

RAJKOT MUNICIPAL CORPORATIONa
SOLID WASTE MANAGEMENT

CONSTRUCTION OF MSW REFUSE TRANSFER STATION WITH SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF MACHINERIES / EQUIPMENTS, TRANSPORTATION OF COMPACTED MSW FROM TRANSFER STATION TO TREATMENT / LANDFILL SITE AND SETTING UP OF MATERIAL RECOVERY FACILITY INCLUDING OPERATION & MAINTENANCE OF WHOLE SYSTEM FOR THE PERIOD OF 05 YEARS AT MOTA MOVA FOR RAJKOT MUNICIPAL CORPORATION.

E- TENDER
TENDER NOTICE NO: RMC/SWM/2026-27/03

Volume - II

TECHNICAL BID

RAJKOT MUNICIPAL CORPORATION

1 CONTRACT/TENDER FORM

Name of Work : CONSTRUCTION OF MSW REFUSE TRANSFER STATION WITH SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF MACHINERIES / EQUIPMENTS, TRANSPORTATION OF COMPACTED MSW FROM TRANSFER STATION TO TREATMENT / LANDFILL SITE AND SETTING UP OF MATERIAL RECOVERY FACILITY INCLUDING OPERATION & MAINTENANCE OF WHOLE SYSTEM FOR THE PERIOD OF 05 YEARS AT MOTA MOVA FOR RAJKOT MUNICIPAL CORPORATION.

1. To be Submitted by Tenderer/Bidder during the prescribed hour at the Office of the environment engineer, Room No. 03, 3rd floor, Rajkot Municipal Corporation, Dhebar Road, Rajkot

2. Earnest money of **Rs. 27,82,000/-** should be paid along with tender as under

Full amount of earnest money shall have to be paid by demand draft of any Nationalized Bank/Scheduled Bank, payable at Rajkot in favor of The Municipal Commissioner, Rajkot Municipal Corporation only. **The earnest money deposit of successful tenderer shall be released to Contractor only after successful submission of Initial Security Deposit (As mentioned in Clause – 1).**

3. Payment for mechanical component shall be as mentioned in chapter 'specification of mechanical component' under head "Stage of payment for Supply Part".

4. Total Security Deposit for Capital work: **10 % of tender amount** (refer clause 01 condition of contract)

5. Penalty for delay for Capital work: Zero Point two percent (0.2%) of the contract price per day maximum up to ten percent of the contract price.

6. Defect liability period shall be 01 (one) year after successful completion of work

7. Pre-Bid Conference: 01/07/2026 up to 11:30 hrs. at
Office of the environment engineer, Room No. 03, 3rd floor, Rajkot Municipal Corporation, Dhebar Road, Rajkot.

8. Tenders will be opened [tech. bid covers] in the presence of the tenderers who choose to remain present in the office of tender opening officer.

9. The last date of submission of the tender (in Hard Copy) is **18/07/2026, 18:00 Hour.**

10. Validity period of tender offer 120 days from the last date of submission of price – bid.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

**RAJKOT MUNICIPAL CORPORATION
PERCENTAGE RATE TENDER AND CONTRACT FOR WORKS**

2 GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS

1. All work proposed to be executed under this contract shall be notified in a form of invitation to tender Posted online / in newspapers / nprocure website / or in the Municipal Corporation Office and signed by the Officer authorized by the Municipal Commissioner.

This form will state the work to be carried out, as well as the date for submitting and opening of the tender, earnest money to be deposited with the tender, and the amount of security deposit to be deposited by the successful tenderer and the percentage, if any to be deducted from bills. Copies of the specifications, designs, drawings and estimated rates, schedule rates and any other documents required in connection with the work which will be signed by the Environment Engineer, Solid Waste Management Department (Rajkot Municipal Corporation), for the purpose of identification shall also be opened for inspection by Contractors at the Office of the Solid Waste Management Department during office hours.

2. In the event of the tender being submitted by a firm, it must be signed by each partner thereof, and in the event of the absence of any partner, it shall be signed on his behalf by a person holding a power-of-attorney authorizing him to do so.
3. Receipt for payments made on account of any work when executed by a firm, should also be signed by all the partners, except where the contractors are described in their tender as a firm in which case the receipts shall be signed in the name of the firm by one of the partners, or by some other person having authority to give effectual receipt for the firm.
4. Any person who submits a 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 work. Tenders which propose any alteration in work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, will be liable to rejection. Tenders shall have the name and the number of the works to which they refer written outside the envelope.
5. The Municipal Commissioner or his duly authorized assistant will open tenders in the presence of any intending contractors who may be present at the time and will enter the amounts of the several tenders in a comparative statement in suitable form. In the event of a tender being accepted, the contractors shall there upon, for the purpose of identification, sign copies of the specifications and other documents mentioned in Rule 1. In the event of a tender being rejected the deposit will be refundable on application.
6. The Rajkot Municipal Corporation shall have the right of rejecting all or any of the tenders without assigning any reasons there of.
7. No receipt for any payment alleged to have been made by a Contractor regard to any matter relating to this tender or the contract shall be valid and binding to the Municipal Corporation unless it is signed by the Environment Engineer (Rajkot Municipal Corporation).
8. The memorandum of work to be tendered for and the schedule of materials to be supplied by the Municipal Corporation and their rates shall be filled in and completed by the office of the Solid Waste Management Department before the tender form issued. If a form issued to an intending tenderer has not been so filled in and completed, he shall request the said office to have this done before he completes and delivers his tender.

9. All work shall be measured net by standard measure and according to the rules and custom of the Solid Waste Management Department of Rajkot Municipal Corporation 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 shall, if so desired by the Municipal Commissioner, produce along with his tender a banker's certificate of his financial stability. If he fails to produce such a certificate his tender will not be considered.
12. All corrections and additions or pasted slips should be initialed.
13. The measurements of work will be taken according to the usual method in use in the Solid Waste Management Department and no proposals to adopt alternative methods will be accepted.

The Municipal Commissioner's decision as to what is the "usual method in use, in the Solid Waste Management Department will be final".

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

3 CONTRACT AGREEMENT FOR

CONSTRUCTION OF MSW REFUSE TRANSFER STATION WITH SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF MACHINERIES / EQUIPMENTS, TRANSPORTATION OF COMPACTED MSW FROM TRANSFER STATION TO TREATMENT / LANDFILL SITE AND SETTING UP OF MATERIAL RECOVERY FACILITY INCLUDING OPERATION & MAINTENANCE OF WHOLE SYSTEM FOR THE PERIOD OF 05 YEARS AT MOTA MOVA FOR RAJKOT MUNICIPAL CORPORATION.

Articles of agreement made this _____ day of the month of _____ 2026. Between the Municipal Commissioner of Rajkot Municipal Corporation (which expression shall include his successors and assignees of one part) and _____ hereinafter called the contractor (which expression shall include their administrator and assignees of the other part).

Whereas the Contractors above named tendered for the works above mentioned and the same having been accepted by the Standing Committee of the Municipal Corporation vide Resolution No. _____ dated _____; it is hereby agreed that the Contractor should carry out the works according to the terms and conditions of the contract detailed in the percentage Rate Tender Books, - conditions and specifications, which have been signed by the contractors on.

In witness whereof the said Contractors and the Municipal Commissioner on behalf of the Rajkot Municipal Corporation have hereinto set their respective hands this _____ day of the month of _____ of the year 2026.

Signed, sealed and delivered by the said contractor in the presence of

1. _____

2. _____

**Environment Engineer
Rajkot Municipal Corporation**

Signature of the Contractor with seal

4 PERFORMANCE SURETY BOND

As per RMC Stander formate

**IMPORTANT POINTS TO BE BROUGHT TO TENDERER'S NOTICE
THE TENDER MAY BE REJECTED OUTRIGHT IF THE TENDERER**

- A] Stipulates the validity period less than what is stated in the form or tender.
- B] Stipulates his own conditions.
- C] Does not quote his rates inclusive of all taxes excluding GST as may be applicable in his rates.
- D] Does not disclose the full names and addresses of all his partners in the case of partnership concern.
- E] Does not fill in and sign the tender form as well as the bill of quantities and rates, annexure, specifications etc.
- F] Does not pay the Earnest Money Deposit as specified in the tender
- G] Does not submit the tender before the stipulated time on the specified date in the specific office as directed.
- H] Does not attach required technical and financial documents, annexures and certificates with the tender as specified in the tender
- I] Does not submit the enlisted documents (duly attested) along with the technical bid cover, over and above the documents enlisted above.

5 GST CLAUSE

FOR CONSTRUCTION / ERECTION / COMMISSIONING / INSTALLATION / REPAIRS MAINTENANCE / RENOVATION / FABRICATION OF STRUCTURE INCLUDING BUILDING (MEANS ALL WORKS CONTRACT / TURNKEY PROJECT / SUPPLY OF MATERIAL / GOODS)

1. 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. However, all the quoted rates must be excluding GST.
2. 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 RMC, subject to the submission of original Receipt / Proof for the amount actually remitted by the successful Tenderers/ 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, RMC may recover the amount due, from any other payable dues with RMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard. Further the non payment of the GST to the Government may lead to the termination of contract and forfeiture of Security Deposit /Performance Guarantee Amount.
3. If 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 contractor / successful Bidder only, in no case RMC shall be liable for the same.
4. The Contractor will submit the invoice to the RMC having GSTIN of RMC mentioned therein and the taxes shall be shown separately on the face of the invoice so as to claim as ITC by RMC.
5. The Construction labour welfare cess shall be deducted from R.A. bill & Final of the contractor at the prevailing rate. The current rate of labour cess is 1% of the capital amount.
6. All the prevailing taxes (i.e. GST) in the tender shall remain to the contractors account and it shall not be reimbursed / recovered. However, the variation in the prevailing GST structure shall be recovered / reimbursed.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

6 CONDITIONS OF CONTRACT

Clause 1:

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 10 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 Municipal 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.

Security Deposit for Capital Work:

Sr. No.	Security Deposit & Retention Money	Description for payment and release.
1	5% of Capital work (Civil + Mechanical) amount of quoted rate as Security deposit	Contractor shall provide in the form of FDR/BG in favour of the Municipal Commissioner, Rajkot on any Nationalized Bank / Schedule bank / Banks mentioned in RMC circular Bank / Schedule bank/Banks mentioned in RMC circular, payable at Rajkot only. 5% will be released after Completion of Civil and Mechanical Work and after due clearance from Environment Engineer (Solid Waste Management Department) of RMC without any interest. The amount will be paid as per the payment terms and condition of Rajkot Municipal Corporation.
2	5% from each RA Bill as Retention Money. Rajkot Municipal Corporation reserves the rights to increase or decrease Percentage for Deduction of Retention Money.	Retention money shall be refunded only after completion of defect liability period of 1 year and after rectifying the defects found, if any, within defect liability period and after due clearance from Environment Engineer (Solid Waste Management Department) of RMC without any interest as intimated by Rajkot Municipal Corporation.

Note: - Release of Any kind of Performance Security will be subjected to that any defect if found shall have to be rectified /complied as per the direction given by Engineer in Charge, within the said periods and after due clearance from Audit Department of Rajkot Municipal Corporation.

Security Deposit for Operation and Maintenance:

For operation and maintenance contract, contractor shall have to sign separate contract.

Sr. No.	Security Deposit & Retention Money	Description for payment and release.
1	5% of 1st year of Operation and Maintenance contract amount as Security deposit.	<p>Contractor shall provide in the form of FDR/ BG in favour of the Municipal Commissioner, Rajkot on any Nationalized Bank / Schedule bank / Banks mentioned in RMC circular Bank / Schedule bank/Banks mentioned in RMC circular, payable at Rajkot only.</p> <p>5% will be released after Completion of O&M Contract The security deposit for operation and maintenance work will be released after completion of O&M contract, handing over site inclusive of civil, mechanical, electrical, and other component in working condition and after completion of relevant procedures as per the terms and conditions of Rajkot Municipal Corporation. Moreover, clearance from Environment Engineer (Solid Waste Management Department) of RMC shall be obtained for releasing of security deposit amount.</p>
2	Additional Security Deposit to be deposited by contractor each year from 2 nd Year to 5 th Year.	<p>Deficit amount of SD = (Estimated contract amount of next year x 5%) – SD of previous years as per the work order.</p> <p>The amount will be released after completion of O&M contract, handing over site inclusive of civil, mechanical, electrical, and other component in working condition and after completion of relevant procedures as per the terms and conditions of Rajkot Municipal Corporation. Moreover, clearance from Environment Engineer (Solid Waste Management Department) of RMC shall be obtained for releasing of security deposit amount.</p>
3	5% from each RA Bill as Retention Money. Rajkot Municipal Corporation reserves the rights to increase or decrease Percentage for Deduction of Retention Money.	<p>Retention money amount will be released after completion of O&M contract, handing over site inclusive of civil, mechanical, electrical, and other component in working condition and after completion of relevant procedures as per the terms and conditions of Rajkot Municipal Corporation. Moreover, clearance from Environment Engineer (Solid Waste Management Department) of RMC shall be obtained for releasing of security deposit amount.</p>

In addition to above as and when directed additional security deposit as indicated **Unbalanced Offer** Clause, also will be required to be deposited in event of RMC demanding the same because it finds the offer unbalanced. Notwithstanding anything to the contrary contained in this Agreement, the Parties agree that in the event of failure of the Contractor to provide the Security Deposit in accordance with the provisions and within the time specified therein or such extended period as may be provided by the RMC, in accordance with the provisions, the RMC may en-cash the EMD and appropriate the proceeds thereof as Damages, and thereupon all rights, privileges, claims and entitlements of the Contractor under or arising out of this Agreement shall be deemed to have been waived by, and to have ceased with the concurrence of the Contractor, and this Agreement shall be deemed to have been terminated by mutual agreement of the Parties.

- If the Contract price offered by the selected bidder is lower than 10% but up to 20% of the estimated project cost then the additional performance security shall be calculated @ 20% of the difference in the Estimated project cost minus 10% of the estimated project cost and Contract price offered by the selected bidder.
- If the Contract price offered by the selected bidder is lower than 20% of the estimated project cost then the additional performance security shall be calculated @ 30% of the difference in the Estimated project cost minus 10% of the estimated project cost and Contract price offered by the selected bidder.

If contractor fails to remit the security deposit within 15 days from the date of work order, then penalty at the rate of 0.065% per day of the amount of security deposit will be charged. If the security deposit is not paid within one month with penalty, necessary actions as per the conditions of contract will be taken as per the norms of RMC. To levy penalty charges or not will be under the rights and sole discretion of Rajkot Municipal Corporation.

BG shall be valid till final date of completion of work (Whether final bill is audited and paid or not). It shall be contractor's responsibility to extent the BG On or Before expiry of time limit of BG. (i.e. Final date of completion of work). In case of late renewal of BG, penalty of security deposit shall be levied at the rate of 0.065% of per day of BG amount.

- The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of Rs. 300/- if initial Security Deposit paid in form Bank Guarantee or Demand draft as per the form of the agreement approved by the Municipal Corporation, Rajkot.
- If initial Security deposit is paid in form of Fixed Deposit, additional stamp paper amounting @ 4.90% (OR as per RMC's prevailing rules and regulations) 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/-.

Clause 2:

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the Contractor and shall be reckoned from the date on which the order to commence work is given to the Contractor. The work shall throughout the stipulated period of the contract be proceeded with, all due diligence [time being deemed to be the essence of the contract on 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 in 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 in memorandum 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.

Clause 3:

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 installments] or in the case of abandonment of the work owing to serious illness or death of the contractor or any other cause, the Municipal Commissioner on behalf of the Municipal Corporation shall have power to adopt any of the following courses, as he may deem best suited to the interest of the Municipal Corporation.

- a) To rescind the contract [of which rescission notice in writing to the Contractor under the hand of the Municipal 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 the Municipal Corporation.
- b) To employ labour paid by the Solid Waste Management Department 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 the Environmental Engineer (Solid Waste Management) 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 Environmental Engineer (Solid Waste Management) 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 executed out of his hands, and to give it to another Contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original Contractor, if the whole work had been executed by him [as to the amount of which excess expenses the certificate in writing of the Environmental Engineer (Solid Waste Management) shall be final and conclusive] be borne and paid by the original Contractor and shall be deducted from any money due to him by the Municipal Corporation under the contract or otherwise from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.

In the event of any of the above courses be adopted by the Municipal Commissioner the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchases or procured any materials or entered into any engagements or made any advances on account of or with a view to the execution of the work or the performance of the contract. And in case the contract shall be rescinded under 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 Environmental Engineer (Solid Waste Management) 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 be paid the amount so certified.

Clause 4:

If the progress of any particular portion of the work is unsatisfactory the Municipal 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 days' notice in writing and the Contractor will have no claim for compensation for any loss sustained by him owing to such action.

Clause 5:

In any case in which any of the powers conferred upon the Municipal Commissioner by clause 3 and 4 hereof shall have become exercisable and the same shall not have been exercised the non-exercise thereof shall not constitute a waiver of any of the conditions hereof 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 and the liability of the Contractor for past and future compensation shall remain unaffected.

