. diameter vent horn.

FOOT RESTS

A pair of white glazed earthen ware rectangular foot rests of minimum size 250 mm. x 130 mm. x 20 mm. shall be provided with the water closet.

M-63 GLAZED EARTHEN WARE SINK

The glazed earthenware sink shall be of specified size, colour and quality. The sink shall conform to I.S. 771- Part-II-1992. The brackets for sinks shall conform to I.S. 775-1990.

The pipes shall conform to I.S. 1239-Part-I-1990 and I.S. 404-1993 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.

M-64 GLAZED EARTHEN WARE LIPPED TYPE FLAT BACK URINAL/CORNER TYPE URINAL

The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S. 771-1992. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back or corner type urinal must be of first class quality, free from any defects, cracks etc.

M-65 LOW LEVEL ENAMEL FLUSHING TANK

- 65.1 The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to I.S. 774-1990. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm diameter. The outlet shall be connected with W.C. Pan by lead pipe of P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and overflow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1990.

M-66 CAST IRON FLUSHING CISTERN

- 66.1 The cast iron flushing cistern shall be of 15 litres capacity. It shall conform to I.S. 774-1990. The flushing cistern shall be of best quality free from any defects.
- 66.2 The flushing cistern shall have outlet of 32 mm diameter. The outlet shall be connected to lead pipe of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) 1993. For fixing G.I. inlet pipes and overflow pipe 20 mm dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints. The flushing cistern shall be fixed on to C.I. brackets. The brackets shall conform to I.S. 775-1990.

M-67 FLUSH COCK

Half turn flush cock (heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standards.

M-68 CAST IRON PIPES AND FITTINGS

- 68.1 All soil, waste, vent and antisiphonage pipes and fittings shall conform to I.S. 1729-1991. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fittings shall be true to shape, smooth, cylindrical their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pin holes or other imperfections and shall be neatly dressed and carefully fettled.
- 68.2 The end of pipes and fittings shall be reasonably square to their axis.
- 68.3 The sand cast iron pipes shall be of the diameter as specified in the description and shall be in length of 1.5 M., 1.8 M. & 2.0 M. including socket ends of the pipe unless shorter length are either specified or required at junction etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.
- 68.4 Tolerances : The standard weights and thickness of pipes shall be as shown in the table below. A tolerance upto minus 10% may however be allowed against these standard weights.

Sr. No.	Nominal dia of bore	Overall Thick	Wight of pipe excluding ears		
			1.5 m long	1.m long	2 m long
1.	75 mm	5.00 mm	12.83 Kg.	16.52 Kg.	18.36 Kg.
2.	100 mm	5.0 mm	18.14 Kg.	21.67 Kg.	24.15 Kg.
3.	150 mm				
4.	250 mm				

A tolerance upto minus 15% in thickness and 20 mm. in length will be allowed. For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm.

The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

M-68-A P.V.C. Pipes & Fittings

- All soil, waste and vent pipes & fittings shall conform to I.S. 4985-1988 & I.S. 13592:1992. The pipes are provided with an integral rubber ring type socket at one end while the other end is kept plain, smooth & free from burrs. The pipes and fittings shall be true to shape, smooth & cylindrical. They shall be free from cracks, laps, pinholes or other imperfection and shall be neatly dressed and carefully fettled.
- The P.V.C. Pipes shall be of the diameter as specified in the description and shall be in length of 6.0, 3.0 & 1.8 m including socket ends of the pipe unless shorter length are either specified or required at junction etc. Tolerances on specified length shall be + 10 mm and - 0 mm.
- Rubber seal rings for joints and Access Doors shall be manufactured in accordance with IS: 5382-1998. They are made out of natural rubber with a shore 'A' hardness of 40+5.
- The mean outside diameter, outside diameter at any point and wall thickness manufactured plain or with socket shall be as shown in the following table:-

* All dimensions in millimeters.

Sr. No.	Nomian/Outside dia	Mean outside Diamter		Outside diameter at		Wall whtick	
		Min.	Max.	Min.	Max.	Min.	Max
1.	75	70.0	75.3	74.1	75.9	3.2	3.8
2.	100.	110.00	100.4	108.6	111.4	3.2	3.8

- 4.2 Minimum Wall thickness of sockets on pipes & Dimensions of sliding socket of pipes shall be as shown in following table.

* All dimensions in millimeters.

Sr. No.	Nominal outside diameter	Minimum wall thick of sockets on pipes.		Socet Depth min.	Mean inaide diamete of societ at mil point	
		S2, Min	S3, Min		Min	Max
1.	75	2.9	2.4	40.00	75.1	75.3
2.	110	2.9	2.4	48.0	110.1	110.4

- * The outside diameter of pipe shall be obtained by the method given in IS: 12235(Part-1)-1998, wall thickness shall be measured by the method given in IS:12235(Part-2)1998.
- 4.3 The permissible variation between the mean outside diameter & the nominal outside diameter of a pipe shall be positive in the form + x, where is less than or equal to greater of the following two values.
- 0.03 mm, and
 - 0.003 x nominal outside diameter- rounded off to the next higher 0.1 mm.
- 4.4 The permissible variation between the outside diameter at any point (d1) & the nominal outside diameter (de)of a pipe shall not exceed the greater of the following two values.
- 0.5mm, and
 - 0.012 de rounde off to the next higher 0.1
- 4.5 The thickness of fittings and their socket & spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes.

M-69 NAHNI TRAP

Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect servicability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from crack, chips and other flaws or any other kind of defects which affect serviceability. The size of nahni trap shall be as specified and shall be of self cleansing design.

The nahni trap shall be of quality approved by the Engineer- in-charge and shall generally conform to the relevant Indian Standards.

The nahni trap provided shall be with deep seal, minimum 50 mm. except at places where trap with deep seal can not be accommdated. The cover shall be cast iron. Perforated cover shall be provided on the trap of appropriate size.

M-70 GULLY TRAP

Gully trap shall conform to I.S. 651-1992. It shall be sound, free from defects such as fire cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.

The size of the gully trap shall be as specified in the item.

Each gully trap shall have one C.I. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight C.I. cover with frame inside dimensions 300mm. x 300mm. the cover weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

M-71 GLAZED STONE WARE PIPE AND FITTINGS

The pipes and fittings shall be of best quality as approved by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone-ware of fire clay, salt glazed thoroughly burnt throught the whole thickness, of a close even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5 m. lead without showing signs of leakage. The thickness of the wall shall not be less than (1/12)th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe. The pipes shall generally conform to revelant I.S. 651-1992.

M-72 WALL PEG SAIL

- 72.1 The aluminium wall peg rail shall have three aluminium pegs of approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teak wood shall be french polished or oil painted as specified.

M-73 G.I. WATER SPOUT

- 73.1 The G.I. pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best quality.
- 73.2 The pipe shall have length as required for the thickness of well in which it is fixed, and at the outside end tee and bend cut at half the length shall be provided and at either end coupling shall be provided and the have better fixing. The water spout shall be provided as per detailed drawings or as directed.

M-74 ASBESTOS CEMENT PIPE (A.C. PIPE)

- 74.1 The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1926-1980. Special like bends, shoes cowl, etc. shall conform to relevant Indian Standards. The interior of pipe shall have a smooth finish, regular surface and regular internal diameter. The tolerance in all dimensions shall be as per I.S. 1926-Part-I-1980.

M-75 CRYDON BALL VALVE

Ball valve of screwed type including polythene float and necessary lever etc. shall be of the size as mentioned in

the description of item and shall conform to I.S. 1703-1989.

M-76 BITUMEN FELT FOR WATER PROOFING AND DAMP PROOFING

- 76.1 Bitumen felt shall be on the fibre bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1998.

M-77 SELECTED EARTH

- 77.1 The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the item. If item does not indicate anything, the selected earth shall have to be brought from outside.
- 77.2 The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable Materials, stones or brick bats. The clods shall be broken to a size of 50 mm. or less. Contractor shall make his own arrangements at his own costs for land for borrowing selected earth. The stacking of Materials shall be done as directed by the Engineer-in-charge in such a way as not to interfere with any constructional activities and in proper stacks.
- 77.3 When excavated material is to be used, only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall comply with all the requirements of selected earth mentioned above.

M-78 BARBED WIRE

- 78.1. The barbed wire shall be of galvanised steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm unless otherwise specified in the item. The barbed wire shall be formed by twisting together two fine wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed + 0.08 mm
- 78.2. The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. The barbs shall have a length of not less than 13 mm and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.

78.3. The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.

78.4. The lengths per 100 Kg. of barbed wire I.S. type I shall be as under: Nominal 1000 meter Minimum 934 meter Maximum 1066 Meter.

M- 79 VITRIFIED FLOOR TILES

79.1 Vitrified floor tiles shall be of the best quality from manufacturers such as Orient, Kajaria, Johnson, Nitco, Somani,

Bell, Asian, Euro as approved by the Engineer incharge. They shall conform to the IS 4457.

79.2 They shall be monolithic and available in anti-skid finish, having the size of 300 mm. x 300 mm. x 10 mm. thick.

79.3 They shall be rectified, which is the process of sizing & squaring, leading to almost perfect edges and enabling tile installation with very minor joints, giving the installed tiles a joint-free look. They shall be pre-sized and pre-polished.

79.4 Maximum deviation in length $\pm 0.3\%$, maximum deviation in thickness $\pm 2.0\%$, maximum, wedging allowed $\pm 0.27\%$, maximum surface flatness shall be $\pm 0.2\%$, water absorption capacity $< 0.5\%$, maximum Mohs hardness 8.0, flexural strength shall be $> 45 \text{ N/mm}^2$, maximum Abrasion resistance 144 mm^3 , maximum thermal expansion $< (\times 10^{-6})$ maximum thermal shock resistance shall be of no damage, resistance to acid (wt. loss) $< 0.4\%$, Skid resistance (friction coefficient > 0.6 , breaking strength shall be 2600 N, density of (g/cm^3) shall be 2.4 & no moisture expansion.

M-80 C-P.V.C. PIPES & FITTINGS

C-PVC (Chlorinated Poly Vinyl Chloride) SDR II should conform to ASTM F 442, specific to C-PVC in Iron Pipe

size (IPS) dimension, which also can be applied to C-PVC pipe in Copper Tube Size (CTS) dimension. Fitting should conform to ASTM D 2846. Pipes and Fittings should be of ASTRAL make or as approved by Engineer-In-Charge.

M-81 GUN METAL WHEEL VALVE

81.1 The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These shall conform to I.S. 778-1971.

M-82 P.V.C. VALVE

82.1 The P.V.C. handle valve shall be of approved quality. These shall be of P.V.C. fitted with handle and shall be of gate valve opening full way and of the size as specified. These shall conform to relevant I.S.

M-83 ACRYLIC EMULSION PAINTS

83.1. It shall be from ICI, Nerolac, Asian Paints, Berger or equivalent, as approved by the Architect and Engineer-in-Charge. It shall conform to the relevant IS codes.

83.2. It shall be used on both interiors and exteriors, on all different types of plaster, wooden surfaces, stone, brickwork, asbestos cement sheets, hard and soft boards, etc. It shall render rich smooth finish and shall provide a tough film that forms a suitable protection against all elements.

83.3. It shall be water thinnable. It shall require no primer. On a well prepared surface, it shall be applied, after one coat of cement primer, in case it is an interior surface and waterproof cement coating, in case it is an exterior surface. On a new but highly absorbent surface, a thin coat of the same shall be applied by adding two parts of water by volume to two parts of acrylic emulsion by volume. On previously painted surfaces, one coat of the same shall be applied by thinning four parts of the emulsion with one or two parts of water. It shall be applied by brush, roller or spray. It shall have a covering capacity of 25 - 30 S.Mts./Liter, depending on the surface and shade used. It can be washed to remove the day-to-day dirt, after the surface has been painted, minimum for a month.

M-84 BALL VALVE

- 84.1. Ball valve of screwed type including polythene float and necessary level etc shall be of the size as mentioned in the description of item and shall conform to I.S 1703-1977.

M-85 CONCRETE TILES :

- 85.1 The plain cement concrete tiles shall be manufactured using the basic raw material of white cement with the addition of special chemical & quartz chips, which give the tiles extra strength. The concrete tiles shall be highly durable having very superior structure properties such as high transverse and compressive strength, very low water absorption and very low surface abrasion, supplied by manufacturer such as Roughwalk series, "Mozzattera" by "Vyara Tiles", or Terrarock Tiles by Super Tiles & Marble Pvt. Ltd. or equivalent, as approved by the Architect and Engineer-in- Charge.

The tiles shall be manufactured using a vibration system and rubber moulds, under pressure. The tiles shall be subjected to a pressure of not less than 140 Kg./Cm². The proportion of cement to aggregate, in the backing of the tiles shall be not less than 1 : 3, by weight.

The tiles shall be ;hot blasted to give it a special texture. The top shall be treated the two coats of acrylic coating, and factory polished and honed, ready to be fix in the exterior.

- 85.2 The concrete tiles shall be generally square in shape having all angles at perfect right angles and all the edges being sharp & true, having a size of 400 mm. x 40 mm. x 34 mm. thick. The tolerance allowed in length & breadth shall be +- 1.0 mm. & tolerance allowed in thickness shall be + 5 mm..

- 85.3 The tiles shall satisfy the test as regards transverse strength, resistance to wear absorption as per IS : 1237.

Water' Absorption :

Sampling : 6 tiles out of every 3,000 tiles are taken for testing.

Result : Absorption permissible, shall be at the most 1C) %.

Transverse strength test

Sampling : 12 tiles out of every 3,000 tiles are taken for testing.

Result : When wet : 80 Kg./Cm².

When dry : 120 Kg./Cm².

Abrasion test

Sampling : 6 tiles out of every 3,000 tiles are taken for testing.

Result : Average abrasion shall not be more than 3.5 mm.

These tiles shall have plain wearing surface, wherein pigments are used. They shall conform to IS : 1237. The pigments used for coloring cement shall not exceed 10 % by weight of cement used in the mix. The pigments, synthetic or otherwise, used for coloring tiles shall have permanent color and shall not contain Materials: detrimental to concrete.

M-86 CERAMIC TILES :

- 86.1 Ceramic tiles shall be of commercial quality from manufacturers such as Orient, Kajaria, Johnson, Nitco, Somani, Bell as approved by the Engineer incharge.

- 86.2 Ceramic tiles shall be lightweight, with 6 mm. thickness with +- 5.0 % deviation. Therefore, they require thinner floor bedding compare to mosaic/stone flooring. Onlaying, they require no further polishing making the floor ready to live and use.

- 86.3 Ceramic tiles shall be of dimensions of 300 mm. x 300 mm. with ± 0.50 % deviation. All the sides shall be straight & square and the deviation allowed shall be maximum ± 0.40 %.
- 86.4 Ceramic tiles shall have plain and smooth surface quality, free of visual defects to the extent of minimum 95 % of tiles.
- 86.5 Ceramic tiles shall have no warping; their surface shall be flat, with maximum ± 0.5 % deviation allowed.
- 86.6 Ceramic tiles shall have water absorption of no more than 4.0 %.
- 86.7 The bending strength of the ceramic tiles above 300 Kgs./Cm².
- 86.8 The scratch resistant as per Moh's scale shall be minimum 5. The tiles shall be of group III qualify abrasion resistant.
- 86.9 The crazing resistance of the ceramic tiles shall be in conformity with norms.
- 86.10 The resistance fo staining of the ceramic tiles shall be minimum class II.
- 86.11 Ceramic tiles shall be resistant to all acids and alkalis except hydrofluoric acid and its compounds.
- 86.12 The thermal shock resistance shall be up to 10 cycles.

SIGNATURE OF THE CONTRACTOR.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION

SCHEDULE FOR TESTING OF MATERIALS

Sr.No.	Brief description of materials to be tested	Prescription of test which shall be carried out	Frequency @ which test shall be carried out (As per GERI Q.C. Vol-12002)
1.	Sand	(1) Gradation (2) Fineness Modulus (3) Specific Gravity (4) Water Absorption (5) Silt Content	1 per 150 Cumt for concrete or as per requirement of relevant specification.
2.	Coarse Aggregate	(1) Gradation (2) Impact Value (3) Flakiness Index (4) Water Absorption (5) Stripping Value	1 per 150 Cumt for concrete or as per requirement of relevant specification.
3.	C.C.Cube	(1) Compressive Strength	1-5 Cumt. 1-Test 6-15 Cumt. 2-Test 16-30 Cumt. 3-Test 31-50 Cumt. 4-Test 51 Cumt. & above 4 + 1 for each addl. 50 Cumt. or part of thereof.
4.	Flush Door	(1) End Immersion Test (2) Glue Adhesion Test	Randomly as per IS:7638: 1975
5.	Tiles	(1) Wet Transverse Strength (2) Water Absorption	Randomly as per Strength IS:4905:1968
6.	Flyash Brick	(1) Compressive Strength (2) Water Absorption	As per IS:5454:1978
7.	AAC Block	(1) Compressive Strength (2) Dry Density (3) Drying Shrinkage (4) Thermal conductivity	As per IS 2185 Part-3 As per IS 6441
8.	Cement	(1) Consistency test (2) Initial Setting time (3) Final setting time (4) Compressive Strenght (5) Fineness by Dry Sieving (6) Fineness by Specific Surface (7) Soundness by Le-Chatelier (8) Specific Gravity	Every 50 Tons or part thereof
9.	Steel	(1) Weight per meter (2) Yeild Stress/ 0.2 % Proof stress (3) % Elongation (4) Tensile Strenght	(a) For Consigment below 100 tons (i) Under 10 mm dia One sample for each 25 tons or part thereof (ii) 10 mm to 16 mm dia One Sample for each 35 tones or part thereof (iii) Over 16 mm dia One Sample for each 45 tons or part thereof. (b) For Consigment over 100 tons (i) Under 10 mm dia One sample for each 40 tons or part thereof

			(ii) 10 mm to 16 mm dia One Sample for each 45 tones or part there of
10.	Chemical Mortar for AAC Blocks	As per Relievent Latest IS-code	

Note:-

- (1) For Sand and Coarse aggregate two Nos. of full bag for one sample shall be supplied by agency.
- (2) For water test 5:00 liters of water shall be supplied by agency in plastic container for each sources.
- (3) Sample from the lot shall be selected by authorized representative along with representative of SMC or TPI or PMC.
- (4) Selected sample shall be handed over personally by representative of S.M.C. or TPI or PMC in sealed condition with letter containing sample No. and sampling date.
- (5) Test report should be received by the department containing reference of department's letter, sample No. sampling date and date of testing.

SIGNATURE OF THE CONTRACTOR.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION

GENERAL TECHNICAL SPECIFICATION FOR BUILDING WORKS

GENERAL :

1. In the specification "as directed"/"Approved" shall be taken to mean "as directed"/approved by the Engineer-in-charge.
2. Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specification wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular point or aspects in the relevant Indian Standards shall be referred to.
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits :

(i) Length, width and depth (height 0.01 Mt.
(ii) Areas 0.01 Sq.Mt.
(iii) Cubic Contents 0.01 Cu.Mt.

In recording dimensions of work.
The sequence of length, width and height (depth) or thickness shall be followed.
5. The distance which constitutes lead shall be determined along the shortest partial route and not necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specified, it shall mean "all leads".
7. Lift shall be measured from plinth level.
8. Definite particulars covered in the items of work, though not mentioned or elucidated in its specifications shall be deemed to be included therein.
9. Reference to specifications of Materials as made in the detailed specification the items of works is in the form of a designation containing the number of the specification of the material and prefix 'M' e.g. 'M-s'.
10. Approval of the samples of various Materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or Materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such Materials being rejected by the Engineer-in-charge.
11. The contract rate of the item of work shall be for the work completed in all respects .
12. No collection of Materials shall be made before it is got approved from the Engineer-in-charge.
13. Collection of approved Materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
14. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
15. No Materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage on overloading of the various components of the structure.
16. All work shall be carried out in a workmanlike manner as per the best techniques for the particular item.
17. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall be kept in sufficient numbers and in good working condition on the site of the work.

18. The mode procedure and manner of, execution shall be such that it does not cause damage or over-loding of the various components of the structure during execution of after completion of the structure.
19. Special modes of construction not adopted in general Engineering practice, if proposed to be adopted by the Contractor, shall be considered only if the contractor provides swatisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-charge shall not, however, absolve the contractor of theresponsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
20. All installations pertaining to water supply and fixtures thereof as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the Contractor.
21. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such other laws and rules prescribed by Government from time to time.
22. All necessary safety measures and precautions (including those laid down in the various relevent Indian Standards) shall be taken to ensure the safety of men, Materials and machinery on the works as also of the work itself.
23. The testing charges of all Materials shall be borne by the Contractor.
24. Approval to any or the executed items for the work dose not in any way releive the contractor of his responsibility for the correctness,soundness and strength of the structure as per the drawings and specifications.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA),
SURAT MUNICIPAL CORPORATION ,

SIGNATURE OF THE CONTRACTOR.

ITEMWISE DETAILED TECHNICAL SPECIFICATIONS

Note: Item number of Technical specification and Item Number shown in Price Bid may vary. Bidder is instructed to refer relevant Item only.

PART-A- COMPOUND WALL

ITEM NO.1 :-

Excavation for foundation including sorting out and stacking off useful materials and disposing of the excavated stuff up to 50 mt. lead and all lift, watering etc.comp. (A) loose or soft soil with machineries (1) 0 To 1.5 mt. Depth (2) 1.5 To 3.0 MT Depth

1.0 GENERAL

1.1 Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such excavation implement or organic soil, gravel, silt, sand turf loam, clay, peat etc. fall under this category.

2.0 CLEARING THE SITE

2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be the property of the Corporation and shall be conveyed and stacked as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

3.0 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 EXCAVATION

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

5.0 DISPOSAL OF EXCAVATED MATERIALS

5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free

movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

5.2 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead of 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.

6.0 MODE OF MEASUREMENT AND PAYMENT

6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge or as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stop-ping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.

6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

6.3 The rate shall be for a unit of one cubic meter.

ITEM NO.2 :-

Boring holes 3.5 mt. Deep in ordinary soil (for cast in situ piles) & disposal of the surplus excavated soil as directed within a lead of 50 m. For following diameter of piles. (i) 200 mm, (ii) 250 mm, (iii) 300 mm.

Workmanship:

The ground shall be roughly leveled and after making the position of piles, the holes shall be bored with a spiral angle to the 1.8 M depth and specified diameter using boring guide.

The bore holes shall be truly vertical and uniform bore through cut of specified diameter. After boring to the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavated stuff as directed within a lead of 50 M.

Mode of Measurement & Payment : The rate for boring holes shall include :

[a] Roughly leveling the ground in positions where piles are to be provided [b] Making the position of piles by pegs and boring guide and also for shifting of boring guide [c] Bailing out water, if any met with during boring [d] Disposal of surplus excavated soil within a lead of 50 M. and [e] All tools, plants, equipments and labour required for satisfactory completion of work.

The rate shall be for a unit of one Running metre.

ITEM NO.3 :-

Providing & laying C.C 1:3:6 (1cement :3 coarse sand :6 Crushed stone agg 20m.m Nominal size)&curing comp. excl. cost of form work in :(a) foundation & Plinth

1.0 Materials:-

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Stone aggregate 20 mm nominal size shall conform to M-12.

2.0 WORKMANSHIP :

2.1 General :-

Before starting concreting the bed of foundation trenches shall be cleared of all loose materials, levelled, Waterred and rammed as directed.

2.2 Proportion of Mix :-

- The proportion of cement, sand coarse aggregate shall be one part of cement, 3 parts of sand 6 parts of stone aggregate shall be measured by volume.
- 2.3 Mixing :-
The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such case 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.
- 2.4 Transporting and placing the concrete :-
The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.
The concrete shall be laid in layers of 15 cms to 20 cms.
Compacting :-The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filled with mortar.
- 2.5 Curing :-
After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.
- 3.0 Mode of measurements and payment :-
The concrete shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

ITEM NO.4:-

Providing and laying ordinary cement concrete work 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) & curing comp.including cost of form work but excluding cost of reinforcement for reinforced concrete work in: (A) Foundation, footing, Base of columns and Mass concrete.

- 1.0 Materials :-
Water shall conform to M-1, Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.
- 1.1 General :-
- 1.2 The concrete mix is not required to designed by preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 [1 cement: 1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size] by volume Concrete work shall have exposed concrete surface or as specified the item.
- 1.3 The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponding approximately to 1:3:6 1:2:4, 1: 1, 1/2: 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively with conforming to IS:456.
- 1.4 The ingredients required for ordinary work, containing one bag of cement of 50 kg. by weight [0.0342 cu.m.] for different proportion of mix shall be as under.

Grade	Total quantity of dr aggregate by volume per 50 Kg. of cement to be taken as the sum of individual volume of fine and coarse aggregate maximum	Proportion of fine aggregate of coarse aggregate	quantity of water per 50 Kg. of cement maximum
M-100 (1:3:6)	300 Liters	Generally 1:3 for fine aggregate to coarse aggregate by volume but subject to and upper limit	35 Liters
M-150 (1:2:4)	220 Liters		32 Liters
M-150 (1:1.5:3)	160 Liters		30 Liters
M-250 (1:1:2)	100 Liters		27 Liters

1.5 The water cement ratios shall not be more than those specified in the table. The cement content of the mix specified in the table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water cement ratio specified in the table is not exceeded.

1.6 Workability of the concrete shall be controlled by maintaining a water cement ratio that is found to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

1.7 The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

1.8 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm generally considered satisfactory.

1.9 For heavily reinforced concrete members as in the case of the ribs of main beams the nominal maximum size of coarse aggregate should usually be restricted to 5 mm, less than the minimum clear distance between the main bars, or 5 mm, less than the minimum cover to the reinforcement whichever is smaller.

1.10 Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important and the nominal maximum size may some times be as great as or greater than the minimum cover.

1.11 Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time; neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

2.0 WORKMANSHIP :

2.1 General :- The bars shall be kept in position by the following method:

In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 [1 cement 2 coarse sand] about 4 x 4 cms. section of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement.

In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chair spacers or supports bars at 1.0 to 1.2 metres centers.

In case of columns and wall, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

All bars projecting from pillars, columns, beams, slabs etc. to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin

neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.2 Proportioning :-

Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 kg. weight. The volume of one such bag being taken as 0.0342 cu. metre Boxes of suitable sizes shall be used for measuring sand and aggregate. The size of the boxes [internal] shall be 35x25 cms. and 40 cms. deep. While measuring the aggregate and sand, the boxes shall be filled without shaking, ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

2.3 Mixing :-

2.3.1 For all work, concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shown complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than two minutes after all ingredients have been put into the mixer.

2.3.2 When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

2.3.3 Mixer which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch, unless otherwise agreed to by the Engineer-in-charge. The first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement concrete to another.

2.3.4 Consistency :

The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump test in accordance with I.S. 1199 : 1959. The slump of 10 mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.

2.3.5 Inspection :

2.3.5.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit to inspect and accept the formwork and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

2.3.5.2 Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platform

shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

2.3.6 Transporting and laying :-

2.3.6.1 The method of transporting and placing concrete shall as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.

2.3.6.2 All form work shall be cleaned and made free from standing water dust snow or ice immediately before placing of concrete. No concret shall be placed in any part of structure until the approval of Engineer-in-charge.

2.3.6.3 Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.

2.3.6.4 Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters.

2.3.6.5 When trunking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted, and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself, this 13 mm layers of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles, of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed, and then coated with neat cement grout, The first layers of concrete to be placed on this surface shall not exceed 150 mm in thickness and shall be well rammed against old work, particular attention being given to corners and close spot.

2.3.6.6 All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer - in - charge for exceptional cases such as concreting under water where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

2.3.6.7 Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream upto form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30minutes of addition of water to dry mixture. During compaction. It shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

2.3.7 Curing :-

Immediately after compaction, concrete, weather including rain, running water, shocks, vibration, traffic, rapid temperature changes frost and drying out process it shall be covered with wet sacking, hessian or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

2.3.8 Sampling and Testing of concrete :-

2.3.8.1 Samples from fresh concrete shall be taken as per IS 1199:1999 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with IS 516:1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread

over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following.

2.3.8.2	Quantity of concrete in the work	No. of samples
	1-5 Cmt.	1
	6-15 Cmt.	2
	16-30 Cmt.	3
	31-50 Cmt.	4
	51-and above	4+one additional sample for each additional 50 cmt. or part there of.

Note:- Atleast one sample shall be taken from shift. The test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

2.3.8.3 The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportion given for a particular grade does not yield the specified strength such concrete shall be classified as belonging the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

2.3.9 Stripping :

2.3.9.1 The Engineer- in- charge shall be informed in advance by the contractor of his intention to struck the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather & other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances [generally where temperatures are above 20'c] and where ordinary concrete is used forms may be struck after expiry of period specified in the Item No.4 for respective item of form work.

2.3.9.2 All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. Cover to the finished concrete surface. Where it is intended to re-use the from work, it shall be cleaned and made good to the satisfaction of the Engineer- in- charge. After removal of form work and shuttering, the EXECUTIVE ENGINEER shall inspect the work and satisfy by random checks that concrete prosuded is of good quality.

2.3.9.3 Immediately after the removal of forms all exposed bolts etc. Passing through the cement member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and, the resulting holder be filled by cement mortar. All fins caused by from joints, all cavities produced by the removal of form ties and all other holes and depression, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and so as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough

- filling in all avoids. Surfaces which are pointed shall be kept moist for a period of 24 hours.
- 2.3.9.4 If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare portions of the structure affected.
- 3.0 Mode of measurement and payment :
- 3.1 The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deductions shall be made for.
- [a] Ends of dis-similar materials such as joints, beams, posts, girders, rafters, purline, trusses, corbels and steps etc. upto 500 sq.cm. in section.
- [b] Opening upto 0.1 sq.m.
- [c] The volume occupied by reinforcement shall not be deducted from R.C.C.work.
- 3.2 The rate includes cost of all materials labour, tools and plant required for mixing, placing imposition vibrating and compacting, finishing as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.
- 3.3 The rate shall be for a unit of one cubic metre.

ITEM NO.5:-

Providing and laying ordinary cement concrete 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) finishing smooth curing etc. complete including cost of form work but excluding cost of reinforcement for reinforced concrete work (R.C.C.) in : A) Columns,(B) Beam, (C) Slab, (D) Lintels,(E) Chhajja, (F) Staircases, (G) Vertical and horizontal fins.

Detail Specification as per **item no.4**

The rate shall be for a unit of one Cubic meter.

ITEM NO.6:-

Providing and laying cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 crushed stone aggregates 20mm nominal size) and curing complete including cost of form work etc. complete in wall caps/ copings.

Detail Specification as per **item no.4(part-a)** Take concrete grade as 1:3:6

The rate shall be for a unit of one Cubic meter.

ITEM NO.7:-

Providing and fixing TMT Bar reinforcement for RCC work including bending, binding & placing in position etc. complete. Upto G.L. / P.L.

- 1.0 MATERIALS
- 1.1 Mild steel bars shall conform to M-18 Thermo Mechanically Treated steel bars (high yield strength steel deformed bars) shall conform to M-18, Mild steel binding wires shall conform to M-21.
- 2.0 WORKMANSHIP
- 2.1 The work shall consist of furnished and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.
- 2.2 Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.
- 2.3 Reinforcing steel shall conform accurately to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and

dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends, bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transportation or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified for mild steel a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than straight part of the bar beyond the end of the curve shall be at least four times the diameter of the bar. In case which are not round and in case of deformed bars, the diameter shall be taken as the diameter of the circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete. The cold twisted steel bars shall be used without hooks at the ends. Deformed bars without hooks shall, however, comply with relevant anchorage requirements.

- 2.4 All the reinforcement bars shall be accurately placed in exactly the same position as shown on the drawings, and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks or metal chair spacers, metal handers, supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of the concrete, except where shown on the drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All the bars are to be spliced and which are likely to be exceeding 10 days shall be protected by a thick coat of neat cement grout.
- 2.5 Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm. in such a manner that they do not slip over each other at the time of fixing and concreting.
- 2.6 As far as possible, bars of full length shall be used, in case this is not possible, overlapping of bars shall be done as directed. when practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. or 125 times the maximum size of the coarse aggregate whichever is greater between them. Where not feasible, overlapping bars shall be bound with annealed wires, not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.
- 2.7 Wherever indicated on the drawings or desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S-226.
- 2.8 When permitted or specified on the drawings, joints of reinforcement bars shall be welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subjected to more than 75% of the maximum permissible stresses and welds so staggered that at any one section not more than 20% of the rods are welded. Only electric welding using a process which excludes air from molten and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding.

Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

- 3.0 MODE OF MEASUREMENT & PAYMENT
- 3.1 For the purpose of calculating consumption, wastage shall not be permitted beyond 7.5%. Excess consumption over 7.5% will be charged at penalty rate.
- 3.2 Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place do lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tonnes on the same basis of as per M-14 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.
- 3.3 The rate for reinforcement includes cost of steel binding wires, its transporting from departmental store to work site, cutting, bending, placing and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.
- 3.4 The rate shall be for unit of one Kg.

ITEM NO.8 :

Filling in trenches with available excavated earth in layer not exceeding 20cm in depth consolidating each deposited layer by ramming & watering.

- 1.0 FILLING AND DISPOSAL OF THE EXCAVATED STUFF :
The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers. Under no circumstances black cotton soil shall be used for filling the trenches and plinth. The earth to be used for filling shall be free from salts organic or other foreign matter. All clods of earth shall be broken. As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of the debris, brick bats, mortar dropping and filled with earth in-layers not exceeding 20cms. Each layer shall be adequately watered, rammed and console-dated before the succeeding layer is alid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bere where rammers cannot be used. When filling reaches finised level. The surface shall be flooded with water for atleast 24 hours and allowed to dry and then rammed and consolidated.
The blance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.
- 2.0 MODE OF MEASUREMENTS AND PAYMENT :
- 2.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids. If consolidated as instructed above.
- 2.2 The rate shall be for a unit of one cubic metre

ITEM NO.9 :

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 35 Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. Up to G.L./P.L.

- 1.0 MATERIALS

Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.

2.0 WORKMANSHIP

2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.

2.2 Wetting of bricks : The bricks required for masonry work shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water, is an indication of thorough wetting of bricks.

2.3 Laying : Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond. Closures in such case shall be cut to required size and used near the ends of the walls.

A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.

The walls shall be taken up truly in plumb. All courses shall be truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept in uniform.

The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, manson's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.

The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.

2.5 Curing : Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry.

If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.

2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding planks shall be fixed. Simple scaffolding shall be allowed normally. In this

- case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0 MODE OF MEASUREMENTS & PAYMENT :
- 3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.
- 3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---
- i] Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
 - ii] Opening not exceeding 1000 Sq.Cm.
 - iii] Wall plate sand bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
 - iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
 - v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.
 - vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jams, throating and making arches over the aperture be paid for separately.
- 3.3 The rate shall be for a unit of one cubic metre.
- 3.4

ITEM NO.10:-

Providing and applying 20mm. thick sand faced cement plaster on walls or similar surfaces at all floor levels consisting of 12 mm. average thick backing coat of cement mortar 1:3 (1 cement : 3 sand) and 8 mm. thick finishing coat of cement mortar 1:1 (1 cement : 1 sand) etc.comp

- 1.0 Materials :-
Water shall conform to M-1 cement mortar shall conform to M-11.
- 2.0 Workmanship :-
- 2.1 The work shall be carried out in two coats. The backing coat [basecoat] shall be 12 mm. thick in C.M. 1:3. The relevant specifications of Item No.15 shall be followed except that the thickness of back coat shall be 12 mm. average and the proportion shall be of cement mortar 1:3 [1 cement:3 sand]. Before the first coat hardens its surface shall be beaten up by edges of wooden tappers and close dents shall be made on the surface subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.
The second coat shall be completed to 8 mm thickness in C.M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.
- 2.2 Curing :-
The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.
- 3.0 Mode of Measurements and payment :-

- 3.1 The relevant specifications of 10mm thick Plaster Item no.19, Part-A shall be followed except that the sand face plaster in outside shall be measured and paid under this item.
- 3.2 The rate shall be for a unit of one sq.metre.

ITEM NO.11 :-

Providing 20 mm deep finished groove in plaster in line and level etc. Comp. For all Floor

- 1.0 Materials :-
Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-11.
- 2.0 Workmanship :-
The work shall be carried out as directed. The proportion of mix for finishing, touching shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimetre in thickness.
- 3.0 Mode of Measurements and payment :-
- 3.1 The rate includes cost of all materials and labour required to complete the item.
- 3.2 The rate shall be for a unit of one R.M.

ITEM NO.12:-

Providing and applying two coats of weathershield max paint (3 coats may be required in case of darker colours) of ICI Dulux or Apex Ultima of Asian paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers.

Surface Preparation :

surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes.

Priming:

Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. Application of putty is not recommended.

Minimum 4-6 hours duration is required between each coat of weather shield max paint.

Self explanatory and as directed by Engineer-in-charge.

Rate shall be per square metre basis for complete item.

ITEM NO.13 :-

Providing & fixing M.S.Grills of required pattern to wooden frames of windows etc. At all floor levels with M.S. flats at required spacing & frame around square or round bars with round headed bolts and nuts or by screws incl. Priming coat of Red lead paint etc.comp. (A) Plain grill For all Floors

- 1.0 MATERIALS :
The structural steel shall conform to M-22.
- 2.0 WORKMANSHIP :-
The M.S. Grill shall be prepared as per the drawings or as directed for fixing to wooden frames of windows etc.
The grill shall be fabricated to the designs and pattern shown in the drawings and the weight shall be as directed, and the joints shall be revetted or welded as shown in the

plan or as directed. The grill so formed shall be fixed into the strip frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to a minimum of 2 Nos. on such side of the frame or as indicated in the drawing or as directed.

The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

3.0 MODE OF MEASUREMENT AND PAYMENT :-

No payment shall be made for weight of screws, bolts and nuts etc. only weight of grill shall be paid.

The rate shall be for a unit one Kg.

ITEM NO.14:-

Providing and Fixing Hollow steel Sections Framed Work including Cutting, Hoisting, Welding & Fixing in position Purlin, Main Chord etc. as per Engineer-in-charge. TATA / JINDAL / ASIAN Make for Main entry gate etc.

LAYING OUT :

The steel structures, as shown in the drawings or as per directions of the Engineer-in-charge, shall be laid out on a level platform to full scale and to full size in parts. A steel type shall be used for measurements to ensure maximum accuracy.

Wooden templates 12 mm to 19 mm thick or steel templates shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes for rivetting and bolting marked on them. The ends of the steel members shall also be marked for cutting. The base of steel columns and the position of anchor bolts shall be carefully set out.

FABRICATION :

The steel sections as specified shall be straightened and cut square and accurately to correct lengths. The cut ends exposed to view shall be finished smooth. No. two pieces shall be welded or otherwise jointed to make up required length of a member except as indicated in the drawing or otherwise specifically permitted by the Engineer - in - charge. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in cold condition (unless otherwise directed) in such a manner as not to impair the strength of the metal.

All stiffeners shall be formed by pressure, and where practicable, the metal shall not be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including the locating, type, size, length and details of rivets, bolts or welds shall be prepared in advance of the actual fabrication and approved by the Engineer-in-charge. The drawing shall indicate the shop and filed rivets, bolts and welds. The steel members shall be distinctly marked or stencilled with paint with the identification marks as given in the shop drawings.

The bars shall be thickened at the ends so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in the fabrication of various members. So that these can be assembled without being unduly packed strained or forced into position and when built-up shall be true and free from twists, buckles or open joints.

Before making holes in individual members, for fabrication the steel work intended to be riveted or bolted to gather shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping of the surface of the different members. All stiffeners shall be tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut off dressed true and straight and fitted close together,

We splice plates and fillers under stiffeners shall be cut to fit within 3 mm of flange angles. We plated or girders which have no cover plates shall have their ends flush with the top of angles forming the flanges unless otherwise required. The we plates, when spliced shall have clearance of not more than 6 mm.

The erection clearance for cleated ends of members connecting steel to steel preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for practical reasons, greater clearance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement for holding the girders or truss resting on it, from lateral displacement.

Expansion bed plates shall be planed true and smooth. The planning of bed plates shall be done in the direction of the movement of the girder or truss resting on it.

Column splices and but joints of struts and impression members depending on contract for trees transmission shall be accurately machined and closebutted over the whole section. In column caps and bases, the ends of shafts together with the attached gussets, angles, channels etc. after riveting together shall be accurately machined so that the parts connected but against each other over the entire surface of contract. Connecting angles or channels shall be fabricated and placed in position with great accuracy so that they are not unduly reduced in thickness by machining.

The ends of all bearing stiffeners shall be machined or ground to fit tightly both at the top and bottom.

All holes shall generally be drilled to the required size and at the required position. Sub-punching shall be permitted, provided it is done 3 mm. less in diameter and reamed thereafter to the required size.

Holes for rivets and black bolts shall be large by 0.4 to 6 mm. as shown in appendix-I under column "Coarse" than the nominal diameter of the rivets or black bolts depending upon the dia of rivets. Holes for turned and fitted bolts shall be drilled or reamed large by 0.2 to 3 mm. depending upon the dia of bolts as shown in Appendix under column "Medium".

When the number of plates or sections to be riveted together exceeds three or when their total thickness is 90 mm or more, holes shall be drilled or reamed in position, after the members are assembled and the parts firmly hold together by clamps. Before riveting or bolting up or welding finally. The members shall be taken part and all burrs removed.

Holes shall have their axis perpendicular to the surface bore through. The drilling or reaming shall be free from burrs and the holes shall be clean and accurate.

The work or fabrication shall be completed in the work shop as far as it is practicable to do so. Site jointing shall be done with rivets or turned and fitted bolts, or black bolts or welding as shown in drawings or as directed by the Engineer-in-charge. Generally, the following principles shall govern the use of rivets, turned and fitted bolts and black bolts :-

[i] Rivets or turned and fitted bolts shall be used where the connection is such that slip under load has or be avoided.

[ii] Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal of stresses (unless such reversal is due to wind forces.)

In the case of welding, holes shall only be made for the bolts used for temporary fastening as shown in drawings.

WELDING :

Welding shall be generally be done by electric process. The electric arc method being economical, is usually adopted. Where public electricity is not available, a suitable generator shall be arranged. Gas welding shall be resorted to using oxyacetylene flame with specific period approval of the Engineer-in-charge.

Gas welding shall not be permitted for structural steel work. Gas welding required heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, type of welds, shop and site welds, as well as the types of electrodes to be used symbol for welding on plans and shop drawings shall be according to IS : 813-1061. As far as possible, every effort shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions of scaffolding etc. a part from the aspect of economy.

PREPARATION OF SURFACE :

Surfaces which are to be welded together, shall be free from loose mild-scale, rust, paint, grease or other foreign matter. A Coating of boiled linseed oil shall be permitted.

PRECAUTIONS :

All operations connected with welding and cutting equipment shall conform to the safety requirement given in IS : 818-1968 for "Safety and Health requirements in Electric and Gas welding and Cutting Operations".

The following points shall be borne in mind during the process of welding :-

[a] Welds shall be made in the flat position. Wherever practicable.

[b] Arc length, voltage and amperage shall be suited to the thickness of materials, type of groove and other circumstance of the work.

[c] The sequence of welding shall be such that where possible, the members which offer the greatest resistance to compression are welded first.

All defective welds which shall be considered, harmful to the structural strength shall be cut out and rewelded.

Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved by the Engineer-in-charge.

All the members shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of lead painting before fixing then in position.

RATE :

The rate shall be for a unit of one Kg.

ITEM NO 15:-

Applying Priming coat over new steel and other metal surface after over and including preparing the surface by thoroughly cleaning oil, grease dirt and other foreign matter and scoured with brushed fine steel wool, scrapers and sand paper with ready mixed priming paint brushing red lead.

1.0 Materials :

1.1 The ready mixed primer, brushing red lead shall conform to IS 102:1972.

1.2 The thinner (linsed oil) shall conform to IS 75:1973 if for any reason, thinning is necessary in a case of ready mix paint, the brand of thinner recommended by manufacturer shall be used.

1.3 The enamel paints shall conform to M-44 B.

2.0 Workmanship :

2.1 Preparation of surfaces :

The surfaces before painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it with wire brushes, steel wool, scrapers, sand paper etc. This surface shall then be wiped finally with mineral turpentine which shall also removed greas and perspiration of hand marks. The surface shall then be allowed to dry.

2.2 Application of primer :

After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the

manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying will constitute one coat.

During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded the bristles of the brush shall be opened up striking the brush against portion of the unpainted surface with the end of the bristles held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container. The primary coat shall be allowed to dry completely before painting is started.

No hair marks from the brush or clogging at paint puddles in the corner or panels angles of mouldings etc. shall be left on the work.

Special care shall be taken painting over bolts, nuts, rivets overlaps etc.

The container when not in use shall be kept close and free from air so that paint does not thicken and also shall be kept guarded from dust.

2.3 General :

The materials required for painting work shall obtained directly from approved manufacturers are approved dealer and brought to the site in maker's drums, bogs etc. with seal unbroken.

All materials not in actual use shall be kept properly protected lid of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into and shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

If for reasons, thinning is necessary, the brand of thinner recommended by the manufacturer shall be used.

The surface to be painted shall be thoroughly cleaned and dusted. All dust, dirt and greases shall be thoroughly removed before painting is started. No painting on exterior or other exposed parts of the work shall be carried out in wet, damp or otherwise unfavourable weather and all the surface shall be thoroughly dried before painting work is started.

2.4 Application of paint :

Brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions to or three times and then finally brushing lightly in direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

Each coat shall be allowed to dry completely and lightly rubbed with every fine grade of sand paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in the shade and shall be get approved from Engineer-in-charge before next coat is started.

Each coat except the last coat shall be lightly rubbed down with sand paper or fine pumicestone and cleaned of dust before the next coat is applied. No hairmarks from the brush or clogging of paint puddles in the corners of panels, angles of moulding etc. shall be left on the work.

Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved quality brushes shall be used.

3.0 Mode of measurement and payment :

The new steel and other metal surface shall be measured under this item.

All the work shall be measured net in the decimal system as executed subject to the following limits unless otherwise stated hereinafter.

(a) Dimensions shall be measured to the nearest 0.01 mtr.

(b) Areas shall be worked out to the nearest 0.01 sq.metre.

No. deductions shall be made for openings not exceeding 0.5 sq.metre each and no addition shall be made for painting to beadings mouldings, edges, jambs, soffits, sills etc. of such openings.