In the event of the Municipal Commissioner taking action under the sub-clause (a) or (c) of clause 3, he may, be he so desires 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 Environmental Engineer(Solid Waste Management) whose certificate thereof shall be final. In the alternative the Municipal Commissioner may, by notice in writing to the Contractor or his clerk of the works, foremen or other authorized agent require him to remove such tools, plant, materials, or stores from the premises within a time to be specified in such notice; and in the event of the Contractor failing to comply with any such requisition, the Municipal Commissioner may remove them at the Contractor's expense or sell them by auction or private sale at the risk and account of the Contractor in all respects and certificate of the Environmental Engineer (Solid Waste Management) as to the expense of any such removal, and the amount of the proceeds and expense of any sale shall be final and conclusive against the Contractor.

Clause6:

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 Municipal Commissioner within 30 days from the date on which he was hindered*** as aforesaid or on which the cause for asking for extension occurred and the Municipal 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 Municipal Commissioner in this matter shall be final.

Clause 7:

On the completion of the work the Contractor shall be furnished with a certificate by the Environmental Engineer (Solid Waste Management) 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 materials and rubbish, and dispose of the same as he thinks fit and clean off such dirt as aforesaid; and the Contractor shall forthwith pay the amount of all expenses 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.

Clause 8:

No payment shall be made for any work, estimated to cost less than Rupees one thousand, till after the whole of the said work shall have been completed and a certificate of completion given. But in the case of 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 work 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 payments shall be regarded as payments by way or advance against the final payments only and not as payments for work actually done and completed and shall not preclude the Engineer-in-charge from requiring bad, unsound imperfect or unskillful work to be removed and taken away and reconstructed, or re-erected, nor shall any such payments be considered as an admission of the due performance of the contract or any part thereof in such 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 to the measurement and of the total amount payable for the work shall be final and binding on all parties.

Clause 9:

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 and 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:

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, the Engineer-in-charge may depute a subordinate to measure up the said work in the presence of the Contractor or his duly authorized 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.

Clause 11:

The Contractor shall submit all bills on the printed forms to be hand 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.

For Mechanical part**For Supply part:**

The Agency may place the order; however, the Supplier shall deliver the machines to the site only after physical completion of 60% of the civil works. The Supplier must ensure supply, installation, testing, and commissioning of all RTS mechanical equipment within three months thereafter. The machine supplied before completion of 60% of Civil Work will not be accepted by RMC at RTS. All the expense and liabilities of the machine will be of contractors if mechanical components are delivered before schedule as mentioned. The agency will get 80 % of payment out of 100 % after the delivery and verification of machines at **Mota MovaRTS site with all necessary clearance from relevant**

agencies. However, Rajkot Municipal Corporation may release part payment against invoice for purchase of machineries by agency. Rajkot Municipal Corporation & / OR its inspecting agencies may visit vendor's premises and verify delivery of machineries at vendor's premises. 10% payment will be released after satisfactory working of machineries at full load **for one month from date of starting of operation and maintenance period** and submitting certificate from PMC / TPI Agency at **Mota Mova RTS site**. 10% amount will be paid after satisfactory working of machineries at full load **for three months from date of starting of operation and maintenance period**.

Stages of Payment for Supply Part shall be as under:

Stage	Description	Payment to be made	Payment
1	On Purchase and supply of equipment at site of machineries against invoice.	After the product is delivered at site. For Chassis, the payment will be released after invoice is submitted to RMC.	80%
2	On Installation Testing and Commissioning of machineries at MOTAMOVA RTS.	After satisfactory working of machineries at full load for one month from date of starting of operation and maintenance period.	10%
3	Remaining 10 % of payment	After satisfactory working of machineries at full load for one year from date of starting of operation and maintenance period.	10%
TOTAL PERCENTAGE OF PAYMENT			100%

Necessary deduction for SD, retention money, applicable taxes, and duties shall be made from payable amount.

For operation and maintenance part:

The payment will be done every month as per the payment terms and conditions of Rajkot Municipal Corporation. Bidder shall submit Vehicle Tracking System report and weigh bridge data report generated at RTS & disposal site of each machine/vehicle and GPS records provided by the agency for each machine/vehicle along with each RA Bills submitted. If any discrepancies in both details are observed, decision of Environmental Engineer shall be final. The agency shall have to submit the receipt showing daily operation of vehicles. No manual or hand written receipt shall be accepted.

VTS report and weigh bridge data report shall be submitted by contractor as per the format approved by engineer in charge/consultant. The contractor shall make provision for presence of requisite manpower during national holidays and festivals so that the work is not affected. The corporation will make no separate payments for working on holidays, national holidays and festivals. The contract price will be as quoted in schedule B and will be inclusive of all expenses necessary for the continuance of the services under the contract. Such expenses include but not restricted to payments to RTO, Labour Authorities, Local and Municipal Authorities, Semi Govt. or any charges, deposits, dues, taxes, oil, fuel, lubricants, levies, total taxes, octroi duty, labour welfare, cess etc., connected with the service.

The Rate shall be increased every year as shown in the table below.

SR. NO.	YEAR	INCREMENT
01	Year – 1	Quoted price = A
02	Year – 2	B= A x 1.05
03	Year – 3	C= B x 1.05
04	Year – 4	D= C x 1.05
05	Year – 5	E= D x 1.05

The amount quoted in price bid will be multiplied with the increment figure in the table above in each year to arrive at the rates payable in the relevant year.

Base year (1st year) for increment shall be applicable on commissioning of compaction and transportation of MSW.

Clause 12:

If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the RMC 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 the 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 from the security deposit or the proceeds of sale thereof shall be held 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 the 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 department 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.

Clause 13:

The Contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner, and both as regards materials and 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 expenses to make or cause to be made copies of the specifications and of all such designs, drawings and instructions on aforesaid.

Clause 14:

The Engineer-in-charge shall have power to make any alterations in, or additions to the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and the Contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Engineer-in-charge and such alteration shall not invalidate the contract, and any additional work which the Contractor may be directed to do in the manner above specified as 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 the Rajkot 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 the 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 the 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 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 a 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 Municipal 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. The time limit for the completion of work shall be extended in the proportion that the increase in its cost occasioned by alterations or additions the cost of the original contract work, and the certificate of the Engineer-in-charge as to such proportion shall be conclusive.

Clause 15A:

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 herein under, 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, 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, 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 aforesaid.

Clause 15 B:

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

- i] Difficulties relating to the supply of railway wagons and availability of Government controlled materials.
- ii] Force Majeure.
- iii] Act of God.
- iv] Act of the Nation's enemies or any other reasonable cause beyond the control of the Municipal Corporation.

In the cause of such delay in the supply of materials the Municipal Corporation shall grant such extension of time for the completion of the work as shall appear to the Municipal Commissioner to be reasonable in accordance with the circumstances of the case. The decision of the Municipal Commissioner as to the extension of item shall be accepted as final by the Contractor.

Clause 16:

The Contractor is to set out and level the work and will be responsible for the accuracy of the same. He is to provide and maintain measuring and surveying instruments including steel tapes, the theodolite and dumpy level at all times for proper carrying of the work and for the use of the Environmental Engineer (Solid Waste Management) and his representatives including skilled attendance.

Clause 17:

The Contractor is to cover up and protect the works from the weather and is to suspend all wet operations during such weather which, in the Environmental Engineer (Solid Waste Management) opinion, will be detrimental to the work.

Clause 18:

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

Clause 19:

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.

Clause 20:

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.

Clause 21:

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 structure 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 Environmental Engineer (Solid Waste Management).

Clause 22:

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 the Municipal Corporation

Clause 23:

Under no circumstances whatsoever shall the Contractor be entitled to any compensation from the 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.

Clause 24:

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 then notwithstanding the fact that the work, materials or articles complained of may have been inadvertently passed, certified and paid for, the Contractor shall be bound forthwith to rectify, or remove and reconstruct the work so 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 estimate for every day not exceeding ten days, during which the failure so continues and in the event of any such failure as aforesaid the Engineer-in-charge may rectify or remove and re-execute the work or remove and replace the materials or articles complained of 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 Municipal 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.

Clause 25:

All works under in cause 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 authorized agent shall be considered to have the same force and effect as if they had been given to the Contractor himself.

Clause 26:

The Contractor shall give not less than five days' notice in writing to the Engineer-in-charge or his subordinate in charge of the work before covering up or otherwise placing beyond the reach of measurement any work 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.

Clause 27:

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 becomes apparent in it within the Defect liability period mentioned above by the 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 the 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.

The defect liability period would be **One (01) year** for whole works from the certified date of completion of the works as per various clauses of above. During this period, the contractor shall be responsible to make good, working condition and remedy at his own expenses, any defects, which may develop or may be notice for the work carried out by him or due to reasons attributed to him. The Engineer-in-charge shall give the contractor a notice in writing about the defects with remedial measures and the contractor shall make good the same within period specified in the notice. In case of failure, on the part of the contractor to carry out the instructions of Engineer in charge, the Engineer-in-charge may rectify or remove and re-execute, replace the work at the risk and cost of the contractor. The Engineer-in-charge shall be entitled to recover/deducted appropriate the whole or any part of the amount of security deposit for defect liability period towards the expenses.

Clause 28:

The Contractor shall supply at his own cost all materials [except such special materials, if any, as may be supplied from the R.M.C. Stores in accordance with the contract. Plant tools, appliance implements, ladders, cordage, tackle, scaffolding and any temporary works which may be required for the proper execution of the work, in the original; altered or substituted from, and whether included in these specification or, other documents forming part of the contract or referred to in these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage there for, to and from the work, the Contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works and counting, weighing, and assisting in the measurement of examination at any time and from time to time of the work or 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.

Clause 29:

The Contractor shall make his own arrangements for drinking water for the labour employed by him.

Clause 30:

Compensation for all damage done intentionally or unintentionally or by the Contractor's laborers whether in or beyond the limits of the Municipal Corporation property shall be estimated by the Engineer-in-charge or such other office as he may appoint and estimates of the Engineer-in-charge subject to the decision of the Municipal Commissioner on appeal be final and the Contractor shall be bound to pay the amount of the assessed compensation on demand failing which the same will be recovered from the Contractor as damage from the security deposit or deducted by the Engineer-in-charge from any sum that may be due or become due from the Municipal Corporation 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 and he shall also pay any damages and cost that may be awarded by the court in consequence.

Clause 31:

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

Clause 32:

The contract shall not be assigned or sublet without the written approval of the Engineer-in-charge, and if the Contractor shall assign or sublet his contract or attempt to do so, or become insolvent or commence any proceedings to be adjudicated an insolvent or make any composition with his creditors, or attempts or attempt to do the Engineer-in-charge may, by notice in writing rescind the contract. Also if any bribe, gratuity gift, load, perquisite, reward or advantage, pecuniary or otherwise, shall either directly or indirectly be given, promised, or offered by the Contractor, or any of his servants or agents to any public officer or person in the employ of the 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 by 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 Municipal Corporation and 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.

Clause 33:

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

Clause 34:

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.

Clause 35:

All works to be executed under the contract shall be executed under the directions and subject to the approval in all respects of the Environmental Engineer (Solid Waste Management) who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

Clause 36:

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

Clause 37:

When the estimate on which a tender is made includes lump sums in respect of parts of the work the Contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same rates as are payable under this contract or such items or if the part of the work in question is not in the opinion of the Engineer-in-charge capable of measurement the Engineer-in-charge may 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 provisions of the clause.

Clause 38:

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

Clause 39:

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 construed to mean the work or works the contracted to be executed under or in virtue of the contract, whether temporary or permanent, and whether original, altered, substituted or additional.

Clause 40:

All quarry fees and royalties shall be paid by the Contractor. All octroi taxes shall also be paid by the Contractor according to the Municipal Corporation rules in force at the time and no refund shall be given.

Clause 41:

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. If such compensation is paid by government as principal under sub-section 12(1) of the said Act on behalf of the contractor, it shall be recoverable by government from the contractor under sub-section 12(2) of the said section. Such compensation shall be recovered in the manner laid down in clause 1 above.

Clause 42:

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.

Clause 43:

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

Clause 44:

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

Clause 45:

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

Clause 46:

i) No Contractor shall employ any person who is under the age of 15 years. If any contractor found employing person or persons under the age of 15 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.

- ii] No Contractor shall employ donkeys or other animals with breeching of string or thin rope. The breeching must be at least 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 at the site.
- iv] The Engineer-in-charge or his agent is authorized to remove from work any person or animal found working which does not satisfy these conditions and no responsibility shall be accepted by the Municipal Corporation for any delay caused in the completion of the work by such removal.
- v] The Contractor shall pay fair and reasonable wages to the workmen employed by him in the contract undertaken by him in the event of any 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 Environmental Engineer (Solid Waste Management) who shall decide the same.
The decision of the Environmental Engineer (Solid Waste Management) shall be conclusive and binding on the Contractor, but such decisions shall not in any way affect the condition in the contract regarding the payment to be made by the Municipal Corporation at the sanctioned tender rates.

Clause 47:

Payment to the Contractors shall be made by cheque drawn on any bank in Rajkot, provided the amount exceeds Rs. 10. Amounts not exceeding Rs.10 will be paid in cash.

Clause 48:

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

Clause 49:

The work contract tax shall not be paid to the contractor.

Clause 50:

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

Clause 51:

The following conditions 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 Municipal Corporation after payment of final bill shall be equal to 5% 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. 1,000/- 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.25,000/- such additional S.D. shall be recovered for the works amount to Rs. 5 Lacs or more at the rate of 5% 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 sections 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 finalizing the tender etc.

In such cases a fixed amount of Rs. 1,000/- should be recovered from the original contract towards the cost of advertisement and other administrative charges incurred by the department in finalizing 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.

Clause 52: DELETED

Clause 53:

A sum of earnest money mentioned earlier should be paid in demand draft only to the Municipal Commissioner. The amount will be forfeited in case after his tender is accepted, the contractor does not complete the contract documents and pay the amount of security deposit within the specified time as mentioned in clause 1 of condition of contract, otherwise it will be refunded. The Insurance Company's bond will not be accepted against the security deposit.

Clause 54:

The contractor will quote percentage rate for capital work and for O & M work per MT, both in words and figures. The final total as per the percentage and per MT -rates quoted shall also be given both in words and figures.

Clause 55:

No alteration in the form of quotation and in schedule of quantities and no additions in the shape of special stipulation will be permitted. Quotations which do not fulfill all or any of the above conditions or are incomplete in any respect are liable to be rejected.

Clause 56:

The tenderer must obtain for himself on his own responsibility and at his own expense all the information which may be necessary for the purpose of filling this tender and for entering into a contract for the execution of the same from the office of the Environmental Engineer (Solid Waste Management), Rajkot Municipal Corporation, Rajkot, during the office hours between 11:00 A.M. to 6:00 P.M. on weekdays except Sunday & Holidays and must examine the drawings and inspect site of the work and acquaint himself with all local conditions and matters pertaining thereto before submitting the tender.

Clause 57:

The rates quoted by the contractor shall include all eventualities such as heavy rain, sudden floods, ground water level of the site of work, etc. which may cause damage to the executed work or which may totally wash out the work. Until the completion certificate is issued to the contractors, RMC shall not be responsible for such damage or wash out to the construction work.

Clause 58:

Time is the essence of the contract. The capital work should be **completed within 1.5 Year (excluding monsoon)** from the date mentioned in the work order issued to the contractor to

commence the work. The contractor will not execute any item of road work during rain or monsoon period (Also for any other item of work to be executed during monsoon season period consent from engineer in charge is must. The successful contractor will have to give a schedule of the various items of work to be done so that the work is completed within the stipulated time.

Clause 59:

Rate for extra items, as far as possible will be derived from the quoted tender items. If it is not possible to do so, the same shall be carried out from the **R & B, S.O.R. Rajkot District 2024-25 ± Tender premium OR arrived at by adding 15% towards overhead and profits on the actual cost of labour, material and plant and machinery input as approved by the Engineer-in-charge.**

Clause 60:

In case of a delay in execution of work the penalty at the rate of **0.2% of contract value per day subject to the maximum of 10% of the contract value**, shall be payable by the contractor to the Municipal Corporation towards compensation.

Clause 61:

No claim for any extra or compensation for damage will be entertained on account of such variation, except where the quantity is increased by more than 30%. No claim for any extra or compensation for damages will be entertained on account of such variation where the quantity is decreased to any percentage or where the item is totally deleted.

Clause 62:

It should be noted that the contractor shall have to complete the work in stipulated time as per the terms of the contract. The Contractor shall submit complete CPM/PERT chart and get it approved within one month of the award of the work.

Clause 63:

The Contractor shall also arrange to obtain the license from the competent Authority under the contract labour (regulation and abolition) Act 1970.

Clause 64: DELETED

Clause 65:

The following additional information shall be forwarded by the tenderer along with the submission of the tender:

- a] A list of works of comparable nature executed, along with their value and time of completion.
- b] A list of works in hand showing the cost of the work to be completed against each with the certificate from the Head of the office concerned.
- c] A list of machinery in their possession and which they will bring for the proposed work.
- d] Solvency certificate without which such tenders are liable to be rejected. The Solvency certificate should be for the amount equal to 20% of the tender value of the work.
- e] Every contractor shall furnish along with the tender, information regarding income-tax the circle of the district in which he is assessed for income-tax the reference No. and year of assessment.