In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions, lattices, girder and similar work, actual area shall be measured in sq.m. and no extra shall be paid for painting on bolts, heads, nuts, washers, etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.

The different surfaces shall be grouped into one general item. Areas of uneven surface being converted into equivalent paint areas in accordance with the table given as per Annexure-II for payment.

The rate is for complete item as specified i.e. one primer coat and two coats of oil paint.

The rate shall be for a unit of one sq. meter.

ITEM NO 16:-

Painting one coat (excluding priming coat) on Previously Painted steel and other metal surface with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters.

1.0 Materials :

1.1 The ready mixed primer, brushing red lead shall conform to IS 102:1972.

1.2 The thinner (linsed oil) shall conform to IS 75:1973 if for any reason, thinning is necessary in a case of ready mix paint, the brand of thinner recommended by manufacturer shall be used.

1.3 The enamel paints shall conform to M-44 B.

2.0 Workmanship :

2.1 Preparation of surfaces :

The surfaces before painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it with wire brushes, steel wool, scrapers, sand paper etc. This surface shall then be wiped finally with mineral turpentine which shall also remove greases and perspiration of hand marks. The surface shall then be allowed to dry.

2.2 Application of primer :

After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying will constitute one coat.

During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded the bristles of the brush shall be opened up striking the brush against portion of the unpainted surface with the end of the bristles held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container. The primary coat shall be allowed to dry completely before painting is started.

No hair marks from the brush or clogging at paint puddles in the corner or panels angles of mouldings etc. shall be left on the work.

Specials care shall be taken painting over bolts, nuts, rivets overlaps etc.

The container when not in use shall be kept close and free from air so that paint does not thicken and also shall be kept guarded from dust.

2.3 General :

The materials required for painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums, bogs etc. with seal unbroken.

All materials not in actual use shall be kept properly protected lid of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into and shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

If for reasons, thinning is necessary, the brand of thinner recommended by the manufacturer shall be used.

The surface to be painted shall be thoroughly cleaned and dusted. All dust, dirt and greases shall be thoroughly removed before painting is started. No painting on exterior or other exposed parts of the work shall be carried out in wet, damp or otherwise unfavourable weather and all the surface shall be thoroughly dried before painting work is started.

2.4 Application of paint :

Brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of converging the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions two or three times and then finally brushing lightly in direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

Each coat shall be allowed to dry completely and lightly rubbed with every fine grade of sand paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in the shade and shall be get approved from Engineer-in-charge before next coat is started.

Each coat except the last coat shall be lightly rubbed down with sand paper or fine pumicestone and cleaned of dust before the next coat is applied. No hairmarks from the brush or clogging of paint puddles in the corners of panels, angles of moulding etc. shall be left on the work.

Specials care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved quality brushes shall be used.

3.0 Mode of measurement and payment :

The new steel and other metal surface shall be measured under this item.

All the work shall be measured net in the decimal system as executed subject to the following limits unless otherwise stated hereinafter.

(a) Dimensions shall be measured to the nearest 0.01 mtr.

(b) Areas shall be worked out to the nearest 0.01 sq.metre.

No deductions shall be made for openings not exceeding 0.5 sq.metre each and no addition shall be made for painting to beadings mouldings, edges, jambs, soffits, sills etc. of such openings.

In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions,

lattices, girder and similar work, actual area shall be measured in sq.m. and no extra shall be paid for painting on bolts, heads, nuts, washers, etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.

The different surfaces shall be grouped into one general item. Areas of uneven surface being converted into equivalent paint areas in accordance with the table given as per Annexure-II for payment.

The rate is for complete item as specified i.e. one primer coat and two coats of oil paint.

The rate shall be for a unit of one sq. meter.

ITEM NO 17:-

Painting two coat (excluding priming coat) on new steel and other metal surface with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters..

1.0 Materials :

1.1 The ready mixed primer, brushing red lead shall conform to IS 102:1972.

1.2 The thinner (linsed oil) shall conform to IS 75:1973 if for any reason, thinning is necessary in a case of ready mix paint, the brand of thinner recommended by manufacturer shall be used.

1.3 The enamel paints shall conform to M-44 B.

2.0 Workmanship :

2.1 Preparation of surfaces :

The surfaces before painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it with wire brushes, steel wool, scrapers, sand paper etc. This surface shall then be wiped finally with mineral turpentine which shall also removed greas and perspiration of hand marks. The surface shall then be allowed to dry.

2.2 Application of primer :

After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying will constitute one coat.

During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded the bristles of the brush shall be opened up striking the brush against portion of the unpainted surface with the end of the bristles held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container. The primary coat shall be allowed to dry completely before painting is started.

No hair marks from the brush or clogging at paint puddles in the corner or panels angles of mouldings etc. shall be left on the work.

Special care shall be taken painting over bolts, nuts, rivets overlaps etc.

The container when not in use shall be kept close and free from air so that paint does not thicken and also shall be kept guarded from dust.

2.3 General :

The materials required for painting work shall obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums, bogs etc. with seal unbroken.

All materials not in actual use shall be kept properly protected lid of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into and shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

If for reasons, thinning is necessary, the brand of thinner recommended by the manufacturer shall be used.

The surface to be painted shall be thoroughly cleaned and dusted. All dust, dirt and greases shall be thoroughly removed before painting is started. No painting on exterior or other exposed parts of the work shall be carried out in wet, damp or otherwise unfavourable weather and all the surface shall be thoroughly dried before painting work is started.

2.4 Application of paint :

Brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of converging the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions to or three times and then finally brushing lightly in direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

Each coat shall be allowed to dry completely and lightly rubbed with every fine grade of sand paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in the shade and shall be get approved from Engineer-in-charge before next coat is started.

Each coat except the last coat shall be lightly rubbed down with sand paper or fine pumicestone and cleaned of dust before the next coat is applied. No hairmarks from the brush or clogging of paint puddles in the corners of panels, angles of moulding etc. shall be left on the work.

Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved quality brushes shall be used.

3.0 Mode of measurement and payment :

The new steel and other metal surface shall be measured under this item.

All the work shall be measured net in the decimal system as executed subject to the following limits unless otherwise stated hereinafter.

(a) Dimensions shall be measured to the nearest 0.01 mtr.

(b) Areas shall be worked cut to the nearest 0.01 sq.metre.

No deductions shall be made for openings not exceeding 0.5 sq.metre each and no addition shall be made for painting to beadings mouldings, edges, jambs, soffits, sills etc. of such openings.

In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions, lattices, girder and similar work, actual area shall be measured in sq.m. and no extra shall be paid for painting on bolts, heads, nuts, washers, etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.

The different surfaces shall be grouped into one general item. Areas of uneven surface being converted into equivalent paint areas in accordance with the table given as per Annexure-II for payment.

The rate is for complete item as specified i.e. one primer coat and two coats of oil paint.

The rate shall be for a unit of one sq.meter.

ITEM NO.18:-

Decorative wall paintings with designing, painting at place with all necessary materials

Same as per item description, details instruction and as directed by Engineer- in-charge.
The rate shall be for a unit of one Sq.feet.

ITEM NO.19:-

Providing and fixing hot dip Concertina Coil of 610 mm. dia made out of 2.59 mm. (12SWG) hot dip galvanized (G.I. coating not less than 200 gm / s.m.)th. Wire having 80 nos. of spies and 200 nos. of clips made out of stainless steel (AISI 304) 1.5 mm thick. Dia, G.I. Strips 0.5 mm. ht. (G.I coating not less than 120 gm / s.m.) weight of one coil should not be less than 15 kg etc. complete, at the top of compound wall fixed with S.S clips and binding wires wherever necessary etc. complete. (Note : Stretching length of one coil should not be more than 9 m.)

Fixing of hot dip concertina coil of 610mm dia. on 1.05-meter-long M.S. angles of 50mm x 50mm x 6mm thick, bent at 45 degrees. The angles shall be anchored in the RCC column and spaced at minimum distance of 3.0 meters at the top of the compound wall. concertina coil shall be fixed with S.S. clips and binding wires whenever necessary etc. complete. At every 6th post shall be strutted on both sides and end post with one side only. Also providing barbed wire 14x14 gauge with three horizontal lines both sides. The exposed steelwork shall be painted with 1 coat of red oxide and 2 coats of approved oil paint. The concertina coil and barbed wire fencing shall be fixed as per the drawing and in good workmanship as directed by Engineer in charge.

Mode of Measurements & Payment

The measurement shall be done with item of compound wall on running meter basis and the payment shall be made on running meter basis.

ITEM NO.20:-

Steel work welded in built up sections, frame work including cutting, hoisting, fixing in position and applying apriming coat of red lead paint :- (A) In beams and joists channels angles, tees, flats with connection plats or angle cleats as in main and cross beams, hip and trussed purlins connected to common raffers and the like.

LAYING OUT :

The steel structures, as shown in the drawings or as per directions of the Engineer-in-charge, shall be laid out on a level platform to full scale and to full size in parts. A steel type shall be used for measurements to ensure maximum accuracy.

Wooden templates 12 mm to 19 mm thick or steel templates shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes for revetting and bolting marked on them. The ends of the steel members shall also be marked for cutting. The base of steel columns and the position of anchor bolts shall be carefully set out.

FABRICATION :

The steel sections as specified shall be straightened and cut square and accurately to correct lengths. The cut ends exposed to view shall be finished smooth. No. two pieces shall be welded or otherwise jointed to make up required length of a member except as indicated in the drawing or otherwise specifically permitted by the Engineer - in - charge. All straightening and shping to form shall be done by application of pressure and not by manning. Any bending or

cutting shall be carried out in cold condition (unless otherwise directed) in such a manner as not to impair the strength of the metal.

All stiffeners shall be formed by pressure, and where practicable, the metal shall not be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including the locating, type, size, length and details of rivets, bolts or welds shall be prepared in advance of the actual fabrication and approved by the Engineer-in-charge. The drawing shall indicate the shop and field rivets, bolts and welds. The steel members shall be distinctly marked or stencilled with paint with the identification marks as given in the shop drawings.

The bars shall be thickened at the ends so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in the fabrication of various members. Do that these can be assembled without being unduly packed strained or forced into position and when built-up shall be true and free from twists, bricks buckles or open joints.

Before making holes in individual members, for fabrication the steel work intended to be riveted or bolted to girth shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping of the surface of the different members. All stiffeners shall be tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or dressed true and straight and fitted close together,

We splice plates and fillers under stiffeners shall be cut to fit within 3 mm of flange angles. We plates or girders which have no cover plates shall have their ends flush with the top of angles forming the flanges unless otherwise required. The we plates, when spliced shall have clearance of not more than 6 mm.

The erection clearance for cleated ends of members connecting steel to steel preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for practical reasons, greater clearance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement for holding the girders or truss resting on it, from lateral displacement.

Expansion bed plates shall be planed true and smooth. The planning of bed plates shall be done in the direction of the movement of the girder or truss resting on it.

Column splices and butt joints of struts and impression members depending on contract for trees transmission shall be accurately machined and closebutted over the whole section. In column caps and bases, the ends of shafts together with the attached gussets, angles, channels etc. after riveting together shall be accurately machined so that the parts connected butt against each other over the entire surface of contact. Connecting angles or channels shall be fabricated and placed in position with great accuracy so that they are not unduly reduced in thickness by machining.

The ends of all bearing stiffeners shall be machined or ground to fit tightly both at the top and bottom.

All holes shall generally be drilled to the required size and at the required position. Sub-punching shall be permitted, provided it is done 3 mm. less in diameter and reamed thereafter to the required size.

Holes for rivets and black bolts shall be large by 0.4 to 6 mm. as shown in appendix-I under column "Coarse" than the nominal diameter of the rivets or black bolts depending upon the dia of rivets. Holes for turned and fitted bolts shall be drilled or reamed large by 0.2 to 3 mm. depending upon the dia of bolts as shown in Appendix under column "Medium".

When the number of plates or sections to be riveted together exceeds three or when their total thickness is 90 mm or more, holes shall be drilled or reamed in position, after the members are assembled and the parts firmly hold together by clamps. Before riveting or bolting up or welding finally. The members shall be taken part and all burrs removed.

Holes shall have their axis perpendicular to the surface bore through. The drilling or reaming shall be free from burrs and the holes shall be clean and accurate.

The work or fabrication shall be completed in the work shop as far as it is practicable to do so. Site jointing shall be done with rivets or turned and fitted bolts, or black bolts or welding as shown in drawings or as directed by the Engineer-in-charge. Generally, the following principles shall govern the use of rivets, turned and fitted bolts and black bolts :-

[i] Rivets or turned and fitted bolts shall be used where the connection is such that slip under load has or be avoided.

[ii] Black bolts may be used very sparingly where a force is carried through a connecting without impact, vibration or reversal of stresses (unless such reversal is due to wind forces.)

In the case of welding, holes shall only be made for the bolts used for temporary fastening as shown in drawings.

WELDING :

Welding shall be generally be done by electric process. The electric arc method being economical, is usually adopted. Where public electricity is not available, a suitable generator shall be arranged. Gas welding shall be resorted to using oxyacetylene flame with specific period approval of the Engineer-in-charge.

Gas welding shall not be permitted for structural steel work. Gas welding requires heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, type of welds, shop and site welds, as well as the types of electrodes to be used. Symbols for welding on plans and shop drawings shall be according to IS : 813-1061. As far as possible, every effort shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions of scaffolding etc. apart from the aspect of economy.

PREPARATION OF SURFACE :

Surfaces which are to be welded together, shall be free from loose mill-scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

PRECAUTIONS :

All operations connected with welding and cutting equipment shall conform to the safety requirement given in IS : 818-1968 for "Safety and Health requirements in Electric and Gas welding and Cutting Operations".

The following points shall be borne in mind during the process of welding :-

[a] Welds shall be made in the flat position. Wherever practicable.

[b] Arc length, voltage and amperage shall be suited to the thickness of materials, type of groove and other circumstance of the work.

[c] The sequence of welding shall be such that where possible, the members which offer the greatest resistance to compression are welded first.

All defective welds which shall be considered, harmful to the structural strength shall be cut out and rewelded.

Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved by the Engineer-in-charge.

All the members shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of lead painting before fixing them in position.

RATE :

The rate shall be for a unit of one quintal..

PART B - GROUND DEVELOPMENT WORKS

ITEM NO.1:-

Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth up to 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials (B) By manual in area of thorny jungle

Scope:

This work shall consist of cutting, removing and disposing of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, rubbish, top organic soil, etc. to an average depth of 150 mm in thickness, which in the opinion of the Engineer are unsuitable for incorporation in the works, from the area of road and containing road embankment, drains, cross-drainage structures and such other areas as may be specified on the Drawings or by the Engineer. It shall include necessary excavation, backfilling of pits resulting from uprooting of trees and stumps to required compaction, handling, saving, and disposal of cleared materials with all roads and rights. Clearing and grubbing shall be performed in advance of earthwork operations and in accordance with the requirements of these specifications.

Preservation of property/Amenities:

Roadside trees, shrubs, any other plants, poles, fences, signs, monuments, buildings, pipelines, sewers and all highway facilities within or adjacent to the property which are not to be disturbed shall be protected from injury or damage. The contractor shall install at his own cost, suitable safeguards up to the satisfaction of the Engineer.

During clearing and grubbing, the contractor shall take all adequate precautions against soil erosion, water pollution, etc., and where required, do additional works to that effect vide clause 306. Before start of operations, the contractor shall submit to the Engineer for approval his work plan including the procedure for removal and disposal of waste materials, etc., and the schedules for carrying out temporary stipulated in Clause 306.3.

Methods, Tools and Equipment:

Only such methods, tools and equipment as are approved by the Engineer and which will not affect any property to be preserved shall be adopted for the work. If the area has thick vegetation, roots, trees, a crawler or pneumatic tyred dozer of adequate capacity may be used for clearance purposes. The dozer shall have ripper attachments for removal of tree stumps. All trees, stumps, etc., falling within excavation, shall be cut to such depth below ground level that in no case these fall within 500 mm of the surface, or, if not, all vegetation such as roots, under-growth, grass, etc., of objectionable nature unsuitable for incorporation in the embankment shall be removed between fill lines to the satisfaction of the Engineer. All branches of trees extending above the surface shall be trimmed as directed by the Engineer.

All excavations below the general ground level arising out of the removal of trees, stumps, etc., shall be filled with suitable material to the satisfaction of the Engineer so as to make the surface at these points conform to the surrounding area.

Anthills both above and below the ground, as are liable to collapse and obstruct free subsoil water flow shall be removed and their workings, which may extend to several metres, shall be suitably treated.

Disposal of Materials:

All materials arising from clearing and grubbing operations shall be taken over and shall be disposed of by the Contractor at suitable disposal sites with all loads and lifts. The disposal shall be in accordance with local, State and Central regulations.

Measurements for Payment:

Clearing and grubbing for road embankment, drains and cross-drainage structures shall be measured on area basis in terms of hectares.

Rates:

Unit rates for the various items of clearing and grubbing shall be payment in full for carrying out the required operations including all labour, material, tools & equipments to complete the work.

Rate shall be for a unit of one hectare.

ITEM NO.2:-

Providing & filling in plinth with murrum/yellow soil or selected soil (Garden soil) in layers of 20 cm. Th'. Incl. watering, ramming & consolidation etc. complete.

1.0. Materials

- 1.1. Yellow soil or Selected soil shall be clean, of good binding quality and of approved quality obtained from approved pots/ quarries.
of disintegrated rocks which contain silicon material and natural mixture of clay of clariens origin. The size of murrum shall not be more than 20 mm³⁶.

2.0. Workmanship

- 2.1. The relevant specifications of shall be it code 4006 followed except that the murrum or selected soil shall be filled in foundations and plinth in 20 cms layer including consolidating, ramming, watering, dressing etc. complete for garden.

3.0. Mode of Measurements & Payment

- 3.1. The relevant specifications of it code 4006 shall be followed-.
- 3.2. The rate includes cost of collecting and carting Yellow / or selected earth of approved quality with all lead
and labour required for filling in trenches and plinth.
- 3.3. Rate shall be for a unit of one cubic meter.

ITEM NO.3:-

Providing & filling with Mix soil in layers of 20 cm. Th'. Incl. watering, ramming & consolidation etc. complete.

Detailed specification as per **item no.2,(part-b)** of this section but read mix soil instead of yellow soil.

The rate shall be for a unit of one C.M.

ITEM NO.4:-

Excavation for foundation including sorting out and stacking off useful materials and disposing of the excavated stuff up to 50 mt. lead and all lift, watering etc.comp. (A) loose or soft soil with machineries (1) 0 To 1.5 mt. Depth (2) 1.5 To 3.0 MT Depth (3) 3.0 To 5.0 MT Depth.

Detail Specification as per **item no.1 (Part-A)**

The rate shall be for a unit of one Cubic meter.

ITEM NO.5:-

Preparation of subgrade with Compacting, Levelling and consolidation of subgrade with miniroller /plate vibrator machine including watering and filling in depressions which occur during the process as directed by engineer in charge.

Immediately following the spreading of the subgrade material rolling shall be started with miniroller/plate vibrator machine.

Except on superlevated portion where the rolling shall proceed from inner edge to outer, rolling, shall be from the edges gradually progressing towards the centre. First the edge/edges shall be compacted with roller running forward and backward. The roller shall then move inwards parallel to the centre line of the road, in successive passes uniformly lapping preceding tracks by at least one half way width.

Rolling shall continue until the subgrade material is thoroughly keyed and the creeping of the sub-grade ahead of the roller is no longer visible. During the process rolling shall not be done when the sub grade is soft or yielding or when it causes a wave like motion in the sub-grade course.

The rolled surface shall be checked transversely and longitudinally with templates and any irregularities corrected by loosening the surface, adding or removing necessary amounts of subgrade material and rerolling until, the entire surface conforms to desired camber and grade. In no case shall use of screening be permitted to make up depressions.

The bindage materials where it is required to be used shall be applied, successively in two or more thin layers at a slow and uniform rate. After each applications, the surface shall be continuously sprinkled with water, the resulting slurry swept in with hand brooms or mechanical brooms to fill the voids properly, and rolled during which water shall be applied to the wheels of the rollers if necessary to wash down the binding materials sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the wheels of the moving roller. After the final compaction of subgrade course the road shall be allowed to dry overnight. Next morning hungry spot shall be filled with screening of binding materials as directed, lightly sprinkled with water, if necessary and rolled. No traffic shall be allowed on the road until the base has set. The Engineer-in-charge shall have the discretion to stop hauling traffic from using the completed subgrade course if in his opinion it would cause excessive damage to the surface.

MODE OF PAYMENT :-

Payment will be made on Sq.mt. basis consolidation of finished work and shall also includes cost of watering, rent of machinery, cost of fuel, wages of drivers and cleaners, earthen and murrum bund etc. and watchman etc.

ITEM NO.6:-

Providing & laying Granular sub base (GSB) conforming to Grading-II of Table 400.0 of compacted thick of 150mm with specified graded stone metal and sand mixed in place and laid with mechanical means spreading with motor grader and compacting with vibratory roller having minimum 80-100 KN static weight to achieve desired density of 98% of MDD including all material, labour, machinery with all leads and lift etc. complete.

SCOPE This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of Specifications. The material shall be laid in one or more layers as sub-base or lower sub-base and upper sub-base (termed as sub base hereinafter) as necessary according to lines, grades and cross sections shown on the drawings or as directed by the Engineer.

2.0 MATERIALS

2.1 The material to be used for the work shall be natural sand, gravel, crushed stone, or combinations thereof depending upon the grading required. The material shall be free from organic or other deleterious constituents and conform to grading (given below). While the gradings in Table -1 are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75 mm, 53 mm and 26.5 mm, the corresponding gradings for the coarse-graded materials for each of the three maximum particle sizes are given at Table -2. The grading to be adopted for a project shall be as specified in the Contract.

2.2 Physical requirements The material shall have a 10 per cent fines value of 50 kN or more (for sample in soaked condition) when tested in compliance with BS : 812 (Part 111). The

water absorption value of the coarse aggregate shall be determined as per IS :2386 (Part 3); if this value is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS : 383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 per cent.

S. No.	Item	Ref. Code	Frequency
1	Granular Sub Base		
1.1	Gradation	IS:2720 (Part 4)	1 Tests/400 m ³
1.2	Atterberg's limits	IS:2720 (Part 5)	1 Tests/400 m ³
1.3	Moisture Content prior to compaction	IS:2720 (Part 2)	1 Tests/400 m ³
1.4	Field Density of compacted layer	IS:2720 (Part 28)	1 Tests/1000 m ²
1.5	Deleterious content test	IS:2720 (Part 27)	As required
1.6	CBR	IS:2720 (Part 16)	Minimum 30%, as required.

Table 400-1 : Grading for Granular Sub-base Materials

IS Sieve Designation	Percent by Weight Passing the IS Sieve					
	Grading I	Grading II	Grading III	Grading IV	Grading V	Grading VI
75.0 mm	100	-	-	-	100	-
53.0 mm	80-100	100	100	100	80-100	100
26.5 mm	55-90	70-100	55-75	50-80	55-90	75-100
9.50 mm	35-65	50-80	-	-	35-65	55-75
4.75 mm	25-55	40-65	10-30	15-35	25-50	30-55
2.36 mm	20-40	30-50	-	-	10-20	10-25
0.85 mm	-	-	-	-	2-10	-
0.425 mm	10-15	10-15	-	-	0-5	0-8
0.075 mm	<5	<5	<5	<5	-	0-3

3.0 STRENGTH OF SUBBASE

3.1 It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished

3.2 When directed by the Engineer, this shall be verified by performing CBR tests in the laboratory as required on specimens remoulded at field dry density and moisture content and any other tests for the "quality" of materials, as may be necessary.

4.0 CONSTRUCTION OPERATIONS

4.1 Preparation of sub grade Immediately prior to the laying of sub-base, the subgrade already finished as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 8 -10 Ton smooth wheeled roller.

- 4.2** Spreading and compacting The sub-base material of grading specified in the Contract shall be spread on the prepared sub grade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.

When the sub-base material consists of combination of materials mentioned above, mixing shall be done mechanically by the mix-in-place method.

Manual mixing shall be permitted only where the width of laying is not adequate for mechanical operations. The equipment used for mix-in-place construction shall be a rotator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out 9 of 9 to establish its suitability for the work.

Moisture content of the loose material shall be checked in accordance with IS : 2720 (Part II) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction it is from 1 per cent above to 2 per cent below the optimum moisture content corresponding to IS : 2720 (Part VIII). While adding water, due allowance shall be made for evaporation losses. After water, has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotators until the layer is uniformly wet.

Immediately thereafter, rolling shall start. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 8 to 10 Ton weight may be used. For a compacted single layer upto 225 mm the compaction shall be done with the help of a vibratory roller of minimum 8 to 10 Ton static weight with plain drum or pad foot drum or heavy pneumatic tired roller of minimum 200 to 300 kN weight having a minimum tyre pressure of 0.7 MN/m² or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional cross fall and super elevation and shall commence at the edges and progress towards the center for portions having cross fall on the both sides.

Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and camber shall be checked and any high spots or depressions which become apparent corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour.

Rolling shall be continued till the density achieved is at least 98% of the maximum dry density for the material determined as per IS : 2720 (Part 7). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

4.3 Surface Finish and quality Control of Work

The finished surface shall be checked for lines, levels and regularity. The surface evenness of completed surface in longitudinal and transverse direction shall be within the tolerances specified.

5.0 MODE OF MEASUREMENTS:

The surface finish of construction shall conform to the requirements. Granular sub-base shall be measured as finished work in position in cubic meters.

ITEM NO.7:-

Providing & laying C.C 1:3:6 (1cement :3 coarse sand :6 Crushed stone agg 20m.m Nominal size)&curing comp. excl. cost of form work in :(a) foundation & Plinth

3.1.0 Materials:-

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Stone aggregate 20 mm nominal size shall conform to M-12.

3.2.0 WORKMANSHIP :**3.2.1 General :-**

Before starting concreting the bed of foundation trenches shall be cleared of all loose materials, levelled, Waterred and rammed as directed.

3.2.2 Proportion of Mix :-

The proportion of cement, sand coarse aggregate shall be one part of cement, 3 parts of sand 6 parts of stone aggregate shall be measured by volume.

3.2.3 Mixing :-

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such case 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.

3.2.4 Transporting and placing the concrete :-

The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

The concrete shall be laid in layers of 15 cms to 20 cms.

Compacting :-The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filled with mortar.

3.2.5 Curing :-

After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

3.3.0 Mode of measurements and payment :-

The concrete shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

ITEM NO.8:-

'Providing and fixing TMT Bar reinforcement for RCC work including bending, binding & placing in position etc. complete.

Item Description as per item no.7 part-A.

The rate shall be for a unit of one kg.

ITEM NO.9:-

Supplying & filling fine sand(pana) in 75 mm/100mm/150mm compacted thickness over the base including necessary compaction, watering etc. complete. Item includes leveling by using vibratory plates compacted machine and as directed by engineer in charge.

- 1.0 MATERIALS :
- 1.1 Fine sand (Pana) shall conform to specification of material M-3.
- 2.0 WORKMANSHIP :
- 2.1 Fine sand (Pana) shall be supplied to worksite and staked at suitable place. It shall be got approved by Engineer-in-charge. Fine sand (Pana) shall be filled in compacted thickness of 75 mm. It shall be compacted and watered thoroughly.
The rate shall be for a unit of one cubic metre.

ITEM NO.10:-

Providing Interlocking Type Rubber Moulded Cement Concrete Paver Block of Approved Shape, Design & Colour Having 60 mm thickness (M-35) Purchased from SMC's approved paver block manufacturer only & fixing on fine sand bedding. Item Includes leveling by using vibratory plats compacted machine. Item also include materials, labour, equipments, tools, plants, watering, cleaning etc. comp.

RAW MATERIAL

CEMENT:-

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement).

The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

WATER :-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

PAVER BLOCKS CHARACTERISTICS

The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

The surface should be of anti-skid and anti glare type. The paver should have uniform chamfers to facilitate easy drainage of surface run off.

The pavers should have uniform interlocking space of 2 mm to 3 mm to ensure compacted sand filling after vibration on the paver surface.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The pavers shall be manufactured in single layer only.

Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints.

The pavers are to be skirted all round with kerbing using solid concrete blocks of size 100 mm x 200 mm x 400 mm or as directed by the Engineer. The kerbing should be embedded for 100 mm depth. The concrete used for kerbing shall be cured properly for 7 days minimum.

LAYING OF PAVER BLOCKS :-

PRIMING :-

It will be responsibilities of the Contractors to ensure that the manhole/pipeline cable trenches/circular drainage system etc. raised to driveway level using the requisite materials as per instruction of Engg. The areas of potholes/deep depressions at the isolated locations also

have to be filled up before laying the paver blocks. No extra payments will be made for this purpose.

It will be the responsibility of the Contractors to ensure that undulations on the paver blocks are eliminated after the traffic is allowed on it. Proper slope for drainage of water needs to be ensured by the Contractor. All necessary materials, tools, tackles are required to be arranged by the Contractor.

BEDDING SAND COURSE :-

The bedding sand shall consist of a clean well graded sand passing through 4.75 mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the following grading.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

Contractor shall be responsible to ensure that single-sized, gap graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp not rounded as sharp sand possess higher strength and resist the migration of sand from under the block to less frequently areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand use for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.

The sand shall be of uniform moisture content and within 4%-8% when spread and shall be protected against rain when stock piled prior to spreading. Saturated sand shall not be used. The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45 mm and within +/- 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface.

The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screeding. Any precompacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.

Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit.

Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and rescreeded before laying of paving blocks.

LAYING OF INTERLOCKING PAVER BLOCKS :-

Paver blocks shall be laid in herringbone laying pattern throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not be permitted in other than approved locations.

Paver blocks shall be placed on the uncompacted screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond through out the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.

Paver blocks shall be placed to achieve gaps nominally 2 to 3 mm wide between adjacent paving joints. No joint shall be less 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocks shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closure blocks shall consist of not less than 25% of a full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used.

Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks necessary care shall be taken to avoid premature compaction of the sand bedding.

INITIAL COMPACTION :-

After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than Two (2) passes of a suitable plate compactor.

The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic.

Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recompactd as described in Cl. 3.5.

All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.

Any blocks that are structurally damaged prior to or during compaction shall be immediately removed and replaced.

Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

JOINT FILLING AND FINAL COMPACTION :-

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement.

Joint sand shall pass a 2.36 mm (No.8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall comply with the following grading limits.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of this specifications shall accompany the sample.

The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth.

This procedure shall be repeated until all joints are completely filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paver block shall be dry when sand is spread and broomed into the joints to prevent premature setting of sand.

The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1% in any 3 m x 3 m area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

EDGE RESTRAINT :-

Edge restrains need to be sufficiently robust to withstand override by the anticipated traffic, to withstand thermal expansion and to prevent loss of the laying course material from beneath the surface course. The edge restraint should present a vertical face down to the level of the underside of the laying course.

The surface course should not be vibrated until the edge restraint, together with any bedding or concrete haunching, has gained sufficient strength. It is essential that edge restraints are adequately secured.

SAMPLING AND TESTING PROCEDURES FOR PAVER BLOCKS :-

SAMPLE SIZE:-

Internal - Average of minimum 3 samples per 5000 blocks - for paver block manufacturers.

External - Minimum 2 blocks per 10000 blocks. Average of minimum 8 blocks per site - for captioned contractors.

SAMPLING FOR TESTING :-

Sampling for testing of paver blocks shall be done in accordance with Appendix-A.

COMPRESSIVE STRENGTH :-

Testing for 28 days compressive strength shall be undertaken in accordance with Appendix-B. The average compressive strength of 60 mm thick paver blocks tested shall be 31.8 MPa.

Note:- 10% lower tolerance limit in compressive strength shall be allowed.

WATER ABSORPTION :-

Testing for water absorption shall be in accordance with IS 2185:1979:Part I (Specifications for concrete masonry blocks) Appendix C

APPENDIX -A

SAMPLING OF PAVER BLOCKS :-

Method of Sampling:

The paver blocks required for carrying out the tests, a sample of 20 block shall be taken from every consignment of 4000 blocks or part thereof the same size, shape and thickness and the same batch of manufacture from these samples the blocks shall be taken at random for conducting the tests.

MARKING AND IDENTIFICATION :-

All samples shall be clearly marked at the time of sampling in such a way that the designated section of Part thereof and the consignment represented by the sample, are clearly defined.

The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The samples shall be stored in water at $20^{\circ}\text{C} + 5^{\circ}\text{C}$ for 24 hours prior to testing.

APPENDIX - B

PROCEDURE FOR TESTING OF COMPRESSIVE STRENGTH FOR PAVER BLOCK :

Reference: BS 6717 Part I (1993) Specification for Paver Blocks B-1 Testing Machine: The testing machines shall be of suitable capacity for the test and capable of applying the load at the rate specified. It shall comply, as regards repeatability and accuracy with the requirements of relevant IS specification.

Procedure - The sample specimens shall be tested in wet condition after being stored at least 24 hours, in water maintained at a temperature of $20^{\circ}\text{C} + 5^{\circ}\text{C}$ before the specimens are submerged in water, the necessary area shall be determined.

The plates of the testing machine shall be wiped clean and any loose grit or other material removed from the contact faces of the specimen. Plywood nominally 4 mm thick, shall be used as packing between the upper and lower faces of the specimen and the machine plates, and these boards shall be larger than the specimen by a margin of at least 5 mm at all points. Fresh packing shall be used for each specimen tested. The specimen shall be placed in the machine with the wearing surface in a horizontal plane and in such a way that the axes of the specimen are aligned with those of the machines plates. The load shall be applied without shock and

increased continuously at the rate of approximately 15 N/sqmm per minute until no greater load can be sustained. The maximum load applied to the specimen shall be recorded.

ALL CALCULATIONS OF CORRECTED STRENGTH:-

The compressive strength of each block specimen shall be calculated by dividing the maximum load by full cross section area and multiplying by an appropriate factors.

Thickness and Chamfer Correction Factors For Compressive Strength

Work Size thickness in mm	Correction Factors	
	Plain Block	Chamfered
60	1.00	1.06
80	1.12	1.18
100	1.18	1.24

COMPRESSIVE STRENGTH CALCULATION:-

The average corrected compressive strength for the designed block section shall be calculated.

APPENDIX -C

METHOD FOR THE DETERMINATION OF WATER ABSORPTION:-

The test specimens shall be completely immersed in water at room temperature for 24 hours. The specimens shall then be weighed, while suspended by a metal wire and completely submerged in water

They shall be removed from the water and allowed to drain for one minute Visible surfaces water being removed with a damp cloth and immediately weighed

Subsequent to saturation, all specimens shall be dried in a ventilated oven at 100 to 115oC for not less than 24 hours and until two successive weightings at intervals of 2 hours show an increment of loss not greater, than 0.2 percent of the last previously determined mass of the specimen.

Calculate the absorption as follows:

Absorption, kg/m³ $A-B= \frac{10000B-C}{B}$

Absorption percent $A-B \text{ Where } \frac{100B}{B}$

A = wet mass of unit in kg

B = dry mass of unit in kg. And

C = suspended immersed mass of unit in square meter.

Rate shall be for a unit of one square meter.

ITEM NO.11:-

Providing and fixing precast Concrete GRASS PAVER block 60mm thick with grade of concrete M250 pneumatic compressed by Mechanically pressed and as per approved design including filling the joint with sand in proper line & level etc.

1 RAW MATERIAL

1.1 CEMENT:-

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

1.2 AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

1.3 WATER :-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

1.4 OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

2 PAVER BLOCKS CHARACTERISTICS

The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

The surface should be of anti-skid and anti glare type. The paver should have uniform chamfers to facilitate easy drainage of surface run off.

The pavers should have uniform interlocking space of 2 mm to 3 mm to ensure compacted sand filling after vibration on the paver surface.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The pavers shall be manufactured in single layer only.

Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints.

The pavers are to be skirted all round with kerbing using solid concrete blocks of size 100 mm x 200 mm x 400 mm or as directed by the Engineer. The kerbing should be embedded for 100 mm depth. The concrete used for kerbing shall be cured properly for 7 days minimum.

3 LAYING OF PAVER BLOCKS :-

3.1 PRIMING :-

It will be responsibilities of the Contractors to ensure that the manhole/pipeline cable trenches/circular drainage system etc. raised to driveway level using the requisite materials as per instruction of Engg. The areas of potholes/deep depressions at the isolated locations also have to be filled up before laying the paver blocks. No extra payments will be made for this purpose.

It will be the responsibility of the Contractors to ensure that undulations on the paver blocks are eliminated after the traffic is allowed on it. Proper slope for drainage of water needs to be ensured by the Contractor. All necessary materials, tools, tackles are required to be arranged by the Contractor.

3.2 BEDDING SAND COURSE :-

The bedding sand shall consist of a clean well graded sand passing through 4.75 mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the following grading.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

Contractor shall be responsible to ensure that single-sized, gap graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp not rounded as sharp sand possess higher strength and resist the migration of sand from under the block to less frequently areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand use for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.

The sand shall be of uniform moisture content and within 4%-8% when spread and shall be protected against rain when stock piled prior to spreading. Saturated sand shall not be used.

The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45 mm and within ± 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface.

The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screeding. Any precompacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.

Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit.

Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and rescreeded before laying of paving blocks.

4 LAYING OF INTERLOCKING PAVER BLOCKS :-

Paver blocks shall be laid in herringbone laying pattern throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not be permitted in other than approved locations.

Paver blocks shall be placed on the uncompacted screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond through out the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.

Paver blocks shall be placed to achieve gaps nominally 2 to 3 mm wide between adjacent paving joints. No joint shall be less 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocks shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closer blocks shall consist of not less than 25% of a full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used.

Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks necessary care shall be taken to avoid premature compaction of the sand bedding.

4.1 INITIAL COMPACTION :-

After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than Two (2) passes of a suitable plate compactor.

The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic. Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recompacted as described in Cl. 3.5.

All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.

Any blocks that are structurally damaged prior to or during compaction shall be immediately removed and replaced.

Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

4.2 JOINT FILLING AND FINAL COMPACTION :-

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement.

Joint sand shall pass a 2.36 mm (No.8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall comply with the following grading limits.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of this specifications shall accompany the sample.

The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth.

This procedure shall be repeated until all joints are completed filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paver block shall be dry when sand is spread and broomed into the joints to prevent premature setting of sand.

The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1% in any 3 m x 3 m area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

4.3 EDGE RESTRAINT :-

Edge restrains need to be sufficiently robust to withstand override by the anticipated traffic, to withstand thermal expansion and to prevent loss of the laying course material from beneath the surface course. The edge restraint should present a vertical face down to the level of the underside of the laying course.

The surface course should not be vibrated until the edge restraint, together with any bedding or concrete haunching, has gained sufficient strength. It is essential that edge restraints are adequately secured.

5 SAMPLING AND TESTING PROCEDURES FOR PAVER BLOCKS :-

5.1 SAMPLE SIZE:-

Internal - Average of minimum 3 samples per 5000 blocks - for paver block manufacturers.

External - Minimum 2 blocks per 10000 blocks. Average of minimum 8 blocks per site - for captioned contractors.

5.2 SAMPLING FOR TESTING :-

Sampling for testing of paver blocks shall be done in accordance with Appendix-A.

5.3 COMPRESSIVE STRENGTH :-

Testing for 28 days compressive strength shall be undertaken in accordance with Appendix-B. The average compressive strength of 60 mm thick paver blocks tested shall be 31.8 MPa.

Note:- 10% lower tolerance limit in compressive strength shall be allowed.

5.4 WATER ABSORPTION :-

Testing for water absorption shall be in accordance with IS 2185:1979:Part I (Specifications for concrete masonry blocks) Appendix C

APPENDIX -A

SAMPLING OF PAVER BLOCKS :-

Method of Sampling:

The paver blocks required for carrying out the tests, a sample of 20 block shall be taken from every consignment of 4000 blocks or part thereof the same size, shape and thickness and the same batch of manufacture from these samples the blocks shall be taken at random for conducting the tests.

5.5 MARKING AND IDENTIFICATION :-

All samples shall be clearly marked at the time of sampling in such a way that the designated section of Part thereof and the consignment represented by the sample, are clearly defined.

The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The samples shall be stored in water at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 24 hours prior to testing.

APPENDIX - B

PROCEDURE FOR TESTING OF COMPRESSIVE STRENGTH FOR PAVER BLOCK :

Reference: BS 6717 Part I (1993) Specification for Paver Blocks B-1 Testing Machine: The testing machines shall be of suitable capacity for the test and capable of applying the load at the rate specified. It shall comply, as regards repeatability and accuracy with the requirements of relevant IS specification.

B-2 Procedure - The sample specimens shall be tested in wet condition after being stored at least 24 hours, in water maintained at a temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ before the specimens are submerged in water, the necessary area shall be determined.

The plates of the testing machine shall be wiped clean and any loose grit or other material removed from the contact faces of the specimen. Plywood nominally 4 mm thick, shall be used as packing between the upper and lower faces of the specimen and the machine plates, and these boards shall be larger than the specimen by a margin of at least 5 mm at all points. Fresh packing shall be used for each specimen tested. The specimen shall be placed in the machine with the wearing surface in a horizontal plane and in such a way that the axes of the specimen are aligned with those of the machines plates. The load shall be applied without shock and increased continuously at the rate of approximately 15 N/sqmm per minute until no greater load can be sustained. The maximum load applied to the specimen shall be recorded.

B-3 CALCULATION OF CORRECTED STRENGTH:-

The compressive strength of each block specimen shall be calculated by dividing the maximum load by full cross section area and multiplying by an appropriate factors.

Thickness and Chamfer Correction Factors

For Compressive Strength

Work Size thickness in mm	Correction Factors	
	Plain Block	Chamfered
60	1.00	1.06
80	1.12	1.18
100	1.18	1.24

B-4 COMPRESSIVE STRENGTH CALCULATION:-

The average corrected compressive strength for the designed block section shall be calculated.

APPENDIX -C

METHOD FOR THE DETERMINATION OF WATER ABSORPTION:-

The test specimens shall be completely immersed in water at room temperature for 24 hours. The specimens shall then be weighed, while suspended by a metal wire and completely submerged in water

They shall be removed from the water and allowed to drain for one minute. Visible surfaces water being removed with a damp cloth and immediately weighed

Subsequent to saturation, all specimens shall be dried in a ventilated oven at 100 to 115°C for not less than 24 hours and until two successive weightings at intervals of 2 hours

show an increment of loss not greater, than 0.2 percent of the last previously determined mass of the specimen.

Calculate the absorption as follows:

Absorption, kg/m³ A-B

=----- X 10000

B-C

Absorption percent A-B

Where -----X 100

B

A = wet mass of unit in kg

B = dry mass of unit in kg. And

C = suspended immersed mass of unit in kg.

The rate shall be for a unit of one square metre.

ITEM NO.12:-

Providing 100mm thick readymade c.c kerb of strength M-20 (size 300 mm x 380 mm) purchased from SMC's approved paverblock manufacturer & setting in line, level and in truly vertical position, including filling joints in C.M. 1:1 (1 part of cement : 1 part of stone dust) smooth pointing in C.M. 1:1 (1 part of cement :1 part of coarse sand) including watering etc. complete and as directed by Engineer in charge.

RAW MATERIAL:

CEMENT:-

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

WATER :-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

C.C.BLOCK CHARACTERISTICS:

The C.C. block should have perpendicularities after release from the mould and the same should be retained until the laying.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The C.C. block shall be manufactured in single layer only. Skilled labours should be employed for laying blocks to ensure line and level, for laying, desired shape of the surface and adequate compaction of the sand in joint.

The C.C. block must be of size 300 mm x 100 mm x 380 mm and casted in M-200 Grade with 4" (110 mm) radius rounding at the top and 2 (two) nos. 12 mm keys at the other vertical face as directed by Engineer-in-charge.

When foot path meets with a junction or approach road at the end of foot path, a turning radius equal to the width of foot path should be made as per below and as directed by Engineer-in-charge.

Sr No.	Turning Radius	No. of C.C. Block to be fix	Size of C.C. Block in rounding
1.	1.00 mt.	4 Nos.	Outer 370 mm x inner 340 mm x thickness 100 mm x Height 380 mm
2.	1.50 mt.	6 Nos.	
3.	2.00 mt.	8 Nos.	

Strength is measure of the ability of the concrete kerb unit to withstand load. It is determined under laboratory conditions using bending strength. A load is uniformly applied through a 401mm swivel paralkled and rigid bearers rounded to a radius of 201mm until failure reached. For each kerb the individual strength in MPa is determined using the second moment of area. For each of calculation, the second moment of area and distance from the centroid to the extreme tensile fibre are incorporated for the profiles specified within the standard. For other profiles please refer to individual manufacturers who will supply the relevant information. The bending strength in MPa is recovered to check compliance with BS EN, The number of the kerbs per sample will vary depending on previous production performance assessed statistically by attributes of variables. The characteristic bending strength shall not be less than the value corresponding to the class in the table that follows. None of the individual results shall be less than the corresponding minimum bending strength in the table. Where kerbs, due to their geometry, cannot be tested according to this standard they shall be considered to be in the same class as tested kerbs provided they have at least the Bending strength classes.

Class Strength	Marking (MPa)	Characteristic Bending (MPa)	Minimum Bending Strength
1	S	3.5	2.8
2	T	5.0	4.0
3	U	6.0	4.8

WEATHERING RESISTANCE:

Is a measure of the ability of the concrete kerb to withstand weathering specific conditions exist such as frequent contact of the surface with de icing salt under frost conditions. It can be assessed under laboratory conditions by measuring the amount of spalled material from a surface under the cycle of freezing thawing action using a deicing salt solution, or, if non-icing salt is used, then the measurement of the porosity by measuring the water absorption of the kerb could be used.

ABRASION RESISTANCE:

Is a measure of the ability of the concrete kerb to withstand erosion caused by trafficking in service. It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material while applying a known force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

SLIP/SKID RESISTANCE:

Is a measure of the ability of the concrete kerb laid in service to withstand slipping for pedestrians and skidding for vehicles. The unpolished slip resistance value is determined using standard rubber material attached to a pendulum friction tester and tested under wet conditions. To determine the polished pvaer value (PPV) for all paving units BS 7932:1988 should be used. This test method measures the slip resistance of the kerb after it has been synthetically trafficked (or polished) under laboratory conditions to replicate the performance of kerb during their life under traffic conditions. For more details please contact interpave.