Clause 66:

Acceptance of tender will rest with the competent authority who does not bind himself to accept the lowest and reserves the right to reject any or all quotations/tenders and no reasons will be

given for acceptance or rejection thereof. The tenderers whose quotation is accepted will have to enter into a regular contract and abide by all rules and regulations embodied in the tender.

Clause 67:

The tender will be liable to be rejected outright, if while submitting it ---

- a] 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.
- b] Any of the pages of the tender are removed or replaced.
- c] In the case of percentage and per MT rate tender, the rates are not entered in ink in figures and words and the total of each percentage and grand total are not struck by the tenderer in ink in Schedule 'B' under his signature.
- d] Any errors are made by him in the tender.
- e] All corrections and additions or pasted slips are not initiated by tenderers.
- f] The tenderer or in the case of a firm each partner thereof does not sign or the signature/signatures is/are not attested by a witness on page of the tender in the space provided for the purpose.
- g] The tenderers which do not fulfill any of the conditions of those in the printed form and those tenders which are incomplete.

Clause 68:

The contractor has to make all arrangements for procuring the materials required on his own work.

Clause 69:

In case of any discrepancy with tender document the contractor may contact the Environmental Engineer (Solid Waste Management), Rajkot Municipal Corporation, Rajkot.

Clause 70:

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

Clause 71:

The contractor will have to construct shed for storing valuable materials at works site having locking arrangement. The material will be taken for use in the presence of the departmental person. No materials will be allowed to be removed from the site of works.

Clause 72:

Tender once accepted shall be binding on the contractor even if the formal agreement is not signed.

Clause 73:

Tender once offered cannot be withdrawn except with the express permission of the Municipal Corporation.

Clause 74:

The successful tender may be required to furnish surety of 10% of the contract value on stamp paper if so desired by the Municipal Commissioner.

Clause 75:

For all R.C.C. works such as Footings, Columns, Beams, Slabs, Chhajjas, Pardis, Lintels, etc., a 15 cm x 15 cm x 15cm sizes test cube as per the P.W.D. Standard will have to be taken by the contractor and as per instructions and directions of the Engineer-in-charge. These test cubes will be for 7 days and 28 days respectively. After 7 days, 28 days these test cubes will be tested in the Government approved laboratory by the contractor at his own expense and results will be submitted directly to the respective head of the department.

Clause 76:

The tender with all the pages should be furnished along with earnest money deposit, duly filled in and signed. No pages can be removed from the conditions of contract, specifications of drawings, otherwise it will be considered as an intentional fault and the tenderer will be liable for rejection and the amount of earnest money deposit forfeited.

Clause 77:

If the work executed is found to be of inferior quality or of any substandard quality not conforming to the specifications at any point of time during the inspection of by Engineer-in-charge or any Higher Authority, the contract shall be terminated assigning prior notices & reasons there off and no payment shall be made towards the probable damages or loss caused to the contractor and materials purchased by him for this work and no compensation whatsoever either shall be paid to contract by Municipal Corporation

Clause 78:

The Successful contractor shall take "all contract risk insurance policy" for the tendered cost of the work. "Work's man compensation policy" for all workers and labour of contractor and clients working at site and "Third party insurance policy" to fully cover all third-party type risk for the whole contract i.e. Construction, supply installation, testing and commissioning and Operation & maintenance of sewage treatment plant. The insurance policy so taken by the contractor for such purpose shall be in the joint name of the contractor and the client and the policy shall be deposited with the clients.

Clause 79:

The Contractor should note that the conditional tenders shall be out rightly rejected.

Clause 80:

Out of the amount payable/creditable to contractor's account, the Central Government/State Government tax/taxes shall be deducted at source in accordance with the relevant laws/rules from time to time prevailing.

Clause 81:

In no case, octroi exemption shall be granted for any of the materials or equipments brought by the contractor for execution of this work.

Clause 82:

Rajkot Municipal Corporation shall not provide 'C' Form for tax purposes.

Clause 83:

Star Rate for Steel and Cement shall be paid to the contractor as per the clause and calculation mentioned below.

PRICE VARIATION CLAUSE**APPLICABLE TO STEEL AND CEMENT USED FOR THIS PROJECT ONLY**

The contractor must make own arrangement for cement & steel required for the work.

No material to be supplied by RMC.

Star Rates for cement is Rs.300/- only per bag of 50 Kg.

The fluctuation in rates of cement shall be adjusted in the bills payable to the contractor as per the formula as under.

For Cement

$$V_c = B_c \times D_c \times (C_1 - C_0) / C_0$$

V_c = Difference of amount payable during the quarter under consideration due to change in the Rates for the cement.

B_c = Star rate of cement (Rs. 300/- per Bag.) As per **RMC SOR 2024-25**

D_c = Quantity of cement used/consumed during the quarter under consideration.

C_1 = The ave. whole sale price index for cement in all commodities as published by RBI for the Quarter under consideration.

C_0 = the ave. whole sale price index for cement in all commodities as published by RBI for the Month in which price bid were opened.

Note:-

1. The difference will be payable/ recoverable from the date of commencement of work as per calendar quarterly basis i.e. from Jan to March, April to June and so on.
2. No ceiling limit for the star rate difference payable/ recoverable for cement shall be applicable.
3. The quantity of cement consumed in the quarter shall be considered as per consumption recorded in the site cement register.
4. For calculating star rate difference for the cement for last quarter i.e. the actual cement consumed at site or cement bags to be consumed theoretically plus 5% whichever is less shall only be considered. No star rate difference shall paid beyond that. In short the ceiling limit for bags to be considered for payment of star rate shall be theoretical consumption plus 5% theoretical consumption of cement.

Star Rates for Steel is Rs.69000/- only per M.T.

The fluctuation in rates of Steel shall be adjusted in the bills payable to the contractor as per the formula as under.

For Steel

$$V_c = B_c \times D_c \times (C_1 - C_0) / C_0$$

V_c = Difference of amount payable during the quarter under consideration due to change in the rates for the cement.

B_c = Star rate of Steel (Rs. **69000/-** per M.T.) As per **RMC SOR 2024-25** by considering Rs. 15,000/- per MT labour work cutting, binding, bending, hooking work etc.

D_c = Quantity of steel used/consumed during the quarter under consideration.

C_1 = The ave. whole sale price index for steel in all commodities as published by RBI for the quarter under consideration.

C_0 = the ave. whole sale price index for steel in all commodities as published by RBI for the month in which price bid were opened.

Note: -

1. The difference will be payable/ recoverable from the date of commencement of work as per calendar quarterly basis i.e. from Jan to March, April to June and so on.
2. No ceiling limit for the star rate difference payable/ recoverable for cement shall be applicable.

3. The quantity of steel consumed in the quarter shall be considered as per consumption recorded in the site steel register.
4. For calculating star rate difference for the steel for last quarter i.e. the actual steel consumed at site or steel to be consumed theoretically plus 7.5% whichever is less shall only be considered. No star rate difference shall paid beyond that. In short the ceiling limit for steel to be considered for payment of star rate shall be theoretical consumption plus 7.5% theoretical consumption of steel.

Clause 84:

Same as Clause- 67.

Clause 85:

The final bill shall be paid only after the successful completion of the total work in all respect as directed by Engineer in charge.

Clause 86:

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 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 specified shall be an absolute waiver thereof. No commission by The Rajkot Municipal Corporation of any rights in respect thereof.

Clause 87:

The price to be paid by The Rajkot Municipal Corporation 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.

1. 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 within two (2) months in case of final bill, contractor shall present the bill duly pre receipted on proper revenue stamp.
2. Payment due to contractor shall be made by the 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 unauthorized person.

Clause 88:

The final bill of construction part shall be submitted by Contractor within the (2) months 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 finalized binding on all parties.

Clause 89:

Receipt for payment made on account of work when executed by a firm must be signed by a pension 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.

Clause 90:

When the contractor fulfils 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 along with such application for completion certificate. The Engineer-in-charge shall normally issue to contractor the completion certificate within 2 (two) months 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. Within 2 (two) months 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 cleared off from 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. Be thinks fit.

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.
- c) Certificate of final levels as set out for various works.
- d) Material appropriation statement for the materials issued by owner for work and list of surplus materials returned to The Rajkot Municipal Corporation a store duly supported by necessary documents.

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.

Final Certificate only Evidence of Completion:

Except the final certificate no other certificate or payments against a certificate or a 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.

Clause 91:

Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes, including sales taxes, duties, octroi etc. now or herein after imposed, increased or modified from time to time in respect of work and materials and all contributions and taxes for unemployment compensation, insurance and old age pension or annuities now or herein after imposed by Central or State Government authorities with respect to or cover and by the wages, salaries or other compensation paid to the persons employed by contractor. The contractor shall produce sales tax clearance certificate from the competent authority before payment of final bill. If the contractor is not liable to sales tax assessment a certificate to the effect from the competent

authority shall be produced without which final payment to the contractor shall not made. No "P", "e" or "O" form shall be supplied by the Municipal Corporation and the contractor shall be required to pay full sale tax as applicable. Contractor shall be responsible for compliance with all obligations and restrictions imposed by the labour law or any other law, affecting employer employee relationship. Contractor further agree to comply and to secure the compliance of all sub contractors with applicable Central, State, Municipal Corporation and local law and regulations and requirements. Contractor also agree to defend, indemnify and hold harmless the owner from any liability or penalty which may imposed by Central, State or local authorities by reasons of any violation by contractor or sub contractor or such laws, regulation of requirement and also from all claims, suits or proceedings that may be brought against owner arising under, growing out of or by reasons of work provided for by this contract by third parties or by Central or State Government. Authority or any administration sub division thereof. Though the Government of Gujarat has introduced sales tax on work contract whether it may be named as sales or works contract tax, no exact tax structure has yet been finalized by Government. In such circumstances, the Municipal Corporation shall pay such tax on the work executed by the contractor under this contract whether it may be named as sales tax or work contract tax if the same is levied by the Government at a later date and required to be paid by the contractor. Any kind of tax that is imposed by Central Government I State Government I Local body on later date, not prevailing at the time of inviting tender shall have to be borne by the contractor.

Clause 92:

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 Central 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 cut 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 of contractor's or sub-contractor's employees whose 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's account. Owner shall retain such sum as may be necessary from the contract value until the contractor shall furnish satisfactory proof that all contribution as required by the Employees' State Insurance Act 1948 has been paid.

2) Workman's Compensation and Employees Liability Insurance:

Insurance shall be affected 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 workman's 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.

Clause 93:

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 omission of contractor his employees, agent representatives or Sub contractors. Contractors shall indemnify and keep owner harmless of all claims for damage to properties other than The Rajkot Municipal Corporation's property arising under or by reasons of this agreement if such claims result from the fault and/or negligence or willful act of omission of contractor his employee's agent's representatives or sub-contractors.

Clause 94:

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 employee's 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 to pay 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.

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 The Rajkot Municipal Corporation under sec (12) sub section (2) of the said Act The Rajkot Municipal Corporation shall be at liberty to recover sub amount from any surplus due to the contractor or the security deposit. The Rajkot Municipal Corporation will not be bound to context 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.

The contractor shall protect adjoining sites against structural 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.

Clause 95:

Contractor shall comply with the provisions of the Apprentice Act 1964 and the orders issued there under 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.

Clause 96:

Safety requirement: Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with owners' safety rules and set forth 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 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:

Carrying striking matches' lighters inside the project area and 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-contractor employees in this regard.

(3) Scaffolding:

3.1 Suitable scaffolding shall be provided for workmen for all works that cannot 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 mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable foothold and hand holds 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 any 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 fastened as to prevent it from swaying from the building or structure.

(4) Maintenance of Safety Devices:

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 or work.

(5) Display or Safety Instructions:

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:

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 clauses, 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.O. safety code framed from time to time.

Clause 97:

The Contractor shall have to borne all the charges for testing and inspection purposes. The contractor shall have to bear the to and fro traveling allowances, dearness allowance of The Rajkot Municipal Corporation officials and /or Rajkot Municipal Corporation's consultants or Rajkot Municipal Corporation's other representatives as per prevailing rules and regulation of The Rajkot Municipal Corporation. If the contractor fails to do so, the amount will be deducted from R.A. bills.

Clause 98:

If the contractor fails to complete the work and theMunicipal Commissioner on behalf of the corporation takes actions so as to carry out the remaining work at the risk and cost of the original contractor by advertising the tender for the remaining work and the whole administrative process right from inviting the tenders to finalizing the tender etc. shall have to be repeated. For this a fixed

amount of RS.1000/- shall be recovered from the original contractor towards the cost of re-advertisement and other administrative charges incurred by The Rajkot Municipal Corporation in finalizing the contract for the remaining work. If however, separate advertisement is issued for the instant work, actual cost of advertisement shall be recovered. Such recovery shall be in addition to the recovery to be made under such other relevant clauses.

Clause 99:

Rate quoted shall inclusive of all applicable taxes from time to time as imposed by Central Govt or State Govt. such as IT, Labour Cess, Octroi etc. and any other tax imposed by government. No extra payment shall be made for any tax.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

7 SCHEDULE - B

TO BE FILLED IN ONLINE BY BIDDER

Note:

1. All works shall be carried out as per Government of Gujarat's P.W.D. Handbook and our specifications contained in technical bid document and as directed.
2. All the blanks in the Schedule-B for the quotation in percentage rate tender should be filled.
3. Rates quoted include clearance of site (prior to commencement of work and at its close before handing over) in all respects and hold good for work under all conditions, site, moisture, weather etc.
4. Contractor should put his seal and signature on each page of schedule –B.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

8 MEMORANDUM

1. General Description of Work: - CONSTRUCTION OF MSW REFUSE TRANSFER STATION WITH SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF MACHINERIES / EQUIPMENTS, TRANSPORTATION OF COMPACTED MSW FROM TRANSFER STATION TO TREATMENT / LANDFILL SITE AND SETTING UP OF MATERIAL RECOVERY FACILITY INCLUDING OPERATION & MAINTENANCE OF WHOLE SYSTEM FOR THE PERIOD OF 05 YEARS AT MOTA MOVA FOR RAJKOT MUNICIPAL CORPORATION.

2. Estimated Cost : - **Rs. 27,81,88,424.01/-**

3. Earnest Money Deposit : - EMD i.e. **Rs. 27,56,000/-** shall have to be paid by DEMAND DRAFT of any Nationalized Bank/Scheduled Bank payable at Rajkot in favour of the Municipal Commissioner Rajkot Municipal Corporation only.

4. Security Deposit : - As per clause 1— Condition of Contract
Release of SD : - As per Clause 1— Condition of Contract

5. Time allowed for the Completion of work
From date fixed in written
Order to commence : - For Capital Work-1.5 Year. (Excluding Monsoon)
-For O & M Work- 05 Years (Including Monsoon)

6. Compensation for delay 0.20 percent of work amount of the tendered cost of the whole work per day under Clause 2, Limited to maximum 10% of the Tender cost

7. The progress of the work should Confirm to the following schedule for capital work
10% of the work to be done in ____ 25% of the time.
40% of the work to be done in ____ 50% of the time.
70% of the work to be done in ____ 75% of the time.
100% of the work to be done in ____ 100% of the time.

8. Defect Liability Period : -01 year after successive completion of project (For Capital work).
-05 years after successive completion of O&M period.

9. Water Charges:- Contractor shall have to make his own arrangement of water supply. If Contractor wishes to have water from RMC, he shall have to inform RMC in written within 30 days from starting date of work, if available RMC by paying as per RMC norms.

10. The rate inclusive of : -All taxes including 1% labour welfare cess and all taxes prevailing on date of submission of tender, for O&M Rates and Construction but, not for Mechanical Component / part.
11. Price escalation : -The rate quoted shall be fixed and firm except any statutory tax variation.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

9 SPECIAL CONDITIONS OF CONTRACT

1. General Conditions:

1.1 Location of site & accessibility:

- i] Transfer station site for transfer of Municipal solid waste from primary transportation vehicle to secondary transportation vehicle at **MOTAMOVA** area is located within the jurisdiction of RMC.
- ii] Service roads are laid up to the site of the work. These will be available to the contractor subject to any limitations imposed by RMC.
- iii] The contractor shall have to obtain tokens for himself and obtain gate passes for removing any of his materials outside the premises. The contractors' people's entry and exit will be by main gate only.
- iv] Non availability of access roads or permits for entry of vehicles and equipment at any specific area shall in no case be the cause to condone any delay in the execution of the works or be the cause for any claims or extra compensations.

1.2 Scope of Work:

The contractors shall provide all necessary materials, equipment, labour etc. for the execution and maintenance of the work till completion unless otherwise mentioned in the tender documents. All materials that go with the work shall be approved by the Engineer-in-charge prior to procurement and use.

All RCC work more than 1 cum shall be done by only Ready-Mix Concrete without fly ash content under supervision of RMC.

1.3 Water Supply:

The contractors, however, shall have to make their own arrangements to get necessary water. In no case water will be supplied free of cost. If Municipal mains are not available nearby, the contractor shall have to make his own arrangements at his cost for potable water required for construction purpose by drilling own bore or using any other source as approved by Engineer-in-charge. The contractor shall inform the Engineer-in-charge in writing within 30 days from the date of work order along with test certificate regarding suitability of water for construction purpose. During the course of work, whenever directed by the Engineer-in-charge the contractor shall get the water tested and submit necessary test certificates. If in the opinion of Engineer-in-charge, the quality of water is not good for construction purpose, the contractor shall discontinue using water from the same source and arranging for another source of water.

1.3 Electric Supply for construction purpose:

The contractor shall make his own arrangements at his own cost for electric supply required for operating various plants and machineries required for the work and for general lighting purpose for site, office, labour colony etc. The energy bills shall also be paid by the contractor. Rajkot Municipal Corporation will issue No Objection Certificate to the contractor for getting electric supply for construction purpose. All possible assistance will be rendered for getting electric supply from PGVCL or Electric.Co. As the case may be however, it shall be the responsibility of the contractor to get the electric supply from the concerned authority.

2. Submission of Tender:

- 2.1 Downloaded Tender must be submitted without making any additions, alterations and as per details given in other clauses given here under. The requisite details shall be filled in by the

contractor in the tender documents. The percentage and per MT rates shall be filled in the given Schedules online in Price bid volume, tender condition and bills of quantity should be clearly brought out in a separate letter.

2.2 Addenda/corrigenda to these tender documents, if issued must be signed and submitted along with the tender documents.

The tenderer should write clearly the revised quantities in Bills of Quantity of tender documents and should price the work based on revised quantities when amendments for quantities are issued in addenda.

3. Documents

3.1 The Tenders as submitted will consists of the following:

- i] Complete set of tender documents as downloaded duly filled in and signed by the tenderer as prescribed in different clauses of the tender documents.
- ii] Declaration showing all works as similar types and magnitudes carried out and on hand with the contractor and the value of works that remains to be executed in each case must accompany the tender.
- iii] Demand draft or NEFT/RTGS or Online transfer of earnest money deposit must accompany the tender. Tenderer may pay earnest money in the form of a Crossed Demand Draft of a local bank drawn in favor of the Municipal Commissioner.
- iv] The contractor shall have to furnish Income Tax Clearance Certificate before his tender is accepted and intimate Assessment No. & Ward under which he is assessed.
- v] Tenderer should submit the True Copy of the Certificate of Registration along with the tender without which the tender will not be considered.

3.2 All pages to be initialed

All signatures in tender documents shall be dated as well as all the pages of the sections of tender documents shall be initialed at the lower right hand corner and signed wherever required in the tender papers by the tenderer or by a person holding power of attorney, authorizing him to sign on behalf of the tenderer before submission of tender.

3.3 Rates to be in figures & words

The tenderer shall quote Rate in English both in figures as well as words in schedules.

3.4 Corrections & Erasures

All corrections and erasures in the entries of tender papers will be signed in full by the tenderer with date. No erasures or over-writings are permissible.

3.5 Discrepancies & Adjustments of Errors

Any error in quantity or amount in schedule 'B' showing items of works to be carried out shall be adjusted in accordance with the following rules ---

- a] In the event of a discrepancy between description in words & figures quoted by a tenderer in the 'rates' column, the descriptions in words shall be prevailed.
- b] In the event of an error occurring in the 'amount' column of the schedule 'B' showing items of

works, as a result of wrong multiplication of the unit rate and quantity, the unit rate shall be regarded as firm and multiplications shall be amended on the basis of the rates.

- c] All the errors in totaling in 'amount' column and in carrying forward totals shall be corrected.
- d] Any rounding off of amounts against 'items' or in 'totals' shall be ignored.

The tendered sum so altered shall, for the purpose of the tenders is substituted for the sum originally tender and considered for acceptance.

3.6 Signature of Tenderer

The tender shall contain the name, residence and place of business of person or persons making the tender and shall be signed by the tenderer with his usual signature. Partnership name by all the partners or by duly authorized representative followed by the name and designation of the person signing. Tender by a corporation limited company shall be signed by an authorized representative and a power of attorney in behalf shall accompany the tender. A copy of the constitution of the firm with the name of all the partners to be furnished

3.7 Details of Experience

The tenderer should enclose documents **Volume-I Post qualification** to show that he has previous experience in having successfully completed in the recent past works of this nature, together with the names of owners, location on sites and values of contracts.

4. Transfer of Tender Documents

Transfer of tender documents purchased by an intending tenderer to another is not permissible.

5. Validity

The validity period of the tender submitted for this work shall be of One hundred and twenty calendar days (120 days) from the due date of the opening of technical 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 makes any modification or addition in the terms & conditions of 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.

6. Addenda/Corrigenda

Addenda/Corrigenda to the tender documents may be issued prior to the date of opening of tenders to clarify documents or to effect modifications in the design or contract terms. All addenda/corrigenda issued shall become part of tender.

7. Right to Owner to Accept or Reject Tender

The right to accept the tender will rest with the RMC however, does not bind itself to accept the lowest tender, and reserves to itself the authority to reject any or all the tenders received without assigning any reason whatsoever. Tenders in which any of the particulars and prescribed information are missing or are incomplete in any respect and/or the prescribed condition is not fulfilled are liable to be rejected.

In addition to the above, the tender will also be liable to be rejected outright if ---

- i] the tenderer proposes any alterations in the works specified or in the time allowed for carrying out the work or any condition or correction made in any code or mode of schedule 'B' or specifications.
- ii] Any of the page or pages of the tender is/are removed or replaced.
- iii] All corrections, additions or pasted slips are not initialed by the tenderer.
- iv] 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.

8. Security Deposit

As per clause 1 of Conditions of Contract

9. Collection of Data Tenderers' Responsibility

The tenderer shall visit the site and acquaint himself fully of the site and no claims whatsoever will be entertained on the plea of ignorance or difficulties involved in execution of work or carriage of materials.

10. Signing of the Contract

The successful tenderer shall be required to execute an agreement in the proforma attached with the tender documents within ten days of the receipt by him of the notification of acceptance of tender. In the event of failure on the part of the successful tenderer to sign the agreement within the above stipulated period, the acceptance of the tender shall be considered as cancelled and Earnest Money Deposit amount will be forfeited.

11. Co-Ordination of Work

The Engineer-in-charge shall co-ordinate the works of various agencies engaged at site to ensure minimum disruption of work carried out by different agencies. It must be the responsibility of the contractor to plan and execute the work strictly in accordance with site instructions to avoid hindrance to the work being executed by other agencies.

12. Interpretation of Contract Documents

- 12.1 Except if and to the extent otherwise provided by the contract, the provisions of the General Conditions of Contract and special conditions shall prevail over those of any other documents forming part of the contract. Several documents forming the contract are to be taken as mutually explanatory, should there be any discrepancies, inconsistencies, errors or commissions in the contracts or any of them, the matter may be referred to the Engineer-in-charge who shall give his decisions and issue to the contractor instructions directing in what manner the work is to be carried out. The decision of the Engineer-in-charge shall be final and conclusive, and the contractor shall carry out the work in accordance with this decision.
- 12.2 Works shown upon the drawings but not mentioned in the specifications or described in the specifications without being shown on the drawings shall nevertheless be held to be included in the same manner as if they had been specifically shown upon the drawings and described in the specifications.

12.3 i] The various documents forming the contract are the essential parts of the contracts and a requirement occurring in one is as binding as though occurring in all, they are intended to be mutually explanatory and complementary and to describe and provide for a complete work.

ii] In the event of any discrepancies, the various documents forming the contract or in any one document, the following order of precedence should apply ---

a] Dimensions & quantities ---

i] Drawings.

ii] Schedule 'B' of the tender form.

On drawings, figures, dimensions, unless obviously incorrect will be followed in preference to shown 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/ directions in what manner 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

iii] The contractor should take no advantage of any apparent error or commission in drawings or specifications and the Engineer-in-charge shall make such corrections and interpretations as necessary to fulfill the intent of the plans and specifications.

13. Force Majeure

Any delays in or failure of the performance of either part hereto shall not constitute default hereunder or give rise to claims for damages, if any, to the extent such delays or failure of performance is caused by occurrences such as Acts of God or the public enemy; expropriation or confiscation of facilities by Government authorities, compliance with any order or request of any Governmental authorities, acts of war, rebelling or sabotage or fires, floods, explosions, riots or illegal strikes. The contractor shall keep records of the circumstances referred to above and bring these to the notice of the Engineer-in-charge in writing immediately on such occurrences.

14. Forfeiture of Security deposit

Whenever any claim against the contractor for the payment of a sum of money arises out of or under the contract, the RMC shall be entitled to recover such sum by appropriating in part or whole of the security money of the contractor. In case, the security money is insufficient or if no security money has been taken from the contractor, then the balance or the total sum recoverable, as the case may be, be deducted from any sum then due or which at any time thereafter may become due to the contractor. The contractor shall pay on demand any balance remaining due.

15. No Compensation for Alteration in or Restriction of Work

If at any time after the commencement of the work, the Rajkot Municipal Corporation shall for any reason whatsoever not require the whole or part thereof as specified in the tender to be

carried out, the Engineer-in-charge shall give notice in writing of the fact to the contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been by reason of any alterations having been made in the original specifications, drawings, designs and instruction which shall not involve any curtailment of the works as originally contemplated.

16. Right of the Rajkot Municipal Corporation to Determine/Terminate Contract

- i] The Rajkot Municipal Corporation shall, at any time, be entitled to determine and terminate the contract, if in the opinion of the Rajkot Municipal Corporation the cessation of the work becomes necessary owing to paucity of funds or for any other cause whatsoever, in which case the cost of approved materials at the site as verified and approved by the Engineer-in-charge and of the value of the work done to date by the contractor shall be paid for in full at the rate specified in the contract. A notice in writing from the Rajkot Municipal Corporation to the Contractor of such determination and the reason thereof shall be the conclusive proof of the fact that the contract has been so determined and terminated by the Rajkot Municipal Corporation.
- ii] Should the contract be determined under sub-clause (i) of this clause and the contractor claims payments to compensate expenditure incurred by him in the expectation of completing the whole of the work, the Municipal Corporation shall consider and admit such claims as are deemed fair and reasonable and are supported by vouchers to the satisfaction of the Engineer-in-charge. The decision of the Municipal Commissioner on the necessity and propriety of any such expenditure shall be final and conclusive and binding on the contractor.
- iii] If work of Construction of RTS and O&M is found unsatisfactory by Rajkot Municipal Corporation (RMC), RMC shall terminate the contract after giving notice period of 90 days for correction and after letter of correction, if no improvement is found, in this case decision of competent authority, for forfeiture of SD/EMD etc. and debarring / blacklisting the agency shall be binding to the contractor.
- iv] The activity is under essential service; contractor is not allowed to stop this work at any point of time. But if contractor willing to leave this work / contract, he should give written notice to RMC before 90 days.
- v] Notwithstanding, if contractor stop / leave the work by his own discretion SD/ EMD, Amount pending in running bill etc. shall be forfeited and additional expenditure for execution of remaining work shall be recovered through, if be needed, legal proceeding and Agency shall be debarred / blacklisted subject to approval of competent authority.

17. Drawings to Be Supplied by the Rajkot Municipal Corporation and Relevant Drawings and Design to be supplied by Contractor.

- The drawings attached with the tender are indicative in nature, showing the general layout and conceptual presentation of the project components.
- The detailed construction drawings shall be issued progressively by Rajkot Municipal Corporation (RMC) during the execution stage, incorporating the finalized details of mechanical and electrical equipment as proposed by the Contractor.
- The design and preparation of detailed drawings for the MRF Shed, including PEB Shed/ Shed structural design, relevant drawings, and electrical layout, shall be the responsibility of the Contractor. All designs shall be carried out in accordance with the relevant Indian Standards (IS Codes) and applicable engineering best practices. The submitted designs and drawings shall be

vetted and approved by RMC / RMC-appointed Third-Party Inspection (TPI) agency / Project Management Consultant (PMC). Any observations, modifications, or corrections suggested by RMC or its appointed agencies shall be incorporated by the Contractor without any additional cost or price escalation. The Contractor shall submit the final approved drawings in three (3) sets of hard copies, along with soft copies, to the department.

- The work shall be executed strictly in accordance with the approved structural, architectural, and electrical drawings for all project components. All drawings shall be properly coordinated and cross-verified prior to execution.
- In case of any discrepancy between architectural, structural, or electrical drawings, the Contractor shall seek and obtain the written instructions of the Engineer-in-Charge, whose decision shall be final and binding.
- In case of any discrepancy between the Schedule of Quantities (BOQ) and the drawings, the BOQ shall prevail, unless otherwise directed in writing by the Engineer-in-Charge.
- Transparent roof sheets covering 4% of the shed roof area shall be installed to provide skylight and Trbo fan on top of roof.
- Contractor should prepare fire fighting system regarding all plan and detail drawings and relevant approval by own cost. And same submitted designs and drawings shall be vetted and approved by RMC relevant department / RMC-appointed Third-Party Inspection (TPI) agency / Project Management Consultant (PMC).
- Contractor should prepare 150 TPD Marental Recovery Facility system (Machinery & Equipments) regarding Design, all plan and detail drawings by own cost. and same submitted designs and drawings shall be vetted and approved by RMC / RMC-appointed Third-Party Inspection (TPI) agency / Project Management Consultant (PMC).
- **Site Plan Passing and Statutory Approvals:**
 - **Contractor's Scope:** The Contractor shall be solely responsible for obtaining all necessary plan passings, building permissions, statutory clearances, and relevant approvals required for the site from all competent authorities.
 - **Cost Liability:** All costs, fees, levies, taxes, and incidental charges associated with obtaining these approvals shall be borne entirely by the Contractor at their own expense.
 - **Liaison and Support:** Rajkot Municipal Corporation (RMC) will provide necessary handholding support, facilitation, and standard authorization letters to assist the Contractor in coordinating with relevant departments.
 - **Handover of Documents:** Upon receiving the approvals, the Contractor shall immediately hand over all original approved plans, clearance certificates, permits, and official receipts to RMC for records and compliance.

18. Setting out Works

The Engineer-in-charge shall furnish the contractor with only the four corners of the work site and a level bench mark, and the contractor shall set out the works and shall provide an efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out. The contractor shall carry out the level work/set out the work with total stations.

19. Responsibility for Level & Alignment

The contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the level and correctness of every part of the work and shall rectify any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost, when instructions are issued to that effect by the Engineer-in-charge.

20. Discrepancies between Instructions

Should any discrepancy occur between the various instructions furnished to the contractor, his agents or staff, or any doubt arises as to the meaning of any such instruction or, should there be

an misunderstanding between the instructor's staff and the Engineer-in-charge's staff, the Contractor shall immediately report the matter in writing to the Engineer-in-charge whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions, doubts or misunderstanding shall in any event be admissible.

21. Inspection of Work

The Engineer-in-charge or his representative , Third party Inspector , Project management consultants representative appointed by RMC will have full power and authority to inspect the works at any time wherever in progress, either on the site or at the Contractor's premises/workshops wherever situated, premises/workshop of any person, firm or corporation where materials are being made or are to be supplied, and the contractor shall afford or procure for the Engineer-in-charge or his representative , Third party Inspector , Project management consultants representative every facility and assistance to carry out such inspection. 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 representative, Third party Inspector, Project management consultants representative to visit the works 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 the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself. The Contractor shall give not less than seven day's notice in writing to the Engineer-in-charge or his representative, Third party Inspector, Project management consultant's representative before covering up or otherwise placing beyond reach of inspection and measurement any other work in order that the same work may be inspected and measured. In the event of breach of the above, the same shall be uncovered at contractor's expense for carrying out such measurements or inspections.

22. Tests for Quality of Work

All workmanship shall be of the respective kinds described in the contract documents and in accordance with the instructions of the Engineer-in-charge or his representative , Third party Inspector , Project management consultant's representative and shall be subjected from time to time to such tests at Contractor's cost as the Engineer-in-charge or his representative , Third party Inspector , Project management consultant's representative may direct at the place of manufacture or fabrication or on the site or at all or any such places. The Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be required and selected by the Engineer-in-charge or his representative, Third party Inspector, Project management consultant's representative.

23. The Rajkot Municipal Corporation may do Part of the Work

Upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this contract, the Rajkot Municipal Corporation has the alternative right, instead of assuming charge of entire work, to place additional labour force, tools, equipments and materials on such parts of the works, as the Rajkot Municipal Corporation may designate or also engage another Contractor to carry out the work. In such cases, the Rajkot Municipal Corporation shall deduct from the amount which otherwise becomes due to the Contractor, the cost of such work and materials with 10% added to overall departmental charges and should the total amount thereof exceed the amount due to the Contractor, the Contractor shall pay the difference to the Rajkot Municipal Corporation.

It should be specifically noted that wherever bank guarantee is required to be submitted, it should be from Nationalized Banks/scheduled bank only.