Kerb and edgings are mainly used as edge restraints to paved surfaces or where changes in surface materials or levels occur. They retain any unbound construction material, e.g. laying course material, within the paved area and help support the applied loads by preventing horizontal displacement of the pavement construction. Channels may be used in these applications as well but can also be used to intercept and transport surface water. In vehicular areas kerb, edging and channel units will inevitably be overrun or suffer side impact from vehicle tyres sometime in their service life. By selecting the appropriate units and ensuring correct installation they will give long and durable service.

TOLERANCES:

Performance deviations the value for possible deviation from manufacturer's declared values are as follows.

Length:

1% to the nearest mm, with a minimum of 4mm and not exceeding 10mm.

Other dimensions:

Other faces : 3% to the nearest mm, with a minimum 3 mm not exceeding 5 mm.

Other parts : 5% to nearest mm, with a minimum of 3 mm not exceeding 10 mm.

Flatness and straightness:

Length of gauge mm	Permissible deviation mm
300	1.5
400	2.0
500	2.5
800	4.0

The difference between any two measurements of single kerb shall be $\leq \pm 5$ mm.

Installation of concrete kerbs, edging and channel units has five main stages:

- Preparation of support layers.
- Construction of unit foundation.
- Laying to line and level.
- Bedding of units.
- Haunching of units.

The unit foundation itself must be supported, either on an extension to the underlying pavement sub layers or, for thin pavements (e.g. edgings on pedestrian footways), directly on an adequate subgrade. The depth of the unit and that of the pavement construction will determine on which pavement layer the kerb foundation will sit.

Products should be laid using one of the following alternative methods:

1. Units set on a race of freshly mixed concrete.
2. Units bedded on a mortar bed on top of a hardened concrete race or onto a mortar bedding on a carriageway.
3. Units bonded to the pavement surface.

LAYING OF C.C. BLOCK AS KERB :

C.C. block shall be placed in line, level and in true vertical position with 12 mm gap including filling joints in C.M. 1:1 (1 Part of cement : 1 part of stone dust) and smooth pointing in C.M. 1:1 (1 cement of cement : 1 part of stone dust) including watering.

At the Residential units, it shall be kept 8" (200 mm) open above water table and at the commercial complex, it shall be kept 3" (75 mm) open above water table and as directed by Engineer-in-charge.

SAMPLING AND TESTING PROCEDURE FOR C.C. BLOCK:

Sample size:

- Internal : Average of minimum 3 samples per 3000 blocks - for paver block manufacturers.
- External : Minimum 3 blocks per 3000 blocks.

Sampling for testing :

Sampling for testing of C.C. kerb shall be done in accordance with Appendix-A in item no.6.

Compressive strength : testing for 28 days compressive strength shall be undertaken.

Abrasion Resistant: It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material applying a known force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

Bending strength : The characteristic bending strength shall be less than the value corresponding to the class. None of the individual results shall be less than the corresponding minimum bending strength.

The rate shall be for a unit of one R.M.

For ensuring quality control and workmanship, above test shall be taken at 01 (One) test per each 1000 (One thousand) Nos. of C.C. block.

The C.C. block shall be got tested at (R&B) field laboratory of GERI (R&B) or S.V.N.I.T., or Govt. approved laboratory.

Laying on pavement surface:

The units may be laid directly onto a suitable pavement surface which should extend to a width to fully support the units and any required haunching. The units are bonded to the surface using a suitable synthetic resin compound or with a modified strengthened mortar.

Jointing:

Concrete kerbs are generally laid with unfilled, close joints with a minimum joint width of 12 mm they must not be butt-jointed. Mortar joints should be filled by 1:1 (1 Cement : 1 stone dust) and enlashed with the mortar which should be freshly mixed, consisting of 1:1 (1 Cement : stone dust) where mortar joints are used, they should be completely filled and fully compacted. Joints width should be 12 mm.

Where units are laid over or adjacent to a jointed concrete pavement, suitable joints should extend through the line of the units at the joints and continue through the kerb race. When mortar joints are used, movement joints should be provided. These movement joints should be formed of 12 mm thick easily compressible material, extend through the kerb race. Mortar should be used as soon as possible and any material that has begun to set or has been mixed for more than two hours discarded.

Contractors need to plan the work to ensure risk is kept to an acceptable level. This may involve the following actions.

- Rethink the phasing of the kerb installation to maximise the number of kerbs being laid at one time.
- Lay direct from the pack rather than double handling by stringing out ahead of final laying.
- Use machinery capable of handling both packs and individual kerbs.
- Use machinery solutions for the handling of non standard kerb details such as feature kerbs, transition kerbs, drop kerbs, quadrants (cheeses) and radius kerbs.
- Ensure that workers are trained in the safe use of mechanical lifting equipment.
- Provide training in safe lifting techniques for works involved with kerb laying.
- Consider use of alternative lightweight kerb components for certain circumstances.

Kerb laying by hand involves a serious risk of injury to those who are doing the work and therefore employers need to take action to control this risk. When taking the risk, the best solutions will be those which address all three main hazards, the weight of the kerb, the repetitive nature of the operation and poor posture during work. The hierarchy of control measures is suggested. You should try to adopt the solution nearest the top of the hierarchy first, as these will give the best level of risk control. In rare cases, where it is not possible to use any mechanical solutions, short stretches of kerb may be laid manually. Where this is necessary workers should be trained in good handling techniques. The use of lighter weight kerbs or devices that allow two people to share the lift will reduce the risk of injury.

GENERAL GUIDANCE:

It is important that work procedures are drawn up before commencement to identify any hazards. Failure to do this can result in lack of co-ordination of materials and multiple handling of product. Correct personal protective clothing should be provided.

Planning the work:

Work should be planned and coordinated to avoid unnecessary handling.

For operations where fork lift vehicles are used, kerbs should be stacked onto timber pallets. Ensure that pallets are robust as the failure of a pallet could allow kerbs to fall.

Stripping and wrapping of packs should only be removing just prior to use of the kerbs.

Care should be taken when cutting bands and/or removing wrapping to avoid kerbs falling.

Accurate placement of the concrete bed will minimise shovelling operations.

Accurate preparation of the concrete bed and any excavated trench will reduce the amount of adjustment to kerbs once laid.

Where power tools are used for cutting these should be concrete cutters with diamond blades and water flow lubrication for cooling and dust suppression.
The rate should be for a unit of One R.M.

ITEM NO.13:-

Providing and fixing in position Readymade vacume wet press kerb block (Height 450 x Width 600 x Thickness 125) with all labour and material charges asper instruction of Engineer in charge.

The item shall be executed as per the Self Explanatory, as directed by Engineer-in-charge.
The rate shall be for a unit of one R.mt

ITEM NO.14:-

Supplying & filling white sand compacted thickness over the base including necessary compaction, watering etc. complete. Item includes levelling by using vibratory plates compacted machine and as directed by Engineer in charge.

MATERIALS :

White sand shall conform to specification of material M-3.

WORKMANSHIP :

White sand shall be supplied to worksite and staked at suitable place. It shall be got approved by Engineer-in-charge. White sand shall be filled in compacted. It shall be compacted and watered thoroughly.

The rate shall be for a unit of one cubic meter.

ITEM NO.15:-

Providing & fixing M.S.Grills of required pattern to wooden frames of windows etc. At all floor levels with M.S. flats at required spacing & frame around square or round bars with round headed bolts and nuts or by screws incl. Priming coat of Red lead paint etc.comp. (A) Plain grill For all Floors

1.0 MATERIALS :

The structural steel shall conform to M-22.

2.0 WORKMANSHIP :-

The M.S. Grills shall be prepared as per the drawings or as directed for fixing to wooden frames of windows etc.

The grill shall be fabricated to the designs and pattern shown in the drawings and the weight shall be as directed, and the joints shall be revetted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the strip frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to a minimum of 2 Nos. on such side of the frame or as indicated in the drawing or as directed.

The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

3.0 MODE OF MEASUREMENT AND PAYMENT :-

o payment shall be made for weight of screws, bolts and nuts etc. only weight of grill shall be paid.

The rate shall be for a unit one Kg.

ITEM NO.16:-

Painting two coat (excluding priming coat) on new steel and other metal surface with synthetic enamel paint, burshing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters.

Detailed specification as per **item no.17(part-A)**

Rate shall be per Squire metrer basis.

ITEM NO.17:-

Providing and Supplying ISI standard R.C.C. pipes (of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to department stores, stacking etc. complete.(IS 458 / 1989) Note : One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.

Lowering, laying and jointing RCC pipes in C.M. 1:1 1/2 of following diameters in proper position, grade and alignment at all level as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing as per ISI code. Class NP3 Test Pressure 0.7 Kg. / sq. cm

1.0 MATERIALS :

1.1 The reinforced concrete light duty non-pressure pipes of specified diameter shall confirm to I. S. 458-1971. Cement mortar of required proportion shall conform to M-7.

2.0 WORKMANSHIP :

2.1 EXCAVATION OF TRENCHES :

2.2 The width of the trenches shall be 1.05/1.20 metre and depth shall be corresponding to invert level of the screen chamber and required levels as directed.

2.3 At joints, the trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line and gradient in accordance with general specifications of earth work in trenches.

3.0 LAYING :

3.1 The pipe shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made of left on the bed to receive the sockets of the pipes.

3.2 JOINTING :

3.3 Tarred gasking or yarn soaked in neat cement slurry shall first be placed around the spigot of each pipe and spigot shall than be placed well home into the socket of the pipe previously laid.

The pipe shall then be adjusted and fixed in the correct position and gaskin caulked home sas to fill not more than 1/4th of the total depth of (13 mm in depth) the socket.

3.4 The remainder of the socket shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the a socket is filled, a fillet shall be formed round the joints forming an angle of 45 degree with the barrle of the pipe.

3.5 The mortar shall be mised as necessary for immediate use.

3.6 After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper or 'badger'. The newly made joints shall be protected, until

- set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose.
- 3.7 The mortar shall be cured for 10 days.
- 4.0 **MODE OF MEASUREMENT AND PAYMENT :**
- 4.1 Pounding or bottaning of the trenches bed to fit the lower part of the pipe and 'Grips' dug to take socket collars etc. are included in the rate of laying the pipes.
- 4.2 The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connection shall be included in the total length of the pipe drains. Nothing extra shall be paid for the same. The rate excludes necessary excavation, including refilling trenches etc.complete.
- 4.3 The rate shall be for a unit of one running metre.

ITEM NO.18:-

Providing & construction simple chamber of 23 cm. th' B.B. Masonary in C.M 1:5 with cement plaster 15 mm th' in C.M. 1:3 inside & outside to exposed faces, R.C.C. top slab with 1:2:4 mix (1 cement: 2 Sand : 4 Grade stone aggregate 20mm size) ,Foundation concrete 1:5:10 & fixing C.I. cover with frame to be not less than 38 kg. On top etc. comp. Inside dimension,455 x 610 mm & 450 mm deep for single pipe. Same As Above But Precast RCC Heavy Duty Cover Instead of C.I. Cover 0.6 x 0.45

**(A) Same as above but Precast RCC heavy duty Cover instead of C.I. Cover
Extra for every additional depth of 0.1 mt beyoung 0.45 mt**

- 1.0 **Materials :**
Water shall confirm M-1. Cement shall confirm to M-3. Coarse sand shall confirm to M-6. Flyash Building Brick shall confirm to M-15(A). Cement mortar shall confirm to M-11.
- 2.0 **Workmanship :-**
- 2.1 The item covers the construction of simple chamber of clear size 0.45 x 0.60 mts.with 23 thick brick wall in C.M.1:5 and smooth plaster 15 mm thick C.M. 1:3 Bedding concrete of C.C. 1:5:10, 150 mm thick, the projected bed concrete beyond chamber wall shall be of 75 mm. The chamber frame & cover shall be of Precast RCC heavy duty cover fixed with C.M. 1:1 etc. comp.
- 2.2 Specification for item No.1[a] shall be read for excavation, & specification for Item No.8 shall be adopted for P.C.C. and specification for Item No.12 shall be read for B.B. Masonary and specification for Item No.14 shall be read for plaster work except that the thickness of plaster shall be 15 mm thick in CM 1:3.
- 3.0 **Mode of Measurements and payments :-**
[1] The rates including all labours, materials, tools and plats etc. required for satisfactory completion of this work.
[2] The rate shall be for a unit of one number.

PART C - GAZZEDO

ITEM NO.1:-

Excavation for foundation upto 1.5m. Depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50 mt. lead. (A) loose or soft soil with machineries (1) 0 To 1.5 mt. Depth (2) 1.5 To 3.0 MT Depth (3) 3.0 To 5.0 MT Depth.

1.0 GENERAL

1.1 Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such excavation implement or organic soil, gravel, silt, sand turf loam, clay, peat etc. fall under this category.

2.0 CLEARING THE SITE

2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be the property of the Corporation and shall be conveyed and stacked as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

3.0 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 EXCAVATION

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

5.0 DISPOSAL OF EXCAVATED MATERIALS

5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

5.2 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead or 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at

scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.

6.0 **MODE OF MEASUREMENT AND PAYMENT**

6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge or as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.

6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

6.3 The rate shall be for a unit of one cubic meter.

ITEM NO.2:-

Boring holes 3.5 mt. Deep in ordinary soil (for cast in situ piles) & disposal of the surplus excavated soil as directed within a lead of 50 m. For following diameter of piles. (i) 250 mm

Workmanship:

The ground shall be roughly leveled and after making the position of piles, the holes shall be bored with a spiral angle to the 1.8 M depth and specified diameter using boring guide.

The bore holes shall be truly vertical and uniform bore through cut of specified diameter. After boring to the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavated stuff as directed within a lead of 50 M.

Mode of Measurement & Payment : The rate for boring holes shall include :

[a] Roughly leveling the ground in positions where piles are to be provided [b] Making the position of piles by pegs and boring guide and also for shifting of boring guide [c] Bailing out water, if any met with during boring [d] Disposal of surplus excavated soil within a lead of 50 M. and [e] All tools, plants, equipments and labour required for satisfactory completion of work.

The rate shall be for a unit of one Running metre.

ITEM NO.3:-

Providing & laying cement concrete 1:2:4 (1 cement: 2 sand:4 graded stone agg. 20 mm nominal size)& curing comp. Includ.cost of form work but exclu. Cost of reinforcement for reinforced concrete work in : (A) Foundation and plinth.

Item Description as per **item no.3(part-A)**.Take 1:2:4 instead of 1:3:6

The rate shall be for a unit of one cubic metre.

ITEM NO.4:-

Providing and laying ordinary cement concrete work 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) & curing comp.including cost of form work but excluding cost of reinforcement for reinforced concrete work in: (A) Foundation, footing, Base of columns and Mass concrete.

Detail Specification as per **item no.4 (Part-A)**

The rate shall be for a unit of one Cubic meter.

ITEM NO.5:-

Providing and laying ordinary cement concrete 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) finishing smooth curing etc. complete including cost of form work but excluding cost of reinforcement for reinforced concrete work (R.C.C.) in : A) Columns. (1)Having c/s area up to 0.08 s.mt

Detail Specification as per **item no.4.Part-A)**
The rate shall be for a unit of one Cubic meter.

ITEM NO.6:-

Providing and laying ordinary cement concrete 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) finishing smooth curing etc. complete including cost of form work but excluding cost of reinforcement for reinforced concrete work (R.C.C.) in : B) Beam (1)Having c/s area up to 0.08 s.mt & upto 0.12 sq.mt

Detail Specification as per **item no.4(Part-A)**
The rate shall be for a unit of one Cubic meter.

ITEM NO.7:-

Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level

Detail Specification as per **item no.7.(part-a).**
The rate shall be for a unit of one Kg.

ITEM NO.8:-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 70Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. Up to G.L./P.L.

- 1.0 MATERIALS
Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.
- 2.0 WORKMANSHIP
- 2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.
- 2.2 Wetting of bricks : The bricks required for masonry work shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water, is an indication of thorough wetting of bricks.
- 2.3 Laying : Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond. Closures in such case shall be cut to required size and used near the ends of the walls.
A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.
The walls shall be taken up truly in plumb. All courses shall be truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept in uniform.
The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, manson's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

- Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.
- All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.
- 2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.
- The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.
- 2.5 Curing : Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.
- 2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry.
- If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.
- 2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding planks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0 MODE OF MEASUREMENTS & PAYMENT :
- 3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.
- 3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---
- i] Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbels, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
 - ii] Opening not exceeding 1000 Sq.Cm.
 - iii] Wall plate, sand bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
 - iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
 - v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.

- vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jams, throating and making arches over the aperture be paid for separately.

3.5 The rate shall be for a unit of one cubic metre.

ITEM NO.9:-

Providing and filling in plinth with murrum / yellow soil or selected soil in layers of 20 cm. thickness including watering, ramming and consolidation etc. complete.

- 1.0 Materials :-
Murrum shall be cleaned, of good binding quality, and of approved quality obtained from approved pots/ quarries of disintegrated rock which contain silicious material and natural mixture of clay of calcarious origin. The size of murrum shall not be more than 20 mm.
- 2.0 Workmanship:-
- 2.1 The murrum to be used for filling shall be free from salts, organic or other foreign matter. All clods of murrum shall be broken.
- 2.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc. and filled with murrum in layers not exceeding 20 Cms. Each layers shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The murrum shall be rammed with iron rammers where feasible and with the butt ends of crowbars, where rammer cannot be used.
- 2.3 The plinth shall be similarly filled with murrum in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for atleast 24 hours and allowed to dry and then rammed and consolidated.
- 2.4 The finished level of filling shall be kept to shape intended to be given to the floor.
- 2.5 In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation shall also be as specified.
- 2.6 The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances blackcottom soil shall be used for filling the plinth.
- 3.0 Mode of measurement and payment :-
- 3.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage of voids if consolidated as instructed above.
- 3.2 The rate includes cost of collecting and carting murrum or selected murrum of approved quality with all lead and labour required for filling in trenches and plinth.
- 3.3 The rate shall be for a unit of one cubic metre.

ITEM NO.10:-

Providing & applying 20mm.th. Sand faced cement plaster on walls or similar surfaces at all floor levels consisting of 12 mm. Av. th'. Backing coat of C.M. 1:3 (1 cement :3 sand) & 8 mm.th. Finishing coat of C.M.1:1 (1 cement: 1 sand)--- Upto G.L./P.L

Item Description as per **Item no.10.(part-A)**

The rate shall be for a unit of one square metre.

ITEM NO.11:-

Providing & Laying green polished kota stone slab flooring at all floor levels,over 20 mm av.th.base of C.M. 1:6(1cement: 6 sand) laid over&joined with grey cement slurry incl. Rubbing & polishing etc. comp. (A) 25 mm. thick For all Floor

- 1.0 Materials :-
Water shall confirm to M-1,Lime Mortar shall confirm to M-10,Cement Mortar shall confirm to M-11,Polished Kota Stone shall confirm to M-49,
- 2.0 Workmanship :-
- 2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.
- 2.2 Bedding for the kotah stone slabs shall be cement mortar 1:6 [1 cement : 6 coarse sand] or L.M. 1:1.5 of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently placed in position and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.
- 2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.
- 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.
- 2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.
- 3.0 Mode of Measurements&payments:-
The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt.
The rate shall be for a unit of one sq.metre.

(B) WORK ABOVE PLINTH LEVEL

ITEM NO.12:-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 70Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. Ground floor

- 1.0 MATERIALS
Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.

2.0 WORKMANSHIP

- 2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.
- 2.2 Wetting of bricks : The bricks required for masonry work shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water, is an indication of thorough wetting of bricks.
- 2.3 Laying : Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond. Closures in such case shall be cut to required size and used near the ends of the walls.
A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.
The walls shall be taken up truly in plumb. All courses shall be truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept in uniform.
The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, manson's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.
Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.
All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.
- 2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.
The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.
- 2.5 Curing : Green work shall be protected from rain suitably. Masonary work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.
- 2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry.
If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.
- 2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding

- poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0 MODE OF MEASUREMENTS & PAYMENT :
- 3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.
- 3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---
- i] Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
 - ii] Opening not exceeding 1000 Sq.Cm.
 - iii] Wall plate and bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
 - iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
 - v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.
 - vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jams, throating and making arches over the aperture be paid for separately.
- 3.6 The rate shall be for a unit of one cubic metre.

ITEM NO.13:-

Providing & Applying 15mm thk cement plaster in single coat on brick/ concrete walls similar surfaces for plastering & finished even & smooth with a floating coat of cement slurry mixed with admixture of lime or neeru in required proportion etc. comp. in C.M 1:3 (1 cement : 3sand) (A) For wall and similar.

1.0 MATERIALS

Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11.

2.0 WORKMANSHIP

- 2.1 Scaffolding - Wooden ballies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.
- 2.2 Preparation of Background - The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface be roughened by wire brushing if it is not hard and hacking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.
- Raking of joints in case of masonry work where necessary, shall be allowed to dry out for sufficient period before carrying out the plaster work.
- The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such areas shall be moistened again.

For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3 APPLICATION OF PLASTER

The plaster about 15 x 15 Cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surface gauges shall be truly in place of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden flat according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, junctions etc. shall be carried out with proper templates to the size required.

Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommending the plaster, the edges of the old work shall be scrapped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cms. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arrises. Horizontal points in plaster work shall not also occur on parapet tops and copings as those invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

Each coat shall be kept damp continuously till the next coat is applied for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking or walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air to dry weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

3.0 MODE OF MEASUREMENTS & PAYMENT

- 3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth or height shall be measured correct to a centimetre.
- 3.3 Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.
- 3.4 This item includes plastering upto floor two level.
- 3.5 The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any, shall be deducted.
- 3.6 Soffits of stairs shall be measured as plastering on ceilings. Blowing soffits shall be measured separately.
- 3.7 For jambs, soffits, sills etc. for openings not exceeding 0.5 Sq.Mts. each in area for ends of joints, beams, posts, girders, step etc. not exceeding 0.5 Sq.Mts. each in area for and for openings exceeding 0.5 Sq.Mts. and not exceeding 3 Sq.Mts. in each area deductions and additions shall be made in the following manner ---

- a] No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 Sq.Mts. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings for finish to plaster around ends of joints, beams, posts etc.
- b] Deduction for openings exceeding 0.5 Sq.Mts. but not exceeding 3 Sq.Mts. each shall be made as follows and no additions shall be made for reveals, jambs, soffits sills etc. of these openings --
 - i] When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.
 - ii] When two faces of wall are plastered with different types of plaster or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and/or pointing as the case may be.
- 3.8 For openings having door frames equal to projecting beyond the thickness of wall, full deductions for opening shall be made from each plastered face of the wall.
- 3.9 In case of opening of area above 3 Sq.Mts. each deductions shall be made for opening but jambs, soffits and sills shall be measured.
- 3.10 The rate shall be for a unit of one Sq.Mts.

ITEM NO.14:-

Providing & laying granite slab 18mm thick in flooring, treads of steps and landing laid on bed of 20mm thick cement mortar 1:6 (1 Cement : 6coarse sand) or lime mortar 1:1.5 laid and finished with flush pointing in white or colour cement including rubbing and polishing complete. (Basic Rate:- Rs.1590.0/S.M.)

- 1.0 Materials :-
Water shall confirm to M-1,Lime Mortar shall confirm to M-10,Cement Mortar shall confirm to M-11, Granite Slab flooring shall confirm to M-49,
- 2.0 Workmanship :-
- 2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.
- 2.2 Bedding for the kotah stone slabs shall be cement mortar 1:6 [1 cement : 6 coarse sand] or L.M. 1:1.5 of thickness 20 mm as given in the description ofthe item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped genetly to bring it in level with the other slabs. It shall than be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently placed in positon and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible.The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall and floor shall be finshed neatly. The finished surface shall be in true levels and slopes as directed.
- 2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.
- 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to

350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.

2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.

3.0 Mode of Measurements & payments:-

The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt.

The rate shall be for a unit of one sq.metre.

ITEM NO.15:-

Providing & laying granite slab 18mm thick in skirting, risers of steps, dado and pillars laid on 10mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) and finished with flush pointing in white or colour cement including rubbing & polishing comp.. (Basic Rate:- Rs.1590.0/S.M.)

Details specification same as per **item No.14**

The rate shall be for a unit of one Sq.metre.

ITEM NO.16:-

Steel work welded in built up sections, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint (A) in beams & joists channels angles, tees, flats with connection plates or angle cleats as in main & cross beams, hip & trussed purlins connected to common rafters & the like.

1.0. Materials The structured steel work shall conform to M-22. Red lead paint shall conform to I.S : 102-1962.

2.0. Workmanship

2.1. The steel sections as specified or required, shall be cut, square and to correct lengths, as per drawings and design. The cut ends exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length of member, except as indicated in the drawing or as directed. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed/permitted.

2.2. Steel riveted or bolted in built up sections, frame work.

2.2.1. The steel structure as shown in the drawings or as per direction of the Engineer-in-charge shall be laid out on a level platform to full scale and to full size in parts. A steel tape shall be used for measurements to ensure maximum accuracy. 2.2.2. Wooden templates 12 mm. to 19 mm. thick or metal sheet template shall be made to correspond to each connecting gussets plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes of the steel members shall also be marked for cutting. The base of steel column and the position of Anchor bolts shall be carefully set out

2.2.3. Ail stiffeners shall be formed by pressure and where practicable the metal shall not to be cut and welded in making these. In major work, or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure including location, type, size, (origin and details of rivets, bolts or weld shall be prepared in advance of the actual fabrication and as distinctly marked or stenciled with paint with the identification mark as

given in the shop drawings. The bars shall be thickened at the ends, so as to provide for screwed threads and gradually tapered off to meet their normal section. Great accuracy shall be observed in fabrication of various member, so that these can be assembled without being unduly packed, stained, or forced into position and when built up, shall be true and free from twists, wrinkles, buckles, or open joints. Before making holes in individual members for fabrication the steel work intended to be riveted or bolted together shall be as aligned or clamped properly and tightly so as to ensure close abutting or lapping of the surfaces of the different members. All stiffeners shall bear tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or crossed true and straight and fitted close together. Web splice plates and stiffeners under stiffened shall be cut to fit within 3 mm. or flange Angles Web plates of Girders shall have no cover. Plates, shall have their ends flush with the top of angles forming the flanges unless otherwise required. The web plates when spliced shall have clearance of not more than 6 mm. The erection, clearance for created ends of members connecting steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably designed seating shall be provided. Pains and rollers shall be accurately tuned to gauge. These straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangements for holding the girders or truss resting on it. In columns caps and bases, the ends of shafts together with the attached gussets Angles, channels etc after riveting together shall be accurately mechanized so that the parts connected Butt against each other over the entire surfaces of contact connecting angles or channels shall be fabricated and placed in position with greater accuracy so that they are not unduly reduced in thickness by machining. The ends of bearing stiffeners shall be mechanized or ground to fit tightly both at the top and bottom, All holes shall generally be drilled to the required size and at required, position. Sub punching shall be permitted provided it is done 3 mm. or less in diameter and reamer thereafter to the required size. The holes for rivets and bolts shall be larger by 0.4 to 6 mm. than the nominal diameter of rivets or bolts depending upon the diameter of rivets. Holes shall have their axis perpendicular to the surface bored through. The drilling or reaming shall be free from burrs, and the holes should be clean and accurate holes for counter sunk bolts shall be made in such a manner that their heads fit flush with the surface after fixing. [Type text] Page 78 The fabrication work shall be completed in workshop as far as it is practicable to do so. Site joints shall be done with rivets and fitted bolts or black bolts, as shown in the drawings or as directed. Generally the following principles shall govern the use of rivets turned and fitted bolts, and black bolts. (i) Rivets and turned and fitted bolts shall be used where the connections is such that slip under load has to be avoided. (ii) Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal or stresses.

2.2.4. Riveting: The parts assembled for riveting shall be in close contact with each other and the bearing stiffeners shall bear tightly both at top and bottom without being drawn or caulked. Members to be riveted shall be properly pinned or bolted and rigidly held to gather while riveting. Drifting of holes shall not be permitted Except to draw the parts together and the drifting tools so used shall have maximum diameter not exceeding, the nominal diameter of rivets or bolts. Drifting done during assembling shall not distort the metal or enlarge the holes. The shanks of rivets shall project beyond the plate-surface sufficiently so as to fill hole thoroughly and form the required head after riveting. The riveting shall be done by hydraulic or pneumatic process. However, where such facilities are not available, hand riveting may be permitted. The rivet shall be heated red hot, care being taken to control the temperature of heating so as not to burn the steel. Rivets of diameter less than 10 mm. may be fitted cold. Rivets shall be of heat finish with heads full and of equal size. All loose, burnt or badly formed rivets with concentric or deficient heads shall be cut out and replaced. The heads of rivets shall be central to shanks and shall grip the assembled member firmly. In cutting out rivets, care shall be taken so as not to injure assembled members, caulking or re-equipping shall not be permitted. For testing rivets, a hammer weighing approximately 0.25 kg shall be used. Both heads of the rivets shall be tapped, slack rivets will give a hollow sound and a jar. All rivet heads shall be painted with red lead paint within a week of their fixing.

2.2.5. All bolt heads and nuts shall be hexagonal and of equal size unless specified otherwise. The screwed heads shall conform to I.S. 1363-1960 and the threaded surface shall not be tapered. The bolts shall be of such length so as to project two clear threads beyond the nuts when fixed in position and these shall fit in the holes without any shakes. The nut shall be fit in the threaded ends of bolts properly. Where turned and fitted bolts are required to be used in place of rivets shall be provided with washers not less than 6 mm. thick so that the nut when tightened shall not bear on the unthreaded body of the bolt. Tapered washers shall be provided for all heads and nuts bearing on leveled surfaces. The threaded portion of the bolt shall not be within the thickness of the parts bolted together, the faces of the bolt heads and nuts abutting against steel members shall be machine finished. Where there is a risk of the nut being removed or becoming loose due to vibrations or reversal of stresses, these shall be secured from slackening by the use of locknuts, spring washers, cross-cutting or hammering down of threads as directed. Bolts, nuts, and washers shall be thoroughly cleaned and dipped in double boiled linseed oil before use. The whole steel work shall be painted with a coat of priming coat of red lead, as per relevant specification of painting.

3.0 Mode of measurements & payment

3.1. The steel work shall be measured in general as under: (a) All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise. (b) The weight of steel sections, steel rods, and steel strips in finished work shall be calculated on standard weight on the same basis on which steel is supplied to Contractor by department or those given in relevant I.S.: if steel is arranged by the contractor. (c) The weight of steel plates and strips shall be taken from relevant I.S. based on 7.35 kg./sq. meter for every millimeter sheet thickness if steel is supplied to the contractor by department. (d) Unless otherwise specified, weight of cleats, brackets, packing pieces, bolts, nuts, washer, distance pieces, separators, diaphragm gusset (taking overall square dimensions) fish plates etc. shall be added to the weight of respective items. (e) In riveted work allowance is to be made for weight of rivet heads. No deductions shall be made for rivet or bolt holes excluding holes for anchor or holding down bolts. (f) For forged steel and steel castings, weight shall be calculated on the basis of 7850 kg./cum. (g) Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure. [Type text] Page 79 (i) Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001m (j) Mill tolerance shall be ignored when weight is determined by calculation.

3.2. The rate includes cost of all material, labour, erection, hoisting scaffolding, protective measure, required for proper completion of the item of work. This shall also include conveyance and delivery handling, loading, unloading and storing etc. required for completing the item described above including necessary wastage involved.

3.3. The rate shall be for a unit of one quintal.

ITEM NO.17:-

Painting two coat (excluding priming coat) on new steel and other metal surface with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters.

Detailed specification as per **item no.17 part-A**

Rate shall be per Square meter basis.

ITEM NO.18:-

Providing & applying two coats of weather shield max paint (3 coats may be required in case of darker colours.) of ICI Dulux or Apex Ultima of Asian Paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding,

preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers.

Surface Preparation :

surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes.

Priming:

Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. Application of putty is not recommended.

Minimum 4-6 hours duration is required between each coat of weather shield max paint.

Self explanatory and as directed by Engineer-in-charge.

Rate shall be per square meter basis for complete item.

ITEM NO.19:-

Providing & fixing colour on galvanised steel, zinc / aluminium alloy coated sheet 0.5 mm. thick roofing fixed with galvanised J or L hook bolts and bolt 8mm dia with bitumen and impet washer filled with white lead etc. Excluding the cost of purlins rafter and trusses. (Tata / Jindal or equivalent)

1.0. Materials :

Corrugated G.I. sheets shall conform to M-23.

2.0. Workmanship

2.1. Spacing of purlins : One purline shall be provided at the ridge and one at the eaves. The spacing of other purlins for 0.8 mm. thick G.I. sheets shall not exceed 1.80 meters. The purline shall coincide with the centre line of the end lap. The ridge purlins shall be placed in such a way that the ridges can be fixed properly. The portion overhanging the wall support shall not be more than one fourth of the 'spacing of purlins'.

2.2. The top surfaces of the purlins shall be painted before the sheets are fixed over them. Embedded portions of purlins shall be finished with two coats of coal-tar.

2.3. Laying of sheets :

2.3.1. The sheets shall be laid in purlins to a true plane with the line of corrugations truly parallel or normal to the sides of area to be covered. The sheets shall not generally be built into gables and parapets. They shall be bent up along their side edges close to the wall, and the junction shall be protected by suitable flashing or by projecting drip course.

2.3.2 The laps at end shall be provided 150 mm. minimum for roof slopes 1 in 2 (1 vertical : two horizontal) and steeper but 200 mm. shall be provided for flatter slopes than those above. The side lap shall be provided two ridges of corrugations at each side.

2.3.3. The sheets shall be cut to the dimensions or the shape of the roof either along their lengths or their width or in slant across the line of corrugations at hips and valleys. The sheets shall be cut carefully with a straight edge and chisel to give straight finish. The sheets shall be laid such that the laps are turned away from the usual direction of local heavy rain.

2.3.4. Fixing of sheets :

2.3.4.1. Sheets shall be fixed to the purlins or other roof members such as hips or valley rafter etc. with 1J' or 1L' galvanized hook bolts, and galvanized nuts 8 mm. dia. with bitumen limpet washers and G.I. washers. Limpet washers with white lead shall be used. Length of hook bolt shall be varied to suit the site requirement. Bolts shall be sufficiently long so that after fixing the project above the top of their nuts by not less than 12 mm the grip of 1J' or 1L' hook bolts on the sides of purlins shall not be less than 25 mm. There shall be minimum of three hook bolts placed at the ridge of corrugations in each sheet in every purlin and their spacing shall not exceed 300 mm. Coach screw shall not be used for fixing the sheets to purlin, where the slopes of roof are not less than 2.1/2

degree (1 vertical and 2.1/2 horizontal). Sheets shall be jointed together at the side laps by galvanized iron bolts and nuts 25 mm. x 6 mm. size each bolt with a bitumen and G.I. limpet washer filled with white lead. Where the overlaps at the sides extend to two corrugations, these bolts shall be placed zigzag over lapping corrugations, so that the ends of the overlapping sheets are drawn tightly towards each other. The spacing of same bolts shall not exceed 600 mm. along each of the staggered rows.

2.3.5. Holes for all bolts shall be drilled and not punched in the ridges of the corrugations from the under side, while the sheets are on the ground. The holes in the sheets shall be at least 50 mm. from the edge. ' Sheets drilled wrongly shall be rejected. The holes in the washers shall be of the exact diameter of the hook bolts or the beam bolts. The nuts shall be tightened from above to give a leak-proof root

3.0. Mode of measurements and payment

3.1. The measurements of the C.G.L sheet roof shall be taken for finished work in superficial area in general plane (not girthed on the roof). The laps between the C.G.I. Sheets both at their ends and along the side edges shall not be measured. The overlaps of C.G.I, sheets over the valley piece and their under lap under the ridge, hip and flashing piece shall be included in the measurements.

3.2. No deductions in measurements shall be made for openings for chimney stacks, sky light etc., of area up to 0.40 sq. mt. nor extra be paid for labour in cutting and for wastage etc. in forming such openings.

3.3. The rate of roof shall include the cost of all materials and labour involved in all operations described above. The rate also includes the cost of provision, erection and removal of the scaffolding, benching, ladders, templates and tools required for the proper execution and erection of the work. The rate includes the cost of purlins, rafters and trusses.

3.4. The rate shall be for a unit of one sq. meter.

PART-D

TOILET, SECURITY CABIN & MAIN GATE

WORK UP TO PLINTH

ITEM NO.1:-

Excavation for foundation upto 1.5m. Depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50 mt. lead. (A) loose or soft soil with machineries (1) 0 To 1.5 mt. Depth (2) 1.5 To 3.0 MT Depth (3) 3.0 To 5.0 MT Depth.

1.0 GENERAL

1.1 Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such excavation implement or organic soil, gravel, silt, sand turf loam, clay, peat etc. fall under this category.

2.0 CLEARING THE SITE

2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be the property of the Corporation and shall be conveyed and stacked as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

3.0 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 EXCAVATION

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

5.0 DISPOSAL OF EXCAVATED MATERIALS

5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

5.3 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead or 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.

6.0 MODE OF MEASUREMENT AND PAYMENT

6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge or as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.

6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

6.3 The rate shall be for a unit of one cubic meter.

ITEM NO.2:-

Providing and laying ordinary cement concrete work 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) & curing comp.including cost of form work but excluding cost of reinforcement for reinforced concrete work in: (A) Foundation, footing, Base of columns and Mass concrete.

Detail Specification as per **item no.4 (Part-A)**

The rate shall be for a unit of one Cubic meter.

ITEM NO.3:-

Providing & laying ordinary cement con.1:1.5:3 (1cement:1.5sand:3 graded stone agg. 20 mm nominal size) finishing smooth curing etc. comp. Incl.. Cost of form work but excl. Cost of reinforcement for R.C.C. Work in : (A) COLUMNS: (1) Having c/s area up to 0.08 s.mt (2) Having c/s area more than 0.08 sq. mt. & upto 0.12 sq.mt (3) Having cross sectional area more than 0.12 sq. mt. (B) BEAM: (G.B./P.B.) (1) Having c/s area up to 0.08 s.mt (2) Having c/s area more than 0.08 sq. mt. & upto 0.12 sq.mt (3) Having cross sectional area more than 0.12 sq. mt.

Detail Specification as per **item no.4(Part-A)**
The rate shall be for a unit of one Cubic meter.

ITEM NO.4:-

Providing and fixing TMT Bar reinforcement for RCC work including bending, binding & placing in position etc. complete. Upto G.L. / P.L.

Item Description as per **item no.7 (part-A.)**
The rate shall be for a unit of one Cubic meter.

ITEM NO.5:-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 35 Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. up to GL/PL

Item Description as per **item no.9(part-A)**
The rate shall be for a unit of one kg.

ITEM NO.6:-

Filling in trenches with available excavated soil in layers not exceeding 20 cm. in depth consolidating each deposited layer by ramming and watering etc. complete.

Item Description as per **item no.8 (part-A)**
The rate shall be for a unit of one Cubic meter.

ITEM NO.7:-

Providing and filling in plinth with murrum / yellow soil or selected soil in layers of 20 cm. thickness including watering, ramming and consolidation etc. complete.

- 1.0 Materials :-
Murrum shall be cleaned, of good binding quality, and of approved quality obtained from approved pots/ quarries of disintegrated rock which contain silicious material and natural mixture of clay of calcarious origin. The size of murrum shall not be more than 20 mm.
- 2.0 Workmanship:-
- 2.1 The murrum to be used for filling shall be free from salts, organic or other foreign matter. All clods of murrum shall be broken.
- 2.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc. and filled with murrum in layers not exceeding 20 Cms. Each layers shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The murrum shall be

- rammed with iron rammers where feasible and with the butt ends of crowbars, where rammer cannot be used.
- 2.3 The plinth shall be similarly filled with murrum in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for atleast 24 hours and allowed to dry and then rammed and consolidated.
 - 2.4 The finished level of filling shall be kept to shape intended to be given to the floor.
 - 2.5 In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation shall also be as specified.
 - 2.6 The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances blackcottom soil shall be used for filling the plinth.
 - 3.0 Mode of measurement and payment :-
 - 3.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage of voids if consolidated as instructed above.
 - 3.2 The rate includes cost of collecting and carting murrum or selected murrum of approved quality with all lead and labour required for filling in trenches and plinth.
 - 3.3 The rate shall be for a unit of one cubic metre.

ITEM NO.8:-

Providing and applying 20mm. thick sand faced cement plaster on walls or similar surfaces at all floor levels consisting of 12 mm. average thick backing coat of cement mortar 1:3 (1 cement : 3 sand) and 8 mm. thick finishing coat of cement mortar 1:1 (1 cement : 1 sand) etc.comp

- 1.0 Materials :-
Water shall conform to M-1 cement mortar shall conform to M-11.
- 2.0 Workmanship :-
- 2.1 The work shall be carried out in two coats. The backing coat [basecoat] shall be 12 mm. thick in C.M. 1:3. The relevant specifications of Item No.15 shall be followed except that the thickness of back coat shall be 12 mm. average and the proportion shall be of cement mortar 1:3 [1 cement:3 sand]. Before the first coat hardens its surface shall be beaten up by edges of wooden tappers and close dents shall be made on the surface subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.

The second coat shall be completed to 8 mm thickness in C.M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.
- 2.2 Curing :-
The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.
- 3.0 Mode of Measurements and payment :-
- 3.1 The relevant specifications of 10mm thick Plaster Item no.19, Part-A shall be followed except that the sand face plaster in outside shall be measured and paid under this item.
- 3.2 The rate shall be for a unit of one sq.metre.

ITEM NO.9:-

Providing & applying two coats of weather shield max paint (3 coats may be required in case of darker colours.) of ICI Dulux or Apex Ultima of Asian Paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers.

Surface Preparation :

surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes.

Priming:

Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. Application of putty is not recommended.

Minimum 4-6 hours duration is required between each coat of weather shield max paint.

Self explanatory and as directed by Engineer-in-charge.

Rate shall be per square meter basis for complete item.

ITEM NO.10:-

Providing & Laying green polished kota stone slab flooring at all floor levels, over 20 mm av.th. base of C.M. 1:6 (1 cement: 6 sand) laid over & joined with grey cement slurry incl. Rubbing & polishing etc. comp. (A) 25 mm. thick For all Floor

1.0 Materials :-

Water shall confirm to M-1, Lime Mortar shall confirm to M-10, Cement Mortar shall confirm to M-11, Polished Kota Stone shall confirm to M-49,

2.0 Workmanship :-

2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.

2.2 Bedding for the kotah stone slabs shall be cement mortar 1:6 [1 cement : 6 coarse sand] or L.M. 1:1.5 of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently placed in position and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.

2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.

- 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.
- 2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.
- 3.0 Mode of Measurements & payments:-
The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt. The rate shall be for a unit of one sq.metre.

ITEM NO.11:-

Providing & Laying green polished kota stone skirting over 40mm (Average) thick base of cement mortar 1:3 (1-cement : 3-coarse sand) or L.M. 1:1.5 (1-Lime putty : 1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete.

- 1.0 Materials :-
Water shall conform to M-1. Lime mortar shall conform to M-10 cement mortar shall conform to M-11 polished kota stone shall conform to M-49.
- 2.0 Workmanship :-
- 2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.
- 2.2 Bedding for the kotah stone slabs shall be cement mortar 1:3 [1 cement : 3 coarse sand] of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently placed in position and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.
- 2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.
- 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of

- soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.
- 2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.
- 3.0 Mode of Measurements & payments:-
The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt.
The rate shall be for a unit of one sq.metre.

ITEM NO.12:-

Providing & Laying polished kota stone of machine cut edge slab 25 mm. th. in riser of steps, tread, dado & pillars center piece not less than 1.2 mt.in width & side pieces of equal size as per design, laid on 10 mm.th. C.M.1:3 (1 cement:3 sand) joined & polishing etc. For all Floor

1.0. Materials

1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11 Polished kota stone shall conform to M-49,

2.0. Workmanship

2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides must be dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 25 mm. (Average) as specified in the item but not less than 20 mm. at any place of the slab.

2.2. Bedding for the Kota stone slabs shall be of cement mortar 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned, wetted and mopped Mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one kota stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the 99 walls shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed

2.3. The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly

2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.

2.5. The holes required for Nahni traps, pipes and any other fittings shall be made, without any extra cost.

3.0. Measurement & payment

3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The kota stone flooring shall be measured in square meters correct to two places decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dado plaster and no deduction shall be made nor extra paid for any opening in floor of areas up to 0.1 sq

3.2. The rate shall be for a unit of one sq. meter

WORK ABOVE PLINTH FOR GROUND FLOOR

ITEM NO.13:-

Providing and laying ordinary cement concrete 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) finishing smooth curing etc. complete including cost of form work but excluding cost of reinforcement for R.C.C. work in: A) Columns (1)Having c/s area up to 0.08 s.mt, Ground Floor and First floor. (2) c/s area more than 0.08sq. mt. & upto 0.12 sq.mt, Ground Floor and First floor.B) Beam, (1)Having c/s area up to 0.08s.mt, Ground Floor and First floor. (2) Having c/s area more than 0.08 s.m. & upto 0.12 s.m, Ground Floor and First floor. (3) Having cross sectional area more than 0.12 sq. mt. Ground Floor and First floor.(C) Slab, (1) Slabs having more than 8cm. and upto 10 cm. thickness, Ground Floor and First floor. (2)Slabs having more than 10 cm. & upto 13 cm. thickness. Ground Floor and First floor. (3) Slabs having more than 13 cm. Thickness Ground Floor and First floor.(D) Lintels, Ground Floor and First floor.(E) Chhajja, Ground Floor and First floor.

Detail Specification as per **item no.4(Part-A)**

The rate shall be for a unit of one Cubic meter.

ITEM NO.14:-

Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level

Detail Specification as per **item no.7(part-a).**

The rate shall be for a unit of one Kg.

ITEM NO.15:-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 70Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. Up to G.L./P.L.

1.0 MATERIALS

Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.

2.0 WORKMANSHIP

2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.

2.2 Wetting of bricks : The bricks required for masonry work shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water, is an indication of thorough wetting of bricks.

2.3 Laying : Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond. Closures in such case shall be cut to required size and used near the ends of the walls.

A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.

The walls shall be taken up truly in plumb. All courses shall be truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept in uniform.

The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, manson's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

- 2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.

The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.

- 2.5 Curing : Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

- 2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry.

If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

- 2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.

- 2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding planks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

- 2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.

3.0 MODE OF MEASUREMENTS & PAYMENT :

- 3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.