24. The following conditions treated as part of the tender document: -

1. All efforts will be made by the corporation to pay the final Bill within one month from the date of completion if possible.
2. The contractor shall make every endeavour to work during working hours only.
3. Repairs of damages by contractor at the own cost should be done under the supervision of Municipal Technical Staff both at plant and payer site as per executed tender specifications.
4. No price variation or escalation shall be paid to the Contractor.
5. No compensation of any item shall be paid in case if the item is omitted i.e. not executed at all.

The Notification by Municipal Commissioner of Police, Rajkot restraining entry of heavy vehicles in Rajkot Municipal Corporation area is taken into consideration before filling up, submitting tender documents. No extra payment shall be made nor shall any claim in this behalf be considered. The tenderer shall have to make suitable arrangements to ensure timely and adequate supply of materials in wake of obligation created under the tender documents upon awarding the contract. Any change(s) modification(s) or amendment (s) in this behalf and / or to this effect made by the said authority from time to time shall have to be taken into consideration and no extra payment shall be made nor shall any claim be considered.

25. Contract Price:

Tile Contract price will be as bid in schedule B (Civil & Mechanical) and will be inclusive of all expenses necessary for the continuance of the services under the contract. Such expenses include but not restricted to payments to RTO, Labour Authorities, Local and Municipal Authorities, Semi Government or any charges, deposits, dues, taxes fuel, oil, lubricants, levies, total taxes, octroi duty, etc., connected with the service.

26. Registration under Central/State Government/ statutory Board Regulation:

Bidder shall get registration from appropriate Authority under the Central Government Regulations "Building and other construction workers (Employment and Regulation of Employment) Act-1996, Building and other construction workers welfare cess act 1996", Gujarat state Governments regulation "Building and other construction workers (Employment and Regulation of Employment) Act -2003 dt.18.08.2003 and also The Gujarat Labour Welfare Fund Act. The bidder shall be deemed to have taken the cognizance of the provisions and actions required to be taken under the said acts at his cost while quoting the rates.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

10 DESCRIPTION OF THE PROJECT

CONSTRUCTION OF MSW REFUSE TRANSFER STATION WITH SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF MACHINERIES / EQUIPMENTS, TRANSPORTATION OF COMPACTED MSW FROM TRANSFER STATION TO TREATMENT / LANDFILL SITE AND SETTING UP OF MATERIAL RECOVERY FACILITY INCLUDING OPERATION & MAINTENANCE OF WHOLE SYSTEM FOR THE PERIOD OF 05 YEARS AT MOTA MOVA FOR RAJKOT MUNICIPAL CORPORATION.

Project Description:

Rajkot is strategically located in the centre of Suarashtra Region in the Aji basin. Rajkot is spread on both banks of Aji River which cuts through the city. The city is well connected not only to major towns within the state but also to neighbouring states through strong transportation linkages all by rail, and road.

The notified Rajkot Urban Development Area is carved out of the one district and 5 talukas - Rajkot, Padadhari, Iodika, kotdasangani and Tankara from Rajkot District. RUDA is surrounded by the other small villages form other talukas.

Within a periphery Form the boundary of RUDA there are 3 urban centers (Municipalities) namely Jamnagar in the north westerns part, Bhavnagar to the southeast and Junagadh in the east.

Rajkot is located at 22°30'N latitude and 70°80'E longitude, with an elevation of 146 meters above mean sea level. The city is administratively divided into 3 zones and 18 wards. The wards are further divided into some sub-wards each for the management of solid waste. Rajkot Municipal Corporation had a population of 13,23,363 people in the year 2011 and an area of 154.76 sq. km.

The Proposed transfer station is modern in all the parameters and designed as per the SWM Rule 2026 and msw manual and CPHEEO manual guidelines.

Extent of Scope of Work

The scopes of works are **to construct Refuse Transfer Station at MOTAMOVA** to suite modern methods of compaction and secondary transportation of waste. This transfer station will include construction of civil structure, weigh bridge etc.

Project covers following component for construction:

SALIENT FEATURES OF TRANSFER STATION	
SR.NO.	COMPONENTS
A1. RTS & MRF with aligned Buildings	
1	Refuse Transfer Station (RTS)
2	Material Recovery Facility (MRF)
3	Aligned Buildings
a	Weight Bridge Room with 02 No's Weigh Bridge
b	Truck Wash & Maintenance Area
c	Generator & Electrical Room
d	Toilet Block
e	Admin Office
f	Container Storage Platform
g	Under Ground Water Tank
A2. Mechanical Works	
1	Stationary Compactor = 03 Nos.
2	Container 20 CU M Capacity = 20 Nos.

3	Hook lift system (Vehicle + lifting mechanism) = 07 Nos.
4	MRF Sorting System = 01 Nos.
A3. Other Infrastructure & Utility Services	
1	Land Development (RCC pavement, plot soil filling)
2	Green Belt
3	Compound Wall
4	Main Gate (14 mt. length with security cabin)
5	Fire Fighting System
6	Storm Water Drain
7	Water Supply Network
8	Sewer Network
9	Bore Well
10	Solar Street Light
11	CCTV Surveillance System
OPERATION AND MAINTENANCE WORK	
1	Operation and Maintenance of RTS for 05 Years

The contractor shall have to commence the work within 15 (Fifteen) days OR as mentioned in LOI/agreement / work order.

The refuse transfer station shall be especially industrial type of building & comes under the Factory Act, therefore, all statutory provisions, rules; regulations shall be observed including, provision of Environmental Quality Act, Government of India. The transfer station is meant for non-toxic, non-hazardous domestic & industrial solid waste.

The machinery provided shall be the proven one & all products shall be of well-established manufacturer as mentioned in the vendor list. All QA/QC procedures shall be strictly followed during construction stages under the supervision of well qualified & experience persons of equipment manufacturer.

The material used for erection of entire plant shall be of good quality & as per vendor list or confirming to ISI standard.

Operation and maintenance of the project will be started after successive completion & commissioning of project for Part – I(Completion of capital works).

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

11 ADDITIONAL CONDITIONS

1. General

The special conditions of Contract shall be read in /conjunction with General Conditions of Contract and all other portions of the tender document and shall be taken as supplementary and amplificatory thereto. In case of any conflict or difference in import and effect between the clauses of General and Special Conditions, the Special Conditions shall be taken as over-riding the particular portion only of the General Conditions of Contract, which cannot be reconciled with these special conditions of Contract. Similarly, the clauses given under technical specifications/Specific requirements shall be read in conjunction with detailed specifications and in case of any conflict, provisions of technical specifications/specific requirements will over-ride the provisions of detailed specifications.

2. Site Particulars

The intending tenderers shall be deemed to have visited the site and familiarized themselves thoroughly with the site conditions before submitting the tender. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the work in strict conformity with the drawings and specifications. For site visit, the intending tenderer may contact the Environmental Engineer (Solid Waste Management), Rajkot Municipal Corporation.

3. Scope of Work

The scopes of works are to construct Refuse Transfer Station at **MOTAMOVA** to suite modern methods of compaction and secondary transportation of waste. This transfer station will include construction of CONSTRUCTION OF MSW REFUSE TRANSFER STATION WITH SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF MACHINERIES / EQUIPMENTS, TRANSPORTATION OF COMPACTED MSW FROM TRANSFER STATION TO TREATMENT / LANDFILL SITE AND SETTING UP OF MATERIAL RECOVERY FACILITY INCLUDING OPERATION & MAINTENANCE OF WHOLE SYSTEM FOR THE PERIOD OF 05 YEARS AT MOTA MOVA FOR RAJKOT MUNICIPAL CORPORATION. along with operation and maintenance for the period of 05 Years.

4. Defects Liability Period

The defects liability period as defined in General Conditions of Contract, shall be 01 (one) year from the date of total completion of the Transfer station site in all respect. For the failure of the contractors in the matter of guarantee, testing, performance, commissioning and handing over and meeting the defects liability, the owner shall have the full right to make necessary recovery from security deposit as may be necessary.

5. Drawings and Documents

The drawings accompanying the tender documents are indicative of scope of work and issued for tendering purposes only. These drawings indicate the location map to enable the contractor to make an offer in line with the requirement of the Owner. Final construction shall be as per approved construction drawings released during the course of execution of work.

6. Terms of Payment

a) Billing for this project work would be done progressively according to the payment terms, rules and practice followed by Rajkot Municipal Corporation.

7. The option for selection of the Make/product/Brand shall rest with Rajkot Municipal Corporation, i.e. the contractor shall have to supply the materials, equipments, plants of a make as approved by the Rajkot Municipal Corporation.

8. Income Tax

Income tax at as per current prevailing rate and as per the norms of RMC on the gross amount billed shall be deducted from the contractor's bills as per section 194C of the Income Tax Act and relevant rules/laws from time to time prevailing.

9. Taxes and duties on material:

GST (goods and 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 term 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 RMC. 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 , RMC may recover the amount due, From any other payable dues with RMC 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 RMC shall be liable for the same. 1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

10. Submission of Tender

Tender duly filled in by tenderer as per General Instructions to the Tenderers of General Conditions of Contract should invariably be submitted along with earnest money as stipulated in the Notice Inviting Tender. Tender without earnest money deposit will be rejected.

Rajkot Municipal Corporation / Municipal Commissioner, RMC reserves the right to reject any (L1) or all tenders without assigning any reasons thereof.

The tender should be submitted in three parts, duly super scribed as follows.

Volume I: Post qualification documents

Volume II: Technical and Commercial aspects of the offer

Volume III: Price bid (Civil, mechanical and electricals work) portion of the offer (BOQ's along with tender set duly filled in) without any conditions.

It is to be noted that the price part (Volume III) shall contain only price quoted by bidder and no conditions whatsoever. Any condition given in the price bid will not be taken into account and it will be sufficient cause for rejection of tender.

11. Project Management Consultant and Third-Party Inspection

This Project is being executed under Swachh Bharat Mission Scheme, which undergoes T.P.I. & P.M.C. agencies intervention. Contractor shall comply all the comments, instructions, recommendation, rectification etc. issued by the supervising agency T.P.I. & P.M.C. without any extra cost, however the charges of both supervising agencies shall be borne by the Rajkot Municipal Corporation.

12. The contractor shall prepare and submit report of daily activities in a proforma, which shall

be approved by Engineer-in-charge before start of work. The daily report shall specifically include details like items executed with respective quantities, materials received on site, materials consumed, etc. In general the proforma and details to be provided in daily report shall contain all necessary information as required by the Engineer-in-charge. During execution of work the proforma shall be modified, if desired by the Engineer-in-charge to accommodate relevant necessary details about daily activities.

- 13.** If cement is required to be used in quantity of less than 50 kg. (i.e. less than one full bag, e.g. 25 kg), the same shall be weighed and packed in advance and then only it shall be used in concrete work.

The contractor shall construct and provide totally watertight godown building for storage of cement. The sidewalls of godown shall have minimum 230 mm thick brick masonry walls plastered on both faces. The roof can be either of leak proof reinforced concrete slab or adequately sloped watertight galvanized / asbestos sheets. Windows/doors shall be normally kept tightly shut to prevent moisture/rain water from entering into the godown. Height of plinth shall be at least 600 mm above natural ground level and such that it permits convenient loading/unloading operations from truck. The floor of the godown shall be at least 150 mm thick densely compacted concrete slab on rubble soling, with proper line, level and slope. Wooden planks or sleepers covered with plastic sheets shall be kept on the floor and the cement bags stored on top of it. Bags shall not be stored more than 10 bags high. Bags shall be stored at least 300 mm away from the walls. Exhaust fans shall be installed on blank walls to improve ventilations. Necessary lighting arrangements and strip heater shall be installed on walls at suitable locations. Stacking of bags shall be such that it can be easily counted and permits movement of personnel for the purpose. The godown shall have lock with two sets of keys. One set of keys shall always remain with the Engineer-in-charge, without whose permission addition, removal or any change in stack of bags stored shall not be allowed. The godown building shall be constructed and provided to the complete satisfaction of Engineer-in-charge before start of work.

- 14.** Project facilities one vehicles fully loaded white colour shall be provided to the Employer / engineer in charge within 10 days of the work order. All expenses required for keeping the vehicles in smooth running conditions such as fuel, lubrication oil & other consumable, necessary service & Maintenance, drivers having valid license, repair & replacement etc. are to be met by the contractor in the event of vehicle being of the road for maintenance or an account of break down, the contractor shall provide substitute vehicle immediately. If the contractor at any time fails to provide vehicle or substitute vehicle as specified above an amount of Rs. 2000/- per day or part there of shall be de debited to the contractor's account. All necessary taxes for operating the vehicles shall be fully paid & all necessary papers shall be provided as required by prevailing motor vehicle Act. With comprehensive insurance cover for the vehicles. The vehicle will be at disposal of the Environmental Engineer and will be used at for any work of RMC. The vehicle will run about 3000 Km/month including day & Night/Sunday/Holidays. The vehicle shall be run /kept in RMC up to work completion. After completion of work, vehicle will have to be handed over to Contractor by RMC.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

12 GENERAL TECHNICAL SPECIFICATIONS

1. In the specifications, "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 late edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specifications wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular points 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 Meter
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 practical 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. Height shall be measured from plinth.
8. Up to "floor level" means actual height of floor (Maxi. 4 M) up to 3 Mts. above plinth level.
9. Definite particulars covered in the items of work, though not mentioned or elucidated in it specifications shall be deemed to be included therein.
10. Reference to specifications of materials as made in the detailed specification of the items of works is in the form of a designation containing the number of the specification of material and prefix 'M' e.g. 'M-5'.
11. Approval to 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.
12. The contract rate of the item of work shall be for the work completed in all respects.
13. No collection of materials shall be made before it is approved by the Engineer-in-charge.
14. Collection of approved materials shall be done at site in a systematic manner. Materials shall be Stored in such a manner so as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
15. Materials, if and when rejected by the Engineer-in-charge shall be immediately removed from the site of work.

16. No materials shall be stored prior to, during and after execution of a structure in such a way so as to cause or lead to damage or overloading of the various components of the structure.
17. All works shall be carried out in a workmanship like manner as per the best techniques for the particular item.
18. 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
19. The mode, procedure and manner of execution shall be such that it does not cause damage or overloading of the various components of the structure during execution or after completion of the structure.
20. 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 satisfactory 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 the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
21. 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.
22. 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 the Government from time to time.
23. All necessary safety measures and precautions (including those laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works as also of the work itself.
24. The testing charges of all materials shall be borne by the contractor.
25. Approval to any of the executed items for the works done not in any way relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.
26. The drawings of all the equipments shall be got approved by RMC prior to dispatch.
27. For R.C.C. items, the payment shall be made at 96% of the tender rate when the R.C.C. work is executed. The remaining 4% shall be released after receipt of satisfactory results of the tests which are to be carried out at the end of 28 days.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

Place:

Date:

13 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 alkalis 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. 12269 – 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 strains or other unsightly deposits on concrete or mortar surfaces.

Hard and bitter water shall not be used for curing.

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 – 1995. 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 unburnt 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 – 1995. 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 Portlandcement as per latest revision of I. S. 12269.

M-4 WHITE CEMENTS:

- 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 gray Portland cement as specified in the Description of 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 properly such that it is neither affected by the cement not 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, alkaly, salts, organic mater, 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 sand shall be as under ---

I. S. Sieve Designation	% by weight Passing sieve	I. S. Sieve Designation	% by weight passing sieve
4.75 mm	100	600 Micron	30 – 100
2.36 mm	90 – 100	300 Micron	5 – 70
1.18 mm	70 -100	500 Micron	0 – 60

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

I. S. Sieve Designation	% by weight Passing thru'	I. S. Sieve Designation	% by weight passing thru'
4.75 mm	100	600 Micron	40 – 85
2.36 mm	100	300 Micron	5 – 50
1.18 mm	70 - 100	500 Micron	0 – 10

M-7 STONE DUST:

- 7.1 This shall be obtained from crushing hard black 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 up to 100 mm Mark. The clean water shall be added up to 150mm marks. The mixture shall be stirred vigorously and the content allowed settling for 3 hours.
- 7.3 The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height than 8% silt shall be washed so as to bring the silt content within the allowable limit.
- 7.4 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. 303 – 1990. Unless a special stone of a particularly quarry is mentioned, 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	% Passing thru' sieve	I. S. Sieve Designation	% passing thru' sieve
12.50 mm	100%	4.75 mm	0.20%
10.00 mm	85 – 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 strength of concrete.
- 8.4 The necessary tests for grit shall be carried out as per the requirements of I. S. 2338 (Parts I to VIII) 1995, 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 interred 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 clad and free from clay, dirt, ash or other deleterious matter.
- 9.3 The average grading for cinder 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 Description. The slaked lime and 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 tarpaulin 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-6.
- 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 at least 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 Normal 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	85-100	100	-	4.75mm	-	0.50	0.50
20 mm	0-20	85-100	100	2.35mm	-	-	-
16 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 COURSE:

- 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 BRICKS BATS AGGREGATE:

- 14.1 Bricks bat aggregates shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean 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 Description. The under burnt or over burnt brick bats shall not be allowed.
- 14.2 The bricks bats shall be measured by volume by suitable boxes as directed.