- 3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---

- i] Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbels, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
- ii] Opening not exceeding 1000 Sq.Cm.
- iii] Wall plate, sand bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
- iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.

- v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.
 - vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jams, throating and making arches over the aperture be paid for separately.
- 3.7 The rate shall be for a unit of one cubic metre.

ITEM NO.16:-

Providing & Applying 10mm thk cement plaster in single coat on brick/ concrete walls similar surfaces for plastering & finished even & smooth with a floating coat of cement slurry mixed with admixture of lime or neeru in required proportion etc. comp. in C.M 1:3 (1 cement : 3sand) (A) For wall (B) For ceilings and soffits of stairs

1.0 MATERIALS

Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11.

2.0 WORKMANSHIP

2.1 Scaffolding - Wooden ballies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2 Preparation of Background - The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, afflorsence and other foreign matter by water or by brushing. Smooth surface be roughened by wire brushing if it is not hard and hacking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

Raking of joints in case of masonry work where necessary, shall be allowed to dry out for sufficient period before carrying out the plaster work.

The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such areas shall be moistened again.

For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3 APPLICATION OF PLASTER

The plaster about 15 x 15 Cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surface gauges shall be truly in place of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden flat according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, junctions etc. shall be carried out with proper templates to the size required.

Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site. In

suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommending the plaster, the edges of the old work shall be scrapped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cms. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arrises. Horizontal points in plaster work shall not also occur on parapet tops and copings as those invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

Each coat shall be kept damp continuously till the next coat is applied for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking or walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air to dry weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

3.0 MODE OF MEASUREMENTS & PAYMENT

- 3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.
- 3.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth or height shall be measured correct to a centimetre.
- 3.3 Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.
- 3.4 This item includes plastering upto floor two level.
- 3.5 The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any, shall be deducted.
- 3.6 Soffits of stairs shall be measured as plastering on ceilings. Blowing soffits shall be measured separately.
- 3.7 For jambs, soffits, sills etc. for openings not exceeding 0.5 Sq.Mts. each in area for ends of joints, beams, posts, girders, step etc. not exceeding 0.5 Sq.Mts. each in area for and for openings exceeding 0.5 Sq.Mts. and not exceeding 3 Sq.Mts. in each area deductions and additions shall be made in the following manner ---
 - a] No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 Sq.Mts. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings for finish to plaster around ends of joints, beams, posts etc.
 - b] Deduction for openings exceeding 0.5 Sq.Mts. but not exceeding 3 Sq.Mts. each shall be made as follows and no additions shall be made for reveals, jambs, soffits sills etc. of these openings --
 - i] When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.
 - ii] When two faces of wall are plastered with different types of plaster or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and/or pointing as the case may be.
- 3.8 For openings having door frames equal to projecting beyond the thickness of wall, full deductions for opening shall be made from each plastered face of the wall.
- 3.9 In case of opening of area above 3 Sq.Mts. each deductions shall be made for opening but jambs, soffits and sills shall be measured.
- 3.10 The rate shall be for a unit of one Sq.Mts.

ITEM NO.17:-

Providing 20 mm thick double coat mala cement plaster on brick / concrete work for plastering comprising of base coat 12 mm thick cement plaster in cement mortar (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trowel including scaffolding curing etc. complete.

1.0 MATERIALS

Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11.

2.0 WORKMANSHIP

2.1 Scaffolding - Wooden ballies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls. 133

2.2 Preparation of Background - The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface be roughened by wire brushing if it is not hard and hacking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface. Raking of joints in case of masonry work where necessary, shall be allowed to dry out for sufficient period before carrying out the plaster work. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such areas shall be moistened again. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3 APPLICATION OF PLASTER The plaster about 15 x 15 Cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surface gauges shall be truly in place of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden flat according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering, corners, junctions etc. shall be carried out with proper templates to the size required. Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scrapped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cms. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as those invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on. Each coat shall be kept damp continuously till the next coat is applied for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking or walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air to dry

weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

3.0 MODE OF MEASUREMENTS & PAYMENT

3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3 Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.

3.5 The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any, shall be deducted.

3.6 Soffits of stairs shall be measured as plastering on ceilings. Blowing soffits shall be measured separately.

3.7 For jambs, soffits, sills etc. for openings not exceeding 0.5 Sq.Mts. each in area for ends of joints, beams, posts, girders, step etc. not exceeding 0.5 Sq.Mts. each in area for and for openings exceeding 0.5 Sq.Mts. and not exceeding 3 Sq.Mts. in each area deductions and additions shall be made in the following manner –

a] No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 Sq.Mts. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings for finish to plaster around ends of joints, beams, posts etc.

b] Deduction for openings exceeding 0.5 Sq.Mts. but not exceeding 3 Sq.Mts. each shall be made as follows and no additions shall be made for reveals, jambs, soffits sills etc. of these openings -

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i] When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

ii] When two faces of wall are plastered with different types of plaster or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for doors, windows etc. on which width of reveals is less than that on the other side but no deduction shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and/or pointing as the case may be.

3.8 For openings having door frames equal to projecting beyond the thickness of wall, full deductions for opening shall be made from each plastered face of the wall.

3.9 In case of opening of area above 3 Sq.Mts. each deductions shall be made for opening but jambs, soffits and sills shall be measured.

3.10 The rate shall be for a unit of one Sq.Mts.

ITEM NO.18:-**Providing throating or plaster drip and moulding it to R.C.C. chajja etc.comp For All Floor**

- 1.0 Materials :-
Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-11.
- 2.0 Workmanship :-
The work shall be carried out as directed. The proportion of mix for finishing, touching shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimetre in thickness.
- 3.0 Mode of Measurements and payment :-
- 3.1 The rate includes cost of all materials and labour required to complete the item.
- 3.2 The rate shall be for a unit of one R.M.

ITEM NO.19:-**Providing 20 mm. deep finished groove in plaster in line and level etc. complete (M.R.)**

Detailed specification as per **item no.11part-A**

Rate shall be per running metrer basis.

ITEM NO.20:-**Providing and laying Vitrified tiles 8mm to 10mm thick, 24" x 24" in flooring, treads of steps and landing laid on 12 mm thick cement mortar 1:3 (1 Cement : 3 Coarse sand) finishing with flush pointing in white cement. (Basic Rate-Rs.366.0/S.M.)**

- 1.0 Materials :
Water shall conform to M-1 cement shall conform to M-3. Lime Mortar shall conform to M-10. Cement mortar shall conform to M-11. The tiles conform to M-81.
- 2.0 Workmanhship :
- 2.1 The work shall be carried out as per I.S.1443-1972.
- 2.1 Bedding :
Bfore spreading the mortar, the sub-base of the floor shall be cleaned of all dirt,scum and loose materials and then well wetted without forming any pools of water on the surface.
In case of R.C.C.floors,the top shall be left a little rough, all points,of level for the finished surface shall be marked out. The lime water of proportion 1:8 (1 cement :8 coarse sand) jointed with neat cement slurry mixed with pigment to match the shade of the tiles as directed shall be then evenly and smoothly spread over the base. Bedding layer or mortar shall be not less than 25 mm and average thickness of bedding shall be 25 mm.
- 2.2 Laying :
Before laying the ceramic tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4 kg.cement/sq.mt.shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slops. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern.
The surface of flooring shall be checked frequently with a straight edge at-least two metres long so as to obtain a truesurface with required slope.
The tiles which are fixed in the adjoining the wall shall go about 10 mm under plaster. Skirting or dedo shall be left unfinished for about 50 mm above finished floor level and unfinished strip then left earlier shall be finished.
In places where full tiles can not be fixed.The tiles shall be cut to the size and smoothened at edges to give straight andtrue joints.

After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.

The day after tiles have been laid, the joints shall be cleaned of every cement grout with a wire brush to a depth of about 5 mm and then grouted with white cement with or without pigment to match the shade of the topping of tiles.

2.3. Curing :

The flooring shall be kept wet with damp sand or water for seven days. It shall be kept undisturbed at least for 14 days. The grinding shall normally be commenced after 14 days.

Testing of the tiles shall be carried out by the contractor at his own cost as per I.S. requirement for required tests.

3.0 Mode of Measurements and payment :

The ceramic tiles flooring shall be measured in Sq. metre for visible area of work done.

No deductions shall be made nor extra paid for any opening in the floor area upto 0.1 Sq. mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc. shall be measured in the same item and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size, standard tiles or other uncut tiles.

The treads of stairs and steps paved with tiles without nosing shall also be measured under this item.

Extra rate shall however be paid for such area where width of treads does not exceed 30 cms.

The rate shall include the cost of all materials, labour involved in all the operations as described above.

The rate shall be for a unit of one sq. metre.

ITEM NO.21:-

Providing and laying Vitrified tiles 8 to 10 mm thick, 24" x 24" in skirting risers of steps and dedo on 10mm thick cement plaster 1:3 (1 cement : 3 coarse sand) and jointed with white cement slurry. (Basic Rate Rs.366.0/S.M.)

1.0 Materials :

Water shall conform to M-1 cement shall conform to M-3. Lime Mortar shall conform to M-10. Cement mortar shall conform to M-11. The tiles conform to M-81.

2.0 Workmanship :

2.1 The work shall be carried out as per I.S.1443-1972.

2.1 Bedding :

Before spreading the mortar, the sub-base of the floor shall be cleaned of all dirt, scum and loose materials and then well wetted without forming any pools of water on the surface.

In case of R.C.C. floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime water of proportion 1:8 (1 cement : 8 coarse sand) jointed with neat cement slurry mixed with pigment to match the shade of the tiles as directed shall be then evenly and smoothly spread over the base. Bedding layer or mortar shall be not less than 25 mm and average thickness of bedding shall be 25 mm.

2.2 Laying :

Before laying the ceramic tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4 kg. cement/sq. mt. shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slopes. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern.

The surface of flooring shall be checked frequently with a straight edge at-least two metres long so as to obtain a true surface with required slope.

The tiles which are fixed in the adjoining the wall shall go about 10 mm under plaster. Skirting or dado shall be left unfinished for about 50 mm above finished floor level and unfinished strip then left earlier shall be finished.

In places where full tiles can not be fixed. The tiles shall be cut to the size and smoothened at edges to give straight and true joints.

After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.

The day after tiles have been laid, the joints shall be cleaned of every cement grout with a wire brush to a depth of about 5 mm and then grouted with white cement with or without pigment to match the shade of the topping of tiler.

2.3. Curing :

The flooring shall be kept wet with damp sand or water for seven days. It shall be kept undisturbed atleast for 14 days. The grinding shall normally be commenced after 14 days.

Testing of the tiles shall be carried out by the contractor at his own cost as per I.S. requirement for required tests.

3.0 Mode of Measurements and payment :

The ceramic tiles flooring shall be measured in Sq. metre for visible area of work done.

No deductions shall be made nor extra paid for any opening in the floor area upto 0.1 Sq. mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc. shall be measured in the same item and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size, standard tiles or other uncut tiles.

The treads of stairs and steps paved with tiles without nosing shall also be measured under this item.

Extra rate shall however be paid for such area where width of treads does not exceed 30 cms.

The rate shall include the cost of all materials, labour involved in all the operations as described above.

The rate shall be for a unit of one sq. metre.

ITEM NO.22:-

Providing & laying granite slab 18mm thick in Window-Door seal Frame Etc laid on 10mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) with nessary adhesive material and finished with flush pointing in white or colour cement, including rubbing & polishing comp.. (Basic Rate:- Rs.1200.0/S.M.)

1.0 Materials:

Water shall conform to M-1. Cement mortar shall conform to M-11. Granite stone slab shall conform M-52.

2.0 Workmanship:

granite slab shall be fixed for risers steps, dado or skirting in C.M. 1:4 and the polishing shall be done manually instead of machine polishing, the exposed edge of granite slab shall be machine cut.

3.0 Mode of Measurement and payment:

The risers of steps, skirting or dado shall be measured in sq. metre. Length shall be measured along the finished faces of risers, skirting or dado. Height shall be measured from finished level of treads of floor to top. Lining of pillars shall be measured under this item.

The rate shall be for a unit of one sq. metre.

ITEM NO.23:-

Labour Charges for Edge Finished for Granite

Detail specification as per manufacture specification and as directed by Engineer-in -charge.

The rate shall be for a unit of one running meter.

ITEM NO.24:-

Providing & laying granite slab 18mm thick in flooring, treads of steps and landing laid on bed of 20mm thick cement mortar 1:6 (1 Cement : 6coarse sand) or lime mortar 1:1.5 laid and finished with flush pointing in white or colour cement including rubbing and polishing complete. (Basic Rate:- Rs.1590.0/S.M.)

- 1.0 Materials :-
Water shall confirm to M-1,Lime Mortar shall confirm to M-10,Cement Mortar shall confirm to M-11, Granite Slab flooring shall confirm to M-49,
- 2.0 Workmanship :-
- 2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.
- 2.2 Bedding for the kotah stone slabs shall be cement mortar 1:6 [1 cement : 6 coarse sand] or L.M. 1:1.5 of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently placed in position and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.
- 2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.
- 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.
- 2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.
- 3.0 Mode of Measurements&payments:-
The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt. The rate shall be for a unit of one sq.metre.

ITEM NO.25:-

Providing & laying granite slab 18mm thick in skirting, risers of steps, dado and pillars laid on 10mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) and finished with flush pointing in white or colour cement including rubbing & polishing comp.. (Basic Rate:- Rs.1590.0/S.M.)

1.0 Materials:

Water shall conform to M-1. Cement mortar shall conform to M-11. Granite stone slab shall conform M-52.

2.0 Workmanship: The relevant specifications of Item No.22 shall be followed except that the granite slab shall be fixed for risers steps, dado or skirting in C.M. 1:4 and the polishing shall be done manually instead of machine polishing, the exposed edge of granite slab shall be machine cut.

3.0 Mode of Measurement and payment:

The risers of steps, skirting or dado shall be measured in sq. metre. Length shall be measured along the finished faces of risers, skirting or dado. Height shall be measured from finished level of treads of floor to top. Lining of pillars shall be measured under this item.

The rate shall be for a unit of one sq. metre

ITEM NO.26:-

Providing & fixing 35mm.th. Flush Door Solid Double Core type Both Face water proof Ply Vannered & 1.5 mm th.laminate shall be pasted on both side with adhesives as specified by the manufacturers. The laminate shall be as per approved shade & texture, of make incl. Sal wood frames of finished size 12cm x 7cm.incl. S.S. Hinges with nessary screws & Anodized aluminum fixtures & fastenings For all Floor Same as Above But Without Frame

1.0. Materials.

- 1.1. Wood for shutter shall conform to M-29.
2. Glass shall conform to M-38.
3. Anodised aluminum butt hinges shall conform to M-43.

2.0. Workmanship

2.1. The item covers the requirement of preparation of shutters for doors, windows, clerestory windows, their supply and fixing.

2.2. Shutters:

2.2.1. Paneled shutters shall be constructed in the form of timber frame work of styles and rails with panel inserted of type as specified in the detailed drawings. Panel shall be fixed by providing grooves in the style and rails. The styles and rails shall be joined to each other by mortise and tenon joints at right angles.

2.2.2. All members of the shutters shall be straight without any warp or bow and shall have smooth, well planed faces at right angles to each other.

2.2.3. The size of styles and rails shall be as per drawings or as directed. Styles and rails of shutters shall be made of one piece only.

2.3. Timber paneling:

2.3.1. Thickness of the panel shall be as specified in the item as shown in the drawing or as directed. If the panel is made from more than one piece the pieces shall be finished as shown in the detailed drawings and shall be joined with continuous groove with specified size. The end pieces of the panel and the top and bottom of the panel shall be provided with continuous tongue to frame into groove of the frame shutter. An air space of 1.5 mm. shall be left in the groove of frame of shutter while framing the panels in it.

2.3.2. The faces of the panel as well as various pieces of the panel shall be- closely fitted to the sizes of the grooves.

2.3.3. Finishing of the corners of raised panel edges shall be done as shown in drawings or as directed.

2.3.4. The thickness specified shall be finished thickness and no tolerance will be permitted.

2.5. Fixtures and Fastenings:

2.5.1. The rate shall include anodised butt hinges including fixing with iron screws. The size and number of hinges shall be as per table given in annexure-1.

3.0. Mode of measurement and payment

3.1. The rate for shutter includes cost of providing block and cleat for keeping the shutter in open position if directed.

3.2. The dimension of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.

3.3. The rate shall be for a unit of one sq. meter.

ITEM NO.27:-

Providing and fixing window having extruded aluminium Powder Coated section frame main outer size 63.50 x 38.10 x 1.95 mm (of Jindal section no:4605, @ Wt. 1.094Kg/mt) horizontal Two track member size 61.85 mm x 31.75 mm x 1.20 mm (of jindal section no:8687, @ Wt. 0.695 Kg/mt.) vertical member of size 61.85 mm x 31.75 mm x 130 mm (of jindal section no:8758 @ wt. of 0.659 kg/mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of jindal section no:8949, @ Wt. of .456 Kg/mt) vertical member of size 40 mm x 18 mm x 1.29mm (of jindal section no:8947, @ Wt. of 0.456 Kg/mt/section 8948, @ Wt. of 0.457 Kg/mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc. complete for window.

(A) Same as above but Colour anodized

Same as per item description, manufacturer's details instruction and as directed by Engineer- in-charge.

The rate shall be for a unit of one Sq.metre

ITEM NO.28:-

Providing and fixing window having extruded aluminium Powder Coated section frame main outer size 95 mm x 24 mm x 1.17 mm (of jindal section no:2459 @ Wt. of 0.738 Kg/mt), horizontal Three track member size 92 mm x 31.75 mm x 1.30 mm (of jindal section no:8688, @ Wt. 1.07 Kg/mt), vertical member of size 92 mm x 31.75 mm x 1.50 mm (of jindal section no:8933, @ Wt. 1.06 Kg/mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of jindal section no:8947 @ wt. of 0.456 kg/mt), vertical member of size 40 mm x 18 mm x 1.29 mm (of jindal section no:8949 @ wt. of 0.456 kg/mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium fittings & fixtures and transparent silicon sealant glass fixing to frame as per details etc

(A) Same as above but Colour anodized

Same as per item description, manufacturer's details instruction and as directed by Engineer- in-charge.

The rate shall be for a unit of one Sq.metre

ITEM NO.29:-

Distemping two coats with oil bound washable distemper of approved brand manufacture & of required shade on wall surface to give an even shade over and & incl. a priming coat of alkali resistance primer of approved brand after thoroughly brushing the surface to give an even shade after thoroughly brushing the surface free from mortar droppings and other foreign matter and also including preparing the surface even and smooth.

1.0. Materials

1.1. The dry distemper and primer shall be of approved brand and manufacture. The dry distemper shall be of required colour and shade and the same shall conform to I.S. 427-1965. Writing shall conform to I.S. 63-1964. 2.0. Workmanship

2.1. Scaffolding : Where scaffolding is required it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well tied suspended platform (Joolas) may be used for distempering. Where ladders are used- pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the walls and floors. \For distempering to ceiling, proper stage scaffolding shall be erected where necessary.

2.2. Preparation of Surface.

2.2.1. The undecorated surface to be distempered shall be thoroughly brushed free from dust, dirt, grease, mortar, droppings and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry at least 2 months before application of distemper.

2.2.2. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster of Paris mixed with dry distemper of the colour to be used. The surface shall then be rubbed down again with a fine grades and paper and made smooth. The surface affected by moulds, moss, fang, algae lichens, efflorescence etc. shall be treated in accordance with I.S. 2395 (Part-I) 1966 before applying distemper. Any unevenness shall be made good by applying putty made of plaster of Paris mixed with water on entire surface including filling up the undulations and then sand papering the same after it is dry.

2.3. Priming coat :

2.3.1. A priming coat of whiting shall be applied as per item No. 18.11 it code18001 over the prepared surface in case of new work on undecorated surface. No coat of white washing with lime shall be used as a priming coat for distemper.

2.3.2. Application of plaster shall be done as under: The primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical stokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

2.3.3. Distemper is not recommended to be applied within six months of the completion of wall plaster.

2.4. Proportion of Distemper : The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturers only. Sufficient quantity of distemper required for one day's work shall be prepared.

2.5. Application of Distemper coat :

2.5.1. For undecorated surfaces after the primer coat is dried for at least 48 hours, the surfaces shall be lightly sand papered to make them smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of distemper shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of at least 24 hours between consecutive coals to permit proper drying of the proceeding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.

2.5.2. Sufficient quantity of distemper shall be mixed to finish on room at a time. The application of a coat in each room snail be finished in one operation and no work shall be started in any room which cannot be completed, on the same day. [Type text] Page 127

2.5.3. 15 cm. double bristle distemper brush shall be used. After the day's work, brushes shall be thoroughly washed in hot water with soap solution and hang down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. Protective Measures : The surfaces of doors, windows, floors, articles of furniture etc. and such other parts of the building as are not to be distempered shall be a plashed form being splashed upon. Such surfaces shall be cleaned of distemper a plashes if any.

3.0. Mode of measurements and payment

3.1. Pruning coal of distemper primer, scraping of surface spoiled by smoke soot, removal of oil and grease spots, treatment for infraction of effloresces, mould moss, fungi, algae and lichens and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.

3.2. All the work shall be measured net in the decimal system as in places subject to the following limits unless otherwise stated hereinafter: (a) Dimensions shall be measured to the nearest 0.01 m. (b) Area in individual items shall be worked out to the nearest 0.01 sq. m. All work shall be measured in sq. meter. No deductions shall be made for ends of joints, beams, posts, etc. of these openings nor for finish around the ends of joints, beams, posts etc.

3.3. Deductions of openings exceeding 0.5 sq.m. but not exceeding 3 sq. m. each shall be made as follows and no addition shall be made for reveal, jambs, soffits etc. of these openings: (a) When both the faces of walls are provided with the same finish deductions shall be made for one face only. (b) When each face of wall is provided with different finish, deduction shall be made for that of frame for door, windows etc. on which width of reveal is less than that of the other side but no deductions shall be made on the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 50% of area of opening on each face shall be made from area of finish. (c) When only one face of wall is treated and the other face is not treated, full deductions shall be made if the width of the reveal on treated side is less than that on untreated side but if the width of the reveals is equal or more than that of untreated side neither deductions nor additions to be made for reveals, jambs, sills and soffits shall be measured

3.4. In case of openings of area exceeding 3 sq.m. each, deduction shall be made for openings, but jambs, sills and soffits shall be measured.

3.5. No deductions shall be made for attachments such as casing, conduits, pipes, electric wiring and the like. 3.6. Item includes removing nails, making good holes, cracks, patches with materials similar in composition to the distemper.

3.7. The rate includes cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above This shall also include conveyance, delivery, bundling, unloading storing etc.

3.8. The rate shall be for a unit of One sq. meter

ITEM NO.30:-

Providing and applying two coats of weathershield max paint (3 coats may be required in case of darker colours) of ICI Dulux or Apex Ultima of Asian paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers.

Surface preparation:

Surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire / stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and clean the surface thoroughly using wire brushes.

Priming:

Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. application of putty is not recommended. Minimum 4-6 hours duration is required between each coat of weathershield max paint.

The rate shall be for a unit of one Sq.Meter

ITEM NO.31:-

(1) The whole work is to be executed through specialized agency with a guarantee of 10 (Ten) years given on a prescribed proforma duly stamped (2) The rate shall include for work at all floors & conducting water proof test as directed. (M.R.)

(A) Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of :

(a) I course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS : 2645 in recommended proportions.

(b) II course of a layer of plaster in C.M. 1:3 with water proofing compound conforming to IS:2645 about 25 mm. th' in the floor of the depression & about 18mm th' On the side walls of the depression up to the floor level, water proofing plaster about 18 mm. th' be continued on the walls above the floor level for a height of 600 mm. with surface suitable to receive further treatment

(c) Finishing top with stone aggregate 10mm to 12mm nominal size spreading @0.008 C.M./S.M., thoroughly embedad in plaster layer.

as per specifications & instructions of Engineer in charge (Cement consumption 0.316 Bags / S.M.)

(B) Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations. (a) Applying and grouting a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with proprietary water proofing compound conforming to IS:2645 over the R.C.C. slab including cleaning the surface before treatment.(b) Laying cement concrete using broken bricks/brick bats 25 mm to 100 mm size with 50% of cement mortar 1:5 (1 Cement : 5 Coarse sand) admixed with proprietary water proofing compound conforming to IS:2645 ,brick bats is finally covered by jointless cement plaster 20mm th. in C.M. 1:4 added with special water proofing compound conforming to IS:2645 & top smooth finished with trowel with false chequered marking of 300 mm.size.The treatment is carried along the vertical surface of the parapet & other adjoining wall up to height of about 300 mm in a shape of quarter round vata Incl. curing etc. Comp. With average thickness of 120 mm and minimum thickness at khurra as 65 mm.

(c) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be down in order and as directed and specified by the engineer-in-charge. With average thickness of 120 mm and minimum thickness at khurra as 65 mm. (Cement consumption 0.511 Bags / S.M.).

Details specification same as per Item description and as instruction by Engineer-in-charge.

The rate shall be for a unit of one Sq.Meter

ITEM NO.32:-

Providing and Fixing Hollow steel Sections Framed Work including Cutting, Hoisting, Welding & Fixing in position Purlin, Main Chord etc. as per Engineerin-charge.TATA / JINDAL / ASIAN Make for Main entry gate etc.

LAYING OUT :

The steel structures, as shown in the drawings or as per directions of the Engineer-in-charge, shall be laid out on a level platform to full scale and to full size in parts. A steel type shall be used for measurements to ensure maximum accuracy.

Wooden templates 12 mm to 19 mm thick or steel templates shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes for revetting and bolting marked on them. The ends of the steel members shall also be marked for cutting. The base of steel columns and the position of anchor bolts shall be carefully set out.

FABRICATION :

The steel sections as specified shall be straightened and cut square and accurately to correct lengths. The cut ends exposed to view shall be finished smooth. No. two pieces shall be welded or otherwise jointed to make up required length of a member except as indicated in the drawing or otherwise specifically permitted by the Engineer - in - charge. All straightening and shping to form shall be done by application of pressure and not by manning. Any bending or cutting shall be carried out in cold condition (unless otherwise directed) in such a manner as not to impair the strength of the metal.

All stiffeners shall be formed by pressure, and where practicable, the metal shall not be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including the locating, type, size, length and details of rivers, bolts or welds shall be prepared in advanced of the actual fabrication and approved by the Engineer-in-charge. The drawing shall indicate the shop and filed rivets, bolts and welds. The steel members shall be distinctly marked or stencilled with paint with the identifica- tion marks as given in the shop drawings.

The bars shall be thickened at the ends so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in the fabrication of various members. Do that these can be assembled without being unduly packed strained or forced into position and when built-up shall be true and free from twists, bricks buckles or open joints.

Before making holes in individual mambers, for fabrication the steel work intended to be rivetes or bolted to gather shall be assembled or clamped properly and tightly so as to ensure chose abutting or lapping of the surface of the different members. All stiffeners shall be tightly both at top and bottom without being drawn or caulled. The abutting joints shall be cut of dressed true and straight and fitted close together,

We splice plates and fillers under stiffeners shall be cut to fit within 3 mm of flange angles. We plated or girders which have no cover plates shall have their ends flush with the top of angles forming the flangesunless otherwise required. The we plates,when spliced shall have clearance of not more than 6 mm.

The erection clearance for cleated ends of members connecting steel to steel preferably be not grater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for prectical reasons, greather cleance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement for holding the girders or truss resting on it, from lateral displacement.

Expansion bed plates shall be planed true and smooth. The planning of bed plates shall be done in the direction of the movement of the girder or truss resting on it.

Column splices and but joints of struts and impression members depending on contract for trees transmission shall be accurately machined and closebutted over the whole section. In column caps and bases, the ends of shafts together with the attached gussets, angles, channales etc. after riveting together shall be accurately machinised so that the parts connected but against each other over the entire surface of contract. Connecting angles or channels shall be fabricated and placed in position with great accuracy so that they are not unduly reduced in thickness by machining.

The ends of all bearing stiffeners shall be machined or ground to fit tightly both at the top and bottom.

All holes shall generally be drilled to the required size and at the required position. Sub-punching shall be permitted, provided it is done 3 mm. less in diameter and reamerred thereafter to the required size.

Holes for revets and black bolts shall be large by 0.4 to 6 mm. as shown in appendix-I under column "Coarse" than the nominal diameter of the revents or black bolts depending upon the dia of revets. Holes f or turned and fitted bolts shall be drilled or reamerred large by 0.2 to 3 mm. depending upon the dia of bolts as shown in Appendix under column "Medium".

When the number of plates or sections to be riveted together exceeds three or when their total thickness is 90 mm or more, holes shall be drilled or reamed in position, after the members are assembled and the parts firmly held together by clamps. Before riveting or bolting up or welding finally. The members shall be taken part and all burrs removed.

Holes shall have their axis perpendicular to the surface bore through. The drilling or reaming shall be free from burrs and the holes shall be clean and accurate.

The work or fabrication shall be completed in the workshop as far as it is practicable to do so. Site jointing shall be done with rivets or turned and fitted bolts, or black bolts or welding as shown in drawings or as directed by the Engineer-in-charge. Generally, the following principles shall govern the use of rivets, turned and fitted bolts and black bolts :-

[i] Rivets or turned and fitted bolts shall be used where the connection is such that slip under load has to be avoided.

[ii] Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal of stresses (unless such reversal is due to wind forces.)

In the case of welding, holes shall only be made for the bolts used for temporary fastening as shown in drawings.

WELDING :

Welding shall be generally done by electric process. The electric arc method being economical, is usually adopted. Where public electricity is not available, a suitable generator shall be arranged. Gas welding shall be resorted to using oxyacetylene flame with specific period approval of the Engineer-in-charge.

Gas welding shall not be permitted for structural steel work. Gas welding requires heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, type of welds, shop and site welds, as well as the types of electrodes to be used. Symbols for welding on plans and shop drawings shall be according to IS : 813-1061. As far as possible, every effort shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions of scaffolding etc. apart from the aspect of economy.

PREPARATION OF SURFACE :

Surfaces which are to be welded together, shall be free from loose mill-scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

PRECAUTIONS :

All operations connected with welding and cutting equipment shall conform to the safety requirement given in IS : 818-1968 for "Safety and Health requirements in Electric and Gas welding and Cutting Operations".

The following points shall be borne in mind during the process of welding :-

[a] Welds shall be made in the flat position. Wherever practicable.

[b] Arc length, voltage and amperage shall be suited to the thickness of materials, type of groove and other circumstance of the work.

[c] The sequence of welding shall be such that where possible, the members which offer the greatest resistance to compression are welded first.

All defective welds which shall be considered harmful to the structural strength shall be cut out and rewelded.

Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved by the Engineer-in-charge.

All the members shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of lead painting before fixing them in position.

RATE :

The rate shall be for a unit of one Kg.

ITEM NO.33:-

Painting two coat (excluding priming coat) on new steel and other metal surface with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters.

1.0. Materials

The enamel paint shall conform to M-44 B.

2.0. Workmanship

2.1. General : The materials required for work of painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums; kegs. etc. with seal unbroken.

2.1.2. All materials not in actual use shall be kept properly protected, lids of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat due to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

2.1.3. If for any reasons, things is necessary, the brand of thinner recommended by the manufacturer shall be used. 2.1.4. The surface to be painted shall be thoroughly cleaned and dusted. All rust, dirt and grease shall be thoroughly removed before painting is started. No painting on exterior or other exposed part o the work shall be carried out in wet, damp or otherwise unfavorable weather and all the surfaces shall be thoroughly dry before painting work is started.

2.2. Application of paint:

2.2.1. Brushing operations are to be adjusted to the spreading capacity advised by the manufacture of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the -laying off is finished. The full process of crossing and laying off will constitute one coat.

2.2.2. Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand-paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in shade and shall be got approved from Engineer-in-charge before next coat is started.

2.2.3. Each coat the last shall be lightly rubbed down with sand paper of fine pumice stone and cleaned of dust before the next coat is applied. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings etc. shall be left on the work.

2.2.4. Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved best quality brushes shall be used.

3.0. Mode of measurements and payment

3.1. The rate shall be for a unit of One sq. meter.

WATER SUPPLY AND SANITARY ITEMS

ITEM NO.1:-

Prov.& Fixing water closet squatting pan (Orissa type W.C.pan) at all floor levels, size 500mm x 400 mm incl. 100 mm size "P" or "S" trap for water closet squatting pan joining the trap with the pan & soil pipe in C.M. 1:1 (1 cement : 1 fine sand) etc. Comp. (A) Vitrified china long pattern of approved colour .For all Floor. make: Cera ; Parry Ware ; Jaquar ; Hind Ware

- 1.0 Materials
Water closet squatting pan (Orissa type W.C. Pan) and 'P' Trap shall conform to M-62, foot rests shall conform to M- 62A. Cement mortar shall conform to M-11.
- 2.0 WORKMANSHIP
 - 2.1 The pan shall be sunk into the floor and embedded in a cushion of average 15 cms. cement concrete 1:5:10 (1 cement; 5 fine sand; 10 graded stone aggregate or brick aggregate 40 mm. nominal size) or as specified. This concrete shall be left 115 mm. below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably sloped so that the waste water is drained into the pan. The pan shall be provided with 100 mm. 'P' or 'S' trap as specified in the item with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak- proof with cement mortar 1:1 (1 cement; 1 fine sand).
 - 2.2 The 'P' or 'S' trap shall be fixed with pan and cast iron pipe with C.M. 1:1. The pan shall be provided with a 100 mm. 'P' or 'S' trap as specified in the item with an approximately 50 mm. seal. The joint between the pan and the trap shall be made leakproof with cement mortar 1:1 (1 cement; 1 fine sand).
 - 2.3 After laying the floor, the floor shall be suitably sloped so that the waste water is drained into the pan. A pair of foot-rests of size 250 mm x 130 mm x 30 mm of white vitreous china shall be set in cement mortar 1:3 (1 cement; 3 coarse sand). The foot rests shall be fixed at a distance of 175 mm. from the inner edge of the back side of the pan and shall be fixed at convenient angle.
- 3.0 MODE OF MEASUREMENT & PAYMENT :
 - 3.1 The rate shall include the cost of all materials and labours involved in all the operations described under workmanship.
 - 3.2 The rate shall be for a unit of one number.

ITEM NO.2 :-

Providing and fixing Wash Down Water closet European type W.C. pan with integral P or S trap with normal closing seat cover L bend including jointing the trap with soil pipe in cement mortar 1:1 (1 cement : 1 fine sand) (A) Vitrified china pattern - I Make Cera size- 350x480x390 mm.

WORKMANSHIP

Closet shall be fixed to the floor by means of 75 mm long 6.5 mm diameter counter sunk bolts and nuts embedded in the floor concrete using rubber or fibre washers so as not to allow any lateral displacement. The joint between the trap of W.C. and soil pipe shall be made with C.M. 1:1 (1 Cement : 1 Fine sand).

MODE OF MEASUREMENT & PAYMENT :

The rate shall include the cost of all labours for fixing pans and seat and cover, inlet, connections etc. complete including testing the same.

The payment of seat and cover shall be made separately.

Payment as per Schedule-B and as directed by Engineer. The rate shall be for a unit of one number.

Providing and fixing Plastic seat and cover for wash down water closet with C.P. brass hinge and rubber buffer hinges black/ white/ colour plastic seat and cover.

As per manufacturer's specification. The seat and cover shall be with ISI mark. Payment as per Schedule-B and as directed by Engineer.

ITEM NO.3 :-

Providing & fixing Wash Hung basin with single hole for pillar tap , Size- 550 x 400 mm at all floor levels, with C.I. or M.S. Brackets painted white incl. cutting holes & making good the same etc. complete. For all Floor. (Make - Cera,Parry ware,Jaguar,Hindware)

1.0 MATERIALS

1.1 The white glazed earthenware wash basin shall be 550 mm. x 400 mm. of 1st quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59. The capstan head pillar tap of specified dia. of C.P. over brass shall be of best quality and shall conform to I.S. 1975-1961. The pillar taps shall be of tested quality. The C.P. brass trap and union shall be of 32 mm.dia. and of best quality and make as approved by the Engineer-in-charge. The brass screw down stop cock of specified dia. shall conform to I.S. 781-1977. The stop cock shall be of tested quality.

2.0 WORKMANSHIP

2.1 The wash basin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement; 3 sand). The bracket shall conform to I.S. 775-1962. The wall plaster on the rear shall be cut to rest the top edge of the wash basin. After fixing the basin, plaster shall be made good and surface finished to match with the existing one.

2.2 The bracket shall be painted white with ready mixed paint. The C.P. brass trap and union shall be connected to 32 mm.dia. waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct into the gully trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under the basin and the waste is discharged into vertically.

2.3 The height of the front edge of the wash basin from the floor level shall be 80 cms.

2.4 The capstan head pillar tap of specified dia. shall be fixed as directed with required washers of selected leather or rubber asbestos composition or plastic as directed. The cock shall be fixed with pipe line with white zink and spun yarn, to make joint water tight. The work shall be carried out in best workman like manner.

2.5 C.P. brass waste trap and union shall be connected to 32 mm.dia. waste pipe which shall be connected suitably towards the wall and which shall discharge into the drain through a floor trap. The C.P. brass waste trap shall be provided for wash basin or sink as the case may be.

2.6 The stop cock shall be fixed in position by means of jam, nut & socket. The stop cock shall be fixed near the inlet of the water metre or as directed. The joints shall be done with white zinc and spun yarn. The joint shall be tested for leak proofing.

2.7 The necessary inlet, outlet connections and fittings such as pillar cocks, C.P. brass waste trap, waste pipe, stop cock etc. shall be fixed as specified above.

2.8 The payment of fittings shall be made under this item.

3.0 MODE OF MEASUREMENTS & PAYMENTS

3.1 The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as specified in workmanship.

3.2 The rate shall be for a unit of one number.

ITEM NO.4 :-

Providing & fixing white vitreous china urinal of size 450 x325mm as per IS-2556 (Part-2) with C.I. hangers and 15mm dia. C.P. spreader,32mm dia CP bottle trap and pipe to wall with C.P. flange complete including cutting and making good the walls and floors wherever required. Make- Cera, Parry ware, Jaquar ,HindWare

Detailed specification same as per item description and as directed by Engineer-in-charge.

The rate shall be for a unit of one number.

ITEM NO.5 :-

Providing & fixing 600 mm.x 450 mm. mirror of superior glass at all floor levels, mounted on 6 mm. th. A.C. sheet or plywood sheet & fixed to wooden plugs with C.P.brass screws and washers etc. For all Floor

- The mirror shall be of the best quality India make of superior glass with 6mm thick hard board backing with primer and two coats of enamel painting and fixed to wooden cleats with CP side clips, screws, washers.
- The mirror shall be of superior sheet glass with edges rounded off or beveled, size 600 x 450 mm unless specified in the schedule. It shall be free from flaws, specks or bubbles and thickness plated and should not be less than 6.0 mm.
- The back of mirror shall be uniformly silver plated and should be free from silvering defects. Silvering shall now have a protective uniform covering of red lid paint, where beveled edge mirror are not available. Fancy looking mirrors with PVC beading/border or aluminum beading on stainless steel beading/border based on manufacturer's specification.
- The backing of mirror shall be provided with 6mm thick marine plywood or environmentally friendly material other than asbestos cement sheet.
- Mirror shall be fixed in position with 6mm thick marine ply wood backing. It shall be fixed by means of 4 nos. of CP brass screws & caps over rubber washers and rawl plug or as per the manufacturer's specification unless specified otherwise the longer side shall be fixed horizontally.

The measurement & Rate shall be for each unit of mirror rail fixed.

ITEM NO.6 :-

Providing and fixing PVC SWR Nahni trap IS 14735 for drain - 75 mm diameter with jali of the following nominal diameter of self cleaning design with C.I. scread down or hinged grating including the cost of cutting and making good the walls.

- Nahani traps or floor traps/P-TRAP shall be cast iron/Low noise PVC (SKYRISE), deep seal with an effective seal of 50 mm.
- The trap and waste pipes shall be set in cement concrete blocks firmly supported on the structural floor.
- The blocks shall be in 1:2:3 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size) mixed with water proof compound and extended to 40 mm below finished floor level.
- Contractor shall provide all necessary shuttering and cantering for the blocks. Size of the block shall be 30 x 30 cms of the required depth.
- The trap shall be installed at lowest point ensure no pending occurs at perimeters of the drain.

The measurement & Rate shall be for each number of P.V.C. nanhi trap fixed.

The rate shall be for a unit of one number.

ITEM NO.7 :-

Providing and fixing U-p.v.c. pipe (SWR) confirming to IS no. 13592 (Type "B") of Prince/Supreme/Jain/Astral/Finolex make for soil and waste discharge system at all floor levels incl. All fixtures like bends, tees, shoe etc. jointed with resin of approved brand & manufacture etc. complete.(M.R.) (A) 75mm Dia,(B) 110 mm dia.

- 1.0 MATERIALS :
The specified dia. P.V.C. spigot and socket soil or waste pipe shall conform M-68-A.
- 2.0 WORKMANSHIP :
- 2.1 The P.V.C. sprigot and Socket soil or waster pipe shall be joint as per following procedure.
- 2.2 Cut the P.V.C. pipe with a fine to the saw to the required lenth pipe should be cut square.
- 2.2 Chamfer the edge of the pipe to be inserted at an angle of about 15 to about 1/3 rd. the wall thickness, using a coarse file.
- 2.3 Make sure the spigot and socket are the roughly clean and dry.
- 2.4 Insert the pipe into the socket without the seal ring and mark along the pipe, when it is fully inserted.
- 2.5 Fix the rubber ring into the groove without rwisting it.
- 2.6 Apply jointing lubricant to the chanfered end of the pipe, upto the make made on spigot or to the socket end of the fitting.
- 2.7 Push the pipe firmly into the socket till the gap between the mark on the sprigot and socket is about 10mm to allow for thermal expansion.
- 3.0 The pipe clips should be spaced at intervals of no more then ten times the outsidde diameter of pipes for horizontal runs & for vartical lines are spaced at intervals of one meter to a maximum of two moters according to pipe diameter.
- 3.1 All entry to main stacks should be protected with minimum 50mm water seal trap. Wherever there is mixing of soil & waste lines.
- 3.2 Smoke just should be avoided and test plug/ socket plug should be used for testing the lines.
- 3.3 All soil pipes shall be carried up above the roof and shall have a wire ballon guard or a cowl.
- 3.4 The vantilation pipe or shaft shall be carried out to a height of atleast one metre above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer two meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out upto a height of atleast one meter above the parapet or two meters measured vertically from the top of any windows or opening which may exist upto a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less than three meters.
- 3.5 Where ventilating pipes are carried in pipe shafts, the shafts, shall be of a minimum size of one meter. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meter from the site of the saft.
- 3.6 The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.
- 3.7 The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separatly connected to respective stacks of upper floors. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separatly discharged over gully trap.
- 4.0 MODE OF MEASUREMENTS & PAYMENT :
- 4.1 The length of pipe shall be measured including all fittings along its length in running meters correct to a centimetre. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.
- 4.2 The rate includes all labour and materials, tool and plant etc. required for satisfactory completion of this item.
- 4.3 The rate shall be for a unit of one running meter.

ITEM NO.8 :-

Providing and fixing s.w. Gully trap with C.I. grating brick masonry chamber and water tight Pre cast R.C.C.cover of 300mm X 300mm size (inside) including plastering smooth inside and outside 15 mm thick in C.M 1:3 etc. comp.i) square mouth traps (A) 100 MM X 300 MM Size - P type.For all Floors.

1.0 MATERIALS :

(1) Water shall conform to M-1. (2) Cement mortar of proportion 1:5 shall conform to M-11. (3) Flyash Building brick shall conform to M- 15(A). (4) The S. W. Gulley trap of 100 mm x 100 mm size shall conform to M-70.

2.0 WORKMANSHIP :

Excavation for gulley trap shall be done true to dimensions and levels as indicated on plans or as directed. The excavation work shall generally be done as per relevant specification of item 1(a) or earth work.

Fixing :

The gulley trap shall be fixed over cement concrete 1:5:10 (1 Cement : 5 sand : 10 graded brick bats aggregate 40 mm nominal size) foundation 650 mm square and 100 mm thick. The depth of top of concrete below the ground level shall be 675 mm. The jointing of gulley outlet to the branch drain described in Item No.60.

Brick Masonary Chamber :

After fixing and testing gulley and branch drain, a brick masonry chamber 300 mm x 300 mm inside with bricks in C.M. 1:5 (1 Cement : 5 sand) shall be built with a 100 mm brick work round the gulley trap from the top of bed concrete upto ground level. The space between the chamber walls and trap shall be filled with cement concrete 1:5:10. The upper portion of the chamber i.e. above the top level of the trap shall be plastered inside with cement mortar 1:3 (1 Cement : 3 sand) finished with floating coat of neat cement. The corners and bottom of the chamber shall be rounded off so as to slope towards.

C.I. Cover with frame 300 mm x 300 mm (Inside) size shall then be fixed on the top of the brick masonry with C.C. 1:2:4 (1 Cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) 40 mm thick and rendered smooth. The finished top of the cover shall be left about 40 mm above the adjoining ground level so as to exclude the surface water from entering the gulley trap.

3.0 MODE OF MEASUREMENTS AND PAYMENT :

The rate includes cost of all labour, materials tools and plant etc. required for satisfactory completion of this item as described above.

The rate shall be for a unit of one number.

ITEM NO.9 :

Prov. & Fix. 10 cm.x15 cm.(4" x 6") S.W. trap with Inside dimension ,455 x 610 mm & 450 mm deep sewer trap chamber with 23 cm th' B.B. masonry walls in C.M 1:5 with cement plaster 15 mm th' in C.M. 1:3 inside & outside to exposed faces, R.C.C. top slab with 1:2:4 mix (1 cement: 2 Sand : 4 Grade stone aggregate 20mm size) ,Foundation concrete 1:5:10 & fixing C.I. cover with frame to be not less than 38 kg. On top etc. comp. for single pipe.' (A).Same as above but Precast RCC heavy duty Cover instead of C.I. Cover

1.0 General :-

The item refers to provide and fix 10 cms. x 15cms. S.W.trap with 0.45 x 0.60 mts. clear opening sewer trap chamber with 23 cms. thick B.B. masonry walls in C.M. 1:5 with cement plaster inside and outside to exposed faces including fixing C.I. cover of 38 Kgs. on top sewer trap.