M-15 BRICKS:

- 15.1 The bricks shall be hand or machine molded 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 molded with a frog of 100 mm x 40mm and 10mm to 20mm deep on one of its flats sides. The bricks shall not break when dropped on the ground from a height of 600mm.
- 15.2 The size of modular bricks shall be 190mm x 90mm x 90mm.

The size of conventional bricks shall be as under --- 225 x 110 x 75mm.

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

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 BURNT CLAY FLY ASH BUILDING BRICKS:

The Burnt Clay Fly Ash 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 be used on one work. The following tolerances shall permit 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 Burnt Clay Fly Ash building bricks shall not be less than 70 Kg/Sq-Cm. and the test shall be conform to IS-3495 (Part-1).

The average water absorption not more than 20 percentages by weight and the test shall conform to IS-3495(Part-3). Sampling of Burnt Clay Fly Ash 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 veins, 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 – 1994. The minimum crushing strength of the stone shall be 200 Kg/Sq.cm. unless otherwise specified.

16.2 The sample 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 Description 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 40mm. 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 LITERATE STONE :

17.1 Literate stone shall be obtained from the approved quarry. It shall be 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 than 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 free from waviness and unevenness and the edges true and square.

17.3 Those types 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:

- 18.1 Mild steel bars reinforcement for R.C.C work shall conform to I.S. 432 – 1995 and shall be of tested quality. It shall also comply with the relevant part of I. S. 456 – 2000.
- 18.2 All the reinforcement shall be clean and free from 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 up to 10 mm length and weight payable worked out as per the rate specified below:

i)	6mm	0.22 Kg / Rmt	viii)	20 mm	2.47 Kg / Rmt
ii)	8mm	0.39 Kg / Rmt	ix)	22 mm	2.98 Kg / Rmt
iii)	10mm	0.62 Kg / Rmt	x)	25 mm	3.85 Kg / Rmt
iv)	12mm	0.89 Kg / Rmt	xi)	28 mm	4.83 Kg / Rmt
v)	14mm	1.21 Kg / Rmt	xii)	32 mm	6.31 Kg / Rmt
vi)	16mm	1.58 Kg / Rmt	xiii)	36 mm	7.99 Kg / Rmt
vii)	18mm	2.00 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 Thermo-Mechanically Twisted and shall conform to I.S. 1786 – 1985.
- 19.2 Other provision and requirement 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 – 1962.
- 20.2 The tensile strength of high tensile steel bars shall be as specified in the Description. In absence of the given strength and minimum strength shall be taken as per Para 6 – 1 of the I.S. 1785 – 1983. 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 gauge) diameter and shall conform to I.S. 280 – 1992.
- 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:

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 steel is supplied by the contractor test Certificates of the manufactures shall be obtained according to I.S. 226 – 1975 and other relevant Indian Standards.

M-23 GALVANISED IRON SHEETS:

23.1 The galvanized iron sheets shall be plain or corrugated sheets of gauge as specified in Description. 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 galvanized sheets class-3 of the thickness as specified in Description. These shall be 600 mm width and properly bent up shape without damage to the sheets in process of bending.

23-A.2 Valleys gutters and flashings shall be also of galvanized sheet of thickness as specified in Description. Valleys shall be over all. They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24 ASBESTOS CEMENT SHEETS:

24.1 Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I. S. 459 - 1992. The thickness of the sheets shall be as specified in the Description. 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 ridge shall be suitable for the types 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 locations.

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 Description. Samples of the tiles to be proved shall get approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

M-26 SHUTTERING

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.

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 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.

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.

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.

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.

The timber used in shuttering shall not be so dry so as to absorb water from concrete and swell or bulge nor do so green or wet so as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surfaces coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.

As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.

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.

The shuttering for beams and slabs shall have camber of 4mm per meter (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 Engineering-in-charge.

M-27 EXPANSION JOINTS – PREMOULDED FILLER:

- 27.1 The Description provided 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 strip 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 20 mm unless otherwise specified.
- 27.4 Premoulded bituminous joint filler shall conform to I. S. 1838 – 1961.

M-28 EXPANSION JOINTS - COPPER STRIPS AND HOLD FASTS:

- 28.1 The Description provides for expansion joints in R.C.C. frame structure for internal joint as well as for exposed joints with the use of necessary copper strip and hold fasts.
- 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 hold fast 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 20 mm. Depth of 'U' to be provided in the expansion joint, in the copper plate shall be of 20 mm.

M-29 TEAK WOOD:

- 29.1 The teak wood shall be of good quality as required for the Description 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, flaw, warps, twists, shakes, bends or any other defects. It shall generally be uniform in substance and of straight fibers 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 aggregates area of such knots shall not be more than 1% of area of piece. The timber shall be closed gained.

Second Class Teak Wood:

No individual hard and sound knots shall be more than 15 sq cm in size and aggregates 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. Specification and of good quality. The types of wood shall be got approved before collecting the same on site. Fabrications 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 permitting for shutters after proper seasoning and chemical treatment.

The non teak wood shall be free large, loose dead or cluster knots, flows, shakes, warps bends, or any other defect. It shall be uniform in substance and of straight fibers as per 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 scantalings, 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 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 DOORS SHUTTERS (SOLID CORE):

30.1 The solid core type flush door shutters shall be of decorative or non – decorative types as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or 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 edge of the core members. The commercial plywood, cross bands shall conform to I.S. 303 – 1998.

30.2 The face panel of the shutter shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross bands, or face veneers. The lapping, rebating opening of glazing, Venetian etc, shall be provided if specified in the drawing.

All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plan, both faces of the shutters shall be sanded to smooth even texture.

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 3mm. in depth have occurred in the assembly glue lines between the plywood face and the stile and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots, knot, whole 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 measuring at any two points.

M-31 ALUMINIUM DOORS, WINDOWS, VENTILATORS:

31.1 Aluminum alloy used in the manufacture of extruded window section 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 in the drawing and design. The fabrication shall be done as directed.

31.2 The hinges shall be cast or extruded aluminum 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 aluminum 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 section formed from cold rolled steel strips not less than 0.9 mm thick and 80 mm. wide for shutters 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 channels section and of rolled pressed or built up (fabricated) joint less construction. The thickness of sheet used shall be not 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 cover shall be 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 lintel as specified with rawly Plugs and a screw bolts etc.
- 32.5 The rolling shutters shall be of self rolling type up to 8 sq. m. clear area without ball bearing and up to 12 sqm Clear area with ball bearing. If the rolling shutters are of larger then gear operated type shutter 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 arrangement, pulling hooks, handles and other accessories.

M-33 COLLAPSIBLE STEEL GATE:

- 33.1 The collapsible steel 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 bearing shall provide in every double channel. Unless otherwise specified the particulars of collapsible gate shall be as under ---
 - i) Pickets: These shall be 20mm. 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 cm.
 - ii) Pivoted M. S. flats shall be 20 mm. X 6 mm.
 - iii) Top and bottom guides shall be from toe or flats 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 WELDING STEEL WIRE FABRIC:

- 34.1 Welding steel wire fabric for general purpose shall be manufactured from cold drawn steel as drawn or galvanized steel conforming to I. S. 266 – 1975 with longitudinal and transverse wire surely 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 workmen like manner and shall be free from injurious defects and shall as ruest proof. The type of mesh shall be oblong or square as directed. The mesh size and sizes of wire for square as well as ablong 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 expects that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimension of strands (width and thickness) shall be as specified. The tolerance or nominal weight of expanded metal sheets shall be of + 10 per cent.
- 35.2 Expands 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 jail):

36. 1 Mild steel wire may be galvanized, as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in Description. The wire shall be sound, free from Slits, surface flaws, rough jagged and imperfect edge 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 old number of layers 3, 3, 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 slitting with change in moisture content.
- 37.3 Usually synthetic resins are used for gluing. 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 three grades namely BWR, WWR and CWR depending upon the adhesives used for bounding 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 finishing plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

37.6 THICKNESS OF PLYWOOD BOARDS

Board	Thickness	Board	Thickness
3 Ply	3 mm	7 Ply	9 mm
	4 mm		13 mm
	5 mm		16 mm
	6 mm	9 Ply	13 mm
5 Ply	5 mm		16 mm
	6 mm		19 mm
	8 mm	11 Ply	19 mm
	9 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 Description or specification or in the special provisions or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specification 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 Description or detailed specifications of the Description of work, sheet glass shall be weighing 7.5 kg./Sq.m. for panes up to 600 mm. X 600 mm.

38.2.2 For panes larger than 600 mm. x 600 mm. and up to 800 mm. glass weighing not less than 8.75 kg./Sq.m. shall be used. For bigger panes up to 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 glassing and framing purpose shall conform to I. S. 761 – 1993. Sheet glass of the specified colours shall be used, if so shown on detailed drawing 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 flat and parallel and polished to obtain clear undisturbed vision and reflection. The plate glass shall be of the thickness, mentioned in the Description 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. Georgian 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 Description and of a specified shape and size as the case may be. Panels may be flats or curved. It should be light in weight. It shall be colourless or coloured or opaque as specified in the Description. 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 Phenolmaldehyde 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 SLABS:

- 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 thermocol etc.

M-42 RESIN BONDED FIBRE GLASS:

- 42.1 The resin bonded fiber glass tile or roofs shall be of approved make and shall be sizes, thickness and finish as indicated.
- 42.2 For test of material wood thermal insulation blanket I.S. 3144 – 1991 followed.
- 42.3 Insulation wool blanket shall be with the following coverings on one or both sides as indicated.
- (1) Bituminized jessian Kraft paper suitable for use in position where moisture has to be excluded.
 - (2) Hessian cloth or Kraft paper for keeping out dust.
 - (3) G.I wire netting, suitable for surfaces to be plastered over.

M-43 FIXTURES & FASTENING:

General ----

- i) The fixtures and fastenings, that is, butt, hangers, 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 Description or its specifications.
- ii) They shall be of iron, brass, aluminum Chromium plated iron, chromium plated brass, copper oxidized iron, and copper oxidized brass or anodized aluminum as specified.

- iii) The fixtures shall be heavy, medium or light type. The fixtures and fastening 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 anodized aluminum fixtures and fastenings shall be bright finished.

Hold fasts:

- i) Hold fasts shall be made from mild steel flat 30 cm. length and one of the hold fasts shall be bent at right angle and two nos. 6 mm. dia. Holes shall be made in it for fixing it to the frame with screws. At the other end, the hold fast 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 Description shall be used and shall be got approved.

Tower Bolts (Barrel Type)

- i) Tower bolts as specified in the Description shall be used and shall be got approved.

Door Latch:

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

Bathroom Latch:

Bathroom latch shall be similar to tower bolt.

Handle:

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 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 fixate. 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 doors 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 900mm. from the floor level. The wooden doorstop shall be provided with 3 coats of approved oil paint.

Casement Window Fastener

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

Casement Stays (Straigot 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 minimum 3 mm. thick plates and projected pivot shall not be less than 12 mm. dia. and 12 mm. lengths 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 color and shape, 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 strainer 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 need 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, levering, caking or colour separation and shall be free from lumps and skins.

The paint as received shall brush easily, possess good leveling properties and show no running or sagging tendencies.

The paint shall not skin within 48 hours in three quarters filled closed container.

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 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 – 1975.

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 strains, cracks, decay and weathering.
- 46.2 The size of various colours of marble chips ranging from the smallest up to 20 mm. shall be used where the thickness of top wearing layers is 6 mm. in size. The marble ships 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:**47.1 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 India 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 projection, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edge shall be sharps and true.
- 47.1.4 The tile sizes shall generally be square shape 24.85 cm. X 24 .85 cm. or 25 cm. X 25 cm. 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 test as regards transverse strength, resistance to wear and water absorption as per I. S. 1237 – 1990.

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. The pigment used for colouring cement shall not exceed 10% by weight of cement used in the mix. The pigments, synthetic or otherwise, used colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete. The colour of the tiles shall be specified in the Description 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 requirement 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 the tiles 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 up to 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 sample, 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 sample 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 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 250 mm. X 250 mm. or as specified. The centre-to-centre distance of the chequer shall not less than 25mm. and not more than 50mm. The overall thickness to the tile shall be 22 mm.
- 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 tops 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 Staircase:

- 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 75 mm. from and including the nosing shall have grooves running parallel to nosing and at centers not exceeding 25 mm.

Beyond that the tiles shall have normal chequer pattern.

M-48 ROUGH KOTASTONE:

- 48.1 The kota 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 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 600 mm X 600 mm and/or size 600 mm X 450 mm 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 edge 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 chiseled, 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 edge 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 Description or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the Description of work with the permissible tolerance of plus or minus 2mm. The provisions in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edge of the face of stone slab shall be fine chiseled or polished as specified in the Description of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and Plan.
- 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 green marble of export quality Kesariyaji green or Udepur Green. Green marble shall not have any colour or ink wash, resin filling, tint, wax coating. The green marble shall be of best quality as approved by the Engineer-in-charge. Slab shall be hard, close, uniform and in texture. They shall also be free defects and cracks. The surface shall be 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 900 mm. X 1800 mm. and preferably 1200mm. X 1800 mm. 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 specimens 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 SLABS:

- 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 and soft veins, cracks or flaws.
- 52.2 The thickness of the stone shall be specified in the Description.
- 52.3 All exposed faces shall be double polished to tender truly smooth and even reletting surface. The exposed edges and corners shall be round off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

M-53 P.V.C FLOORING:

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 odor.

Thickness of flexible type covering, or tiles shall be as specified in the description of the Description.

The flexible type shall be baked with Hessian or other woven fabric. The following tolerance shall be applicable on the nominal dimensions of the sheet 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 sheet tiles.

M-54 FACTING 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 plan rectangular faces with parallel side's straight right-angle 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 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 bricks tiles shall be provided with frog which shall conform to I. S. 1077 -1992.

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

Size	Tolerance for	
	1 st Class Brick	2nd Class Brick
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.
Max below 19 cms.	Max. 2.5 mm
Max above 19 cms.	Max. 3.0 mm

- 54.5 The average compressive strength obtained as a sample of five tiles when tested in accordance's with the procure aid 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 less than 160 kg / Sq.cm.
- 54.6 The average water absorption for five brick tiles shall not be exceed 12 Percent of average weight of bricks before testing. The absorption for each individual bricks 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, sports, chipped edges and corners. The glassing shall be of uniform shade.
- 55.2 The tiles shall be of nominal size of 150 mm. X 150 mm. X 150 mm. unless otherwise specified. The maximum variation from the started 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:

Galvanized 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 galvanized iron fittings shall be 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 Description. They shall be polished bright.

57.3 The minimum finished weight of bib cock and stop shall be as given below ---

Dia.	Bib Cock	Dia.	Bib Cock	Stop Cock
8 mm	0.25 Kg.	15 mm.	0.40 Kg.	0.40 Kg.
10 mm	0.30 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 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 PROCELAIN WASH BASIN:

59.1 Wash basin shall be of white porcelain first quality best India make and it shall conform to I.S. 2556 – (Part – IV) - 1994 and I. S. 771 – 1992. the size of the wash basin shall be as specified in the Description. The wash basin shall be of one-piece construction with continued overflow 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 circular waste hole which is either rebated or beveled internally with 65mm. dia at top and 10mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the underside of the basin shall be provided. Basin shall have an internal so a 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 Description. 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 of 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 of suitable size.

M-61 ORISSA TYPE WATER CLOSED:

- 61.1 The specified 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 internal squaring pan of size 580 mm x 440 mm. with raised footrest.

M-62 INDIAN TYPE WATER CLOSET:

The India types white glazed water closet of first class quality, size as specified in the Description and conforming to I.S. 772 – 1979. And I. S. 2556 – (Part – II) – 1994. Each pan shall have integral flushing 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 if the bottom of the pan shall have sufficient slope from the fronts toward 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.

FOOTRESTS:

A pair of white glazed earthen ware rectangular footrests of minimum size 250 mm. X 130 mm. 20 mm. shall conform 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 – 1962. for steel and lead pipes respectively. 32 mm. brass wastes coupling of standards of 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 of urinal shall be flat back or corner type as specified in the Description 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 flats 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 liters 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 diameters. The outlet shall be connected with W.C. Pan by lead pipe of 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 – 1970.

M-66 CAST IRON FLUSHING CISTERN:

- 66.1 The cast iron flushing cistern shall be of 15 liters 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 outlets shall be connected to end 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 pipes 20 mm. dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanized 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 paints the flushing cistern shall be fixed on C.I. brackets. The brackets shall conform to I.S. 775 – 1990.

M-67 FLUSH COCK:

Half turn flush cock (heavyweight) shall be gun metal chromium plated of diameter as specified in the description of the Description. 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 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 nicely cast and shall be free from cracks, laps, pin holes or other imperfection shall be neatly dressed and carefully fettled.

68.2 The end of Pipes and fitting shall be reasonably square to their axis.

68.3 The sand cast iron pipes shall be 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 Tolerance: The standard weights and thickness of Pipes shall be as shown in the table below. A tolerance up to minus 10% may however be allowed against these standard weights.

Sr. No.	Nominal Dia. Of bore	Overall Thickness	Weight of Pipe Excluding Ears		
			1.5M.long	1.8M.long	2Mlong
1.	75 mm.	5.0 mm.	12.83 Kg.	16.52 Kg.	18.37 Kg
2.	100 mm.	5.0 mm.	18.14 Kg.	21.67 Kg.	24.15 Kg.
3.	150 mm				
4.	250 mm.				

A tolerance up to 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 pipe

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

1. 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.
2. 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 + 10mm and - 0 mm.
3. Rubber real rings for joints 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 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.	Nominal / Outside Dia.	Mean outside Diameter.		Outside Diameter at any Point.		Wall thickness	
		Min.	Max.	Min.	Max.	Min.	Max.
1.	75	75.0	75.3	74.1	75.9	3.2	3.8
2.	110	110.0	110.4	108.6	111.4	3.2	3.8

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 thickness of sockets on pipes.		Socket Depth Min.	Mean inside Diam. of socket at Mid-point.	
		S2, Min.	S3, Min.		Min.	Max.
1.	75	2.9	2.4	40.0	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.

The Permissible variation between the mean outside diameter & the nominal outside diameter of a pipe shall be positive in the form + x, where x is less than or equal to greater of the following two values.

- a) 0.03 mm, and
- b) 0.003 X nominal outside diameter- rounded off to the next higher 0.1 mm.

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.

- a) 0.5 mm, and
- b) 0.012 de round off to the next higher 0.1

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 PVC Multi floor Nahni trap and shall be sound and free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from cracks, 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 nahnitrap provided shall be deep seal, minimum 50 mm. except at places where trap

with deep seal cannot be accommodated. The cover shall be S.S. jail. 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 defect 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 Description.

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 weighting 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 fitting shall be of best quality as approved by the Engineer-in-charge. The pipe shall be best quality manufactured from stone-ware of fire clay, salt glazed thoroughly burnt through 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 shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5m head 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 pipes. The pipes shall generally conform to relevant I. S. 651 – 1992.

M- 72 WALL PEG RAIL:

- 72.1 The aluminum wall peg rail shall have three aluminum pegs of approved quality and size. It shall be fixed on teakwood plank of size 450 mm. X 7 mm. X 20 mm. the teak wood shall be French polished or oil painted as specified.

M-73 G. I. WATERSPOUT:

- 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 wall 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 they have better fixing. The waterspout 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 Description 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 Description and shall conform to I.S. 1703 – 1989.

M-76 BITUMEN FELT FOR WATER PROOFING AND DAMP PROOFING

76.1 Bitumen felt shall be the fiber base and shall be of type 2, self-finished felt grade -2 and shall conform to I.S. 1322 – 1998.

M-77 SELECED 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 Description. If Description 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 CRACKSEAL:

Crack seal manufactured by Chemistic / Chemisol Indian Ltd., is an acrylic base ready application compound.

M-79 CAST IRON STEPS:

The cast iron steps shall be clean, well-cast and they shall be free from air and sand holes, colds shuts and warping which are likely to impair the utility of the castings. The portion of the step which projects from walls of the manhole shall have a raised required designed above the general plan of the top surface of the step along the edges of the tread to provide adequate non-slip grip. The steps shall be of dimensions 375 mm x 150 mm x 25 mm with necessary holding arrangement and carting minimum weight of 4.5 Kg. confirming to I.S. 5455 – 1992 or its latest version.

The cast iron steps shall be coated with a material having tar base or a place bituminous composition of cashew-nut shall liquid. The coating shall be smooth and tenacious. It shall not flow when exposed to a temperature of 0-degree C.

M-80 VITRIFIED FLOOR TILES:

Vitrified floor ties shall be of the best quality like Granamite or equivalent as approved by the Architect / Consultant and Engineer-in-charge.

They shall be monolithic and available in smooth, mirror polished and anti-skid finishes, in size 24" x 24". They shall have a size tolerance of + / - 0.5%, in length and width and + / - 5% in thickness. Allowable warpage shall be + / - 0.2%. Allowable squareness wedging shall be + / - 0.5%. Their water absorption rate shall be less than 0.5%. They shall offer hard- working and hard-wearing floors for homes, public building, apartments and airports.

They shall be extremely strong, breaking strength of the tile being 1600 Kg/Sq.cm. flexural strength 200 Kg/Sq.cm. and bonding strength of 2500 KG/Sq.cm. The shall offer good resistance to abrasion, i.e. greater than 100. they shall be scratch resistant, their hardness on the Moh's scale shall be minimum 7. They shall be able to resist thermal shock up to 10 cycles. They shall have bond strength of 2500 Kg/Sq.cm. and shall have 0.60 co-efficient of

Friction for the polished / unpolished surfaces. All joints of the slabs shall align in both directions.

M-81 STAINLESS STEEL RAILING:

The Stainless-Steel railing pipe shall be specified size and quality. The S.S. railing pipe shall conform to steel of grade designation 312 conforming to IS 13983.

The S.S. pipe shall be of 50 mm dia and of 16-gauge (1.62 mm) thickness with S.S. plate of 2.00 mm thickness.

The S.S. rod and flat shall be of steel grade AISI 312.

M-82 ACRYLIC EMULSION PAINTS:

It shall be from ICI, Nerolac, Asian Paints, Berger, as approved by the Engineer in charge and Engineer-in-Charge. It shall conform to the relevant IS codes.

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.

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-83 BARBED WIRE:

The barbed wire shall be of galvanized steel, and it shall generally conform to I.S. 278-1978. The barbed wire shall be of type-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two bars shall be 75 mm. unless otherwise specified in the item. The barbed wire shall be formed by twisting together two-line wires, one containing the barbs. The size of the line and point wires and barb spacing's 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.

The barbs shall carry four points shall be formed by twisting two-point wires, each two turns, lightly round one line wire, making altogether four complete turns. The barbs shall be so finished that the four points are -set and looked at right angles to each other. 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.

The line and point wire shall be circular 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 weld other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.

The lengths per 100 Kg. of barbed wire I.S. type I shall be as under Nominal 1000 meter Minimum 834 Meter Maximum 1066 Meter.

M-84 WATER BOUND DISTEMPER

It shall be from Asian, Berger or Asian or equivalent as approved by Architect. It shall conform to relevant IS codes.

It can be in powder form or liquid form as per the manufacture's specification. If it is in powder form, it can be prepared by adding warm water in the proportion recommended by the manufacture.

It shall be applied by the conventional distemper brush to all plastered surfaces. It shall be applied by the conventional distemper brush to all plastered walls, ceilings and woodwork. Priming coat shall be applied before applying the paint.

M-85 PLASTIC EMULSION PAINT

Plastic emulsion paint shall conform to IS: 5411 of approved brand and manufacture and of the required shade shall be used.

The plastic emulsion paint is not suitable for application on external, wood and iron surface and surfaces which are liable to heavy condensation. These paints are to be used on internal surfaces except wooden and steel.

M-86 CEMENT PAINT

The cement paint shall be (conforming to IS: 5410) of approved brand and manufacture.

The cement paint shall be brought to the site of work by the contractor in its original container in sealed condition. The material shall be brought by the contractor at a time in adequate to suffice for the whole work or at least for a fortnight's work. The material shall be kept in joint custody of Architect and engineer-in-charge. Empty tins shall not be removed from the site of work, till this item of work has been completed and passed by the engineer-in-charge.

It shall be manufactured from selected range of raw materials and a special cement, so the it shall be suitable for both indoors and outdoors. It shall be suitably used on concrete renderings, cement/sand renderings, cement/lime/sand renderings, asbestos sheets, fiber boards, brickwork, etc. It shall offer matt finish. It shall require no primer and shall be water thinkable. It shall offer a covering capacity as per manufacture's specification, depending on the surface and shade used. It shall preferably not be applied under direct sunlight to avoid patchy effect.

M-87 TEXTURED WALL FINISH

It shall be from Bakelite Hilum Ltd or equivalent as approved by Architect or engineer-in-charge. It shall conform to relevant IS codes. It shall be granules, flakes, granite flakes and granules and flakes mix. It shall be of two component, or one component as specified by the Architect or engineer-in-charge. It shall be easily applicable by trained applicators. The single coat shall be 1.5 mm thick as specified in the item description. It shall be weather and fade resistant, water and damp resistant, durable and highly washable. It shall be acid and alkali resistant, high abrasion resistant, non-toxic and shall be capable to taking any shape. It can be applied on wide variety of surface like cement mortar, plywood, plaster board, AC sheet, Asbestos board, gypsum plaster or any other materials, to get homogenous layer.

It shall be water thinkable to avoid water contamination, incombustible and flexible. It shall be good fire-resistant, anti-fungal, good impact resistant having adhesion strength more than 8 kg. /cm². There shall not be any development of hair line cracks and no peeling off shall occur, after the maximum drying time of 4 hours and curing period of 2 days.

M-88 SILICONE PAINT

It shall be of the best quality, like Wacker, GE Silicone, Pixilate, Dow Corning or equivalent, as approved by the Architect and Engineer-in-charge. It shall conform to the relevant IS Codes.

It shall be prepared by mixing Silicone and Epoxy. It shall be applied on dry as well as damp surfaces. It shall be non-toxic and odorless, so shall be suitable for drinking water structures also. It shall render the surface impervious to water and shall prevent water penetration. It itself shall penetrate into the structure and shall form a strong film on the pores of the structure surface, making the surface watertight, non-toxic and erosion free. It shall be water thinkable. Before use, the hardener of the Silicon ate Epoxy shall be mixed with resin and thinned with water, in the proportions described by the manufacturer. It shall be applied with a suitable spray gun with a fine nozzle. An overlap of 25 to 30 cm. shall be preferred. It shall be semitransparent but on drying it shall become transparent.

M-89 SYNTHETIC ENAMEL PAINT

Synthetic Enamel paint shall conform to IS: 2933. It shall be from Nerolac, Berger, Asian Paints or equivalent. It shall offer variety of finishes like Glossy, Semi-glossy, Pearl luster and Matt finish.

It shall be applied either by brush, roll or spray. It shall have a covering capacity of as specified by the manufacture, depending on the surface to be painted. It shall be used both on metal and wood surfaces.

It shall have a viscosity of application of 30 to 40 seconds, if brush or rollers are used and 20 to 25 seconds, if spraying is done. The drying time shall however vary with the ambient temperature and humidity.

M-90 FRENCH POLISH

Pure Shellac conforming to IS: 16 varying from pale orange to lemon yellow color free from resin or dirt shall be dissolved in methylated spirit at the rate of 140 gm. of Shellac to 1 liter of spirit. Suitable pigment shall be added to get the required shade.

Readymade polish conforming to IS: 348 can also be used. The French polish so prepared shall Conform to IS: 348.

M-91 ALUMINUM SHEETS

It shall be of the best quality and from reputed manufacturer like Hidalgo or equivalent, as approved by the Architect and Engineer-in-charge. It shall conform to IS: 1254, in all respects. The aluminum alloys used in the manufacture of the sheets shall conform to IS: 737.

The sheets shall be extremely light with high-strength-to weight ratio. Having a density of about 2.70 gms/cm³. It is corrosion resistant in almost any kind of environment. Even in highly corrosive industrial environments, it should be resistant to fumes and vapors of organic compounds and to chemicals like ammonia, carbon-dioxide and acids like hydrochloric acid, nitric acid and sulphuric acid. This corrosion resistant property gives the metal a long life and keeps it looking good throughout its life the sheets shall be non-fragile and shall be exceptionally durable. As aluminum reflects a high proportion of the radiant heat, the sheets provide excellent insulation when used for cladding/roofing. The sheets shall be non-combustible, non-flammable and non-sparking. As aluminum is elastic, the sheets shall offer high resistance to denting and shall be shatter-proof. Co-efficient of linear expansion of aluminum is 0.000024 per co. and therefore the lateral expansion of the sheets shall be readily accommodated in the corrugations. The sheets shall offer no health hazard and shall be totally hygienic. Aluminum is a good conductor of heat, its high reflectivity of radiant heat and light (75 to 80 per cent when new, 60 per cent after several years) keeps the interiors of an aluminum building from five to eight-degree Celsius cooler in summer while its low emission rate cuts heat loss during winter.

It shall be available in trapezoidal and rounded corrugations and shall be extensively used for various Industrial buildings, Warehouses, Aircraft hangers, Power plants, Storage sheds, Bunk houses etc. It shall be innovatively used as interior partitions, wall panels, false ceiling etc.

M-92 PVC SHEET

PVC sheet should be of Finolex or equivalent as sample approved by Architect and engineer-in-charge. PVC sheet should be corrosion resistant and chemical resistant. It should resist actions against chemicals like mineral acids, alkalis, plating solutions, pickling solutions, paper making chemicals, most inorganic compounds, alcohols, aliphatic hydrocarbons, glycols, amines and phenols in both liquid and vapor form.

It should be hygienic, virtually maintenance free, UV resistant, highly flexible so that it can be bent perpendicular or parallel to corrugation. It should be light weight than it can be easily handled and transported.

It should possess excellent thermal insulation and rust proof to make it ideal for coastal region.

It should be fire retardant it should be as per the sample approved by engineer-in-charge. It should be such type that it can be used in heavy industries, factories and warehouses, agricultural and food processing industries and for coastal construction.

M-93 PVC WATER STOPS

The PVC water stop shall be of approved make, as approved by the Architect and Engineer-in-charge.

It shall have optimum resilience, high elasticity & stretch strength, immune to corrosion, excellent weather resistance. They shall be manufactured to safeguard against hydrostatic pressure, water seepage, expansion or contraction of joints and to take care of any deflection or displacement arising due to change in temperature or settlement of foundation to eliminate danger of cracks.

They shall be effective in tropical climate having high mechanical strength, good ageing, longer life, shall be unaffected by acids, alkalis, metal salts and other chemicals. It shall not be hazardous and shall have fire retardant properties. It shall absorb less water than rubber, shall work as watertight seal but shall allow safe passage of seepage water and shall withstand high hydrostatic pressure. It shall be easily welded and can be installed easily, having high tensile strength and shall be capable of bearing heavy shocks arising due to turbines, earthquakes, floods etc.

It shall withstand a minimum hydrostatic pressure of 30 m. high column of water.

The selection criteria of water stop depends upon the hydrostatic pressure; however the following points should be kept in mind:

- 1) Where substantial expansion/contraction of joints takes place, Dumb Bell type shall be used.
- 2) Where a firm grip in concrete is desired, serrated types should be used.
- 3) The overall width of the water stop should not be greater than the thickness of concrete.
- 4) The distance from the face of the concrete to the water stop must not be less than half the width of the water stop.
- 5) The width of the water stop must be at least 6 times the largest aggregate used for satisfactory compaction.

The prior approval of selected size and type of water stop shall be taken from the Architect and Engineering-charge, before use.

M-94 ADMIXTURES FOR MASS CONCRETE AND MORTAR**M-94A Joint Sealant:**

94A.1 the sealant shall be of best quality and from manufacturer like CICO, MC-BAUCHEMIE, PIDILITE, Hamper equivalent, as approved by the Architect and Engineer-in-charge. The prior approval for the source shall be taken from the Architect. It shall conform to the relevant IS Code.

94A.2 it shall be a two-component poly supplied rubber joint sealant, based on a low molecular weight polymer. It should not contain chlorides or other corrosive substances.

94A.3 It shall be used for sealing joints in water retaining structures, roofs, external walls, cladding, floors, partitions, ceilings etc. It shall have excellent property to adhere most of building materials like Aluminum, Stainless Steel, Glass, Concrete, Marble, Stone, Brick, Masonry block, Plaster, Ceramic and quarry tiles, Timber etc. The modulus of elasticity of the sealant shall be less than 0.16 MPa, +10% at 100% elongation. The shore "A" hardness of the sealant shall be 22+3 @ 25°C. The operating temperature range for the sealant shall be -25°C to 80°C. The permanent dynamic movement capability of the sealant shall be +25%. The tensile strength of the sealant shall not be less than 0.4 MPa. The optimum width/depth ratio shall be 2:1. The Sp.gr. of the sealant shall be 1.6 kg/lit. The sealant should be capable to resist attack of water, sunlight, oxidation, corrosive fumes, oils, petrol, diluted acids and alkalis, salt spray, aliphatic and aromatic solvents and shall not contain tar or bituminous ingredients. **89A.4** it shall possess the properties like 550% elongation at break, non-toxicity when fully cured, no staining and shrinkage less than 1%. The trafficable strength shall be achieved within 24 hours and full at 7 days (at 25°C & 250% RH). It shall possess excellent coverage capacity and more strength at low dry temperatures.

M-94B Abrasion Resistant Industrial Flooring Aggregate:

94B.1 the flooring aggregate, shall be of best quality and from manufacturer like CICO or equivalent, as approved by the Architect and Engineer-in-charge. The prior approval for the source shall be taken from the Architect. It shall conform to the relevant IS Code.

94B.2 the flooring aggregate shall be a factory processed and specially graded non-oxidizing, non-magnetic and chemically inert metallic flooring aggregate, free from oil and grease.