1.0 MATERIALS

The stone wall sewer trap shall be of 10cms. x 15cms. size conforming to relevant I.S. 651-1980.

2.0 WORKMANSHIP

- 2.1 Necessary excavation shall be done as required. The foundation cement concrete of 1:5:10 shall be laid for a thickness of 15cms. The S.W. trap shall be fixed into the position on the main sewer side of the chamber as directed. Brick masonry chamber of one brick thickness in C.M. 1:8 shall be constructed with the inside dimensions 60cms. x 45cms.
- 2.2 The inside of the chamber shall be plastered in 15mm. thick C.M. 1:3 and shall be finished smooth with cement slurry. The outside of the chamber shall be plastered to a depth of 30 cms. from the top of the chamber. The item also includes providing and laying 1:2:4 cement concrete for fixing the C.I. frame and cover. The C.I. frame and cover shall be of the specified size and it shall not weigh less than 38 Kgs. including frame and cover and shall be painted with two coats of anti-corrosive paint of approved make.
- 3.0 MODE OF MEASUREMENTS & PAYMENTS
- 3.1 The rate includes costs of all materials, labour, tools, plants, etc. required for carrying out satisfactory completion of items as described above.
- 3.2 The rate shall be for a unit of one number.

ITEM NO.10 :

Providing & construction simple chamber of 23 cm. th' B.B. Masonry in C.M 1:5 with cement plaster 15 mm th' in C.M. 1:3 inside & outside to exposed faces, R.C.C. top slab with 1:2:4 mix (1 cement: 2 Sand : 4 Grade stone aggregate 20mm size) ,Foundation concrete 1:5:10 & fixing C.I. cover with frame to be not less than 38 kg. On top etc. comp. Inside dimension,455 x 610 mm & 450 mm deep for single pipe. Same As Above But Precast RCC Heavy Duty Cover Instead of C.I. Cover 0.6 x 0.45

- 1.0 Materials :
Water shall confirm M-1. Cement shall confirm to M-3. Coarse sand shall confirm to M-6. Flyash Building Brick shall confirm to M-15(A). Cement mortar shall confirm to M-11.
- 2.0 Workmanship :-
- 2.1 The item covers the construction of simple chamber of clear size 0.45 x 0.60 mts.with 23 thick brick wall in C.M.1:5 and smooth plaster 15 mm thick C.M. 1:3 Bedding concrete of C.C. 1:5:10, 150 mm thick, the projected bed concrete beyond chamber wall shall be of 75 mm. The chamber frame & cover shall be of Precast RCC heavy duty cover fixed with C.M. 1:1 etc. comp.
- 2.2 Specification for item No.1[a] shall be read for excavation, & specification for Item No.8 shall be adopted for P.C.C. and specification for Item No.12 shall be read for B.B. Masonry and specification for Item No.14 shall be read for plaster work except that the thickness of plaster shall be 15 mm thick in CM 1:3.
- 3.0 Mode of Measurements and payments :-
[1] The rates including all labours, materials, tools and plats etc. required for satisfactory completion of this work.
[2] The rate shall be for a unit of one number.

ITEM NO.11 :-

Providing, Lowering and laying joining R.C.C. NP2 CLASS pipe in cement mortar in proportion 1:1 of following nominal internal diameters including testing of pipes and joints etc. complete. 150 mm dia

- 1.0 MATERIALS :
- 1.1 The reinforced concrete light duty non-pressure pipes of specified diameter shall confirm to I. S. 458-1971. Cement mortar of required proportion shall conform to M-7.
- 2.0 WORKMANSHIP :
- 2.1 EXCAVATION OF TRENCHES :
- 2.2 The width of the trenches shall be 1.05/1.20 metre and depth shall be corresponding to invert level of the screen chamber and required levels as directed.

- 2.3 At joints, the trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line and gradient in accordance with general specifications of earth work in trenches.
- 3.0 LAYING :
- 3.1 The pipe shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made of left on the bed to receive the sockets of the pipes.
- 3.2 JOINTING :
- 3.3 Tarred gasking or yarn soaked in neat cement slurry shall first be placed around the spigot of each pipe and spigot shall then be placed well home into the socket of the pipe previously laid.
The pipe shall then be adjusted and fixed in the correct position and gaskin caulked home so as to fill not more than 1/4th of the total depth of (13 mm in depth) the socket.
- 3.4 The remainder of the socket shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the a socket is filled, a fillet shall be formed round the joints forming an angle of 45 degree with the barrle of the pipe.
- 3.5 The mortar shall be mised as necessary for immediate use.
- 3.6 After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper or 'badger'. The newly made joints shall be protected, until set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose.
- 3.7 The mortar shall be cured for 10 days.
- 4.0 MODE OF MEASUREMENT AND PAYMENT :
- 4.1 Pounding or bottaning of the trenches bed to fit the lower part of the pipe and 'Grips' dug to take socket collars etc. are included in the rate of laying the pipes.
- 4.2 The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connection shall be included in the total length of the pipe drains. Nothing extra shall be paid for the same. The rate excludes necessary excavation, including refilling trenches etc.complete.
- 4.3 The rate shall be for a unit of one running metre.

ITEM NO 12 :-

Providing & Fixing P.V.C. pipes (SCH-80) of Prince/ Supreme/ Jain/ Astral/ Tulsi/Finolexmake for water supply line at all floor levels incl. fixtures like bends, tees, shoe etc joined with resin of approved brand & manufacture etc. comp. Pipe shall be fixed on the wall the help of clamp at every two meter C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials. (a) 15 mm. dia. (b) 25 mm. (c) 40 mm dia. (d) 50 mm dia. (e) 65 mm dia.

Pipe shall be fixed on the wall the help of clamp at every two meter C/C or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials.

- (A) 15 mm Dia
- (B) 25 mm Dia
- (C) 40 mm Dia
- (D) 50 mm Dia

The relevant specification of U-PVC pipes shall be followed for this item. The P.V.C. pipes shall be of SCH-80 of Prince, Supreme, Jain, Astral or Tulsi make for water supply of required diameter. All the fixtures like bend, tees, shoes etc shall be used for line and jointed with resin of approved brand.

The pipe line shall be fixed on the wall and floor as per detail. The joint shall be leak proof and the test shall be done with required pressure of water. The work shall be carried out as per detail and directed by engineer in charge.

The rate shall be for a unit of R.mt.

ITEM NO.13 :-

Providing & fixing 15 mm Dia bib tap with wall flange at all floor levels, polished bright etc.

MATERIALS

1.1 15mm. dia. brass screw down with bright polished finish shall conform to I.S. 781-1990 & M-57. The bib cock shall be best Indian make and quality.

WORKMANSHIP

2.1 The screw down bib cock 15mm. dia. as specified above shall be fixed as directed. The threaded portion shall be smeared with white or red, lead and around with a few turns of fine spun yarn round the screwed end of the pipe. The bib cock shall be then screwed and fixed to water tight position.

MODE OF MEASUREMENTS & PAYMENTS

3.1 The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item.

3.2 The rate shall be for a unit of one number.

ITEM NO.14:-

Providing and fixing gun metal check or non return full way wheel valve at floor levels, etc. complete.

MATERIALS

The gun metal check or non-return full way valve of specified dia. shall conform to I.S. 778-1990 & M-58. The non-return valve shall be tested quality.

WORKMANSHIP

The gunmetal check or non-return valve shall be fully cleared of all foreign matter before fixing of valve shall be done means of bolts, nuts and 3 mm. rubber insertions. with flanges of spigot and socketed tail pieces drilled to the same specification as in case of socket and with flanges in case of flanged pipes. The joining shall be done leak proof.

MODE OF MEASUREMENTS & PAYMENTS

3.1 The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this time.

3.2 The rate shall be for a unit of one number.

ITEM NO.15:-

Providing flush cock consisting lever, cartridge sleeve & flange & concealed part. For all floors. make-cera, parry ware, jaquar, Hindware

MATERIALS :

Half turn flush cock (heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standards.

WORKMANSHIP

The half turn flush cock of specified diameter shall be fixed as directed. The flush cock shall be fixed in G.I. pipe line with necessary fittings. The joints shall be made leak proof by using spun yarn and white zinc.

3.0 **MODE OF MEASUREMENTS & PAYMENTS**

3.1 The rate includes cost of all materials and labour required for satisfactory completion of this item including fittings.

3.2 The rate shall be for a unit of one number.

ITEM NO.16:-

Providing and fixing abonite ball cock of approved quality as directed etc. comp. (A) 25 mm. dia.

1.0 **Materials**

The ball cock of specified diameter shall conform to M-75.

2.0 **Workmanship :**

The abonite ball cock of specified diameter shall be fixed as directed. The threaded portion shall be smeared with white or red lead around with a few turns of fine spun yarn round the screwed end of the pipe. The ball cock shall be then screwed and fixed to water tight position.

3.0 **Mode of Measurement and payment :**

The rate includes cost of all materials and labour involved for carrying out satisfactory work.

The rate shall be for a unit of one number.

ITEM NO.17 :-

Providing & fixing C.P. brass press matic pillar cock with copper connection, C.P. brass screws complete.

- Pillar taps shall be chromium plated brass and shall conform to IS 1795. The nominal sizes of the pillar tap shall be 15 mm or 20 mm as specified. The nominal size shall be designated by the nominal bore of the pipe outlet to which the tap is to be fitted. Finished weights of 15 mm and 20 mm pillar taps shall be as prescribed in below Table.

Minimum Finished Weights of Pillar Taps

Particular	Weights in gms	
	15 mm size	20 mm size
Body	255	505
Washer plate loose valve	15	18
Back nut	40	50
Tap	650	1175

- Casting shall be sound and free from laps, blow hole and pitting. External and internal surfaces shall be clean, smooth and free from sand and be neatly dressed. The body, bonnet and other parts shall be machined true so that when assembled, the parts shall be axial, parallel and cylindrical with surfaces smoothly finished.
- The area of waterway through the body shall not be less than the area of the circle of diameter equal to the bore of the seating of the tap. The seating of pillar tap shall be integral with the body and edges rounded to avoid cutting of washer. Pillar taps shall be nickel chromium plated and thickness of coating shall not be less than service grade No. 2 of IS 4827 and plating shall be capable of taking high polish which shall not easily tarnish or scale.
- Every pillar tap, complete with its component parts shall withstand an internally

applied hydraulic pressure of 20 Kg/sq. cm maintained for a period of 2 minutes during which period it shall neither leak nor sweat.

The measurement & Rate shall be for each unit of pillar cock fixed.

ITEM NO.18 :-

Providing and fixing C.I. manhole cover 0.60 mt. x 0.45 mt. size having weight not less than 35 kg. etc. complete.

- Materials :
- manhole cover 0.60 x 0.45 mts. size shall be of best quality. The weight of C. I. cover and frame shall not be less 35 Kg. The C.I. manhole cover shall be of light duty.
- Workmanship :
- The C.I. manhole cover shall be fixed as and where directed. The frame of manhole cover shall be embedded firmly in R.C.C. slab. After completion of work, manhole covers shall be sealed by means of thick grease.
- Mode of Measurement and payment :
- The rate includes cost of all labour and materials required for satisfactory completion of this item.
- The rate shall be for a unit of one number.

ITEM NO.19 :-

Providing & fixing U-PVC pipes Confirming to IS no. 13592 (Type "A") of Prince/Supreme/Jain/Astral/ Tulsi/Finolex make for rain water at all floor levels incl. fixtures like bends, tees, shoe etc joined with resin of approved brand & manufacture etc. comp. (M.R.) (A) 75 mm. Dia. ,(B) 110 mm dia. (C)160MM.

- 1.0 MATERIALS :
The specified dia. P.V.C. spigot and socket soil or waste pipe shall conform M-68-A.
- 2.0 WORKMANSHIP :
- 2.1 The P.V.C. sprigot and Socket soil or waster pipe shall be joint as per following procedure.
- 2.2 Cut the P.V.C. pipe with a fine to the saw to the required lenth pipe should be cut square.
- 2.2 Chamfer the edge of the pipe to be inserted at an angle of about 15 to about 1/3 rd. the wall thickness, using a coarse file.
- 2.3 Make sure the spigot and socket are the roughly clean and dry.
- 2.4 Insert the pipe into the socket without the seal ring and mark along the pipe, when it is fully inserted.
- 2.5 Fix the rubber ring into the groove without rtwisting it.
- 2.6 Apply jointing lubricant to the chanfered end of the pipe, upto the make made on spigot or to the socket end of the fitting.
- 2.7 Push the pipe firmly into the socket till the gap between the mark on the sprigot and socket is about 10mm to allow for thermal expansion.
- 3.0 The pipe clips should be spaced at intervals of no more then ten times the outsidde diameter of pipes for horizontal runs & for vartical lines are spaced at intervals of one meter to a maximum of two moters according to pipe diameter.
- 3.1 All entry to main stacks should be protected with minimum 50mm water seal trap. Wherever there is mixing of soil & waste lines.
- 3.2 Smoke just should be avoided and test plug/ socket plug should be used for testing the lines.
- 3.3 All soil pipes shall be carried up above the roof and shall have a wire ballon guard or a cowl.
- 3.4 The vantilation pipe or shaft shall be carried out to a height of atleast one metre above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer two meters above the top of the windows. In case of flat roof to which access

- for use is provided, it shall be carried out upto a height of atleast one meter above the parapet or two meters measured vertically from the top of any windows or opening which may exist upto a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less than three meters.
- 3.5 Where ventilating pipes are carried in pipe shafts, the shafts, shall be of a minimum size of one meter. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meter from the site of the shaft.
 - 3.6 The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.
 - 3.7 The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floors. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gully trap.
 - 4.0 **MODE OF MEASUREMENTS & PAYMENT :**
 - 4.1 The length of pipe shall be measured including all fittings along its length in running meters correct to a centimetre. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.
 - 4.2 The rate includes all labour and materials, tool and plant etc. required for satisfactory completion of this item.
 - 4.3 The rate shall be for a unit of one running meter.

ITEM NO.20 :-

Providing and laying ordinary C.C. 1:1.5:3 mix for R.C.C. work including boxing, centering, vibrating, curing and mixed with approved water proofing cement compound or "CEMWET" or "PIDICRETE LW" integral water proofing admixture as water proofing agent to be mixed with 50 Kg. cement bag. Shall be as recommended by the manufacturer of the water proofing material, concrete work for top, bottom slab and side pardi for under ground and over head water tank, Item includes necessary excavation and refilling the available earth, 15 cm. thick C.C. 1:4:8 for bedding concrete, 10 mm. thick water proofing cement plaster in C.M. 1:2 with smooth finishing, watering etc. complete to all inner face of tank and 20 mm. thick sandface cement plaster consisting base coat of 12 mm. thick in C.M. 1:3 and 8 mm. thick finishing coat of C.M. 1:1 on outer surface of tank, curing etc. complete including locking arrangement, outlet, inlet, overflow and washout pipe arrangement as necessary etc. complete, as per structural drawing excluding steel and as directed by Engineer in charge etc. complete. (A) Underground tank

Item includes necessary excavation and refilling available earth, 15 C.M. thick C.C. 1:4:8 for bedding concrete, 10 mm. thick water proofing cement plaster in C.M. 1:2 with smooth finishing watering etc. complete to all inner face of tank and 20 mm thick sand face cement plaster consisting base coat of 12 mm thick in C.M. 1:3 and 8 mm thick.

Finishing coat of C.M.1:1 on outer surface of tank, Curing etc. comp. including locking arrangement, outlet, inlet, overflow and washout pipe arrangement as necessary etc. comp. as per structural drawing and as directed by Engineer-in-charge etc. comp. For under ground water tank and over head water tank.

1.0 Material :

Water shall conform to M-1. Cement shall conform to M-3. Graded stone aggregates 20 & 40 mm nominal size shall conform to M-12, sand shall conform to M-6, Grit shall conform to M-8. The shuttering to be provided shall be of ordinary timber and shall conform to M-26, cold twisted steel bars (High yield strength deformed steel bars shall conform to M-19. Cement mortar shall conform to M-11. G.I. pipe shall conform to M-56. Mild steel binding wire shall conform to M-21.

2.0 General :

The item covers constructing R.C.C., under ground or overhead water tank as detailed specified in the item.

2.1 Workmanship :

The relevant specification of Item No.1 (a.b.) shall be followed for excavation work except that work shall be carried out for under ground water tank.

The relevant specification of Item No.2 shall be followed for 15 cm thick bedding concrete work. Except that the proportion shall be 1:4:8 for under ground water tank.

The relevant specification of Item No.5 shall be followed for R.C.C.work. Except that works shall be carried out for water tank in ordinary M-200 i.e. 1:1 1/2:3 proportion volume including boxing centering, vibrating curing and mixed with approved water proofing cement compound or CEMWET as water proofing agent to be mixed with 50 Kgs. bags shall be used recommended by the manufactures of the water proofing materials. Concrete work for top, bottom slab and side pardi for under ground and over head water tank.

The relevant specification of Item No.7 shall be followed for H.Y.S.D.bars/M.S.bars steel reinforcement for under ground and overhead water tank R.C.C.work.

The relevant specification of Item No.15 shall be followed for 10 mm thick cement plaster in proportion 1:2 except that works shall be carried out for water tank including mixing with approved water proofing cement compound for all inner surface or water tank.

The relevant specification of Item No.19 shall be followed for 20 mm thick sand face cement plaster consisting base coat of 12 mm thick in C.M. 1:3 and 8 mm thick finishing coat of 1:1 on outer surface of tank.Except that the work shall be carried out for water tank.

The relevant specification of Item No. 61 and 62 shall be followed for outlet, wash out and over flow pipe as directed by Engineer- in-charge. Looking arrangement or water tank shall be provided as directed by Engineer-in- charge.

4.0 Mode of measurement and payment :

The rate includes cost of all labours, materials tools and plants etc.required to satisfactory completion of this item as specified in detailed.

The rate shall be for a unit of one litre.

ITEM NO.21:

Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto GL/PL.

Detail Specification as per **item no.7.(part-a)**

The rate shall be for a unit of one Kg.

ITEM NO.22:

Providing erecting and fixing double coated Syntex/Super/Reno PVC (ISI) mark water tank of required capacity each with all necessary fittings & connection etc. complete on terrace.

MATERIAL :

The ready made water tank shall be of any approved manufacture like Sintex, fussion orequivalent quality product as approved by Engineer-in-charge.

WORKMANSHIP :

The water tank shall be approved and fixed as directed by Engineer-in-charge with all fitting and fixtures like over flow pipe, wash out pipe, inlet pipe etc. complete.

MODE OF MEASUREMENT AND PAYMENT :

The rate should cost of all materials labours, tools, plants etc. required to complete the item.

The rate shall be form unit of one litre excluding free brand.

PART-E
RECHARGE BORE WELL

ITEM NO.1 :-

Drilling 300 mm diameter borewell in all types of strata up to required depth including cost of bentonite powder, carting rings, cutter, other required materials, labour charges etc. complete. The drilling shall be done by mud flushed rotary equipment and bore holes should withstand at least till completion of subsequent activities like assembly jointing, lowering of casing / strainer pipes, gravels packing, yield testing etc, complete up to required depth as shown in drawing and directed by engineer -in- charge.

Same as per item description, and as directed by Engineer-in-charge.
The rate shall be for a unit of running meter..

ITEM NO.2 :-

Cleaning of existing unusable / non-working borewell by applying air compressor of capacity not less than 900 CFM/200 PSI for minimum one hours or up to the availability of sand free discharge whichever is later including all labour charges and hire charges of compressor and other equipment etc. complete as directed by engineer-in-charge.

Same as per item description, and as directed by Engineer-in-charge.
The rate shall be for a unit of hectre.

ITEM NO.3 :

Excavation for foundation including sorting out and stacking off useful materials and disposing of the excavated stuff up to 50 mt. lead and all lift, watering etc.comp. (A) loose or soft soil with machineries (1) 0 To 1.5 mt. Depth.

1.0 GENERAL

1.1 Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such excavation implement or organic soil, gravel, silt, sand turf loam, clay, peat etc. fall under this category.

2.0 CLEARING THE SITE

2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be the property of the Corporation and shall be conveyed and stacked as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

3.0 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 EXCAVATION

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & transversely as

directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

5.0 DISPOSAL OF EXCAVATED MATERIALS

5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

5.4 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead or 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.

6.0 MODE OF MEASUREMENT AND PAYMENT

6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge of as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.

6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

6.3 The rate shall be for a unit of one cubic meter.

ITEM NO.4 :-

Providing & laying C.C 1:3:6 (1cement :3 coarse sand :6 Crushed stone agg 20m.m Nominal size)&curing comp. excl. cost of form work in :(a) foundation & Plinth

3.1.0 Materials:-

Water shall conform to M-1. Cement shall conform to M-3.Sand shall conform to M-6.Stone aggregate 20 mm nominal size shall conform to M-12.

3.2.0 WORKMANSHIP :

3.2.1 General :-

Before starting concreting the bed of foundation trenches shall be cleared of all loose materials, levelled, Waterred and rammed as directed.

3.2.2 Proportion of Mix :-

The proportion of cement, sand coarse aggregate shall be one part of cement, 3 parts of sand 6 parts of stone aggregate shall be measured by volume.

3.2.3 Mixing :-

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such case 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.

3.2.4 Transporting and placing the concrete :-

The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

The concrete shall be laid in layers of 15 cms to 20 cms.

Compacting :-The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filled with mortar.

3.2.5 Curing :-

After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

3.3.0 Mode of measurements and payment :-

The concrete shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

ITEM NO.5 :-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 35 Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. - upto GL/PL

Item Description as per item no.9 part-A

The rate shall be for a unit of one cubic meter.

ITEM NO.6 :-

Providing 10mm thick Cement Plaster in single coat on brick/concrete walls far interior plastering up to Floor two level and finished even and smooth in cement mortar 1:3(1 cement:3sandvariousareaasdirectedbyincharge)

Item Description as per item no.16part-d

The rate shall be for a unit of one square meter.

ITEM NO.7 :-

Supplying and filling clean best quality of well- sorted sand having size 1 mm to 2 mm in layer of required thickness in filter chamber as per drawing and as directed by Engineer -in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.

The rate shall be for a unit of one cubic meter.

ITEM NO.8:-

Supplying and filling clean best quality of well sorted - " SEVALIYA" sorted pea gravel having size 6 mm to 10 mm in layer of required thickness in filter chamber as per drawing and as directed by Engineer –in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of one cubic meter.

ITEM NO.9:-

Supplying and filling clean best quality of well- sorted brick bats having size 50 mm to 150 mm in layer of required thickness in filter chamber as per drawing and as directed by Engineer –in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of one cubic meter.

ITEM NO.10:-

Supplying and fixing a display board of size 450 mm x 300 mm or higher, near the recharge system or on outer side of one wall of filter chamber with letters written " GROUND WATER RECHARGE SYSTEM".

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of one Number.

ITEM NO.11:-

Supplying and fixing of a cover made up of 2 mm thick Poly Carbonate sheet on painted Mild Steel square frame as shown in drawings over filter chamber including all materials, fittings and labour charges etc, but excluding the cost of Steel frame and steel angle. The fixing of cover over walls should have arrangement of removing it from the wall for cleaning of filter chamber and re-fixing again from time to time as shown in drawing and directed by engineer – in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of square meter.

ITEM NO.12:-

Providing, Supplying, Fixing in bore hole 150 mm dia 6 Kg/cm² P.V.C Pipe of approved Quality (Prince, Supreme, Finolex) with ISI mark, in borewell / filter chamber, including 3.2 mm x 75 mm vertical perforations with spacing of 4 to 5 mm (or equivalent standard openings) in necessary lengths and necessary fittings and as per site situation and as directed by engineer –in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of running meter.

ITEM NO.13:-

Supplying and filling clean best quality of well- sorted " SEVALIYA " pea gravel having size 4 mm to 6 mm surrounding casing pipe in borewell as per drawing and as directed by Engineer –in- charge

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of one cubic meter.

ITEM NO.14:-

Providing, fixing and binding SS-304 Hexagonal wire mesh surrounding the perforated casing pipe in filter chamber as directed by Engineer –in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge
The rate shall be for a unit of square meter

ITEM NO.15:-

Providing, supplying and fixing 100 mm dia. 6 kg / cm² standard PVC pipe with ISI mark, in brick masonry wall with jali at outside of wall and nylon mesh filter bag 100 x 500 mm fitted on inside end of pipe including plumbing, fittings, clamping etc, complete to keep away debris from surface runoff entering into the filter chamber as shown in drawing and directed by Engineer –in- charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of one Number.

ITEM NO.16:-

Demolition including stacking of serviceable materials and Disposal of unserviceable materials with lead and lift (a) unreinforced cement concrete

As the item itself is logical and self explanatory it should be carried out as per the instruction of Engineer-In-Charge.
The rate shall be for a unit of one Cubic metre..

ITEM NO.17:-

Steel work, welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (A) In beams and joists, channels angles Tees, flats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins connected to common rafters and directed by Engineering-in-charge.

Same as per item description, manufacturer details and as directed by Engineer-in-charge.
The rate shall be for a unit of quintal.

PART-F
COMPOSTING BED

ITEM NO.1:-

Boring holes 3.5 mt. Deep in ordinary soil (for cast in situ piles) & disposal of the surplus excavated soil as directed within a lead of 50 m. For following diameter of piles. (i) 250 mm.

Workmanship:

The ground shall be roughly leveled and after making the position of piles, the holes shall be bored with a spiral angle to the 1.8 M depth and specified diameter using boring guide.

The bore holes shall be truly vertical and uniform bore through cut of specified diameter. After boring to the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavated stuff as directed within a lead of 50 M.

Mode of Measurement & Payment : The rate for boring holes shall include :

[a] Roughly leveling the ground in positions where piles are to be provided [b] Making the position of piles by pegs and boring guide and also for shifting of boring guide [c] Bailing out water, if any met with during boring [d] Disposal of surplus excavated soil within a lead of 50 M. and [e] All tools, plants, equipments and labour required for satisfactory completion of work.

The rate shall be for a unit of one Running metre.

ITEM NO.2:-

Excavation for foundation including sorting out and stacking off useful materials and disposing of the excavated stuff up to 50 mt. lead and all lift, watering etc.comp. (A) loose or soft soil with machineries (1) 0 To 1.5 mt. Depth (2) 1.5 To 3.0 MT Depth.

1.0 GENERAL

1.1 Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such excavation implement or organic soil, gravel, silt, sand turf loam, clay, peat etc. fall under this category.

2.0 CLEARING THE SITE

2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be the property of the Corporation and shall be conveyed and stacked as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

3.0 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 EXCAVATION

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

5.0 DISPOSAL OF EXCAVATED MATERIALS

5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free

movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

5.2 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead of 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.

6.0 MODE OF MEASUREMENT AND PAYMENT

6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge of as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stop-ping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.

6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

6.3 The rate shall be for a unit of one cubic meter.

ITEM NO.3:-

Providing and laying cement concrete 1:4:8 (1 cement : 4 sand : 8 graded stone aggregates 40 nominal size) and curing complete including cost of form work but excluding the cost of reinforcement etc. complete in foundation and plinth.

3.1.0 Materials:-

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Stone aggregate 20 mm nominal size shall conform to M-12.

3.2.0 WORKMANSHIP :

3.2.1 General :-

Before starting concreting the bed of foundation trenches shall be cleared of all loose materials, levelled, Waterred and rammed as directed.

3.2.2 Proportion of Mix :-

The proportion of cement, sand coarse aggregate shall be one part of cement, 3 parts of sand 6 parts of stone aggregate shall be measured by volume.

3.2.3 Mixing :-

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such case 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.

3.2.4 Transporting and placing the concrete :-

The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position,

compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

The concrete shall be laid in layers of 15 cms to 20 cms.

Compacting :-The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filled with mortar.

3.2.5 Curing :-

After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

3.3.0 Mode of measurements and payment :-

The concrete shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

ITEM NO.4:-

Providing & laying cement concrete 1:2:4 (1 cement: 2 sand:4 graded stone agg. 20 mm nominal size)& curing comp. Includ.cost of form work but exclu. Cost of reinforcement for reinforced concrete work in : (A) Foundation, footing, Base of columns and Mass concrete.

Item Description as per item no.4 part-A.

The rate shall be for a unit of one cubic meter

ITEM NO.5:-

Providing and laying ordinary cement concrete work 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) & curing comp.including cost of form work but excluding cost of reinforcement for reinforced concrete work in: (A) Foundation, footing, Base of columns and Mass concrete.

1.0 Materials :-

Water shall conform to M-1, Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.

1.1 General :-

1.2 The concrete mix is not required to designed by preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 [1 cement: 1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size] by volume Concrete work shall have exposed concrete surface or as specified the item.

1.3 The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponding approximately to 1:3:6 1:2:4, 1: 1, 1/2: 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively with conforming to IS:456.

1.4 The ingredients required for ordinary work, containing one bag of cement of 50 kg. by weight [0.0342 cu.m.] for different proportion of mix shall be as under.

Grade	Total quantity of dr aggregate by volume per 50 Kg. of cement t be taken as the sume of individual volume of fine and coarse aggregate maximum	Proportion of fine aggregate of coarse aggregate	quantity of water per 50 Kg. of cement maximum
M-100 (1:3:6)	300 Liters	Generally 1:3 for fine aggregate to coarse aggregate by volume but subject to and	35 Liters
M-150 (1:2:4)	220 Liters		32 Liters

M-150 (1:1.5:3)	160 Liters	upper limit	30 Liters
M-250 (1:1:2)	100 Liters		27 Liters

- 1.5 The water cement ratios shall not be more than those specified in the table. The cement content of the mix specified in the table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water cement ratio specified in the table is not exceeded.
- 1.6 Workability of the concrete shall be controlled by maintaining a water cement ratio that is found to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.
- 1.7 The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.
- 1.8 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm generally considered satisfactory.
- 1.9 For heavily reinforced concrete members as in the case of the ribs of main beams the nominal maximum size of coarse aggregate should usually be restricted to 5 mm, less than the minimum clear distance between the main bars, or 5 mm, less than the minimum cover to the reinforcement whichever is smaller.
- 1.10 Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important and the nominal maximum size may some times be as great as or greater than the minimum cover.
- 1.11 Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time; neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.
- 2.0 WORKMANSHIP :
- 2.1 General :- The bars shall be kept in position by the following method:
In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 [1 cement 2 coarse sand] about 4 x 4 cms. section of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement.
In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing chair spacers or supports bars at 1.0 to 1.2 metres centers.
In case of columns and wall, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.
All bars projecting from pillars, columns, beams, slabs etc. to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.
- 2.2 Proportioning :-
Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 kg. weight. The volume of one such bag being taken as 0.0342 cu. metre Boxes of suitable sizes shall be used for measuring sand and aggregate. The size of the boxes [internal] shall be 35x25 cms. and 40 cms. deep. While measuring the aggregate and sand, the boxes shall be filled without shaking, ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.
- 2.3 Mixing :-

- 2.3.1 For all work, concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shown complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than two minutes after all ingredients have been put into the mixer.
- 2.3.2 When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.
- 2.3.3 Mixer which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch, unless otherwise agreed to by the Engineer-in-charge. The first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement concrete to another.
- 2.3.4 Consistency :
The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump test in accordance with I.S. 1199 : 1959. The slump of 10 mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.
- 2.3.5 Inspection :
- 2.3.5.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit to inspect and accept the false work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.
- 2.3.5.2 Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platform shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.
- 2.3.6 Transporting and laying :-
- 2.3.6.1 The method of transporting and placing concrete shall as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.
- 2.3.6.2 All form work shall be cleaned and made free from standing water dust snow or ice immediately before placing of concrete. No concret shall be placed in any part of structure until the approval of Engineer-in-charge.
- 2.3.6.3 Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than

30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.

2.3.6.4 Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters.

2.3.6.5 When trunking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted, and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself, this 13 mm layers of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles, of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed, and then coated with neat cement grout, The first layers of concrete to be placed on this surface shall not exceed 150 mm in thickness and shall be well rammed against old work, particular attention being given to corners and close spot.

2.3.6.6 All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer - in - charge for exceptional cases such as concreting under water where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

2.3.6.7 Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream upto form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30minutes of addition of water to dry mixture. During compaction. It shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

2.3.7 Curing :-

Immediately after compaction, concrete, weather including rain, running water, shocks, vibration, traffic, rapid temperature changes frost and drying out process it shall be covered with wet sacking, hessian or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

2.3.8 Sampling and Testing of concrete :-

2.3.8.1 Samples from fresh concrete shall be taken as per IS 1199:1999 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with IS 516:1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following.

2.3.8.2 Quantity of concrete in the work	No. of samples
1-5 Cmt.	1
6-15 Cmt.	2
16-30 Cmt.	3
31-50 Cmt.	4
51-and above	4+one additional sample for each additional 50 cmt. or part there of.

Note:- Atleast one sample shall be taken from shift. The test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The

number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

- 2.3.8.3 The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportion given for a particular grade does not yield the specified strength such concrete shall be classified as belonging the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

2.3.9 Stripping :

- 2.3.9.1 The Engineer-in-charge shall be informed in advance by the contractor of his intention to struck the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather & other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances [generally where temperatures are above 20°C] and where ordinary concrete is used forms may be struck after expiry of period specified in the Item No.4 for respective item of form work.

- 2.3.9.2 All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. Cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the EXECUTIVE ENGINEER shall inspect the work and satisfy by random checks that concrete produced is of good quality.

- 2.3.9.3 Immediately after the removal of forms all exposed bolts etc. Passing through the cement member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and, the resulting holder be filled by cement mortar. All fins caused by from joints, all cavities produced by the removal of form ties and all other holes and depression, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and so as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all avoids. Surfaces which are pointed shall be kept moist for a period of 24 hours.

- 2.3.9.4 If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare portions of the structure affected.

3.0 Mode of measurement and payment :

- 3.1 The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deductions shall be made for.

[a] Ends of dis-similar materials such as joints, beams, posts, girders, rafters, purline, trusses, corbels and steps etc. upto 500 sq.cm. in section.

[b] Opening upto 0.1 sq.m.

- [c] The volume occupied by reinforcement shall not be deducted from R.C.C.work.
- 3.2 The rate includes cost of all materials labour, tools and plant required for mixing, placing imposition vibrating and compacting, finishing as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.
- 3.3 The rate shall be for a unit of one cubic metre.

ITEM NO.6:-

Providing and laying ordinary cement concrete 1:1.5:3 (1 cement, 1.5 sand, 3 graded stone aggregates 20 mm nominal size) finishing smooth curing etc. complete including cost of form work but excluding cost of reinforcement for reinforced concrete work (R.C.C.) in : A) Columns,(B) Beam, (C) Slab.

Detail Specification as per **item no.4(Part-A)**

The rate shall be for a unit of one Cubic meter.

ITEM NO.7:-

Providing TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level

Detail Specification as per **item no.7(part-a).**

The rate shall be for a unit of one Kg.

ITEM NO.8:-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 70Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. Up to G.L./P.L.

- 1.0 MATERIALS
Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.
- 2.0 WORKMANSHIP
- 2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.
- 2.2 Wetting of bricks : The bricks required for masonry work shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water, is an indication of thorough wetting of bricks.
- 2.3 Laying : Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond. Closures in such case shall be cut to required size and used near the ends of the walls.
A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.
The walls shall be taken up truly in plumb. All courses shall be truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept in uniform.
The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, manson's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.
Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the

- work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.
- All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.
- 2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.
The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.
- 2.5 Curing : Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.
- 2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be levelled, cleared of all loose materials, cleaned and wetted before starting masonry.
If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.
- 2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding planks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0 MODE OF MEASUREMENTS & PAYMENT :
- 3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.
- 3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---
- i] Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
 - ii] Opening not exceeding 1000 Sq.Cm.
 - iii] Wall plate and bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
 - iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
 - v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.
 - vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jambs, throating and making arches over the aperture be paid for separately.

3.8 The rate shall be for a unit of one cubic metre.

ITEM NO.9:-

Filling in trenches with available excavated earth in layer not exceeding 20cm in depth consolidating each deposited layer by ramming & watering etc.complete.

1.0 FILLING AND DISPOSAL OF THE EXCAVATED STUFF :

The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers. Under no circumstances black cotton soil shall be used for filling the trenches and plinth. The earth to be used for filling shall be free from salts organic or other foreign matter. All clods of earth shall be broken. As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of the debris, brick bats, mortar dropping and filled with earth in-layers not exceeding 20cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars where rammers cannot be used. When filling reaches finished level. The surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.

2.0 MODE OF MEASUREMENTS AND PAYMENT :

2.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids. If consolidated as instructed above.

2.2 The rate shall be for a unit of one cubic metre

ITEM NO.10:-

Providing and filling in plinth with murrum / yellow soil or selected soil in layers of 20 cm. thickness including watering, ramming and consolidation etc. complete.

1.0 Materials :-

Murrum shall be cleaned, of good binding quality, and of approved quality obtained from approved pits/ quarries of disintegrated rock which contain silicious material and natural mixture of clay of calcareous origin. The size of murrum shall not be more than 20 mm.

2.0 Workmanship:-

2.1 The murrum to be used for filling shall be free from salts, organic or other foreign matter. All clods of murrum shall be broken.

2.2 As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc. and filled with murrum in layers not exceeding 20 Cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The murrum shall be rammed with iron rammers where feasible and with the butt ends of crowbars, where rammer cannot be used.

2.3 The plinth shall be similarly filled with murrum in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

2.4 The finished level of filling shall be kept to shape intended to be given to the floor.

2.5 In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation shall also be as specified.

2.6 The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil shall be used for filling the plinth.

3.0 Mode of measurement and payment :-

- 3.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage of voids if consolidated as instructed above.
- 3.2 The rate includes cost of collecting and carting murrum or selected murrum of approved quality with all lead and labour required for filling in trenches and plinth.
- 3.3 The rate shall be for a unit of one cubic metre.

ITEM NO.11:-

Providing & applying 20mm.th. Sand faced cement plaster on walls or similar surfaces at all floor levels consisting of 12 mm. Av. th'. Backing coat of C.M. 1:3(1 cement :3 sand) & 8 mm.th. Finishing coat of C.M.1:1 (1 cement: 1 sand)--- Upto G.L./P.L

Item Description as per **Item no.10 (part-a).**

The rate shall be for a unit of one square meter

ITEM NO.12:-

Providing and applying two coats of weathershield max paint (3 coats may be required in case of darker colours) of ICI Dulux or Apex Ultima of Asian paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers.

Surface Preparation :

surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes.

Priming:

Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. Application of putty is not recommended.

Minimum 4-6 hours duration is required between each coat of weather shield max paint.

Self explanatory and as directed by Engineer-in-charge.

Rate shall be per square metrers basis for complete item.

PART G
BENCHES AND DUSTBINS

ITEM NO.1 :-

Providing, supplying & placing precast RCC Wooden benches as per given specifications. (Seating plank dimensions : Seating Length of the Bench : 1380 mm, Seating width of the Bench : 450 mm, Seating height of the Bench : 450 mm, Seating plank thickness : 60 mm, Total height of the Bench : 900 mm.)M-30 grade of Concrete using vibration compaction process. Benches consists of 2 Nos. L-shape base support in wooden texture and 1 Nos. flat back and 1 Nos. bottom plank leg thickness :90 mm, Leg height : 830mm, Leg width : 600 mm, backside plank width : 350 mm, backside plank length : 1380 mm, backside plank thickness : 60 mm. Bench top and back planks are treated with special anticorrosive, water proof coating, prevent sun, rain, light and fungal attack, as to make surfaces glossy and water proof. The back rest should show as details given by SMC in embossed at casting time.

Above item shall be executed as per detail item description and shall be get approved by engineer in charge prior to procurement And The system shall be installed as per the manufacture installation manual.

The rate shall be for a unit of pair.

ITEM NO.2 :-

Providing and fixing Dustbin with M.S. stand at the location including concrete foundation block needed to fix the stand as directed by the EIC.

Above item shall be executed as per detail item description and shall be get approved by engineer in charge prior to procurement And The system shall be installed as per the manufacture installation manual.

The rate shall be for a unit of pair.

ITEM NO.3 :-

Providing & Fixing heavy duty p.v.c Dustbin with auto hinges and cover as Directed By Engineer in charge.(0.3 cu.mt)

Above item shall be executed as per detail item description and shall be get approved by engineer in charge prior to procurement And The system shall be installed as per the manufacture installation manual.

The rate shall be for a unit of pair.

ITEM NO.4 :-

Providing and Fixing Hollow steel Sections Framed Work including Cutting, Hoisting, Welding & Fixing in position Purlin, Main Chord etc. as per Engineer-in-charge. TATA / JINDAL / ASIAN Make (M.R.)

Above item shall be executed as per detail item description and shall be get approved by engineer in charge prior to procurement And The system shall be installed as per the manufacture installation manual.

The rate shall be for a unit of one Kg.

PART -H
CHILDREN PLAYING EQUIPMENT

(A) CHILDREN PLAYING EQUIPMENTS, OUTDOOR PHYSICAL FITNESS EQUIPMENTS

PROVIDING, SUPPLYING AND FIXING OF CHILDREN PLAYING EQUIPMENTS, OUTDOOR PHYSICAL FITNESS EQUIPMENTS (INCLUDING ONE YEAR FREE MAINTENANCE)

ITEM NO.1 :-

(A) CHILDREN PLAYING EQUIPMENTS, OUTDOOR PHYSICAL FITNESS EQUIPMENTS

Multi Activity Play System -4

Double lane Slide

Four seater arc swing

Double seater arc swing

Circular Swing

Animal M.G.R.

Platform M.G.R.

Dolphin See Saw

Multi Seater See-Saw

Combination Set 3 in 1

Mini Slide

Mini Wave Slide

Toddler Swing

Spring Rider Duck

Spring Rider Racer

S Loop Climber

Sunset Scrambler

Above item shall be executed as per detail item description and shall be get approved by engineer in charge prior to procurement And The system shall be installed as per the manufacture installation manual.

The rate shall be for a unit of pair.

Signature of the Contractor

Executive Engineer,
SOUTH ZONE-A (UDHANA)
Surat Municipal Corporation

SPECIFICATION FOR ELECTRICAL INSTALLATION WORK

SUPPLY :

The supply mains will be brought in at places marked drawing and will be 3 Phase 50, cycles, 4 wires system 415 volts between phase and 230 volts between phase and neutral.

SAMPLES :

The Contractor shall submit to the Engineer-in-charge for approval samples of accessories and apparatus they (the contractor) propose to use for the installation.

The tenderer shall submit a list of important contracts carried out by them to the Engineer-in-charge.

DRAWINGS :

Samples to be submitted by the contractor and this specifications shall not be departed from without the instructions of the Engineer-in-charge in writing. No approval given by the Engineer-in-charge approval to any drawings or samples submitted by the contractor shall in any way exonerate the contractor from his liability out the work in accordance with the terms of this contract.

SUPERVISION :

The whole of the work, shall be carried out to the satisfaction of the Municipal Engineer and under the constant supervision of the contractor's competent qualified and experience Electrical Engineer. The contractor shall if require, furnish the full details of the Engineer's qualification.

EXECUTIVE ENGINEER,
SOUTH ZONE-A (UDHANA)
SURAT MUNICIPAL CORPORATION,

SIGNATURE OF THE CONTRACTOR.

STANDARD

SPECIFICATION

FOR

INTERNAL ELECTRIFICATION WORK

Part (E) ELECTRIFICATION WORK

Scope:

This section covers, definition of point wiring, system of wiring and supply, installation, connection, testing and commissioning of point wiring for light points, ceiling fan points, exhaust fan points, convenience socket outlet points, power socket outlet points, bell outlet points etc. Including fixing of light fixtures, ceiling fan, exhaust fan, wall fan, bell etc

Material specification & workmanship

Standards

Code of practice for electrical wiring installation system voltage not exceeding 650: IS: 732

Code of practice for fire safety of buildings general) electrical installation : IS: 1646

Rigid steel conduits for electrical wiring : IS: 1653

Fittings for rigid steel conduits for electrical : IS: 2667

Flexible steel conduit for electrical wiring : IS: 3480

Accessories for rigid steel conduits for : IS: 3837

Pvc insulated cables (wires) : IS: 694

Rigid non-metallic conduits for electrical wiring : IS: 2509

Flexible (playable) non-metallic conduits for : IS: 6946

Three pin plugs and sockets : IS: 1293

Conductors for insulated electrical cables and : IS: 8180

Specification for conduit for electrical installation : IS: 9537--1980

Accessories for non-metallic conduits for electrical wiring : IS: 3419

Switches : IS: 3854

Plugs : IS: 6538

Shunt capacitors for power systems : IS: 2834-1954

HRC cartridge fuses and links up to 660 volts : IS: 2208

General and safety requirement for lighting fittings : IS: 1913-1969

Code of practice for lighting public thorough fares : IS: 2944-1981

3 pin plug sockets : IS: 1293

Specification of conduits for electrical installation : IS: 8130

Guide for electrical layout in residential building Indian electricity act and rules: IS-4648

Rigid and flexible conduits:

All conduits shall be rigid pvc pipe having minimum wall thickness of medium gauge 1.5 to 1.8 approved by fia. & isi and shall confirm to is 9537.

Up to 38 mm. Diameter - minimum 1.8 mm. Wall thickness.

Above 40 mm. Diameter - minimum 2.2 mm. Wall thickness.

20, 25, and 32 mm diameter- minimum 1.5 mm wall thickness

Flexible conduits shall be formed from a continuous length of spirally wound interlocked steel strip with a fused zinc coating on both sides. The conduit shall be terminated in brass adapters.

Accessories:

Pvc conduit fittings such as bends, elbows, reducers, chase nipples, split couplings, plugs etc. Shall be specifically designed and manufactured for their particular application. All conduit fittings shall conform to is: 2667-1964 and is: 3857-1966.

Casing and capping

Casing and capping shall be of good quality pvc, free from defects like deformations, unevenness, blisters, cavities, etc.

The casing shall be of square or rectangular body with top of the side walls suitable for tightly fitting slide-in type capping with double grooving. All surfaces shall have smooth finish inside and outside.

Wires:

All wires shall be single core multi-strand/ flexible copper frls type pvc insulated as per is: 694 and shall be 660 v\1100 v grade.

All wires shall be colour coded as follows :

	phase	colour of wire
R		red
Y		yellow
B		blue
N		black
Earth		green (insulated)
Control (if any)		grey
All off wires shall be same as phase wire		

Switches & sockets:

Switches shall be moulded plate type flush Modular type with silver-coated contacts.

Sockets shall be 3 pin with switch and plate type cover.

Combination of multiple switch units and sockets should be used to minimize the switch boxes.

All screws shall be brass – chromium plated and shall be counter sunk type with half round head or flat headed.

For heavy duty, metal clad sockets MCB/Isolator mounted in a galvanized steel box shall be provided.

Workmanship

Point wiring

The size of conduit shall be selected in accordance with the number of wires permitted under table given below.

The minimum size of the conduit shall be 25 mm. Diameters unless otherwise indicated or approved. Size of wires shall not be less than 1.5 sqmm copper or 2.5 sqmm aluminium

Nominal dia of wires	Nominal cross sec. Area	20 mm		25 mm		32 mm		38 mm	
(mm)	(mm ²)	S	B	S	B	S	B	S	B
1/1.12	1.0	7		13	--	20	--	--	--
1/2.40	1.5	4		8	6	15	9	--	--
1/1.80	2.5	4		6	4	10	8	--	--
1/2.24	4	2		4	3	8	6	--	--
1/2.80	6	1		4	3	6	6	--	--
1/3.55	10	1	--	3	2	5	4	6	5

note: s: runs of conduits which have distance not exceeding 4.25 m. Between draw boxes & which do not deflect from the straight by an angle more than 15 degree.

b: runs of conduits which deflect from the straight by more than 15°

Conduits shall be kept at a minimum distance of 100 mm. From the pipes of other non-electrical services. And maintain minimum 300 mm distance between telephone, TV& computer piping (if possible)

Separate conduits/raceways shall be used for :

Normal lights and 5 a 3 pin sockets on lighting circuit.

Separate conduit shall be laid from d.b. to switch board or point.

Power outlets - 15 a 3 pin 20 a/30 a, 2 pin scraping earth metal clad sockets.

Emergency lighting.

Telephones.

Fire alarm system.

Public address system & music system.

For all other voltages higher or lower than 230 v.

T.V. antenna.

Water level guard.

Computer wiring

Call bell wiring layout of conduits shall be generally as indicated on drawings and the layout shall be supplemented and complemented by contractor on site with the approval of the engineer.

Wiring for short extensions to outlets in hung ceiling or to vibrating equipment's, motors etc., shall be installed in flexible conduits. Otherwise rigid conduits shall be used. No flexible extension shall exceed 1.25 m.

Conduits run on surfaces shall be supported on gi 12 mm. Thick pressure saddles which in turn are properly screwed to the wall or ceiling. Saddles shall be at intervals of not more than 500 mm. Fixing screws shall be with round or cheese head and of rust-proof materials. Exposed conduits shall be neatly run parallel or at right angles to the walls of the building. Unseemly conduit bends and offsets shall be avoided by using fabricated mild steel junction/pull through boxes for better appearances. No cross-over of conduits shall be allowed unless it is necessary and entire conduit installation shall be clean and neat in appearance.

Conduits embedded into the walls shall be fixed by means of staples at not more than 500 mm. Intervals. Chases in the walls shall be neatly made and refilled after laying the conduit and brought to the finish of the wall but final finish will be done by the building contractor.

Conduits buried in concrete structure shall be put in position and securely fastened to the reinforcement and got approved by the engineer, before the concrete is poured. Proper care shall be taken to ensure that the conduits are neither dislocated nor choked at the time of pouring the concrete. Suitable fish wires shall be drawn in all conduits before they are embedded.

Where conduit passes through expansion joints in the building, adequate expansion fittings shall be used to take care of any relative movement.

Inspection boxes shall be provided for periodical inspection to facilitate withdrawal and removal of wires. Such inspection boxes shall be flush with the wall or ceiling in the case of concealed conduits. Inspection boxes shall be spaced at not more than 12 meters apart or two 90° solid bends or equal. All junction and switch boxes shall be covered by 6 mm. Clear per plate truly cut and fixed with cadmium plated brass screws. These junction boxes shall form part of point wiring or conduit wiring as the case may be including the cost of removing the Perspex cover for painting and re-fixing. No separate charges shall be allowed except where specially mentioned.

Conduits shall be free from sharp edges and burrs and the threading free from grease or oil. The entire system of conduits must be completely installed and rendered electrically continuous before the conductors are pulled in. Conduits should terminate in junction boxes of not less than 32 mm. Deep.

An insulated earth wire of copper rated capacity shall be run in each conduit. The earth continuity conductor shall be as follows.

Load balancing: balancing of circuit in three-phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

Minimum size of earth conductor not forming part of same cable as associate circuit conductor

Nominal cross section area of largest associated copper circuit conductor in sq. Mm	nominal cross section area of earth continuity conductor in sq. Mm
6.0	2.5
10.0	6.0
16.0	6.0
25.0	16.0
35.0	16.0
50.0	16.0

Lighting & power wiring:

All final branch circuits for lighting and appliances shall be flexible copper wire of appropriate size run inside conduits. The conduit shall be properly connected or jointed into sockets, bends, and junction boxes.

Branch circuit conductor sizes shall be as shown in the schedule of quantities and or drawings.

All circuits shall preferably be kept in a separate conduit up to the distribution board. No other wiring shall be bunched in the same conduit except those belonging to the same phase. Each lighting branch circuit shall not have more than ten outlets or 800 watts whichever is lower. Each conduit shall not hold more than three branch circuits, of the same phase.

Flexible cords for connection to appliances, fans and pendants shall be 650/1100 v grade (three or four cores i.e. With insulated neutral wire of same size) with tinned stranded copper wires, insulated, twisted and sheathed with strengthening cord. Colour of sheath shall be subject to the engineer's approval.

Looping system of wiring shall be used. Wires shall not be jointed. Where joints are unavoidable, they shall be made through approved mechanical connectors. No such joints shall be made unless the length of the sub-circuit, sub-main or main is more than the length of the standard coil.

Control switches shall be connected in the phase conductors only and shall be 'on' when knob is down. Switches shall be fixed in 3 mm. Thick painted or galvanized steel boxes with cover plates as specified. Cadmium plated brass screws shall be used.

Power wiring shall be distinctly separate from lighting wiring. Conduits not less than 25 mm. And wires not less than 2.5 sq.mm. Copper shall be used.

Every conductor shall be provided with identification ferrules at both ends matching the drawings.

Testing

The entire installation shall be tested for:

Insulation resistance.

Earth continuity.

Polarity of single pole switches

STANDARD

SPECIFICATION

FOR

MCB, MCCB, ELCB/RCCB

&

DISTRIBUTION BOARDS

INTENT:

This specification is intended to cover the design, manufacture, assembly, testing at manufacturer's works, packing, transportation, receipt at site, installation, testing and commissioning of all Distribution Boards, MCB, MCCB, ELCB/RCCB etc. and complete with all materials and accessories for efficient and trouble-free operation

The DBs shall be Company Manufacture.

The MCB, ELCB/RCCB & MCCB shall be of the same make as of DBs.

MINIATURE CIRCUIT BREAKER

Miniature circuit breakers shall be quick make and break and break type non-welding self-wiping silver alloy contacts for 10 ka short circuit both on the manual and automatic operation, confirms with British standard BS : 3871 (part-i) 1965 and is :8825 (1996) with facility for locking in off position.

The housing of MCBs shall be heat resistant and having high impact strength. The fault current of MCBs shall not be less than 10ka, at 230 volts. The MCBs shall be flush mounted and shall be provided with trip free manual operating mechanism with mechanical "on" and "off" indications. 'c' characteristic current limiting type, 10 ka and having quick break with trip free operating mechanism. Each pole of the breaker shall be provided with inverse time thermal over load and instantaneous over current tripping elements, with trip-free mechanism. In case of multi-pole breakers, the tripping must be on all the poles and operating handle shall be common. Pressure clamp terminals for stranded/solid conductor insertion are acceptable up to 4 sqmm aluminium or 2.5 sq.mm copper and for higher ratings, the terminals shall be suitably shrouded. Wherever MCB isolators are specified they are without the tripping elements.

The MCB contact shall be silver nickel and silver graphite alloy and tip coated with silver. Proper arc chutes shall be provided to quench the arc immediately. MCB's shall be provided with magnetic fluid plunger relay for over current and short circuit protection

EARTH LEAKAGE CIRCUIT BREAKER/RESIDUAL CURRENT CIRCUIT BREAKER

The RCCB should suffice all the requirements of is as per code is - 12640 - 1988. The arc should be current operated and not on line voltage.

The RCCB should ensure mainly the following functions:

Measurement of the fault current value.

Comparison of the fault current with a reference value.

The RCCB should have a torrid transformer which has the main conductors of primary (p - n) which check the sum of the current close to zero

All metal parts should be inherently resistant to corrosion and treated to make them corrosion resistant

It should be truly current operated

It should operate on core balance torrid transformer

Its accuracy should be $\pm 5\%$.

It should operate even in case of neutral failure.

It should trip at a present leakage current within 100 ma

Its enclosure should be as per ip 30.

Its mechanical operation life should be more than 20,000 operations.

It should provide full protection as envisaged by ie rules - 61-a, 71-ee, 73-ee, 1985 and also rule 50 of ie rule1956.

It should conform to all national and international standards like is: 8828-1993, is: 12640-1988, bs 4293 - 1983, cee 27 (international commission rules for the approved of electrical equipment).

MOULDED CASE CIRCUIT BREAKER

The MCCB shall be air break type and having quick break with trip free operating mechanism confirmed to IS : 8825 and IEC-60947-1/2 standard.

It should have thermal magnetic trip unit, adjustable thermal protection from 0.8 -1 In for 400 amp. and short circuit protection from 5 -10 In for rating more than 4000amp. It should be of rated operational voltage of 690 V AC (50 Hz) and insulation voltage of 750V AC. It should have electrical life of 4000 (2500) operations and

mechanical life of 10000 (8000) operations for rating 400 amp. (>400 amp.) All the MCCB above 400 shall be have breaking capacity of 50KA. And 25 KA for MCCB < 400 amp rating

Housing of the MCCB shall be of heat resistant and flame retardant insulating material. Operating handle of the MCCB shall be in front and clearly indicate ON / OFF / TRIP positions. The electrical contact of the circuit breaker shall be of high conducting non deteriorating silver alloy contacts. The MCCB shall be provided with thermal / magnetic type bi-metal over load release and electro-magnetic short circuit protection device. All the releases shall operate on common trip bus bar so that in case of operation of any one of the releases in any of the three phases, it will cut off all the three phases and thereby single phasing of the system is avoided. The MCCB whenever called for in the appendix drawings shall provide an earth fault relay. The MCCB shall provide two sets of extra auxiliary contacts with connections for additional controls at future date. The electrical parameters of the MCCB shall be as per the descriptions given in the attached drawings.

DISTRIBUTION BOARDS

Distribution board using TPN/ DP/ SP MCB/MCCB isolator, earthing terminal, connector strip for phase neutral and earth for each circuit, CRCA sheet steel housing and complete.

Common banking of neutral & earth conductor is not allowed. It shall be suitable to operate on 415/220 volt, 50hz.

A. C. Supply and withstand short circuit current of 10ka.

Construction

Distribution boards shall be fabricated from 2mm. Gauge CRCA sheet or shall be factory readymade as specified in the material list. It shall be of double door type with hinged (lockable if required) door suitable for recessed mounting in wall and dead front operated. Distribution boards shall be powder coated with 7-tank process application. The distribution boards shall be provided with phase barriers, wiring channels to accommodate wires and individual per phase neutral links.

There shall be separate or individual earth link as per requirement. Proper arrangement shall be made for mounting of MCB's and other accessories. Distribution boards shall meet with the requirements of IS 2675 and marking arrangement of bus bars shall be in accordance with I.S. standards.

It should be totally enclosed and made dust, vermin and weather-proof such that, it meets to the IP-51 and IP-54 protection for indoor and outdoor application respectively.

A detachable cover plate of 2mm. CRCA sheet shall be on front of board such that, all live parts of the electrical accessories mounted on board shall be accessible only on removal of said cover plate. The cover plate shall be fixed to the board with adequate size zinc passivity metal screws. Above the detachable cover plate, one additional hinged door of 2 mm thick CRCA sheet should be provided with necessary locking arrangement and suitable gasket capable of withstanding corrosive and humid atmosphere.

Inter connection of wiring shall be done with 660/1100 V. Grade, PVC insulated, flexible copper conductor of one size higher current carrying capacity than that of switch rating.

Bus bars shall be suitable for the incoming switch rating and sized for a temperature rise of 35° C over the ambient. Each board shall have two separate earthing terminals.

Circuit diagram indicating the load distribution shall be pasted on the inside of the DB as instructed. One earthing terminal for single phase and two terminals for 3 phases DB's shall be provided with an earth strip connecting the studs and the outgoing ECU earth bar.

The top and the bottom faces of the D.B. shall be provided for conduit entry of minimum 1.5" dia if required and shown in drawing, copper cable entry provision shall be made. The circuit connection from MCB's shall be brought to elemex type connector provided on top/bottom of the DB. The connector shall be suitable to receive phase, neutral and earth wire/cable coming from each individual circuit. The connectors shall have identification tag. The faces if asked shall be kept detachable. All outgoing feeders shall terminate on a terminal strip which in turn is interconnected to the mcb/fuse base by means of insulated single conductor copper wires as follows

Up to 15 amp 2.5 sqmm

25 amp 4.0 sqmm

32 a 6.0 sq.mm.

40 amp 10 sqmm

63 a 16 sq.mm.

Each DB shall have indicating lamp, preferably neon type denoting power availability in the board. Indicating lamps shall be complete with fuse.

STANDARD

SPECIFICATION

FOR

LT CABLES

&

CABLE TERMINATION

1.1 KV GRADE L.T. CABLES:

General:

The medium voltage cables shall be supplied, laid, connected, tested and commissioned in accordance with the drawings, specifications, relevant Indian standards specifications, manufacturer's instruction, all cables run in parallel between L.T. side of the existing transformer, L.T. incomer A.C.B.'S of L.T. switch board panel / outgoing of panel to motor terminal etc as required and as directed by the engineer-in-charge. Excavation and refilling using bricks, road crossing using RCC pipe, sand etc. Will be in the scope of contractor and shall be done as per relevant is standard.

The cable shall confirm to relevant is which should be specified and shall bear ISI mark. The quantities mentioned above are approximate only. The cables should be supplied after taking actual measurement jointly. No straight joint in any cables shall be permitted. Any piece or cut length shall have to be taken back by contractor. The contractor should plan and purchase the cable to avoid wastage / cut length / excess length as the client will not accept the same under any circumstances. The cable shall be genuine and of approved make only.

Root marker shall be provided for every 10 meter length of underground cable and cable identifier for every 20 meter length of cable not covered in underground.

RCC half round muff of standard make shall be provided for protection of underground cable.

All above item should be got approved from engineer-in-charge before execution.

The cables shall be delivered at site in the original drums with manufacturer's name, size and type clearly written on the drums.

All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of handling during transportation, loading, unloading etc.

The cable shall be supplied in single length i.e. Without any intermediate joint or cut unless specifically approved by the client. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. With cable compound as per standard practice.

Conductor:

Uncoated, annealed copper / aluminium, of high conductivity, up to 4 mm² size the conductor shall be solid and above 4 sq. Mm, the conductor shall be concentrically stranded as per IEC: 228.

Insulation:

Cross link polyethylene (XLPE) extruded insulation rated at 70oc.

Core identification:

Two cores	: red and black
Three cores	: red, yellow and blue
Four core	: red, yellow, blue and black
Single core	: green, yellow for earthing.

Black shall always be used for neutral.

Assembly:

Two, three or four insulated conductors shall be laid up, filled with non-hygroscopic material and covered with an additional layer of thermoplastic material.

Armour:

Galvanized steel flat strip / round strips applied helically in single layers complete with covering the assembly of cores

For cable size up to 10 sq mm : armor of 1.4 mm diag.i. round wire

For cable size above 10 sq mm : armor of 4 mm wide 0.8 mm thick gi strip

Sheath:

St -2 PVC along with polypropylene fillers to be provided. Inner sheath shall be extruded type and shall be compatible with the insulation provided for the cables. Outer sheath shall be of an extruded type layer of suitable pvc material compatible with the specified ambient temp. Of 50oc and operating temperature of cables. The sheath shall be resistant to water, ultra violet radiation, fungus, termite and rodent attacks. The colour of outer sheath shall be black. Sequential length marking along with size and other standard parameters shall be required at every 1.0 meter on the outer sheath.

Testing:

The finished cables shall be tested at manufacturer's works for all the routine tests for all the length and size of cables to be delivered at site and the certificate for the same shall be furnished to client. If required, the cables shall be tested in presence of the client's representative.

Voltage test: each core of cable shall be tested at room temperature at 3 kv A.C. R.M.S. for duration of 5 minutes.

Conductor resistance test:

The D.C. resistance of each conductor shall be measured at room temperature and the results shall be corrected to 20 degree centigrade to check the compliance with the values specified in the is 8130 – 1976.

Cable tests before and after laying cables at site:

Insulation resistance test between phases, phase to neutral and phase to earth.

Continuity test of all the phases, neutral and earth continuity conductor.

Earth resistance test of all the phases and neutral.

All the tests shall be carried out in accordance with the relevant is code of practice and INDIAN electricity rules.

The vendor/contractor shall provide necessary instruments, equipment's and labour for conducting the above tests and shall bear all the expenses in connection with such tests. All tests shall be carried out in the presence of client and the results shall be prescribed in forms and submitted.

Cable marking:

The outer sheath shall be legibly embossed at every meter with following legend: electric cable: 1100 v, size: ____c x ____ mm² with manufacturer's name, year of manufacturing and ISI symbol.

Sealing drumming and packing:

After tests at manufacturer's works, both ends of the cables shall be sealed to prevent the ingress of moisture during transportation and storage. Cable shall be supplied in length of 500 metres or as required in non-returnable drums of sufficiently sturdy construction. Cables of more than 250 meters shall also be supplied in non-returnable drums. The spindle hole shall be minimum 110 mm in diameter.

Each drum shall bear on the outside flange, legibly and indelibly in the english literature, a distinguishing number, the manufacturer's name and particulars of the cable i.e. Voltage grade, length, conductor size, cable type, insulation type, and gross weight. The direction for rolling shall be indicated by an arrow. The drum flange shall also be marked with manufacturer's name and year of manufacturing etc.

L.T. Cable terminations:

Cable termination:

Cable terminations shall be made with aluminium crimped type solder less lugs for all aluminium cables and stud type terminals. For copper cables copper crimped solder less lugs shall be used. Crimping shall be done with the help of hydraulically operated crimping tool. For joints where cable is with aluminium conductor and bus bars are aluminium, bimetallic lugs shall be used with compound. Cupal type of washers, crimping tool shall be used for crimping any size of cable.

Cable glands:

Cable glands shall be of brass single compression type. Generally single compression type cable glands shall be used for indoor protected locations and double compression type shall be used for outdoor locations. Glands should be of nickel-plated brass, with pvc shrouds over it. Before applying PVC shrouds, all bare metal shall be wrapped with pressure sensitive adhesive tape.

Ferrules:

Ferrules shall be of self-sticking type and shall be employed to designate the various cores of the control cable by the terminal numbers to which the cores are connected, for ease in identification and maintenance.

Cable joints:

Kit type joint shall be done and filled with insulating compound. The joint should be for this 1.1 kv grade insulation, cable termination for conductors up to 4 sqmm may be insertion type and all higher sizes shall have compression type lugs. Cable termination shall have necessary brass glands. The end termination shall be insulated

with a minimum of six half-lapped layers of pvc tape. Cable armouring shall be earthed at both ends. Cable joints shall be done as per regular practice and check shall be carried out for loose connections and leakages. Insulation cutting shall be done properly taking care that no area of the conductor remains exposed. Crimping shall be done with the help of hydraulic tool. Proper insulation tape shall be applied at the cable and lug joint.

Saddles and clips:

Saddles and clips shall be pvc covered or of g.i. fixing screws shall be round head brass, where screws are used. Nuts shall be of brass, square pressed type.

Jointing sleeves:

Jointing sleeves shall be of brass with standard termination. Solder type cable connectors / cable sleeves shall be used to join the cable / conductors. The solder used shall comply with B.S. 219 type no corrosive flux only shall be used.

RCC Hume Pipe

The Concrete Pipes shall be conforming to IS: 458/2003 (Fourth Revision) with up-to-date amendment with regards to Design /Dimensions / Tolerances / Workmanship & Finish / Materials used for making the Pipes. The Pipes shall be manufactured by spinning process. The ends of the concrete pipes shall be suitable for flush joints or collar joints or suitable for Socket & Spigot, roll on joints or confined gasket joints as per the requirements of the purchaser.

DWC Pipe

Double walled corrugated pipes (DWC) of polyethylene (conforming to is 14930 ii) with necessary connecting accessory of same material at required date for laying of cable below ground / road surface for enclosing the cable and back filling the same to make ground as per original.

Diameter mentioned in the abstract sheet shall be considered Inner Diameter.

Excavation and covering the cable:

The DWC duct shall be prominently marked with indelible ink, with the following information at interval of every meter to enable identification of the pipe. The size of the ink markings shall be distinct, clear and easily visible.

Ink marking would have following written:

Manufacturer's name (can be in abbreviated form)

Name of the duct with size

Lot no. Of the product

Date of manufacture

Product length

CABLE TRAY

General

The cable tray shall be fabricated out of 2 mm thick slotted/ perforated MS sheets as channel sections, single or double bended. The channel sections shall be supplied in convenient lengths and assembled at site to the desired lengths. These may be galvanized or painted as specified.

The jointing between the sections shall be made with coupler plates of the same material and thickness as the channel section. Two coupler plates, each of minimum 200mm length, shall be bolted on each of the two sides of the channel section with 8mm dia round headed bolts, nuts and washers. In order to maintain proper earth continuity bond, the paint on the contact surfaces between the coupler and cable tray shall be scraped and removed before the installation.

The permissible uniformly distributed load for various type of cables trays and for different supported span shall be as per IS.

The width of the cables tray shall be chosen so as to accommodate all the cables in one tier, plus 30 to 50% additional width for future expansion. This additional width shall be minimum 100mm. The overall width of one cable tray shall be limited to 1000mm.

Factory fabricated bends, reducers, tee / cross junction. Etc shall be provided as per good engineering practice. The radius of bends, junctions etc. shall be less than the minimum permissible radius of bending of the largest size of cable to be carried by the cable tray.

The cable tray shall be suspended from the ceiling slab with the help of 10 mm dia MS round or 25 mm x 5 mm flats at specified spacing. Flat type suspenders may be used for channels up to 450 mm width bolted to cable trays. Round suspenders shall be threaded and bolted to the cable trays or to independent support angle 50 mm x 50 mm x 5mm at the bottom and as specified These shall be grouted to the ceiling slab at the other end through an effective means, as approved by the Engineer – in – charge, to take the weight of the cable tray with the cables.

The entire tray (except in the case of galvanized type) and the suspenders shall be painted with two coats of red oxide primer paint after removing the dirt and rust, and finished with two coats of spray paint of approved make synthetic enamel paint.

The cable tray shall be bonded to the earth Terminal of the switch bonds at ends.

The cable tray shall be measured on unit length basis, along the centre line of the cable tray, including bends, reducers, tees, cross joints, etc.

The ladder type of cable tray shall be fabricated of double bended channel section longitudinal members with single bended channel section rungs of cross members welded to the base of the longitudinal members at a centre to centre spacing of 250 cm as per IS.

Cable Laying

Route

Before the cable laying work is undertaken, the route layout of the cable shall be submitted to the Engineer -in-Charge and the work shall be undertaken only after approval of the route layout.

Whenever cables of different voltages are laid following points shall be noted while laying along well demarcated or established roads, the LV / MV cables shall be laid further from the kerbed line than HV cables.

Cables of different voltages and also power and control cables shall be kept in different trenches with adequate separation. Where available space is restricted such that this requirement cannot be met, LV / MV cables shall be laid above HV cables.

Where cables cross one another, the cable of higher voltage shall be laid at a lower level than the cable of lower voltage.

Proximity to communication cables.

Power and communication cables shall be as far as possible cross each other at right angles. The horizontal and vertical clearance between them shall not be less than 60 cm.

Methods of Laying

The cables shall be laid direct in ground, pipe, closed or open ducts, cable trays or on surface of wall etc. The method(s) of laying required shall be specified in the tender / schedule of work.

Laying direct in ground

This method shall be adopted where specified in the schedule of works. Normally this method shall be adopted when the cable route is through open ground, along roads, lanes, etc. and where no frequent excavations are likely to be encountered and where re-excavation is easily possible without affecting other services.

Trenching

Width and depth of the trench shall be as shown in the drawing. When more than one tier of cables is unavoidable and vertical formation of laying is adopted, the depth of the trench shall be increased by 30 cm for each additional tier to be formed

The trenches shall be excavated in reasonably straight lines. Wherever there is a change in the direction, a suitable curvature shall be adopted complying with the minimum bending radius specified in Table – 11. Where gradients and changes in depth are unavoidable, these shall be gradual. The bottom of the trench shall be level and free from stones, brick bats etc.

TABLE – 2

System voltage	Minimum bending radius		
	Single Core	Multi-Core	
		Armored	Unarmored
11KV	20D	12D	15D
22KV	25D	15D	20D
33KV	30D	20D	25D

Note: Where “D” is the overall diameter of the cable

Excavation should be done by suitable means – manual or mechanical. The excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench.

Adequate precautions should be taken not to damage any existing cable(s), pipes or any other such installations in the route during excavation. Wherever bricks, tiles or protective covers or bare cables are encountered, further excavation shall not be carried out without the approval of the Engineer-in- Charge.

Existing property, if any, exposed during trenching shall be temporarily supported adequately as directed by the Engineer -in-Charge. The trenching in such cases shall be done in short lengths, necessary pipes laid for passing cables there in , if required. If there is any danger of a trench collapsing or endangering adjacent structures, the

sides should be well shored up with sheeting as the excavation proceeds. Where necessary, these may even be left in place when backfilling the trench.

Excavation through lawns shall be done in consultation with the department concerned.

Laying of Cable in Trench

Sand cushioning: The excavated trench shall be provided with a layer of clean, dry sand cushion of not less than 8 cm in depth, before laying the cables therein. However, sand cushioning may not be provided for MV cables, where there is no possibility of any mechanical damage to the cables due to heavy or shock loading on the soil above if so specified in the tender document and as per approval of the Engineer-in-Charge. Sand cushioning shall however be invariably provided in the case of HV cables.

The cable drum shall be properly mounted on jacks, or on a cable wheel at a suitable location, making sure that the spindle, jack etc. are strong enough to carry the weight of the drum without failure and that the spindle is horizontal in the bearings so as to prevent the drum creeping to one side while rotating.

The cable shall be pulled over in rollers in the trench steadily and uniformly without jerks and strain. The entire cable length shall be far as possible laid off in one stretch. PVC / XLPE cables less than 120 sq.mm size may be removed by "Flaking" i.e. by making one long loop in the reverse direction. For short runs and sizes up to 50 sq.mm of MV cables, any other suitable method of direct handling and lying can be adopted without strain or excess bending of the cables.

After the cable has been so uncoiled, it shall be lifted slightly over the rollers beginning from one end by helpers standing about 10 m apart and drawn straight. The cable shall then be lifted off the rollers and laid in a reasonably straight line.

Testing before covering. The cables shall be tested in presence of the Engineer -in-Charge for continuity of cores and insulation resistance and the cable length shall be measured, before closing the trench.

Sand covering: Cables laid in trenches in a single tier formation shall have a covering of dry sand of not less than 17 cm above the base cushion of sand before the protective covers laid. In the case of vertical multi -tier formation, after the first cable has been laid, a sand cushion of 30 cm shall be provided over the base cushion before the second tier is laid. If additional tiers are formed, each of the subsequent tiers also shall have a sand cushion of 30 cm as stated above. Cables in the top most tier shall have a final sand covering not less than 17 cm before the protective cover is laid. Sand covering as stated above need not be provided for MV cables where a decision is taken by the Engineer -in-Charge as per sub clause (iii-a) above, but theater tier spacing should be maintained with soft soil instead of sand between tiers and for covering. Sand cushioning shall however be invariably provided in the case of HV cables.

Extra loop cable

At the time of original installation, approximately 3 m of surplus cable shall be left on each terminal end of the cable and on each side of the underground joints. The surplus cable shall be left in the form of a loop. Where there are long runs of cables such loose cable may be left at suitable intervals as specified by the Engineer-in-Charge.

Where it may not be practically possible to provide separation between cables when forming loops of a number of cables as in the case of cable emanating from a substation, measurement shall be made only to the extent of actual volume of excavation, sand filling etc and paid for accordingly.

Mechanical protection over the covering: Mechanical protection to cables shall be laid over the covering to provide warning to future excavators of the present of the cable and also to protect the cable against accidental mechanical damage by pick-axe blows etc. as follows:

Unless otherwise specified, the cables shall be protected by second class brick of nominal size 22 cm x 11.4 cm x 7 cm or locally available size, placed on top of the sand (or, soil as the case may be). The bricks shall be placed breadth wise for the full length of the cable. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and projects at least 5 cm over the sides of the end cables.

Where bricks are not easily available, or are comparatively costly, there is no objection to use locally available material such as tiles or slates or stone / cement concrete slabs. Where such an alternative is acceptable, the same shall be clearly specified in the tender specifications.

Backfilling

The trenches shall be then backfilled with excavated earth, free from stones or other sharp edged debris and shall be rammed and watered, if necessary in successive layers not exceeding 30 cm depth.

Unless otherwise specified, a crown of earth not less than 50 mm and not exceeding 100 mm in the centre and tapering towards the sides of the trench shall be left to allow for subsidence. The crown of the earth, however, should not exceed 10 cms so as not to be a hazard to vehicular traffic.

The temporary restatements of roadways should be inspected at regular intervals, particularly during wet weather and settlements should be made good by further filling as may be required.

After the subsidence has ceased, trenches cut through roadways or other paved areas shall be restored to the same density and materials as the surrounding area and repaved in accordance with the relevant building Specifications to the satisfaction of the Engineer -in-Charge.

Where road berms or lawns have been cut out of necessity, or kerb stones displaced, the same shall be repaired and made good, except for turfing /asphalting, to the satisfaction of the Engineer -in-Charge and all the surplus earth or rock shall be removed to places as specified.

Laying of single core cables

Three single core cables forming one three phase circuit shall normally be held in close trefoil formation and shall be bound together at intervals of approximately 1m. The relative position of the three cables shall be changed at each joint at the time of original installation, complete transposition being effected in every three consecutive cable lengths. Route markers Location: Route markers shall be provided along with the runs of cable allocations approved by the Engineer -in-Charge and generally at intervals not exceeding 100m. Markers shall also be provided to identify change in the direction of the cable route and locations of underground joints.

Plate type marker: Route markers shall be made out of 100 mm x 5 mm G.I. /aluminium plate welded / bolted on 35 mm x 35 mm x 6 mm angel iron, 60 cms long. Such plate markers shall be mounted parallel to and at about 0.5 m away from the edge of the trench.

CC marker: Alternatively, cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate of 20 mm in size) shall be laid flat and centered over the cable. The concrete markers, unless otherwise instructed by the Engineer -in-Charge, shall project over the surrounding surface so as to make the cable route easily identifiable.

Inscription: The words IITG-MV / HV CABLE as the case may be shall be inscribed on the marker.

Laying in Pipes / Closed Ducts

In locations such as road crossing, entry in to buildings, paved areas etc., and cable shall be laid in pipes or closed ducts. Stone ware pipes, GI, CI or spun reinforced concrete pipes shall be used for cables as specified in the schedule of works. Where cables pass through foundation walls or other underground structures, the necessary ducts or openings will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations or structures, the electrical contractor shall determine their location and obtain approval of the Engineer in Charge before cutting is done. At road crossing and other places where cables enter pipe sleeves adequate bed of sand shall be given so that the cables do not slack and get damaged by pipe ends.

At road crossings, the top surface of pipes shall be at a minimum depth of 1 m from the pavement level. When pipes are laid cutting existing road, care shall be taken so that the soil filled up after laying the pipes is rammed well in layers with watering as required to ensure proper compaction. A crown of earth not exceeding 10 cm should be left at the top. After the subsidence has ceased, the top of the filled up trenches in road ways or other paved areas shall be restored to the same density and material as the surrounding area in accordance with the direction of the Engineer -in-Charge (Civil) up to his satisfaction.

All G.I. pipes shall be laid as per layout drawings and site requirements. Before fabrication of various profiles of pipe by hydraulically operated bending machine (which is to be arranged by the Contractor), all the burrs from the pipes shall be removed. G.I. pipes with bends shall be buried in soil / concrete in such a way that the bends shall be totally concealed. For G.I. pipes buried in soil, bitumen coating shall be applied on the buried lengths. Installation of G.I. pipes shall be undertaken well before paving is completed and necessary coordination with paving agency shall be the responsibility of Electrical Contractor. The open ends of pipes shall be suitably plugged with G.I. plugs after they are laid in final position. G.I. plugs shall be supplied by the Contractor at no extra cost.

Laying in Open Ducts.

Open ducts with suitable removable covers (RCC slabs or chequered plates) are generally provided in substations, switch rooms, plant rooms, and workshops etc. for taking the cables. The cable ducts should be of suitable dimensions for the number of cables involved.

For laying of cables with different voltage ratings in the same duct shall be avoided. Where it is inescapable to take HV & MV cables same trench, they shall be laid with a barrier between them or alternatively, one of the two (HV / MV) cables may be taken through pipe(s). Splices or joints of any type shall not be permitted inside the ducts.

The cables shall be laid directly in the duct such that unnecessary crossing of cables is avoided.

Where specified, cables may be fixed with clamps on the walls of the duct or taken in hooks / brackets / cable trays through in ducts.

Where specified, ducts may be filled with dry sand after the cables

are laid and covered as above, or finished with cement plaster, especially in high voltage applications.

Laying on Surface

The method may be adopted in places like switch rooms, workshops, tunnels, rising (distribution) mains in buildings etc. This may be necessitated in the works of additions and / or alternations to the existing installation, where other methods of laying may not be feasible. Cables may be laid in surface by any of the following methods as specified:

Directly clamped by saddles or clamps

Supported on cradle

Laid on troughs / trays duly clamped.

Laying on Cable Tray

This method may be adopted in places like indoor substations, air - conditioning plant rooms; generator rooms etc. or where long horizontal runs of cables are required within the building and where it is not convenient to carry the cable in open ducts. This method is preferred where heavy sized cables or a number of cables are required to be laid. The cable trays may be either of perforated sheets Type or ladder type as specified.

STANDARD

SPECIFICATION

FOR

LIGHT FIXTURES & FANS

General

This section relates to technical specification for indoor & outdoor lighting equipments of the project.

All fixtures shall be complete with accessories necessary for installation whether so detailed under fixture description or not.

Fixture housing, frame or canopy shall provide a suitable cover for the fixture outlet box or fixture opening.

Fixtures shall be installed at mounting heights as detailed on the drawings or instructed on site by the engineer in charge.

Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture. Design of hangers and method of fastening other than shown on the drawings or herein specified shall be submitted to the engineer in charge for approval.

Pendant fixtures within the same room or area shall be installed plumb and at a uniform height from the finished floor. Adjustment of height shall be made during installation as per engineer in charge instructions.

Flush mounted and recessed fixtures shall be installed so as to completely eliminate light leakage within the fixture and between the fixture and adjacent finished surface.

Fixture mounted on outlet boxes shall be tightly secured to a fixture stud in the outlet box. Extension pieces shall be installed where required to facilitate proper installation.

Fixture shall be completely wired and constructed to comply with the regulations and standards for electric lighting fixtures, unless otherwise specified. Fixtures shall bear manufacturer's name and the factory inspection label unless otherwise approved.

Wiring within the fixture and for connection to the branch circuit wiring shall not be less than 2.5 sqmm copper for 250 volt applications. Wire insulation shall suit the temperature conditions inside the fixture and wires bypassing the choke/ballast shall be heat protected with a heat resistant sleeve.

Metal used in lighting fixtures shall be not less than 22 swg or heavier if so required to comply with the specification or standards. Sheet steel reflectors shall have a thickness of not less than 20 swg. The metal parts of the fixtures shall be completely free from burrs and tool marks. Solder shall not be used as mechanical fastening device on any part of the fixture.

Ferrous metal shall be bowdlerized and given a corrosion resistant phosphate treatment or other approved rust inhibiting prime coat to provide a rust-proof base before application of finish.

Non-reflecting surfaces such as fixture frames and trim shall be finished in baked enamel paint.

Light reflecting surface shall be finished in baked white enamel having a reflection factor of not less than 80%. All parts of reflector shall be completely covered by finish and free from irregularities. After finish has been applied and cured, it shall be capable of withstanding a 6 mm radius bend without showing sign of cracking, peeling or loosening from the base metal. Finish shall be capable of withstanding 72 hours exposure to an ultraviolet sun lamp placed 10 cm from the surface without discoloration, hardening or warping and retain the same reflection factor after exposure. Test results shall be furnished for each lot of fixtures.

Fixture with visible frames shall have concealed hinged and catches. Pendant fixtures and lamp holders shall be provided with ball type aligiers or similar approved means. Recessed fixtures shall be constructed so as to fit into an acoustic tile ceiling or plaster ceiling without distorting either the fixture or the ceiling plaster rings/flanges shall be provided for plaster ceiling. Fixtures with hinged diffuser doors shall be provided with spring clips or other retaining device prevent the diffuser from moving.

Detailed catalogue cuts for all fixtures, or, if so required by the engineer in charge sample fixtures shall be submitted for approval to the architect/consultant before orders for the fixtures are placed. Shop drawings for non-standard fixture types shall be submitted for approval to the architect/consultant.

Recessed fixtures shall be constructed so that all components are replaceable without removing housing from the ceiling.

Supplying and erecting LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single MCPCB,

with housing used as a heat sink shall be made of thick sheet Steel conforming to IS: 513/CRCA powder coated and high U.V. & corrosion resistance

with diffuser and/or Polycarbonate optics with company mark/name

120 to 300 V, Power Factor more than 0.9, THD < 10 %,

CCT 4000 K to 6500K, Uniformity ratio >0.7,

Luminaire efficacy > 100 lumens/watt ,

LED driver efficiency > 85 %

CREE / OSRAM / PHILIPS Lumileds / NICHIA / EOUL/Bridgelux(U.S.A.) make LED used for luminaire.

(fitting required LM-79 & LM-80 Certificates)

(NOTE: Above description have shown ranges of Wattage capacity of LED fittings. The Engineer in charge may select any wattage capacity between the ranges shown.)

Fans, regulators and clamps :

Ceiling fan should follow the below mentioned standards

Is 374(part 0/sec 0):1979 : electric ceiling type fans and regulators (third Revision)

Is 2997(part 0/sec 0):1964 : air circulator type electric fans and regulators

Is 302 (part 2/sec 80):2003: safety of household and similar electrical Appliances

Part 2 particular requirements, sec 80 fans (superseding is 12155:1987)

Ceiling fans including their suspension shall conform to relevant iss with secondary safety device incorporated against free fall of fans from their hooks.

Fan hooks made of MS rods of 15mm diameter shaped in 'u' form with their legs projecting horizontally on the top at least 19 cm on either side and tied over the top reinforcement of the roof shall be laid in the concrete slabs.

The body of the ceiling fan, exhaust fan and fan regulator shall be connected to the earthing system by proper earth leads.

Exhaust fans

Exhaust fans shall conform to is 302(part 2/sec 80):2003 : safety of household and similar electrical appliances: part 2 particular requirements, Sec. 80 - fans (superseding is 12155:1987) and other relevant ISS.

It should be reversible fresh air cum exhaust fan

STANDARD SPECIFICATION

FOR

EARTHING

Material Specification & Workmanship

The earthing system complete in all respect with all equipment, fittings and accessories for efficient and trouble-free operation. The material to be supplied by the contractor and work to be carried out by the contractor shall be in general, but not limited to, conforming to the specification laid down for each item.

Codes & standards

The design, material, assembling, inspection and testing shall comply with all currently applicable statutes, regulations and safety codes in the locality where the system will be installed. The equipment shall also confirm to the latest applicable standards and codes of practice as mentioned below

Sr.	Item	Relevant is
1	Code of practice for earthing	IS 2309 BS7430
2	Insulation co-ordination application guide	IS 3716
3	Code of practice for protection of buildings and allied structures against lightning	IS 3043 BS 6651
	IEEE guide for safety in AC sub-station grounding	IEEE 80
	Standard for qualifying permanent connections used in Substation grounding.	IEEE 837
4	Indian electricity rules, 1956 with latest amendments	
5	Indian electricity act, 1910	
6	National electrical code	

Wherever, reference to any specification appears in this document, it shall be Taken as a reference to the latest version of that specification unless the year of issue of the specification is specifically stated.

Materials required

All required hardware such as bolts, nuts, washers (round and spring type), anchor fasteners, screws, etc. of sizes and type as required shall be conforming to relevant is. All hardware shall be hot-dip galvanized or zinc passivized /cadmium plated as per requirement of work either mechanical fabrication or electrical jointing
All other items required for installation shall be as approved by engineer in-charge.

Workmanship

Following activities shall be carried out for the earthing station

Excavation in hard murrum.

Laying Watering pipe.

Brick masonry with cast iron frame and hinged covers.

Charcoal and Salt fill.

Earth station should be 1 meter away from building.

Keep minimum 3 meter distance between two earth pits.

The pit should be minimum 4 meter deep.

The earth resistance should not exceed 1 ohm.

All earth pits of same category shall be interlinked with strip.

Separate earthing for the Audio-Video device to be provided as required

INSTALLATION OF SYSTEM

The plate/pipe electrode, as far as practicable, shall be buried below permanent moisture level but in no case less than 3 M below finished ground level

The plate/pipe electrode shall be kept clear of the building foundation and in no case, it shall be nearer by less than 2 M from outer face of the respective building wall / column

The plate electrode shall be installed vertically and shall be surrounded with 150 mm. thick layers of Charcoal dust and Salt mixture

50 mm. dia. G.I. pipe for watering, shall run from top edge of the plate electrode to the mid-level of block masonry chamber

Top of the pipe shall be provided with G.I. funnel and screen for watering the earth / ground through the pipe

The funnel with screen over the G.I. pipe for watering to the earth shall be housed in a block masonry chamber as shown in the drawing

The masonry chamber shall be provided with a Cast Iron hinged cover resting over the Cast Iron frame which shall be embedded in the block masonry

Construction of the earthing station shall in general be as shown in the drawing and shall conform to the requirement on earth electrodes mentioned in the latest edition of Indian Standard IS: 3043, Code of Practice for Earthing Installation

The earth conductors (Strips / Wires, Hot dip G.I. / copper) inside the building shall properly be clamped / supported on the wall with Galvanized Iron clamps and Hot Dip GI screws / bolts. The conductors outside the building shall be laid at least 600 mm. below the finished ground level

The earth conductors shall either terminate on earthing socket provided on the equipment or shall be fastened to the foundation bolt and / or on frames of the equipment. The earthing connection to equipment body shall be done after removing paint and other oily substances from the body and then properly be finished

Over lapping of earth conductors during straight through in joints, where required, shall be of minimum 75mm. long and bitumen coated

The earth conductors shall be in one length between the earthing grid and the equipment to be earthed

Minimum distance of 3 meter shall be maintained between other electric conductor, earthing conductor and the conductor laid for the lightning protection system. Earthing and lightning protection system conductors shall be bonded to each other to prevent side flashover in case of non-availability of adequate clearance

The earthing met conductors, risers, earthing cables, etc. passing through walls shall be covered with galvanized iron sleeves for the passage through wall. Water stop sleeves shall also be provided wherever the earthing conductor enters the building from outside

INSPECTION AND TESTING

The following earth resistance values shall be measured with an approved earth megger and recorded.

Each earthing station

Earthing system as a whole

Earth continuity conductors

Earth conductor resistance for each earthed equipment shall be measured which shall not exceed 1 ohm in each case. In case of more earth resistance, the Contractor shall have to carry out necessary modification in the system without any cost implication to the Client

Measurements of earth resistance shall be carried out before earth connections are made between the earth and the object to be earthed

All tests shall be carried out in presence of the consultant / client and report should be submitted in two sets

STANDARD SPECIFICATION

FOR

WATER COOLERS & PURIFIER

Water Cooler

Providing & erecting water cooler having storage capacity 150 Ltr. & cooling capacity 150 Ltr.per hour @ an ambient temp of 45° C. The outlet temp. of the water should drop by 15°C within a hour, The water cooler should be comprising of hermetically sealed compressor, fan motor, condensing unit, water tank surrounded by evaporating, coil, thermostats, relay etc.complete with necessary inlet & outlet connection. The body of water cooler will be made from Stainless Steel.

Purifier

Retains Natural Quality of Water

Aquaguard 200 ensures that wholesome natural salts and minerals in the water are retained without adding iodine or chemicals.

Effective 3 Stage Purification Process

1. The micro-porous, heavy-duty sediment filter candle of polypropylene and bacteriostatic carbon removes physical impurities like dust, dirt etc.
2. Then the specially treated activated carbon removes chlorine along with its by-products and other organic impurities thus reducing unpleasant odour, taste and colour.
3. Finally, the ultraviolet treatment effectively inactivates all known diseases- causing bacteria and viruses.

Built- in Safety Mechanism

Its electronic monitoring system uses a photo resistor to stop the flow of water instantly if purification is incomplete.

Unique Flow of Water

To ensure maximum contact time in the purification chamber, the water flows against the force of gravity.

Water Control Sensor

It switches on automatically when the water level is low and switches off again when the water level is full. Besides saving power, reducing maintenance cost and eliminating physically monitoring, it ensures that the water storage tank of the cooler is always full.

STANDARD SPECIFICATION

FOR

PUMP SETS & STARTERS

Providing & erecting open well horizontal mono block pump set with cast iron body, complete for three phase submersible motor having [B] For 2 HP 3 phase open well horizontal mono block pump set suitable for 200 LPM @ 25 mtr head suitable for 50 mm dia delivery pipe Cat.II

Supplying of single phase submersible pump set suitable for 100 mm size or more dia bore well having motor capacity and discharge as under with necessary panel box

B) Motor rating 1.5 HP (16 stage) pump having capacity of 50 LPM at 60 mtr head suitable for 32 mm dia. delivery pipe Cat.II

Supplying & erecting approved make motor control cubical panel (Direct - on - line) made from 16 G. CRCA sheet duly epoxy powder painted inside and outside with hinged doors and locking, arrangement consisting of suitable size of ON- OFF isolator (AC - 3/23duty) main fuses, single phasing preventer, indicating lamps for R- Y - B phases, overload relay, Automatic water level controller, Ammeter, Voltmeter each with two way selector switch incoming, wires duly socket crimped, main contactor & overload relay, start - stop push buttons, to be erected on angle iron frame grouted on wall as directed. The isolator, overload relay & contactors will be of L & T, Siemens or BCH make only. (a) DOL up to 5.0 H.P.

Supplying & erecting approved make Automatic liquid level controller 6A. With Megnet Sensor as per instruction of Engineer in charge on site complete with wiring connection with existing wires , with copper conductor from pump to upper and lower tank.(Excluding Wire and Starter

STANDARD SPECIFICATION

FOR

PUBLIC ADDRESS SYSTEM

PUBLIC ADDRESS SYSTEM

Introduction

Public Address System (PA system) is an electronic sound amplification and distribution system with a microphone, amplifier and loudspeakers, used to allow a person to address a large public, for example for announcements of movements at large and noisy air.

The simplest PA system consists of a microphone, an amplifier, and one or more loudspeakers.

A sound source such as compact disc player or radio may be connected to a PA system so that music can be played through the system.

The process begins with a sound source (such as a human voice), which creates waves of sound (acoustical energy). These waves are detected by a microphone, which converts them to electrical energy. This signal is amplified in an amplifier up to a required level. The loudspeaker converts the electrical signal back into sound waves, which are heard by human ears.

Amplifier

Supplying & erecting Philips Ahuja make or equivalent Amplifier having following specification: Power Output :250W (RMS) (300W Max.) inputs : 6 Misc. & 2 Aux. frequency Response :50-1500HZ 13db Tone Controls :Cut & Boost type LED Meter :5 LED Arrays The amplifier suitable to operate 240V A.C. & 24volt D.C. (Battery) with automatic changeover from AC to Battery operation, duly protected by wrong Battery Polarity connections.

An amplifier in PA equipment is a device, which takes low level input signal from microphones and amplifies to a high level output signal to the desired output power, which will be delivered to the loud speakers at the output stage by suitable connection.

The output power of the amplifying system should be so chosen as to be capable of establishing at any point amongst the audience, a sound level of 80 dB during operation, the gain controls of the amplifying system should be so set that the signal reach each member of audience at comfortable listening level, that is during weak passage the signals are distinctly audible at each point, while during loud passage these do not cause annoyance. The amplifying system should have a gain sufficient to deliver the required output power.

For matched impedance working, the output impedance of the amplifier should be such as to operate into the range of impedances presented by the load.

The output transformer of the amplifier should have impedance tapping of 4, 8 & 16 ohms to enable operation with loudspeakers of these standard impedances. For constant voltage working, the transformer should be provided with 70 to 100 volts constant voltage tapings. High power amplifiers should incorporate safeguard against excessive voltage or current rise in case of open circuit condition or short circuit conditions respectively, in output circuit.

Loudspeaker

Criteria for determining the loudspeakers required -The number of loudspeakers, their location, height, direction and the power input to the loudspeakers installed will have to be decided with the object of maintaining the intensity of reproduced sound above the local prescribed noise level so that the masking effect of noise over the signal could be reduced considerably.

The loudspeakers used should have adequate power handling capacity and should normally be of high efficiency type.

Loudspeakers used for "A" Category reproduction should have effective frequency range of 100 to 10,000 Hz. (The response of the speaker system within the environment after installation should be considered as the effective frequency response). For this reproduction, directional type of loudspeakers (column) should be used.

Column loudspeakers are ideal for obtaining the vertical directivity pattern. The height of column and number of speakers in it determine the directivity. A wider range of high quality reproduction may be obtained by employing multiunit type, wherein the whole frequency range will be covered by two or three groups of speakers arranged in separate columns, but mounted close to each other and connected through a properly designed dividing network.

The directivity pattern of such speakers should be such as to provide sufficient intelligibility at all points of the seated area and avoid feedback to microphone, dead spot and echo.

For best results, the column loudspeakers shall be installed vertically at a height of 1.5-1.8 m above the platform level and inclined at an angle of 8 degree to 10 degree towards the ground.

All the loudspeakers in each group should be connected in parallel and in phase across the output line.

Dynamic Microphone

Dynamic microphones are versatile and ideal for general-purpose use. They use a simple design with few moving parts. When a magnet is moved near a coil of wire an electrical current is generated in the wire. Using this electromagnet principle, the dynamic microphone uses a wire coil and magnet to create the audio signal.

When the diaphragm vibrates in response to incoming sound waves, the coil moves backwards and forwards past the magnet. This creates a current in the coil which is channeled from the microphone along wires.

The microphone chosen should have uniform frequency response within ± 3.0 dB from 100 to 10000 Hz.

The microphone plugs and sockets should be of multi-contact (three or more) type and freely interchangeable.

Part (G) FOR FIRE PROTECTION SYSTEM

Scope of Work:

The scope covers the fire protection system which includes Fire Hydrant System and Hand Appliances suitable for all the type of risk / fire for different buildings, equipment etc.

Preparation of fire fighting scheme drawings, getting them verified / approved by the Fire Consultant, Design, supply, inspection, transportation to site, fabrication with three phase welding machine , installation, erection, painting, testing and commissioning of the Fire Hydrant System with mechanical and electrical equipment, instrumentation, pipes, valves, fittings, supports, cables etc. complete in all respects, and preparation & submission of drawings / calculations / other documents to the concerned authorities and obtaining interim and final Approval / Sanction / NOC (No Objection Certificates) from Surat Municipal Corporation Fire & Emergency Department - after execution of work as required.

This document shall be read in conjunction with all relevant commercial documents. In case of contradiction between technical specification and other documents, data in technical specifications shall prevail, however decision of fire consultant in this regard will be final. In case during tendering process, if contractor find any ambiguity, it should be brought in notice to the fire consultant.

All work under this contract shall be carried out in accordance with the Technical Specification and the latest revisions of Indian Standards, Codes, Indian Electricity Rules and also Regulations and Norms of Surat Municipal Corporation Fire Department.

Codes and Standards

Following codes and standards are referred to prepare this design specification

Design Codes

Reference Codes

IS codes

IS 636:1988 Type B,	Reinforced rubber-lined fire hose
IS 903:1993	Fire hose delivery coupling and Branch pipe with nozzle
IS 5290:1993	Hydrant valves (Landing valve)
IS 10221:1982	Anti-corrosion treatments (coating and wrapping) for underground M.S. pipes
IS 2171:1999	Specification for Portable (10 Kg) DCP fire Extinguisher
IS 2878: 2004	Fire Extinguisher (4.5 / 6.8) CO2 Type
IS10658:1999	Specifications for High Capacity (25 / 50 / 75 Kg) DCP Fire Extinguisher
IS 2546:1974	Specifications for Galvanised M.S Fire Bucket
NBC Codes	Fire Protection Manual (Issued by National Building Code-India)

Fire Hydrant and Water System Description

The following type of systems shall be provided for the Saheed Smarak, near Vesu at Surat for Surat Municipal Corporation.

Fire Water Pumping System

Fire Water Pumping System comprises of Electric motor driven main pump, Diesel Engine driven standby pumps of required capacity as mentioned in the BOQ with adequate head and Electric motor driven 1 Nos. of Jockey Pump of required capacity as mentioned in the BOQ with adequate head, Suction / Delivery piping, Strainers, Gate Valves, Check Valves, Instruments, Diesel Engine Control Panels for auto operation of Fire Pumps etc. shall be installed in common Fire Water Pump House. Fire Water Pumps will draw the water from dedicated Fire Water Tanks having fire water storage capacity of 2, 50, 000/- litres.

Make-up water line is provided at the inlet of the Fire water tank by Surat Municipal Corporation at make-up water compartment of the underground sump/tank. The water will be delivering at natural gravitational force. Also, raw water from the bore well may be provided as an alternate source in case.

Make up fire water compartment of the underground sump will store mainly potable water but even bore well pump water can be sourced to fill the make up fire water sump, in case of emergency.

The fire water tanks are provided with level switch connections near the tank bottom and tank top for monitoring. Hydraulically operated Float Valve will be provided at incoming water line to fill water level automatically.

The level switch at the tank bottom shall be ensuring that the fire water pumps do not run dry at low level in the tank.

The fire water storage tanks shall be provided with a level switch which is a part of Main Control Panel installed in Main MCC block to indicate both Low-low level and High-high level alarm / indication at Main Control Room.

Diesel engine control panel installed at Fire Water Pump House shall have following Minimum features

Auto/manual switch for start/stop of Diesel engine pump

Battery charger(s) with battery selector switch for working + standby sets of batteries

Fail to start Alarm/indication

Low lube oil pressure Alarm/indication

High cooling water temperature Alarm/indication

Fuel low level Alarm/indication

Over speed Alarm/indication

Low hydrant pressure Alarm/indication

All above alarms shall be repeated at Main Control Room in Main MCC room

Potential free NO/NC contacts shall be provided by Hydrant system contractor along with pressure, level, flow switches and pump failure relay contacts. These contacts shall be used by fire detection vendor to map this on fire detection and alarm system with date and time stamping. Monitor modules will be provided by the fire detection and alarm system vendor in marshalling box near pump/ Engine control panel.

Fire Hydrant System

Hydrant system comprises of a network of piping installed mostly above ground on sleepers around the areas to be protected excluding underground piping at road crossing and paved areas etc. Double Headed Hydrants, Water Monitors, Fire Hoses,

Hose cabinets, Branch Pipe with nozzles will be placed at strategic locations as per standards.

The Fire Hydrant header sizes shall be designed, NBC, for the minimum residual pressure of 7 Kg / cm² g at hydraulic remotest point of application in the plant.

Fire hydrant system shall be in closed loops to ensure multidirectional flow in the system.

Isolation valves shall be provided to enable isolation of any section of the network without affecting the flow in the rest. The isolation valves shall be located normally near the loop junction. Additional isolation valves shall be provided in the segments where, the length of the segment exceeds 300 Mts.

All underground mains shall be coated and wrapped as per Specification to protect it against soil corrosion.

Double headed hydrants, Water Monitors shall be placed 30m apart in the entire terminal except in non-hazardous area, where they shall be spaced at 45m interval.

Hydrant / Monitor stand post shall be located 15m away from the periphery of storage tank or equipment under protection. In case of non-hazardous buildings this distance shall not be less than 2m and not more than 15m. Hydrants /Monitors shall be located along road side for easy accessibility.

Each hydrant stand pipe will be 100 mm size with two 80mm outlets for two separate hydrant valves. Each hydrant will be provided with a Hose Box containing required length of fire hose pipes with instantaneous coupling to IS 636 (Type A), Branch pipe with nozzle, spanner, etc.

Monitors shall be used to protect the tanks/equipment and shall not be installed within 15m of hazardous equipment. The location of Monitor shall not exceed 45 m from the hazard to be protected.

In the unlikely event of a fire in the terminal, one end of fire hose(s) shall be connected to the outlet of hydrant valve and branch pipe with nozzle shall be attached to its other end. Upon opening of the valve, water shall flow through the hose(s) and the water jet through the nozzle shall be directed towards the seat of fire. Depending upon the intensity of fire water monitors shall be operated. The effective fire fighting through the trained personnel will reduce the loss.

Hand Appliances

Fire extinguishers shall be located at convenient locations and shall be readily accessible and clearly visible at all times. The maximum running distance to locate an extinguisher shall not exceed 15 m. The extinguisher shall be installed in such a way that its top surface is not more than 1.5 m above floor/ground level.

Hand appliances like DCP (Dry Chemical Powder), Sand Bucket, CO2 are used to extinguish initial stage of fire. Each extinguisher shall be operated as per operation instructions given on each extinguisher.

Valve Chamber

Valve chamber of adequate size to accommodate external valves shall be constructed as directed per site condition

Painting

All external steel surfaces shall be thoroughly cleaned to remove rust, scale etc. before applying the primer

All underground piping shall be provided protective wrappings as per TAC norms and/or specification.

All over ground piping/hose boxes/landing valves/hose reel, M S frames etc. shall be painted with two (2) coats of RED LEAD primer or equivalent followed by two coats of Post Office Red coloured Synthetic enamel finish paint

All other equipment shall be given a red oxide/zinc chromate primer and two (2) coats of synthetic enamel

Thrust Block

Thrust blocks in water mains are created in the following ways:

Where the pipe changes direction horizontally or vertically;

where the pipe changes in size;

at dead ends;

at restrictions; and,

When valves or hydrants are closed quickly.

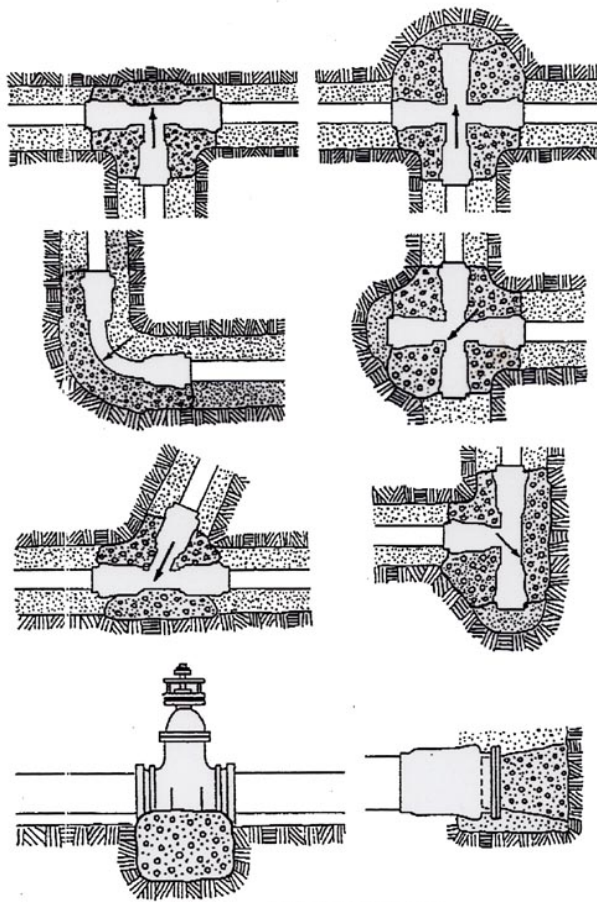
Thrust blocks are used at these locations to prevent damage to the pipe caused by unsupported pipe movement. Tees, bends, plugs, hydrants, and other appurtenances and fittings require thrust blocks to restrain the pipe. If thrust blocks are not provided, the pipe would be free to move causing joint separation, leakage, and damage to other connected structures or pipes.

INFORMATION regarding the use of thrust blocks includes the following:

Normally plain unreinforced CONCRETE is used to construct blocks. Reinforcement may be used as needed. Sulphate resistant additives may be added to the concrete if the soil contains sulphates. Materials such as wood or any other degradable material are not recommended since these materials are subject to deterioration.

Thrust blocks must bear against UNDISTURBED soil. Disturbed soil is subject to compression upon loading and therefore should not be used as a bearing surface.

The LOCATION for use of thrust blocks is illustrated in the figure below.



LOCATION OF THRUST

Fire Water Pumping System

All Main Fire Water Pumps along with Jockey Pump shall be kept in auto position for its automatic operation during emergency. The jockey pump shall maintain a minimum header pressure of 7.5 Kg/Sq. cm in the entire fire water network. Jockey pumps shall start automatically at the 7.5 Kg/Sq. cm pre-set pressure and stop automatically at the 8.8 Kg / Sq. cm. In case the demand of water is more than the capacity of jockey pump, the header pressure (indicated by pressure switch (1W+1S) mounted on the header) shall drop down, which will initiate the starting of the first main diesel driven fire water pump. In case the header pressure continues to drop down, the second main diesel driven fire water pump shall get started after a pre-set time interval. The same philosophy shall be followed for the start of the subsequent main fire water pumps. Each main fire water pump shall have its own control panel. A duty selection switch provided in the control room shall determine the sequence of triggering of the main fire water pumps. The main pump(s) shall have to be stopped manually. All the pumps shall be started sequentially during fire condition through the control panel installed at Fire Water Pump House provided for each pump.

Controls

Electric Motor driven fire & jockey pumps & diesel engine driven fire pump shall start automatically through preset pressure switches in proper sequence as elucidated elsewhere above.

Stopping of all fire pumps shall be manual only

Audio visual alarm shall be sounded when fire pumps start/starts

Power supply 'ON-OFF' indication shall be provided in the Fire Pump Control Panel

A C Motors

All A C motors shall be approved type & totally enclosed fan cooled and shall have Class B insulation with degree of protection IP 55 conforming to IS 325 and frame. All motors shall be suitable for both DOL and STAR/DELTA starting, as required. The motor terminal box shall be suitable for receiving aluminium cables and suitable for positioning on the motor body at intervals 90 degree as required for the particular application. The motors shall have also two distinct terminals for earthing. All the motors shall be suitable for 415 V (- 15% to + 5% variation) 3 phase 50 HZ plus minus 3% AC supply.

1.1 KV GRADE L.T. CABLES:

General:

The medium voltage cables shall be supplied, laid, connected, tested and commissioned in accordance with the drawings, specifications, relevant Indian standards specifications, manufacturer's instruction, all cables run in parallel between L.T. side of the existing transformer, L.T. incomer A.C.B.'S of L.T. switch board panel / outgoing of panel to motor terminal etc as required and as directed by the engineer-in-charge. Excavation and refilling using bricks, road crossing using RCC pipe, sand etc. Will be in the scope of contractor and shall be done as per relevant is standard.

The cable shall confirm to relevant is which should be specified and shall bear ISI mark. The quantities mentioned above are approximate only. The cables should be supplied after taking actual measurement jointly. No straight joint in any cables shall be permitted. Any piece or cut length shall have to be taken back by contractor. The contractor should plan and purchase the cable to avoid wastage / cut length / excess length as the client will not accept the same under any circumstances. The cable shall be genuine and of approved make only.

Root marker shall be provided for every 10 meter length of underground cable and cable identifier for every 20 meter length of cable not covered in underground.

RCC half round muff of standard make shall be provided for protection of underground cable.

All above item should be got approved from engineer-in-charge before execution.

The cables shall be delivered at site in the original drums with manufacturer's name, size and type clearly written on the drums.

All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of handling during transportation, loading, unloading etc.

The cable shall be supplied in single length i.e. Without any intermediate joint or cut unless specifically approved by the client. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. With cable compound as per standard practice.

Conductor:

Uncoated, annealed copper / aluminium, of high conductivity, up to 4 mm² size the conductor shall be solid and above 4 sq. Mm, the conductor shall be concentrically stranded as per IEC: 228.

Insulation:

Cross link polyethylene (XLPE) extruded insulation rated at 70oc.

Core identification:

Two cores : red and black
Three cores : red, yellow and blue
Four core : red, yellow, blue and black
Single core : green, yellow for earthing.

Black shall always be used for neutral.

Assembly:

Two, three or four insulated conductors shall be laid up, filled with non-hygroscopic material and covered with an additional layer of thermoplastic material.

Armour:

Galvanized steel flat strip / round strips applied helically in single layers complete with covering the assembly of cores

For cable size up to 10 sq mm : armor of 1.4 mm dia g.i. round wire

For cable size above 10 sq mm : armor of 4 mm wide 0.8 mm thick gi strip

Sheath:

St -2 PVC along with polypropylene fillers to be provided. Inner sheath shall be extruded type and shall be compatible with the insulation provided for the cables. Outer sheath shall be of an extruded type layer of suitable pvc material compatible with the specified ambient temp. Of 50oc and operating temperature of cables. The sheath shall be resistant to water, ultra violet radiation, fungus, termite and rodent attacks. The colour of outer sheath shall be black. Sequential length marking along with size and other standard parameters shall be required at every 1.0 meter on the outer sheath.

Testing:

The finished cables shall be tested at manufacturer's works for all the routine tests for all the length and size of cables to be delivered at site and the certificate for the same shall be furnished to client. If required, the cables shall be tested in presence of the client's representative.

Voltage test: each core of cable shall be tested at room temperature at 3 kv A.C. R.M.S. for duration of 5 minutes.

Conductor resistance test:

The D.C. resistance of each conductor shall be measured at room temperature and the results shall be corrected to 20 degree centigrade to check the compliance with the values specified in the is 8130 – 1976.

Cable tests before and after laying cables at site:

Insulation resistance test between phases, phase to neutral and phase to earth.

Continuity test of all the phases, neutral and earth continuity conductor.

Earth resistance test of all the phases and neutral.

All the tests shall be carried out in accordance with the relevant is code of practice and INDIAN electricity rules.

The vendor/contractor shall provide necessary instruments, equipment's and labour for conducting the above tests and shall bear all the expenses in connection with such tests. All tests shall be carried out in the presence of client and the results shall be prescribed in forms and submitted.

Cable marking:

The outer sheath shall be legibly embossed at every meter with following legend: electric cable: 1100 v, size: ____c x ____ mm2 with manufacturer's name, year of manufacturing and ISI symbol.

Sealing drumming and packing:

After tests at manufacturer's works, both ends of the cables shall be sealed to prevent the ingress of moisture during transportation and storage. Cable shall be supplied in length of 500 metres or as required in non-returnable drums of sufficiently sturdy construction. Cables of more than 250 meters shall also be supplied in non-returnable drums. The spindle hole shall be minimum 110 mm in diameter.

Each drum shall bear on the outside flange, legibly and indelibly in the english literature, a distinguishing number, the manufacturer's name and particulars of the cable i.e. Voltage grade, length, conductor size, cable type, insulation type, and gross weight. The direction for rolling shall be indicated by an arrow. The drum flange shall also be marked with manufacturer's name and year of manufacturing etc.

L.T. Cable terminations:

Cable termination:

Cable terminations shall be made with aluminium crimped type solder less lugs for all aluminium cables and stud type terminals. For copper cables copper crimped solder less lugs shall be used. Crimping shall be done with the help of hydraulically operated crimping tool. For joints where cable is with aluminium conductor and bus bars are aluminium, bimetallic lugs shall be used with compound. Cupal type of washers, crimping tool shall be used for crimping any size of cable.

Cable glands:

Cable glands shall be of brass single compression type. Generally single compression type cable glands shall be used for indoor protected locations and double compression type shall be used for outdoor locations. Glands should be of nickel-plated brass, with pvc shrouds over it. Before applying PVC shrouds, all bare metal shall be wrapped with pressure sensitive adhesive tape.

Ferrules:

Ferrules shall be of self-sticking type and shall be employed to designate the various cores of the control cable by the terminal numbers to which the cores are connected, for ease in identification and maintenance.

Cable joints:

Kit type joint shall be done and filled with insulating compound. The joint should be for this 1.1 kv grade insulation, cable termination for conductors up to 4 sqmm may be insertion type and all higher sizes shall have compression type lugs. Cable termination shall have necessary brass glands. The end termination shall be insulated with a minimum of six half-lapped layers of pvc tape. Cable armouring shall be earthed at both ends. Cable joints shall be done as per regular practice and check shall be carried out for loose connections and leakages. Insulation cutting shall be done properly taking care that no area of the conductor remains exposed. Crimping shall be done with the help of hydraulic tool. Proper insulation tape shall be applied at the cable and lug joint.

Saddles and clips:

Saddles and clips shall be pvc covered or of g.i. fixing screws shall be round head brass, where screws are used. Nuts shall be or brass, square pressed type.

Jointing sleeves:

Jointing sleeves shall be of brass with standard termination. Solder type cable connectors / cable sleeves shall be used to join the cable / conductors. The solder used shall comply with B.S. 219 type no corrosive flux only shall be used.

Conventional Fire Alarm System

General

A conventional Fire Alarm System employs one or more initiating circuits, connected to sensors (initiating devices) wired in parallel.

Each device is connected to the control panel with its own wire in series.

These sensors are devised to decrease the circuit's resistance when the environmental influence on any sensor exceeds a predetermined threshold values.

Fire Alarm Control Panel

Microprocessor based conventional Fire Alarm Control Panel.

It should be compatible with conventional detectors, manual call points and normally open dry contact devices.

It should be with Switched Mode Power Supply, Modular Construction, with Auto Resettable Fuse, with Surge Protection for all Input and outputs devices, Programmable AC loss delay/Trouble, with Remainder/ Alarm Verification, with Battery polarity reversible protection, Surface Mount.

The Panel shall be fully complies with UL/ EN Standards.

The Rugged CRCA sheet with powder coated finish, Operates on 220 V AC, 50Hz, AC mains power supply, 16x2 dot matrix LCD display.

All zones accept smoke detectors and normal open contact devices.

Any zone can be configured as alarm or supervisory zone.

And shall be programmed as silence-able or non- Silence-able

With Standby (battery) backup 24VDC power supply with built in charger, Error free Fire / Fault status in unambiguous colored LED indication, provision of System ON indication, with facility of Main & Standby status with audible and visual indication and Battery low visual warning with audible tone, with Lamp test facility.

All field wiring circuits shall be supervised, with Zone Isolation facility with loop voltage cut off, and with Earth fault annunciation facility and AC low voltage cutoff.

System should be compatible for any kind of detectors like Multi Sensor Detector, Smoke Detector, Heat Detector, and Optical Beam Detector.

Conventional Fire Alarm Repeater Panel

The microprocessor based Fire Alarm Repeater Panel and which is compatible Main Fire Alarm Control Panels. It should communicate with FACP through RS485 and shows the status of the FACP Connected with it or FACP's in network, with 20 X 4 Dot Matrix LCD displays, with alphanumeric keypads.

Repeater Panel shall be suitable for RS 485 Communication for Network Repeater, with System ON, AC ON, Battery ON, Charger ON indications, with Lamp test facility.

Maximum 8 panels including repeater connection in a Single Network via RS-485 should be possible.

Repeater Panel should monitor the status of FACP's via RS-485 Network communication; User can disable / Enable the Zone of Fire Alarm Control Panel Connected in network.

Conventional Photoelectric Smoke Detector & Heat Detectors

The conventional detectors shall be designed to work with all conventional Panels. The detectors should have low profile and have LED's for 360 visual indication. The blinking LED's indicate normal operating conditions whereas the steady state indicates fire status. It should have unique protocol chamber designed to sense smoke produced by wide range of sources of combustion. It should have drift compensation feature where in the detector adjusts its normal reference based on environment conditions. Sensor should be easy to install and easy to maintenance, and should be with standard base.

Manual Call Point

Manual Call Point should compliant with latest standards and should be designed to interface with Conventional fire alarm panel, switches shall be provided for activating the call point. The RED blinking LED indicates normal operating condition. Activation of MCP is indicated by RED steady LED.

Sounder

The Sounder should be designed to deliver cost-efficient and reliable safety solutions which meet various international standards to fulfill the industry's needs. The sounders can be flush / ceiling mounted with / without back box, with 2 Audible Tones Settings: Continuous and Temporal, suitable for 12/24 V DC Operation...

Item Wise Description

Item No 1

Supplying, installation, testing and commissioning of Electric driven Main Fire Pump suitable for automatic operation and consisting of following, complete in all respects, as required : (a) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical

seal conforming to IS 1520. (b) Suitable HP Squirrel cage induction motor, TEFC, synchronous speed 1500 RPM, suitable for operation on 415 volts, 3 phase 50 Hz, AC supply with IP 55 protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325. (c) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required. (d) Suitable cement concrete foundation duly plastered with anti vibration pads. (1.9) 1620 lpm at 56 m Head

Item No 2

Supplying, installation, testing and commissioning of diesel engine driven main fire pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Diesel Driven Pump) Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520. Suitable HP, 1500 RPM water cooled with radiator, diesel engine conforming to relevant IS standard complete with auto starting mechanism, 12 /24 volts electric starting equipment, diesel tank, exhaust pipe extended upto 10 m outside pump house duly insulated with 50 mm thick glass wool with 1.0 mm thick aluminium sheet cladding, residential silencer, instruments and protection as per standard specification, stop solenoid for auto stop in the event of fault with audio indications, painted with post office red colour etc. as required. M.S fabricated, common base plate, coupling, coupling guard, foundation bolts etc. as required. Suitable cement concrete foundation duly plastered and with anti vibration pads. (2.9) 1620 lpm at 56 m Head

Item No 3

Supplying, installation, testing and commissioning of electric driven pressurisation pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Jockey Pump) Horizontal type, multistage, centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS : 1520. Suitable HP squirrel cage induction motor TEFC type suitable for operation on 415 volts, 3 phase 50 Hz AC supply with IP 55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS : 325. M.S.fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required. Suitable cement concrete foundation duly plastered and with anti vibration pads. (3.6) 300 lpm at 56 m Head

Item No 4 , 5 & 6

Supplying, fixing, testing & commissioning of double flanged sluice valve of rating PN 1.6 with non rising spindle, bronze/gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets and conforming to IS 780 of following sizes as required : (12.3) 65mm dia, 80 mm dia & 150 mm dia.

C I components of the sluice valve shall be of Grey cast iron conforming to IS 210. The valves shall be flanged having solid wedge gate valve, inside screw, hand wheel with open-close indications etc. all conforming to IS 780 but of nominal pressure

rating of PN 1.6 as per TAC norms

Test Pressure at manufacturer's works

Flange drillings shall normally be as per IS 1538. However, if the manufacturer drills the flanges to other standard specifications, the valves shall be supplied with a pair of matching flanges, nuts, bolts, washers; rubber insertion etc. and such flanges shall have inside threads to suit pipes of same nominal size as that of the valve

The quoted price of the valves shall also include cost of arrangement for securing the valves in 'open' or 'closed' positions by padlock/riveted strap, where required per TAC norms

Item No 7 & 8

Supply, Installation and Testing of: Check Valve (Ball type or Swing type) with necessary pipe fittings, hardware and consumables. MOC:-Body: Cast Iron (With Flange Ends). Standard: ISI Marked. UOM:-Price Per Each No. 150 mm dia , 80 mm dia

C I reflux valves, i.e. swing check type non-return valves, shall be conforming to IS 5312. Test pressures shall be same as per CI sluice valves

Item No 9

Supply, Installation and Testing of: Foot Valve (Ball type or Swing type) with necessary pipe fittings, hardware and consumables. MOC:-Body: Cast Iron (With Flange Ends). Standard: ISI Marked. UOM:-Price Per Each No. 150 mm dia

Item No 10

Supply, Installation and Testing of: Foot Valve (Ball type or Swing type) with necessary pipe fittings, hardware and consumables. MOC:-Body: Cast Iron (With Flange Ends). Standard: ISI Marked. UOM:-Price Per Each No. 80 mm dia

Item No 11 & 12

Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange. (15.1) 80 mm dia , & 150 mm Dia

“Y” strainers up to 50mm shall be of gunmetal and above 50mm shall be of Gun metal body.

Strainers shall incorporate a removable bronze screen with 3.175 mm (1/8”) perforations and a permanent magnet. Strainers shall be provided with flanges at both inlet and outlet. They shall be designed to enable blowing out of accumulated dirt and facilitate dirt and facilitate removal and replacement of the screen without disconnection of the main pipe.

All strainers shall be provided with equal size isolating “Slim Seal” valves of approved brands as shown in drawings so that the strainer may be cleaned without draining the system.

Type of strainer: „Y“/ Bucket

Material of construction: gun metal

Connection up to 50mm : screwed end

> 50mm : Flange ends

Free straining area : minimum of 3 times the pipe c/s area for Y” strainer minimum of 6 times the pipe c/s area for bucket type strainer.

Application : water.

Item No 13

Supply, Installation and Testing of: Pressure Gauge with Siphon Tube and Cock. MOC:-4” Dial- Glycerin filled- Stainless Steel Body Pressure Gauge with GI Siphon Tube and Brass Cock. Size:-Dial: 4” (100 mm) Range: 0 – 16 Bar (kg/cm2) UOM:-Price Per Unit

Item No 14

Supply, Installation and Testing of: Pressure Switch with Siphon Tube and Cock. Size:- Range suitable for System Design Pressure. UOM:-Price Per Unit

Item No 15

Supply, Installation and Testing of: Electric Control Panel for Electric Motor Driven Main Fire Pump and Jockey Fire Pump. Both pumps can be Start Automatically (by Pressure Switch) or Manually. Design As per the Detail Specifications given. We will provide Power Cable up to Pump Panel; Including Electrification work From Panel to Pump. UOM:-Price Per Set.

Item No 16

Supply, Installation and Testing of: Electric Control Panel for Diesel Engine Driven Standby Fire Pump. We will provide Power Cable up to Pump Panel; Electrification From Panel to Pump subject to your scope only. UOM:-Price Per Set.

Item No 17

SITC of Pressurized Air Vessel f Size 450 mm Dia x 2000 mm long fabricated from 10 mm thick MS Plate with 25 mm drain valve, air release valve with ball valve on top and isolation valve.

Item No 18 & 19

Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :100 mm dia & 150 mm dia

Aboveground Pipe Laying.

Supply, Fabrication, Installation, Hydro Testing & Painting of Above Ground Pipe.

With necessary Pipe Fittings (Flanges, Bands, Socket etc.),

MS Support/Clamps/Hangers etc.

Hardware (Gaskets, Nut-Bolts, Paint etc.),

Consumables (Welding Rod, etc.) and Labour Charge.

Quality: GI, C-Class (Heavy).
Paint:
UOM:-Price Per Running Meter

Item No 20 & 21

Underground Pipe Laying
Supply, Fabrication, Installation, Hydro Testing & Coating of Underground Pipe.
Pypkote Pipe Coating (4 mm),
Hardware (Gaskets, Nut-Bolts, Paint etc.),
Consumables (Welding Rod, etc.) and All Civil Work like excavation, sand bedding, earth filling etc. as mentioned in the detail specifications.
Quality: GI , C-Class (Heavy).
UOM:-Price Per Running Meter

Item No 22

Supplying and fixing Single headed external yard hydrant valve with 1 No. 63 mm dia instantaneous FM Gunmetal/Stainless Steel coupling and cast iron wheel, ISI marked, conforming to IS 5290 (type A) with blank Gunmetal/Stainless Steel cap and chain as required :Single headed Gunmetal
Material - Gunmetal

Item No 13

Supply, Installation and Testing of: Fire Hose Cabinet (Hose Box) suitable to accommodate 02 no. of 15 m long fire hoses and 01 no. of nozzle. With Lock-n-key facility. Wall Mounting Design. MOC: 16 Gauge MS Box with Powder Coating Standard: - As per Guidelines. UOM:-Price Per Each No. Size:- Suitable for 02 nos. of 15 m long hoses.

Hub and sides: Aluminum Alloy/Mild steel/ Aluminum sheet Wall Bracket: Cast iron / Mild steel.
Hose tube (25 mm): Thermoplastic (Textile Reinforced) Type-2, (Nominal internal dia) as per IS- 12585
Nozzle with branch Pipe: Brass as per IS 8090 Stop Valve (Ball Valve): Gun metal.
Method of Construction:
The Wall Mounting swinging Hose reel drum with Gun Metal Nozzle, gate valve, shall be connected on M.S. bracket with provided flange, gaskets, Nut bolts etc. with use of required tools and plants. The water flow rate shall be not less than 24 LPM and the range of jet shall be not less than 6 metre.

Item No 24

Supply, Installation and Testing of: Short Branch-pipe Nozzle. MOC: Red Powder Coated Aluminium. Standard: As Per IS Standard, Heavy Quality. UOM:-Price Per Each No. Size:- 63 mm X 20 mm

Item No 25

Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required : 2 way-100 mm dia M.S. Pipe

Supplying and installing fire brigade Header pf 150 mm Φ G.I. "C" class pipe having 2 Nos. of 100mm 'T' outlet with 100mm Φ flange, fitted with 2 Nos. of G.M. fire branching inlet connection, each consisting of 2 Nos. 63mm dia. G.M. male inlet for supplying water in fire tank.

Material:

Pipe material: G.I. 'C' class (Heavy duty)

Branching inlet: Gun metal

Male inlet: Gun metal

Method of Construction:

In case underground storage tank is not approachable by fire tenders, a 2 way 63mm diameter instantaneous male inlet connection is provided at street level and connected to UG tank with 1 meter length of 100mm. diameter underground pipe. The whole unit shall be placed in provided MS box made of 2mm thick MS sheet with openable glass cover.

Mode of Measurement:

Executed quantity shall be measured on number basis.

Item no 26 & 27

Butterfly Valve

Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :150 mm dia & 80 mm dia

Butterfly valve conforming to IS: 13095 shall be provided. All valves shall be suitable to with-stand the pressure in the system and rating shall be as per BOQ; All valves shall be right handed (i.e. handle or key shall be rotated clock wise to close the valve), the direction of opening and closing shall be marked and an open/shunt indicator fitted.

The material of valves shall be as under :

Body - Cast iron / cast steel

Disc - Stainless Steel

Seat – Nitrile

Item No 28

Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required : Single headed Gunmetal

Item No 29

Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required :Gun Metal

Item No 30

Supply, Installation and Testing of: Fire Hose Reel Set with necessary pipe fittings, hardware and consumables. MOC:-Drum: 16 G Powder Coated MS, Hose: 19 mm X 30 m heavy-duty RUBER hose. Shut-off Nozzle: SS-304. With Control Valve: SS- 25mm Ball Valve. Standard:As Per IS Standard. Heavy Quality. UOM:-Price Per Each No. Type 1 - Size:-19 mm dia x 30m long Hose.

Hub and sides: Aluminum Alloy/Mild steel/ Aluminum sheet Wall Bracket: Cast iron / Mild steel.

Hose tube (25 mm): Thermoplastic (Textile Reinforced) Type-2, (Nominal internal dia) as per IS- 12585

Nozzle with branch Pipe: Brass as per IS 8090 Stop Valve (Ball Valve): Gun metal.

Method of Construction:

The Wall Mounting swinging Hose reel drum with Gun Metal Nozzle, gate valve, shall be connected on M.S. bracket with provided flange, gaskets, Nut bolts etc. with use of required tools and plants. The water flow rate shall be not less than 24 LPM and the range of jet shall be not less than 6 metre.

Item No 31

Fire Extinguisher- ABC Powder type, 6 kg.

Supply, Installation and Testing of: ABC Powder Fire Extinguisher necessary hardware and consumables.

Stored Pressure Mechanism.

Charged with MAP-50 % (ABC) Dry Powder.

With wall mounting clamp.

Size:-6 kg Powder.

UOM:-Price Per Each No.

Item No 32

Fire Extinguisher- CO2 Gas type, 4.5 kg.

Supply, Installation and Testing of: CO2 Gas Fire Extinguisher with necessary hardware and consumables.

Standard: - Confirming to IS: 15683-2006 with ISI Mark.

Size:-4.5 kg

UOM:-Price Per Each No.

The fire extinguisher of 4.5 kg CO2 (wheel) type, design, construction and testing as per I.S. No.15683 with fire rating 21b. operating temperature-30`c to +55` c, supplied with body bearing I.S. No.7285 mark and approved by CCOE tested at 250 kgf/cm2 , fitted with ISI marked & CCOE approved valve as per is 3224. CO2 gas as per I.S. No.15222. Externally painted with PO red shade No.538 of I.S. No.5, supplied with standard accessories. The latest hydro test certificate tested by manufactures is to be submitted along with the supply.

Item No 33

Supplying FIRE bucket round bottom of 9 litres capacity made out of 24 gauge G.I. sheet with extra handle at bottom duly painted white inside and Red out side with FIRE mark, filled with dry-sand and kept on existing stand provided or hung on wall hook.

Bucket Fabricated from 24 gauge GI sheet
The Fire Buckets shall be as per the relevant IS 2546-1974.
Size of the Fire Bucket shall be minimum nine (9) litres.
The Fire Buckets shall be supplied empty.
The material of construction shall be Galvanised Iron.
The Fire Buckets shall be provided with anti corrosive treatment.
The bottom of the buckets shall be hemispherical.
The Fire Buckets shall be provided with handle for hanging at the top.
There shall be another handle at the side / bottom of the bucket.
The handles shall help for holding while throwing the content.
The Fire Buckets shall be provided with anti corrosive treatment.
Painting, Outside of the Fire Bucket shall be painted with primer and Fire Red Colour the word FIRE shall be written outside the bucket in bold black letters.
The inside of the Fire Bucket shall be painted with primer and white.

Item No 34

Wall hook 22 to 25 cms. projection for keeping fire buckets made out of 15 mm dia. M.S rod grouted in wall to a depth of minimum 15 cms.

Item No 35

Manual call point

SITC of Analogue Addressable Manual Call Point with Integral Short Circuit Isolator, Analogue Addressable Protocol having, Bi-coloured status LED (red for alarm, amber for (short-circuit), Non-frangible element fitted as standard (conforms to EN54), pulsing/non-pulsing can selectable via panel, Electronically addressed, Approved by LPCB.

Each floor will have at least two manual call point. The call points shall from integral part of the fire detection system, manual call points shall be wall -mounted type. the housing Should be Mild steel / Thermo plastic and should be dust proof . Once the glass is broken alarm should sound on the floor as well as on the main control panel and visible indication its operation. Provision for inserting a hand set for direct communication to main panel shall be made near the manual call point, within the tendered rate.

Alarm status is indicated by colour LED.

Operates on 24 VDC.

Red, Green, Yellow colour Plastic MCP's.

Yellow and Green for Gas Abort & Release purpose.

1 No's of CO & NC Output.

Item No 37

Hooter Cum Sounder

Supply, Installation of: Hooter Cum Sounder size:- Range suitable for System Design Pressure.

UOM:-Price Per Unit MAKE : DANFOSS

Depending on the floor area its layout external audible alarm devices shall be provided with a pair of devices in parallel. The circuit feeding power from zonal panel to these alarm devices in parallel. The circuit feeding power from zonal panel to these alarm devices shall be a ring circuit . If ring circuit is not provided then design provision to give fault signal on zonal panel in the events of short circuit or disconnection of power to sounders shall be made.

Slim and Sleek.

Wall or Ceiling mountable.

Sounder with Back. Box.

24VDC Operation.

Piezo Electric Type.

Fire Engine Siren tone.

Item No 38

Supply Installation Testing and Commissioning of Battery Backup for FA System.

Item No 39

SITC of Active Repeater Panel to be integrated with Fire Alarm Control Panel, larger display Full colour 800 x 480 LCD with resistive touch screen and automatic back-light dimming and the status of any Fire/Fault of Integrated Fire Alarm Panels, Panel should compliant with EN54-2, EN54-4 and Approved by LPCB

Item No 40

SITC of Analogue Addressable Smoke Sensor which is fully compatible with Analogue Addressable Protocol, having removable high performance chamber with Twin fire LED's allow 360 degree viewing, User selectable sensitivity modes 1% to 4.5% obs/m, Incorporate Optical elements, lock mechanism (sensor to base), Electronically addressed, Pulsing/non-pulsing controlled from panel. Approved by LPCB & VdS.

The detector working on the light scattering principle will be capable of detecting visible smoke from smouldering fires long before the fire breaks out into visible flame.

The normal sensitivity / response threshold value, the design and construction of the detector will be in accordance with IS-11360, BS- 5445 Part 7 (European standard EN54-7) or ANSI-UL268 as applicable. Smoke detectors will be marked with their normal sensitivity and tolerance limits and listed spacing as per relevant standards.

LED's for 360 visibility.

Advanced detection and communication protocol.

Sleek low-profile housing design.

Regular 100mm base.

IP – 42

Smoke Sensitivity $(1.96 \pm 0.76) \% / \text{ft}$

Air Velocity 0 - 4000 fpm.

Item No 41

SITC of Analogue Addressable Multi- Sensor which is fully compatible with Analogue Addressable Protocol, having removable high performance chamber with Twin fire LED's allow 360 degree viewing, User selectable sensitivity modes 1% to 4.5% obs/m, Incorporate Optical and dual Heat elements, lock mechanism (sensor to base), Electronically addressed, Pulsing/non-pulsing controlled from panel. Approved by LPCB & VdS.

Item No 42

SITC of Remote alarm indicator that provides visual alarm indication for digital analog addressable sensors that are installed in concealed locations or where the sensor's alarm indicator is not visible to responding personnel. UL Listed

Item No 43

SITC of 2 Zone standalone Fire Alarm control Panel, 16X2 Character LCD Display, provision for zone wise contact and sounder. Panel does not have provision to connect Repeater Panel. Make: Ravel Approval: CE Mark.

As per IS -15908: 2011 Standard.

LCD Display

Standby battery backup with built in charging.

Fire / Fault status LED indication.

SMPS System.

Keypad for panel operation.

System indication.

Standby status indication.

Low Battery warning with tone.

Relay output for actuators.

Lamp Test facility.

Zone wise Isolation facility with loop voltage cut off.

Compatible to all type of Conventional Detectors.

Optional Zone Wise Sounder and Contact.

IP50

Item No 44

SITC of Zone wise contact card for 2 zones - RE-102 Fire alarm control panel

Item No 45

SITC of Zone wise Sounder card for 2 zones - RE-102 Fire alarm control panel

Important Note for Bidder

The work is to be carried out at Exposed RCC Building. So it requires skilled workers & very precise workmanship. Contractor need to understand the values associated with the Building & work with high precision, accuracy & safety.

List of equipment given above and the length of all pipes indicated above are approximate to give the bidder an idea of the scope. Actual items shall be executed as per working drawings by consultant.

The list of equipment accessories & their capacities may vary as per design and detailed engineering by the bidder to achieve the minimum equipment rated capacity as specified in Scope of work & battery limits.

The length / height of pipes located/ mentioned are approximate. It may vary on either side. Successful bidder has to supply the entire fire hydrant piping and scheme as per site requirement and as per the approved norms.

The items under BOQ shall be on FOR site basis inclusive of packing & forwarding, insurance, freight, taxes, duties, octroi etc.

The equipment and accessories shall be covered under the warranty/guarantee clauses specified in bidding document.

The Bidder will have use three phase welding machine only for all the welding works.

Any Supporting material/ hardware/ Accessories etc. to main equipment required for installation, testing & commissioning shall be included in the cost of that particular items.

Before Procuring any Material contractor shall take prior approval of Fire Consultant. All Supporting technical documents, GA Drawings, schematics, etc. is to be furnished along with approval

If required Fire Consultant/ Client can ask Inspection & Testing of Material either & OEM/Manufactures location or at Third Party inspection Lab, and all the cost towards inspection & testing shall be borne by the contractor. All cost including transportation, lodging, boarding, consultant's charges, local conveyance etc.

Defect Liability period for Fire Protection System contract is 2 year from the date of handing over, including all comprehensive maintenance with material, labour, manpower, etc.

Contractor shall consider updated Code & Standard for each individual item while bidding and comply the same at the time of execution without any extra cost.

Approved Vendor/Make

The contractor shall use materials in their works subject to inspection prior to dispatch, by Fire Consultant or Owner or his authorized representative of any materials, as deemed necessary in accordance with the following list. All materials not otherwise specified shall be in accordance with the latest Indian Standard Specification, where such exists and prior approval of Owner/Fire Consultant. The contractor shall be bound to offer sample of materials, which are claimed to be conforming to IS Specifications, for testing at an approved Test Laboratory as suggested by Fire Consultant.

Contractor shall purchase all materials from the makers or their authorized stockiest only. Necessary documentary evidences must be produced to the Owner or their authorized representative on demand. Contractor shall be bound to supply items of any make of the items as per the choice of the Owner without any extra price.

Item Description	Approved Vendor.
Main Pump/ Sprinkler Pump / Jockey Pump- Electric Motor Driven:	
Pump:	ABB, KSB, Kirloskar, Grundfoss,
Motor:	ABB, Kirloskar, Grundfoss
Standby Pump- Diesel Engine Driven:	
Pump:	KSB, Kirloskar, Grundfoss
Pipe: Galvanised- Medium	Tata, Jindal, Zenith.
Pipe Fitments: Galvanised- Medium	R' Brand, Unik, GOEL or any equivalent ISI Marked.
Electric Switch Gears:	L&T, Siemens, GE or equivalent.
Wires/ Cables:	Polycab, Finolex
Valves:	
Butterfly Valves: CI Body, SS Disk, PN 16 Rating.	Intervolve, Audco, Normex, Sant, Zoloto, Normex
Ball Valve: SS	DRP, ITAP, Sant, Zoloto, Normex
Sluice Valve: CI (PN 16 Rating)	Kirloskar, Upadyaya, Audco, Sant, Normex, Zoloto
Non Return Valve: CI (PN 16 Rating)	Intervolve, Audco, Sant, Normex, Zoloto
Strainer: CI with SS Mesh, Y Type.	Anil, Upadyay, Sant, Trishul, Normex, Zoloto
Hose Reel Drum: Vertical Swinging Type.	SRI, Aaag, New Age, Safex, Minimax,
Hose Reel Hose: Nylon Braided Rubber	Dunlop or equivalent, Safex
Hose Reel Shut-off Nozzle: SS-304	SRI, New Age, Aaag, Essel, Safex, Minimax.
Air Release Valve:	New Age, Aaag, Essel, Zoloto, Sant, Kirloskar, Normex,
ABC- Fire Extinguisher	Kanex, Safex, Minimax.
CO2-Kg Fire Extinguisher	Kanex, Safex, Minimax.
Paint:	Asian Paints, Berger.
Nut Bolts: Galvanized, Size: 5/8.	Good Quality fasteners as per passed sample.
Anchor Fastener:	Hilti/ Fisher
Packing & Gaskets:	Champion Packing
Pipe Waterproof Wrapping Coating: 4 mm thick.	PYPEKOTE (IWL), PIPEKOTE (ARL)
Welding Rod:	Advani, Esab, Mangalam.
Pressure Gauge	H Guru, Waree, Micro, Wika.
Pressure Switch:	Indfoss, Danfoss, Kidde, Waree.
Conventional Fire Alarm System	Raval, Honeywell

All the materials shall be ISI marked wherever available from the list of manufacturer given above, wherever the ISI marked materials are not available, the materials shall be from the best quality available in the market, subject to submission of satisfactory test report with prior approval from the Owner/Architect.

If make/brand of any material is not specified in the above vendor list, contractor should take prior approval for make & model of that particular items from fire consultant.

Technical Specifications For External Decorative Lighting with Data Sheet

TECHNICAL SPECIFICATIONS FOR EXTERNAL STREET LIGHT POLE

1.0 SCOPE OF WORK

This section relates to specifications for Design, Supply (wherever called for), Installation, Connection, Testing and Commissioning of Decorative STREET LIGHT Luminaire

The Scope includes:

1. Loading-Unloading at site
2. Unpacking
- 1.1 3. Assembling
4. LED street light luminaire c/w Driver and Pressure Die Cast Aluminum Decorative Poles.
5. Decorative LED luminaire
6. Fixing and connecting wiring to the fixture
7. Testing and commissioning

2.0 CODES & STANDARDS

Sr.	Item	Relevant IS	Relevant IEC
1	General and safety requirements for light fittings	IS 1913	
2	Code of practice for lighting public thoroughfares	IS 1944	
3	Water proof electric lighting fittings	IS 3528	
4	Water tight electric lighting fittings	IS 3553	
5	M.S. tubular and other wrought steel pipe fittings	IS 1239	
6	Luminaries for street lighting. (Parts/Sec. 3)	IS 10322	
2.1 7	Classification of degree of protections provided by enclosures.		IEC 60529
8	Fixed general purpose luminaries		IEC 60598-2-1
9	General requirement and tests		IEC 60598-1
10	Limits for Harmonic current emission —THD < 10%		IEC 61000-3-2
11	Specification for Permitted Humidity Test		IEC 60068-2-38
12	Method for random sampling	IS 4905	
13	LED luminaire photometry measurement.	LM 79	
14	Lumen Maintenance	LM 80	

3.0 DESIGN BASIS & SITE CONDITIONS AND DESIGN CRITERIA FOR VENDORS

- 3.1 All the equipment and components provided and accessories shall be suitably designed for installation and satisfactory operation as specified below.

Site conditions	
Location Gujarat	Site altitude 81 M above mean sea level
Ambient temperature	Relative humidity
Maximum 45 ° C	Maximum 85 %
Minimum 13 ° C	Minimum 25 %
Design 50 ° C	Design 98 % at 50 ° C
Seismic factor Zone III as per IS:1893	Environmental Tropical/humid/corrosive/Dusty conditions
Electrical system data:	
Power supply for Equipment	
Voltage 230 V \pm 5 %	Frequency 50 Hz \pm 3 %

3.2 DESIGN CRITERIA FOR VENDORS

- 3.2.1 The lighting calculations are to be carried out using the computer programme DIALUX 4.10 OR AGI 32 and shall include the average horizontal illuminance on the pathway, the average horizontal illuminance for ROAD on either side of the POLE / luminaire location, the glare, and the uniformity ratios including the average to minimum and the maximum to minimum.

- 3.2.2 The following parameters are to be specifically adhered to:

1. The average horizontal and vertical illuminance on the pathway shall be 10-12 LUX uniformly distributed when measured between poles located at spacing between poles shown in drawings and similar distance on perpendicular either side of the post top location.
2. Uniformity ratio maximum to minimum shall not exceed 5:1.
3. Uniformity ratio average to minimum shall not exceed 3:1.
4. Glare shall be minimum almost No Glare.

- 3.2.2 The lighting calculations will be based on a light loss factor (or) Maintenance Factor of 0.8 and a calculation grid of 1 metre intervals along the pathway and 0.5 metre intervals across the pathway.

- 3.2.3 The pole spacing will be governed by the drawings provided along with the tenders. In general the design shall be based on pole spacing as shown in tender drawings between each pole.

4.0 TECHNICAL REQUIREMENTS

4.1 SYSTEM

- 4.1.1 The lighting installation for the project shall be carried out by use of outdoor type, weather proof luminaries, to be mounted on pole and as shown in drawings.

- 4.1.2 Fitting including all accessories having IP66 protection Class (Optics Compartment)

- 4.1.3 The control gear shall be designed in such a way so that temperature rise of heat sink shall not be more than 40 Deg. C with respect to ambient temperature.

- 4.1.4 For External street lighting, luminaire shall be low glare such that it shall not cause inconvenience to the public viewed directly.

- 4.1.5 In general all luminaires shall be Dark Sky Compliant as required by ECBC / Green Building Norms.
- 4.1.6 Variation in illumination level shall be $\pm 1\%$ is allowed in input voltage range from 120 V AC to 270 V AC.
- 4.1.7 Electric power supply at 415 volt, three phase, four wire, 50 Hz. to be tapped from the lighting panel / or 230 V will be available at each pole foundation.
- 4.1.8 The electric power shall be distributed to the lighting poles through electric cables and shall be distributed equally on three phase of the electric power supply system.
- 4.1.9 Wherever required and suiting to aesthetic value Individual control fuse with junction box shall be provided on each poles. The junction box shall be weather proof (IP-66, IK-10), having gasketed lockable hinged cover.
- 4.1.10 The light poles shall be earthed individually with coil type earth station using 8 SWG G.I wire.
- 4.1.11 Electric cable required for the street lighting installation shall be 1100 volt grade, PVC insulated and sheathed, armoured cable having stranded Al/Cu. conductor of rating as mentioned in the drawing / BOQ.
- 4.1.12 Technical details of the fixtures IP & IK etc should be clearly mentioned in catalogue on website. Any deviation in the technical criteria must be supported by test from UL or ERDA lab and must be presented at the time of tender submission
- 4.2 LED LUMINAIRES:
- 4.2.1 High power and high lumen efficient LEDs suitable for following features shall be used:
- a The working life of the lamp at junction temperature of 110 Deg. Centigrade for 350 mA to 700 mA current shall be more than 50,000 hours of accumulative operation and shall be suitable for continuous operation of 24 hours per day .these features shall be supported with datasheet. After 50,000 burning hours, the luminaire intensity shall be at least 70%.
- b Adequate heat sink with proper thermal management shall be provided.
- c Color temperature of the proposed white color LED shall be 3000k – 3500 k.
- d The direct output of LED shall be more than 115 lumen per watt at minimal operating current and shall ensure guaranteed operation life of 50,000 burning hours with Controlled junction temperature of 110 Deg. Centigrade.
- e System Efficiency including all LED, driver electronics etc. shall be more than 85%.
- f Power factor of complete fitting shall be more than 0.95.
- g The driver card shall withstand 440V and shall resume normal working when nominal voltage is applied again.
- h Thermal management shall be designed in such a way that the LED junction temperature shall not exceed beyond 40 Deg. Centigrade over ambient temperature. Design ambient conditions are mentioned above in the specifications.
- i The manufacturer will have to submit the LM-79, LM-80, L70 and B50 life expectancy performance reports to support the above compliance.
- j LEDs should be fitted with wide angle low glare and high transmittance lenses and zero upward light ratios with full cut off beyond 80°.

- k Ambient Operating temperature - 10°C to + 50°C.
- l The system should also be provided with suitable protections against voltage peaks/ surges.
- 4.2 LIGHTING POLES / CONSTRUCTION
- 4.2.1 DECORATIVE LED STREET LIGHT LUMINAIRE
- 4.2.1.1 The quality and performance is expected to be of EN60598-1 CEI 34-21 (European) standards & degree of protection should be according to EN 60529 European standards.
- 4.2.1.2 Street light fitting should Providing Street light pole bracket consisting of "B" Class MS .pipe of 4.2 cms. outside dia. complete with suitable MS sleeve tubing of required size and length suitable for 76.5mm/80mm/require size of pole top having nuts and bolts for fixing the brackets and having spread of 0.5 mtr. Length with 110 deg. with vertical plane and suitable welded stiffener reducer and nipple with check knut complete painted with one coat. of Red oxide / PU base primer and two coats of Aluminum / PU paint. paint The luminaries shall be generally having direct type but low glare considering public promenade.
- 4.2.1.3 Street light pole shall be tropicalised for local conditions as defined in the specifications above and vendor shall guarantee the performance requirements are met as per defined in the tender documents.
- 4.2.1.4 The luminaire housing shall be completely made of pressure die cast aluminum with higher thermal conductivity, corrosion resistant pressure die cast body with suitable epoxy powder coated / PU painted. The color in general shall be Dark Grey / Graphite Black.
- 4.2.1.5 The luminaire complete with LED section, Optics etc shall be dust and Weather proof (Min IP-66) protection as per IEC – 60529.
- 4.2.1.6 The complete assembly along with optics and diffuser shall be Vandal proof; minimum of IK-08 protection is required for post top luminaires. The diffuser shall be made from high quality, UV stabilized and Non-Yellowing Polycarbonate / PMMA.
- 4.2.1.7 The street lightluminaire shall be suitable for direct mounting on pole bracket
- 4.2.1.8 The gasket shall be EPDM or Silicon Rubber Gaskets only; all screws shall be Allen-Key type or requires special tools for opening of the housing / control gear box and shall be of Stainless Steel.
- 4.2.1.10 The base compartment (Control Gear Compartment) shall be provided with wooden back board and enough space to terminate 4 Core 16 Sq. mm Aluminum Armored cable with loop in and loop out multi way connectors strips; 2 A DP MCB along with the Driver fixed on the wooden back board, 2 nos. Earthing Studs etc
- 4.2.1.11 The compartment door shall be secured with tamper resistant special bolts requiring special tools and shall be provided with suitable gasket to comply with IP 66 requirements.
- 4.2.1.12 The pole shall be complete with all mounting accessories, switchgear and connector strips.
- 4.2.1.13 The poles shall conform to the drawings and where such drawing is not available, the contractor shall make such drawing and have it approved before fabricated.
- 4.2.1.14 The poles shall be PU painted; the color of the paint shall match the post top luminaire with 2 coats of epoxy primer applied before painting.
- 4.2.1.15 The luminaire lumen output shall be enough at minimum system wattage so as to cover

- wide area.
- 4.2.1.16 The luminaire Color Temperature to be as per datasheet.
- 4.2.1.17 Vendor to submit the detailed calculation for lux level with uniform distribution including the lux distribution curve /graph/spatial distribution with dimension.
- 4.2.1.18 Supplier will be solely responsible for testing and performance compliance of the luminaries after installation and shall also ensure the specified and uniform illumination and comfort level on the horizontal plane at plaza level.
- 4.3 CABLE LAYING (NOT APPLICABLE)
- 4.3.1 Electric cable for the street lighting installation shall follow specification under the heading "L.T XLPE cable".
- 4.3.2 Cable shall be terminated in a 4-way terminal block inside the pole or to the attached junction box as shown on drawings.
- 4.3.3 Cable route shall be as shown on the drawings or the contractor shall mark out the route and lay the cables only upon approval of the route.
- 4.3.4 Cable laying shall be done with excavation, backfilling of trench with sand & bricks at bottom & top.
- 4.4 EARTHING
- 4.4.1 All light fixtures and poles shall be earthed as specified under section "EARTHING".
- 4.4.2 Earth electrode shall be of 8 SWG coil type and shall otherwise meet to the specification given under heading "Earthing".
- 5.0 INSTALLATION OF SYSTEM
- Lighting installation shall be carried out as per details shown in the drawing.
- The poles shall be erected in perfect plumb with concrete foundation at a location shown in the drawing. The foundation shall be designed to withstand the static load as well as wind velocity and bending moment of the pole and shall be approved by the client prior to execution.
- The civil foundation will be provided by Civil Contractor. The Cables will be provided at the foundation; based on the distribution luminaire vendor to install the pole and connect the power and earthing cables.
- The luminaries shall also be installed on the pole and be electrically wired to the respective driver at base compartment..
- Earthing installation shall follow the details for the same shown in the drawing.
- On completion of the installation, the street light poles shall be painted with two coats of metal primer (Red Oxide) followed by two coats of Synthetic enamel of the shade as approved by the Engineer-in-charge.
- 6.0 DRAWING & INFORMATION
- 6.1 On award of the contract, the contractor shall submit the fully dimensioned general arrangement drawings complete with plan, elevation and sectional views. As built drawing should be submitted indicating cable rout, exact position of light fixtures.
-

7.0 INSPECTION & TESTING

Test certificate should be produced for IR test carried out on all LT cables and panels. All the lamps should be controlled as per required control logic. Operation of timer, contactor circuits should be tested.

Tests are classified as:—

- 7.1 Prototype test
 Type test
 Acceptance test
 Routine test.

Report of actual Lux level should be submitted.

8.0 METHOD OF MEASUREMENT

- 8.1 Supply, Installation, connection, testing and commissioning of each light fitting with lamp, control gear, earthing etc. shall be considered as one unit for measurement and payment.

Supply, installation, connection, testing and commissioning of each lighting pole, concrete coping/foundation, base plate, junction box/access panel, internal connection from fuse to the light fixture with 2.5 mm.² copper conductor wire, earthing etc. shall be considered as one unit for measurement and payment.

All cabling work shall be measured on the basis of unit length and the cost shall include, cost of cable, excavation, laying, back filling, cable terminations and connection in junction box or pole terminal box etc.

9.0 TEST

- i) Visual and Dimensional Check:

The unit shall be checked visually for all dimensions as per approved design and drawing. General workmanship should be good; all the components properly secured and sharp edges shall be rounded off. Check the marking and quality of the workmanship visually. Check the rating and make of electronic / electrical items.

- ii) Checking of documents of purchase of LED
 iii) Check Document of purchase of LED lamps of approved sources
 iv) Resistance to humidity test

This is carried out by suspending the painted panels in corrosion chamber maintained at 100% RH and temperature cycle of 42 to 48 deg. C for 7 days and examining it for any sign of deterioration and corrosion of metal surface.

- v) Insulation resistance test

The insulation resistance of the unit between earth and current carrying parts shorted together shall not be less than 2 M when measured with 500V megger.

- vi) HV test

Immediately after insulation resistance test, an AC voltage of 1.72 KV RMS (1500 + 2x rated voltage) of sine wave form of 50 Hz shall be applied for one minute between the live parts and frame. There shall not be any kind of break down, flashover or tripping of supply.

- vii) Over voltage protection

The Luminaire shall withstand at 300V AC for two minutes.

- viii) Surge protection

It shall withstand a surge of 1.5kV 3% for 50 microsecond's 20 % at the input terminals for all types. (Tests shall comply with Clause 5.4 of latest IEC 60571-1).

ix) Temperature rise Test:

Temperature rise Test shall be conducted at 180VAC with full load. The temperature rise shall be recorded by temperature detectors mounted at the specified reference points on the body of semiconductors, capacitors and other components as agreed between purchaser and manufacturer. The maximum-recorded temperature under worst conditions shall be corrected to 55°C and compared with maximum permissible temperature (for power devices at junction). Under loading conditions as specified above, the corrected temperature of the power devices shall have a safety margin of minimum 100 °C.

Temperature at junction shall not exceed 100 °C when corrected to 55°C. The Luminaire shall also be subjected for short time rating after continuous loading to ensure the temperature rise is within the permissible limit. The maximum temperature rise of the electronics devices on the PCBs shall be in limit for industrial grade components suitable for 85°C environment.

x) Ra (Colour Rendering Index) measurement test

The lumen is the unit of luminous flux, which is equal to the flux emitted in a solid angle of one Steradian by a uniform point source of one candela.

The initial reading of the chromaticity co-ordinates x & y shall be within 5 SDCM (Standards Deviation for Colour matching) from the standardised rated value as per Annex. D of IEC 60081 - 1997.

The initial reading of the general colour-rendering index (Ra) shall not be less than the rated value decreased by 3.

The lumen maintenance of the lamp shall not be less than 80% of the initial lumen after 20000 burning hours and 70% of the initial lumen after 50000 hours. The initial lumen will be taken after 100 hours aging.

Photometric test shall be conducted as per annexure B of IEC 60081-97.

The lumen maintenance test shall be done as per annexure C of IEC 60081-97.

xi) Lux measurement

Lux measurement with the help of Lux meter shall be done at a distance as shown above. Value obtained shall not be less than the Lux specified in the table therein, considering 10% Lumen is absorbed by the reflector.

xii) Fire retardant Test

Fire Retardant test shall be conducted as per IEC 332-1 of the wire used in the fittings.

xiii) Test for IP66 protection

This test shall be conducted as per IEC

xiv) Environmental tests

The Luminaire shall meet the following tests as prescribed in IEC – 60571.

- a) Dry heat test.
- b) Damp heat test
- c) Test in corrosive atmosphere
- d) Combined dust, humidity and heat test
- xv) Reliability Test

The reliability can only be determined in actual service. However, the following tests shall be carried out on the prototype to simulate as close as possible, the service conditions. There shall be no failure during this test.

- a) The light unit shall be mounted in an oven maintained at 75°C. b) The light will be operated at the specified maximum voltage and at 75°C for a period of 100 hours.
- xvi) Life Test

The lumen maintenance & life test shall be done as per annexure C of IEC 60081-97.

xvii) Endurance Test

The Luminaire shall be kept "ON" with input voltage of 250VAC for 200 hours. After this the Luminaire is subjected to 20,000 cycles of "ON" and "OFF", each cycle consisting of 3 seconds "ON" and 10 seconds "OFF" period. Luminaire should survive this test. Test is to be continued for one lakh cycles, followed by Performance test.

xviii) Safety:

The Luminaire shall comply with the safety requirements as per IEC 61195.

9.0

TRANSPORT, DELIVERY & STORAGE

The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location or site store.

9.1

All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

10. GUARANTEE & WARRENTY

The Bidder shall stand un-conditional guarantee for the performance of entire luminaire equipment and control gear components with LED lamp for 5 years from the date of commissioning

NOTE :

1. For all IS/ISI standards, the latest applicable revisions shall be applied.
2. For CPCB / GPCB, Latest Norms will be applied.

APPROVED VENDOR LIST

CIVIL MATERIAL MAKE LIST		
SR. NO.	ITEMS	MAKE/BRANDS
1	Cement	Ultratech, Ambuja, Sanghi, Siddhi, Wonder, J K Laxmi, Hathi (53 / 43 Grade)
2	High Yield Strength Deformed steel bars Thermo mechanically treated (TMT) / Structural steel	(Fe-500/500D) Tata, SAIL, RINL, JSW, Electrotherm, National, RINL, Mono Steel India Ltd. ,Gallantt metal Ltd., bhagyaLaxmi Rolling mill Pvt. Ltd., Zalanani "polaad"
3	Mild steel structure	Tata, SAIL, RINL, JSW, Electrotherm, National, RINL
4	Vitrified tiles	Orient, Kajaria, Jhonson, Nitco, Somani, Bell, Asian or Euro
5	Telephone Black granite	With metallic ringing Sound (Approved by Architect or engineer in charge)
6	Dark original green Udaipur marble, Khatu Stone	Without any stain or color coating (Approved by Architect or engineer in charge)
7	Glazed tiles	Orient, Kajaria, Jhonson, Nitco, Somani, Bell, Asian or Euro
8	Aluminum Section (Powder coated)	Jindal, Banco, Hindalco
9	Acrylic emulsion plastic Paint	Nerolac, Asian, ICI, Berger
10	Weather shield max paint	ICI, Asian apex ultima, Dulux
11	Sanitary fittings	Cera, Hindware, Perryware, Nicer, Duravit, Jaguar
12	PVC or UPVC fittings	Astral, Supreme, Prince, Finolex
13	PTMT fittings	Prayag, Wilson
14	PVC (Triple layer coated) water tank	Sintex, Super
15	Construction chemicals	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
16	Door-window fittings & fixtures	Brass-sonal make c.p. heavy section
17	Wood	100% natural (pure) seasoned wood
18	Ply wood	Century or Anchor
19	Glass	Saint gobain , Modi, AIS,
20	Ready mixed concrete	Ultratech / Lafarge
21	Rebars	Hilti, Fisher
22	Binding Wires	Galvenised coated wire
23	Epoxy Joints	Laticretes, Pidilite, Mapei
24	Veneer / Laminates	Century, Greenlam
25	FRP Frame and Shutters	Sintex or equivalent approved by Consultant
26	Aluminium Section	Jindal, Hindalco, Banco

27	Lapi / Putty	JK White, Birla
28	SS Pipes	Grade 316, Jindal or its equivalent
29	Sanitary fittings	Jaguar, Cera, Hindware, Hindustan
30	Toilet fittings	Cera, Hindware, Perryware, Nicer, Duravit, Jaguar
31	Water Proofing Cool Gaurd	Panas, Cembo
32	Concrete Admixture	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
33	Waterproofing to Terrace or Sunken Slab	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
34	Special Repairs Job including Polymer Mortar, Protective Coating, Injection Grout, Micro Concrete, Crack filling etc.	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
35	Anchor Grouts	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
36	Foundation Grouts	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
37	Construction and Expansion Joint Sealant	Basf, Fosroc, Roff, Perma, Sunanda, Sika, OR equivalent
38	Paver Block	Anjani Cement Articals, Laxmi Tiles, Shree Arihant Precast Products, Vyara Tiles Pvt. Ltd, Krishna Precast, Bansal Buidling Material Pvt. Ltd., Kismat Tiles & Flyash Product
39	Precast Kerb	Anjani Cement Articals, Laxmi Tiles, Shree Arihant Precast Products, Vyara Tiles Pvt. Ltd, Krishna Precast, Bansal Buidling Material Pvt. Ltd., Kismat Tiles & Flyash Product

NOTE ON APPROVED VENDOR LIST: -

1. Equipment's/ items for which no make is specified, approval shall be obtained from both Consultant and Client prior to supply. Contractor will have to propose Minimum three vendors for such item, right to selection/rejection of particular make offer by contractor is with consultant and client.
2. Various options are given in the above vendor's list. However, choice as to the selection of particular make will rest to both Consultant and Engineer-in-Charge.
3. No deviation in the make list shall allowed.

SIGNATURE OF THE CONTRACTOR.

Date :- - -2026

Electrical Make List		
Sr. No.	Item	Make
1.	Wiring Accessories	SOR Category - III
2.	Switchgear & DB	SOR Category - III
3.	Wires and Cables	Any ISI
4.	Lift	KONE, Schindler, Mitsubishi
5.	Concealed Pipes	FIA approved and ISI
6.	Ceiling Fan	BEE (5 star rating)
7.	Glands and lugs	HMI, MCI and Dowels
8.	Pump	SOR Category-III
9.	Starter	L&T, Siemens, Crompton
10.	Lighting Items	SOR Category-III
11.	Measuring Instruments	Enercon, Meco, Rushabh
12.	Air condition	BEE (5 Star rating)
13.	Panel Fabricator/Builder	CPRI Approved only
14.	Automatic liquid level controller	Electro Power

Sr. No.	Item	Approved Make	Make Offered By Contractor
1	Modular Switches &Accessoires	Legrand, Schneider, MK,Ancohor,allwyn,pointer,vinay,alex, promot	
2	Rigid PVC Pipe, Junctions, Fan Box & Other Conduit Accessories	Precesion, Nihir, Finolex, polycab,	
3	Flexible Wires & Flexible Cables	R.R. Kable, Havell's, Finolex, KEI, Polycab	
4	ARMOURED CABLES & UNARMOURED CABLES	Finolex, Torrent, Havells, KEI, RR kabel, Bharat CAB ,CCI, UNIVERSAL,INCAB, GLOSTER, TORPODURE	
5	Ceiling Fan, Wall Fan	Havells, Crompton, Khaitan	
6	Exhaust Fan	Almonard, Havells, Crompton, Khaitan	
7	LED Batten (Box Type Tube Light)	Philips, Osram, Havells.	
8	LED Panel, Down Light, Decorative Suspended Light, Profile Lighting, Decorative Low Bay, Decorative Hanging/Pendent Light	Philips, Osram, XAL, GE,	
9	LED Rope Light/ LED Strip	Havells, Bajaj, Osram, Philips	
10	LED Street Light	Philips, Keselec Schreder, Osram, Havells	
11	Decorative LED Urban Street Light	Philips, Keselec Schreder, Osram, Havells	
12	Tree Uplighter, Bollards, Wall Mounted Up-Down Light, Spike Light, Step Light	Philips, Keselec Schreder, Osram, Thorn, Bega, Fiberly,	
13	Underwater Light Fixture (Static & RGB)	Philips, Osram, Keselec Schreder, Fiberly,	
14	Distribution Boards, ELCB & MCBs	Legrand, Schneider, Hager, Siemens,havells, l&T,ABB	
15	IP66 Junction Box	Hansel, Legrand, Schneder	
16	LT Panel	CPRI Approved Following Vendors	

17	LT Switchgear, ACB, MCCB, Changeover	Legrand, Schneider, Hager, Siemens, L&T, ABB	
18	Power & Control Panel accessories	Trinity, Nippen, Standard, L&T, Elico, Legrand, Schneider, Siemens	
19	Time Switch	Siemens, Schneider, Legrand, Hager, L&T	
20	Digital Meters	Rishabh (L&T), Conzerve, HPL, Enercon, Krycard, Yocogava, Abb, Siemens,	
21	Selector Switch	L&T, Keycee, Salzer, Siemens, Jyoti	
22	C.T (Cast Resin)	Ashmor, Kappa, Jyoti, ABB, Silkana, Gilbert, Precise, L&T	
23	LED Indicating Lamp	Raas Control, Teknik, Vaishno, Binay,Esbee (L&T),	
24	Push Button	Siemens, Raas Control, L&T, Binay, ABB, Schneider	
25	LT Cables (Copper & Aluminium)	R.R. Kable, Havells, Finolex, KEI	
26	Cable Gland	Jaison, 3d, Commet, HMI	
27	Lugs & Sockets	Dowells, Ismal, 3d, Jaison	
28	Maintenance Free Earthing & BFC	Ashlok, Elink	
29	Public Address & Evacuation System	Bosch, Bose, Philips, Yamaha, Sony, Atlass Sound	
30	ELV Cables (HDMI, VGA, RCA)	Kramer, QED, or as approved by consultant& Client	
31	Lift	Kone,schindler,otis,Mitsubishi,Thyssenkrupp, Trio,Techno,Omega,Johnson,Orbis	
32	D.G Set	Engin : Cummins,Greaves,kirloskar,Caterpillar Alternator : Crompton,KEC,Stamphord	
33	C.C.T.V System And DVRs (Camera System)	Bosch,Pelco,Sensormatic,Zicom,Sony,Hik Vision	

34	Pumps set	Cromton,Kirlosker,Lubi	
35	Liquid Level Controller	GELCO, OCLEG, C&S, BCH, Siemens	

NOTE ON APPROVED VENDOR LIST: -

1. Equipment's/ items for which no make is specified, approval shall be obtained from both Consultant and Client prior to supply. Contractor will have to propose Minimum three vendors for such item, right to selection/rejection of particular make offer by contractor is with consultant and client.
2. Various options are given in the above vendor's list. However, choice as to the selection of particular make will rest to both Consultant and Client.
3. No deviation in the make list shall allowed.

QUALIFICATION CRITERIA

The qualification process will lay high emphasis on the ability and competency of bidders to do high quality work within the given time schedule. The following criteria along with other conditions/criteria shall be applicable to Bidder.

- Bidder must possess valid electrical contractor's license, issued by concerned department of state government of Gujarat.
- Minimum "B" Class or above Registration in any department of the government namely JPWD/ MES/ CPWD/ SMC or any other municipal corporation.

GENERAL SPECIFICATIONS

1. WIRING RULES :

The installation generally shall be carried in conformity with the Indian Electricity Act/Rules and the latest edition of the wiring rules of the Installation of Electrical Engineer (London) but where this specification differs from those rules the specifications shall be followed.

2. DEFINITION :

The definition of terms the I.E.C. wiring rules shall apply.

3. PRESSURE AND FREQUENCY :

The supply will be three phase 50 cycles A.C. 4 wire system 415 volts between phase, and 230 volts between phase and neutral and apparatus required shall be suitable for this supply.

4. SYSTEM OF WIRING :

Wiring for lights, fans wall sockets, refrigerators and bells shall be carried out as described in the items and details shall be confirmed with the specification herein.

5. All wiring must be done on the distribution system with main and branch distribution board at convenient centres and without isolated fuse. All conductors shall be run as far as possible so as to be easily accessible and capable of being inspected. Facility for maintenance shall be particularly provided for and blanking of circuits carefully arranged.

6. CONDUCTORS :

All conductors shall be of copper as set for in the I.E.C. wiring rules 11th edition and no insulated conductor shall have cross section less than of 1/0.044 and every such conductor of greater gross section shall be standard.

7. FALL OF POTENTIAL :

The cross sectional area of all conductor inside the building shall be so proportioned to their loads that the drop in pressure between the main fuses and the nearest consuming appliance shall not exceed 2% with all devices in use.

8. CIRCUITS :

No final lighting or fan circuits from a distribution in boards shall carry more than 3 amperes of 6 points and as far as possible the loading shall be arranged so as to obviate the necessity of using various sizes of fuse wires on sub-circuits.

9. TESTS :

The installation with fittings complete shall before current is switched on satisfactorily pass the following test.

- (a) All the lamps and appliance having been connected to the conductors and all switches and fuses be (ON a pressure not less than twice the working pressure) (subject to a limit of 500 volts) shall be applied and the installation resistance of the whole or any part of the installation to earth must be less in megohms than 25 divided by the number of points.

10. JOINTS :

All joints in conductors shall be made by means of approved mechanical connector in suitable approved joints boxes but as far as possible looping back shall be adopted.

11. SWITCHES :

- (a) All main switches shall be of quick make and break combined switch and fuse, ironclad type of reliable make and subject to approval.
- (b) All branch switches controlling not more than 5 amperes shall be of quick and break, push button or tumbler pattern and shall be 'NO' when the knob is down, the attachment of covers to

the base of the switch must be by means of machine screws. All fan and wall socket shall provided with controlling switches.

12. DISTRUBUTION BOARDS :

All distrubution boards shall be fitted with hard grin pattern Home Office Type procelain fuses (one on positive side of circuit, the neutral being connected to a common bus bar of copper in such away that the circuit can be easily isolated from the distribution boards) of substantial make and atleast of 5/10 Amp. capacity poecelain 5 amp. round cut-outs will not be allowed to be used as fuse holder. All distribution boards shall be fitted with the wall enclosed in box of approved pattern (to be supplied by the contractor) when concelled system is adopted and on polished folding Type Teakwood blocks with cover in the case of open wiring in each case the pattern shall be submitted to the Engineer-in-charge for approval. Load on each floor shall be distributed on required distribution boards.

13. CELLING ROSES AND SOCKETS :

Celling roses and wall sockets shall be of reliable make and subject ot the approva. The subspension of the flexible wire for light pendants shall be so executed that the weight of the pendant will not be carried by the terminals of the ceiling rose.

14. LAMP HOLDERS :

Lamp holders for use on brackets shal have not less than a half inch female nipple. All cases must be solid and substantial and of bayonet pattern. Pendent lamp holder shall have a good grips fitted on them so as to carry the weight of the pendent.

15. INTERCHANGE ABILITY :

Similiar parts of all the switches, lamp holders, ceiling rose, brackets, pendants and all other fittings of the same type shall be interchangeable.

16. CONDUIT TO BE CONTINUOUS :

Conduit shall be of rigid P.V.C.

17. BUNCHING OF WIRES :

The wires of a circuit must be each together in a conduit.

18. JOINTS IN CONDUIT :

The lengths of conduit shall be jointed by means of adhesive solution.

19. PRECAUTION AGAINST INSECTS AND DAMP :

All cutlets of conduit system shall be properly drained and ventilated but in such a manner as to prevent the entry of insects.

20. PROTECTION OF CONDUIT :

The conduits and fittings shall be joined by means of ahdesive solution.

21. CONDUCTOR :

All conductors used in in conduit wiring shall be standard confirming to I.S. 694 1988 Part -II

22. ERECTION AND EARTHING OF CONDUIT :

Conduit shall be electrically continuous through out and shall be permanently and efficiently connected to earth by means of solied or standard copper wire having a cross sectional area not less than that of No. 8 S.W.G. in conduit system the pipe must be continuous when passing through wall of 1 floor and earthing shall extend to the metal frame of all mainand branch switches and distribution boards. Gas pipes must not be used for obtaining and earth connection.

23. EARTH WIRE AND PLATES :

The earthing wire and the connection with earth shall be of 8 SWG G.I. as per specified instructed by Engineer-in-charge and shall be so constructed and laid as to avoid the formation of any electronic couple. all earthing wired shall be efficiently protected against mechanical damages.

24. PASSING THROUGH WALLS :

The conductor shall be carried in an approved heavy gauge solid drawn or lapwelded conduit tube or porcelain ducts. Where a wall tube passes outside a building so as to be exposed to the weather, the other end shall be bellmouthed and turned down wards.

25. PLUGGING WALLS :

Plugs for ordinary walls or ceiling shall be of well seasoned teak wood not less than two inches long by one inch. Square on the inner and three fourth inch square on the outer or they shall be cemented into the walls to within one fourth inch of surface used with plaster or line putting to give the cement hold the plugs, two counterboards not less than half inch diameter, one inch deep must be provided on each of the two opposite sides. Iron screw may be used for attaching battens to the plugs. Where owing to **IRREGULAR COURING OR OTHER REASONS THE PLUGGING OF THE WALLS IRREGULAR PRESENTS DIFFICULTIES BATTONS OR CONDUIT SHALL BE ATTACHED TO THE WALLS OR CEILING IN AMANNER APPROVED BY THE ENGINEER-IN-CHARGE.**

25. ATTACHMENT TO WALLS AND CEILINGS :

In the case of lead covered or Cab-Tyre Shethed system the conductors shall be fixed on varnished teak wood battans not less than half inch in thickness by means of metal clips (of approved make) spaced at intervals of not more than 4.1/2 inches. The clips shall be fixed to T.W.battans by means of brass screws or pins set level with the surface of the clips. Pawl plug may be used for fixing battans to walls and ceiling, but only taper T.W. plugs (see clause 24) shall be used for fixing T.W. base blocks for switches regulator and ceiling rose.

26. ATTACHMENT OF FITTINGS AND ACCESSORIES :

All ceiling roses, wall socket switches, regulators, brackets, pendants and accessories attached to wall or ceiling shall be mounted on substantial teak wood varnished blocks having solid backs not less than quarter inch thick. All accessories shall be fixed to such base blocks by means of brass screw.

27. PASSING THROUGH FLOORS :

All wires passing through floors shall be efficiently protected by means of metal or T.W. covering box extending not less than 8 fts. above floor level conduit or porcelain tubes shall be used for lading the wires though the floor.

28. FITTINGS :

No wire shall be buried directly in plaster.

29. FITTINGS :

Fans, regulators, lighting, fixtures etc. whether supplied by the employer or conductor shall be erected in position by the contractor in such manner as not expose any unsightly fittings necessary for suspension from the ceiling or walls, and in conformity with the surrounding architectural design.

30. RATING :

The rating of consuming devices unless indicated on the drawings will be as follows :-

Ceiling Fans	150 Watts.
Desk fans	80 „
Lights	60 „
Wall sockets	80 „

31. LOCATION OF CONTROL BOARDS :

The control boards shall be fixed in consultation with the Engineer-in-charge.

32. All makings on the switches and distribution boards shall comply with Rule 510 of Indian Electricity Act.
33. All control switches shall be located as far as possible on walls.
34. In wiring work should be used approved by I.S.I.

SIGNATURE OF THE CONTRACTOR.

EXECUTIVE ENGINEER
SOUTH ZONE-A (UDHANA)
SURAT MUNICIPAL CORPORATION

GENERAL

1. Meters for power points, light and fan points shall be separate mains shall be brought to the position indicated on the planned the line shall be taken there from to the distribution boards on various floors.
2. Electric company's charges for bringing the main cables to position indicated together with the connection for meters are payable by the S.M.C.
3. It will be the responsibility of the contractor to get power connection form supplying company. The application and all respective forms shall be signed by the contractor & service connection, applicable charges shall be paid by the corporation. The Corporation will not take over the possession of dwelling units unless permanent electric connection is received and the entire installation is energized.
4. The contractor having electric contract license of Gujarat State shall only be eligible to tender.

SIGNATURE OF THE CONTRACTOR.

EXECUTIVE ENGINEER
SOUTH ZONE)-A (UDHANA)
SURAT MUNICIPAL CORPORATION

I have tendered after studying the above specification.

Signature of the Contractor:-

Address:

Date:-

SPECIFICATION OF MATERIAL

WIRES & CABLES : FINOLEX/L & T /HAVELLS/R.R.CABLES

ARMOURED CABLES : TROPODURE/INCAB/TORRENT/FINOLEX/UNISTER/GLOSTER/CCI/BHARAT CAN/ABOCAB/HAVELLS.

UNARMOURED CABLES : TROPODURE/INCAB/TORRENT/FINOLEX/UNISTER/GLOSTER/CCI/BHARAT CAN/ABOCAB/HAVELLS/R.R.CABLES

WIRING ACCESSARIES CRABTREE, M K INDIA(LOGIC),ANCHOR(ROMA),JAINEX,STRACCO

MCB /DISTRIBUTION BOARDS : SEIMENS/INDO KUPP/MDS/HAVELES/HAGER/STANDARD/SCHINEIDLER/ABB

I here by agree to supply as above make materials of your choice.

Date :-

Signature of the Contractor.

SPECIAL CONDITION

- (1) Point wiring shall be from the distribution fuse board, No sub main shall be measured.
- (2) Samples of materials shall be given to Engineer-in-charge and approval should be taken in writing before its use.
- (3) Fabrication drawing should be get approved from the Engineer-in-charge prior to Manufacturer.
- (4) Pipe laying lay out shall be as per instruction given by Engineer-in-charge.
- (5) There shall be no junction in wiring out let box shall be used after bond.
- (6) Electrical contractor shall make good the civil work if chased or damaged.
- (7) Electrical Engineer-in-charge opinion shall be final and binding on contractor.
- (8) Qualified labour and supervisors shall work at site.
- (9) Electrical Contractor shall not permit unqualified labour contractor to work at site. He shall observe Govt. rules regarding control of labour. He shall submit test report and carry out tests as required and furnish detailed drawings on completion of work. The responsible authorised person by the contractor should be available at site daily when work is in progress.
- (10) The Electrical appliance-materials shall bear the ISI mark or declaration indicating manufacturer's names and appliances material used having been manufactured in accordance with the manufacturer's certificate issued by the Government of Gujarat and confirming to the standard specified by the I.S.I. shall be given by the contractor.
- (11) Entire work shall be conforming to IS where ever not specified.

The conditions laid down under House Hold Electrical appliances (Quality control Act 1981) shall be followed.

The Contractor shall provide test report and get the installation approved from Govt. Elect. Authority is required.

CONTRACTORS STAMP AND SIGNATURE.

SPECIAL CONDITION

- (1) Point wiring shall be from the distribution fuse board, No sub main shall be measured.
- (2) Samples of materials shall be given to Engineer-in-charge and approval should be taken in writing before its use.
- (3) Fabrication drawing should be get approved from the Engineer-in -charge prior to Manufacturer.
- (4) Pipe laying lay out shall be as per consultants drawings.
- (5) There shall be no junction in wiring out let box shall be used after bond.
- (6) Electrical contractor shall make good the civil work if chased or damaged.
- (7) 50% payment shall be paid to the contractor on delivery of material at site, either of bill value or item rate which is less, in case of open PVC conduit wiring.
- (8) 30% of item rate shall be paid on laying of pipes. 50 % on completion. 10% after 30 days of final take over of the installation date. 10 % shall be paid after 365 days from the date of take over of installation, in case of concealed.
- (9) Electrical Engineer-in-charge opinion shall be final and binding on contractor.
- (10) Qualified labour and supervisors shall work at site.
- (11) Electrical Contractor shall not permit unqualified labour contractor to work at site. He shall observe Govt. rules regarding control of labour. He shall submit test report and carry out tests as required and furnish detailed drawings on completion of work. The responsible authorised person by the contractor should be available at site daily when work is in progress.
- (12) The work shall be carried out during working days between 8.00 A.M. to 6.00 P.M. only. The cable trench should not remain open for more than 24 hours after excavation. If contractor intends to work on holiday or outside working hours specified, he shall take prior permission from the Engineer-in-charge. In that case overtime to the staff shall have to be paid by the Contractor. The Electrical appliance-materials shall bear the ISI mark or declaration indicating manufacturer's names and appliances material used having been manufactured in accordance with the manufacturer's certificate issued by the Government of Gujarat and conforming to the standard specified by the I.S.I. shall be given by the contractor.

The conditions laid down under House Hold Electrical appliances (Quality control Act 1981) shall be followed.

I/We agree to carry out the above work at rates indicated above at _____ percentage above/below the rates indicated above i.e. I/We agree to carry out the above work at a total cost of Rs. _____ .

The Contractor shall provide test report and get the installation approved from Govt. Elect. Authority is required.

CONTRACTORS STAMP AND SIGNATURE.

Note: The applications for electric meter for individual and common facilities shall be done by the contractors. All the deposits shall be paid by Contractor in the name of Surat Municipal Corporation for availing electric meters / transformers & other related activities. The original receipts shall be submitted to SMC.



SURAT MUNICIPAL CORPORATION

SOUTH ZONE- A (UDHANA)

Tender (Online) Notice No. DMC/SZ-A/03/2026-27, Work No.: -04

TENDER FOR

Work Name	Construction of Garden developement at T.P.48 (Bhestan) in F.P.77, South Zone-A (Udhana). (2nd attempt)
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Checklist for the Bidder

Sr. No.	Particulars	To be Submitted with Tech-bid		Please Mark as ✓ for Submission
		File to be Attached Online	Hard Copy Submission	
1.	Earnest Money Deposit/Tender Fee as specified elsewhere in the tender document.	YES	DD/PO	
2.	Certified copy of Registration/valid GST registration and Copy of Income tax PAN	YES	NO	
3.	Certified copy of Professional Tax Registration (EC /RC)	YES	NO	
4.	Digitally Signed Partnership Agreement/ Partnership Deed/ Power of Attorney/ Board Resolution in case of Semi Government / Government Organization for bidding the Tender Documents etc (If Applicable) (PDF file to be uploaded with Tech Bid.)	YES	NO	
5.	Certified copies of Experience, namely Work Orders and/or Certificates of satisfactory completion from Respective Authorities	YES	NO	
6.	Latest Bank Solvency certificate of the Current Year from Bankers of Nationalized/ Scheduled bank (Valid for Not less than 4 Months from date of Tender Opening), having minimum value equal to 20 % of the total estimated cost of Tender. (i.e 20% of 34.89 lacs)	YES	NO	
7.	Certificate from Chartered Accountant, showing the average annual financial turnover of last three years. (PDF file to be uploaded with Tech Bid.)	YES	NO	
8.	Last Three Years Income Tax Clearance Certificate	YES	NO	
9.	All the Documents Required as per the Check list of Tech. bid / Attached Annexure with the tender	YES	NO	
10.	Affidavit of the Annexure-A, Non Blacklist Contractor (To be given on the authorized amount of stamp paper approved by Government of Gujarat with Applicable Article signed by authorized notary)	YES	YES	
11.	List of Technical Personnel	YES	NO	
12.	Addenda Corrigendum (s) duly Sealed / Signed (If Applicable)	YES	YES	

Note:- All the above mentioned documents must be colored scanned and notarized with clearly displaying stamp, number and name of the notary. Moreover, all of the above mentioned documents along with supporting documents shall be submitted in electronic format only. Only Documents [Earnest Money Deposit, Tender fees, Affidavit, Addenda Corrigendum (s) duly Sealed / Signed (If Applicable)] shall only be submitted in HARD COPY to Surat Municipal Corporation by all bidders.