94B.3 it shall be used as a surface hardener to concrete floors. It is recommended for Factory floors, Warehouses, Hangers, Car parks and such other areas, subjected to heavy vehicular traffic. It shall also be used on open and continuously wet surfaces. The flooring aggregate shall build in wear resistance and shall produce high abrasion resistant floor surface. It shall impart extreme surface density and shall resist oil and water penetration. It shall provide a non-rusting floor surface which is easy to maintain.

94B.4 It shall be used with cement in the ratio, as per the manufacturer's instructions and spread evenly on the surface to be treated, at the rate depending on the type of floor. The flooring aggregate shall be spread when the surface of the concrete floor is still fresh, i.e. as soon as the surface water has evaporated and then trowled, in stages, to bring about a uniform and smooth finish.

M-94C Concrete Hardener and Dustproofed:

94C.1 The Concrete hardener and dustproofed, shall be of best quality and from manufacturer like CICO or equivalent, as approved by the Architect and Engineer-in-charge. The prior approval for the source shall be taken from the Architect. It shall conform to the relevant IS Code. 90C.2 It shall have a specific gravity of 1.18 and shall be applied on concrete floors, at the rate of at least 25 lit's per 100 m². Per coat. A total of three coats shall be applied for permanently hardened concrete floor, with increased abrasion resistance, increased surface density, and increased resistance to chemical attack and to eliminate dust accumulation. Drying time of 4-6 hours for each coat shall be allowed before the floor is put to use or is applied with another coat of the product. Precautions shall be taken while using the product, to avoid contact with eyes and open wounds and to work in good ventilation. After application, the affected parts shall be washed copiously. It shall not be stored for a period of more than 2 months before use.

M-94D Water Repellent Coating:

94D.1 The Water repellent coating, shall be of best quality and from manufacturer like CICO or equivalent, as approved by the Architect and Engineer-in-charge. The prior approval for the source shall be taken from the Architect. It shall conform to the relevant IS Code.

94D.2 Water repellent coatings for exterior exposed surfaces shall be acrylic resin based, having a Flash point of approx. 400C and specific gravity of 0.95.

94D.3 it shall be suitably used for concrete, brick, stone and plastered surfaces preventing moisture penetration and thus any damage to the interiors. It shall be quick acting, long lasting, invisible i.e. colorless so as to maintain the original color of the surface treated. It shall impart sealing characteristics so that the treated surface becomes stain and dust free. The coating itself shall not darken or turn yellow with age.

M-94E Accelerating, Water Reducing Admixture and Plasticizer:

94E.1 The Accelerating, Water reducing admixture and plasticizer, shall be of best quality and from manufacturer like CICO or equivalent, as approved by the Architect and Engineer-in-charge. The prior approval for the source shall be taken from the Architect. It shall conform to the relevant IS Code.

94E.2 It shall be in liquid state with a specific gravity of 1.30 and complying with ASTM C-494 Type E, IS : 9103 & IS : 2645. It shall accelerate the setting and hardening of the concrete mix, thereby achieving higher early age strength. It shall reduce the water content of the concrete without affecting its workability. It is useful for pre-cast/pre-stressed works,

structural concrete works, floors, roads, runways, paving etc. It shall be used at the rate instructed by the manufacturer, with cement, depending on the amount of acceleration of hardening required. It should be compatible to all types of cement.

M-94F Retarding, Water Reducing Admixture and Plasticizer:

94F.1 The Retarding, water reducing admixture and plasticizer, shall be of best quality and from manufacturer like CICO, Feb Rife or equivalent, as approved by the Architect and Engineer-in-charge. The prior approval for the source shall be taken from the Architect. It shall conform to the relevant IS Code.

94F.2 It shall be in liquid state with a specific gravity of 1.22 and complying with ASTM C-494 Type B & D, IS : 9103, CRD-C87 Type B & D, BS 5075 Part 1. It shall be added to the concrete mix during the mixing process, at the same time as the water or the aggregates. No extension of normal mixing time is necessary. It shall extend the period of time as to placing the concrete and compacting, i.e. delay the initial and final setting time. It shall help to spread the heat of hydration over a longer period of time. It shall give a highly workable concrete with a low W/C ratio. It shall be used at the rate instructed by the manufacturer, with cement, depending on the amount of acceleration of hardening required. It should be compatible to all types of cement.

M-95 Corrugated GI Sheet

CPWD specification clause no. 12.1.1, 12.1.2 shall be followed.

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

Signature of the Contractor with seal

14 FREQUENCY OF TESTS (CIVIL WORKS)

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
	Soil		IS 2720
	Core cutter test	At every 500 m3. of compacted earth filling for mass filling work	
	Standard Proctor Test	Once for each source of earth	
	Coarse Aggregate / Fine Aggregate		
	Specific gravity	Once or Charge in source	IS 2430 - 1986
	Bulkage of Sand	In monsoon/Rainy season when concreting is done by volumetric batching this test is to be performed daily and necessary Bulkage corrective to be applied	
	Dry/Loose Bulk density	As and when required	
	Silt content in Sand	For each source	
	Aggregate impact value	If the source explored between 501-1500 cum take one gross sample at each 100 cum. If the source explored between 1501-5000 cum, take one gross sample at each 200 cum.	
	Sieve analysis of aggregate		IS 2386
	Aggregate crushing value		
	Flakiness Index Thickness Test		
	Bricks		IS 5454-1978
	Visual Check	Total 20 Nos. of Bricks to be selected from three trucks (i.e.; 6 to 7 bricks from each Truck)	
	Dimensioned Check		
	Water absorption	For each source Random 3 Nos. to be tested from 20 Nos. of bricks as selected in 6 (i) & 6(ii)	
	Compressive strength		
	Cement		IS 3535 - 1986
	Fineness of cement	For each batch received at site or and above test certificates from manufacturer/ supplier. Will have to be brought by the contractor.	
	Standard consistency of cement		
	Setting time		
	Compressive strength		
	Soundness		
	Reinforcement Steel		IS 1786-1985

Sr. No.	Title		Frequency of Test / Check	Relevant IS Codes	
	i. Rolling margin		For bar dia. < 10mm – One sample from each 25 tonne or part thereof For bar dia. 10mm to 16mm – One sample from each 35 tonne or part thereof For bar dia above 16mm – One sample from each 45 tone or part thereof One sample consists of 3 Nos. of bars of at least 0.5m length		
	ii. Tensile Test iii. Elongation iv. Bend – Rebend test		For each lot received at site or and above test certificates from manufacturer/supplier. Will have to be brought by the contractor.		
	Structural Steel			IS 2062-1992	
	i. Rolling Margin		One sample for each 20 MT or part thereof		
	ii. Tensile test iii. Elongation iv. Bend – Rebend test				
7.	Concrete			IS 456-2000	
	i. Slump Test ii. Compressive strength		For each concrete cube set The cube samples shall be taken for each grade of concrete for following daily concrete quantity		
			Qty. of concrete in Cum (Daily)	Number of Samples	
			1-5	1	
			6-15	2	
			16-30	3	
			31-50	4	
			51 and above	4 plus one additional for each 50 cum. of concrete	
			One sample consists of six nos of cubes. Three for 7 days and three for 28 days strength. However, where 7 days strength is not required the sample size may be reduced to three nos of cubes for 28 days strength only. Standard deviation to be taken every month The frequency is to maintain for initial period, till consistent results are obtained. It may be reduced as per engineer in charge’s discretion		
8.	Calibration of test equipment		As per frequency set in Laboratory Manual		
9.	Inspection and test status		Daily		

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
10.	Control of nonconforming product	On occurrence of Nonconformity	
11.	Frequency of Tests for road works		
a	Sand Content	2 tests per 3000 cum of Soil	IS : 2720 (Part 4)
b	Plasticity Test	2 tests per 3000 cum of Soil and each type of soil sample	IS : 2720 (Part 5)
c	Density Test	2 test per 3000 cum of soil and each type of soil sample	IS 2720 (Part 8)
d	Deleterious Content Test	As and when required	Is 2720 (Part 27)
e	Moisture Content Test	1test for every 250 cum of soil	Is 2720 (Part 2)
f	CBR Test	1 test per 3000 cum of soil, on soaked and unsoaked sample	IS 2720 (Part 16)

Frequency of Tests for Earth work in Embankment:

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
1.	Field density tests either by core cutter method or sand replacement method	every 500 Cmt. of earth placed in the embankment	
		one test for every full or part shift of compaction operations	
		one test for every 50 m length of bund in each layer	
		every 500 sq. meters area of the trimmed slopes	

Frequency of Tests for Prime Coat / Tack Coat:

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
1.	Quality of Binder	2 Samples per lot to be subject. some tests as directed by the Engineer	
2.	Binder Temp. for application	At regular close intervals	
3.	Rate of Spread of Binder	2 tests per day	

Frequency of Tests for Dense Bituminous Macadam / Asphalt Concrete:

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
1.	Quality of Binder	2 Samples per lot to be subject some tests as directed by the Engineer	
2.	Aggregate Impact Value	1 Test per 50 m3 of Aggregate	
3.	Flakiness Index and Elongation Index	1 Test per 50 m3 of Aggregate	
4.	Stripping Value	Initially One set of 3 representative specimens for each source of supply. Subsequently when warranted by changes in the quality of aggregate.	
5.	Water Absorption of Aggregate	Initially One set of 3 representative specimens for each source of supply. Subsequently when warranted by changes in the quality of aggregate.	
6.	Sand Equivalent Test	As required	
7.	Stone Polishing Value	As required. For Bituminous Concrete	
8.	Mix Grading	One set of test on individual constituents and mixed aggregate from the dryer for each 400 tonnes of mix subject to a minimum of two tests per plant per day.	
9.	Stability of Mix	For each 400 tonnes of mix produced, a set of 3 Marshall specimens to be prepared and tested for stability, flow value, density and void content subject to minimum of 2 sets being tested per plant per day.	
10.	Water Sensitivity of Mix (Retention of Marshall Stability)	As required for bituminous concrete.	
11.	Swell test on the Mix	As required for bituminous concrete.	
12.	Control of Temp. of Binder in boiler, Aggregate in the dryer and Mix at the time of Laying and Rolling	At regular close intervals	
13.	Control of Binder content and Gradation in the Mix	One test for each 400 tonnes of mix subject to a minimum of 2 sets per day per plant. Regular control and through checks on the weight of mixed material and layer thickness.	

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
14.	Rate of Spread of Mixed Material	One test per 250 m2 area.	

Frequency of Tests for Granular Sub Base:

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
1.	Gradation	One test per 200 m3	MORT&H
2.	Atterberg limit	One test per 200m3	
3.	Moisture content prior to compaction	One test per 250 m2	
4.	Density of compacted layer	One test per 500 m2	
5.	Deleterious constituents	As directed by engineer in-charge	Is 2720 (Part 27)
6.	C.B.R.	As directed by engineer in-charge	IS 2720 (Part 16)

Frequency of Tests for Wet Mix Macadam:

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
1.	Aggregate Impact Value	One test per 200 m3 of aggregate	IS 2386
2.	Grading	One test per 100 m3 of aggregate	MORT&H
3.	Flakiness and Elongation Index	One test per 200 m3 of aggregate	IS 2386

4.	Atterberg limits of portion of aggregate passing 425 micron sieve	One test per 100 m3 of aggregate	
5.	Density of compacted layer	One test per 500 m2	

Frequency of Tests for WaterBound Macadam Sub Base/Base: IS 2386 and MORT &H

Sr. No.	Title	Frequency of Test / Check	Relevant IS Codes
1.	Aggregate Impact Value	One test per 200 m3 of aggregate	
2.	Grading	One test per 100 m3 of aggregate	
3.	Flakiness and Elongation Index	One test per 200 m3 of aggregate	

ALL TESTS SHALL BE CARRIED OUT BY THE CONTRACTOR AT HIS OWN COST.

15 GENERAL TECHNICAL SPECIFICATION FOR ELECTRICAL INSTALLATION WORK

All electrical items specification shall be as per detailed item specification and as per general specification for electrical installation work and as per instruction of engineer in charge.

Below list of items are likely to be used in the project. However, final capacity/size/rating etc shall be decided during detailed engineering and they should be got approved from EIC.

This list should be considered as technical specifications. For any query or discrepancy follow the detail tender specifications or IS Rules decision of EIC shall be final and binding.

The list below is indicative, not exhaustive. Necessary items required to be added for satisfactory completion of the project should be considered as part of the scope of work.

1. INTERNAL WIRING

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 etc. including fixing of light fixtures, ceiling fan, exhaust fan, wall fan etc.

1.1 STANDARDS

The following standards and rules shall be applicable:

STANDARD NO.	PARTICULAR
IS : 732	Code of practice for electrical wiring installation (System voltage not exceeding 650 V)
IS : 1646	Code of practice for fire safety of buildings (General) Electrical installation.
IS : 2509	Rigid non-metallic conduits for electrical wiring.
IS : 6946	Flexible (Pliable) non-metallic conduits for electrical installation.
IS : 1293	3 pin plugs and sockets.
IS : 8130	Specifications of conduits for electrical installation.
IS : 3854	Switches for domestic purpose.
IS : 3415	Fittings for rigid non-metallic conduits.
IS : 4648	Guide for electrical layout in residential building Indian electricity act and rules.

Regulations for the electrical equipment in buildings issued by the Bombay Regional Council of Insurance Association of India.

All standards and codes mean the latest.

1.2 POINT WIRING

A point shall consist of the branch wiring from the distribution board together with a switch as required, including the ceiling rose or pendant holder or swan holder, or ceiling fan box or socket or suitable termination. A point shall include, in addition, the earth continuity conductor / wire from the distribution board to the earth pin / stud of the outlet / switch box and to the outlet points.

The point wiring shall be carried out in the under mentioned manner :

- 1.2.1 Supply, installation, fixing of conduits with necessary accessories, junction / pull / inspection / switch boxes and outlet boxes.
- 1.2.2 Supplying and drawing of wires of required size including earth continuity wire.
- 1.2.3 Supply, installation and connection of flush type switches, sockets, cover plates, switch plates, etc.
- 1.2.4 The point shall be complete with the branch wiring from the Switch board to the outlet point, Pre laid conduit with accessories, junction, pull, inspection boxes, control switch, socket, outlet boxes, ceiling roses, button / swan holder, connector etc.

1.3 POINT RATE

The rate per point shall include supply, installation, connection, testing and commissioning of point as described under “point wiring”. The measurements of the points will be enumerated.

Circuit Mains shall not be paid extra. Rate for the point shall consist of wiring from the outlet point to the switch board as required with a connector/ plate/ ceiling rose fan box with hook socket with switch. The point rate shall include in addition to phase and neutral wire a PVC insulated earth continuity wire from switch to outlet. The unit rate for the point shall consist of the circuit wiring from LDB to outlet point through switch and/or socket, switch board as required and including the outlet points with connector, fan hook box or sockets. A point shall include in addition to phase and neutral wire a PVC insulated Earth continuity wire from LDB to the final termination at outlet points. No extra rate shall be paid for circuit mains for looping switch board to switch board.

1.4 SYSTEM OF WIRING

Unless otherwise mentioned on the drawings, the system of point wiring shall be as follows:

The system of wiring shall consist of single core, PVC insulated, 650/1100 volt grade, copper conductor FRLS wires laid through concealed PVC conduits as directed.

1.5 GENERAL

The contractor shall submit for approval, the drawing of conduit layout indicating the route of the conduits, number and size of the conduits, location of junction / inspection / pull / outlet boxes, size and location of switch boxes, number and size of wires pulled through each conduit and all other necessary relevant details prior to laying of conduits. Only after the drawings are approved, the contractor shall proceed the work of conduit laying.

Prior to laying and fixing of conduits, the contractor shall carefully examine the working drawings prepared by him and approved by the Consultant indicating the layout, satisfy himself about the sufficiency of number and sizes of conduits, location of junction boxes, sizes and location of switch boxes and other relevant details. Any discrepancy found in the drawings shall be brought to the notice of the Owner's site representative. Any modifications suggested by the contractor shall be gotten approved before the actual laying of conduits is commenced.

In laying of conduits, it is important that not more than two right angle bends are provided for each circuit and as far as possible. No junction box shall be provided in the entire length of conduit run for drawing of wires. Only switch outlets, lighting fixture outlets, equipment power outlets and socket outlets shall be considered for drawing of wires.

1.6 MATERIAL

1.6.1 PVC CONDUITS :

All non-metallic PVC conduits shall conform to IS : 9537. The conduit shall be plan and type as specified in IS : 9537 and shall be used with the corresponding accessories (Refer IS : 3419 specification for fittings for rigid non PVC metallic conduits). PVC conduits shall be rigid unplasticised, medium gauge having 1.6 – 1.8 mm. wall thickness up to 20 mm. diameter conduit and 1.8 - 2 mm. wall thickness for all sizes above 20 mm. diameter.

1.6.2 BOXES:

All the boxes for switches, sockets and other receptacles, junction boxes, pull boxes and outlet boxes shall be fabricated from 2.0 mm. thick mild sheet painted with two coats of red-oxide and then two coats of enamel paints as called for. Colour of the paints shall be as approved by the client. The boxes shall have smooth external and internal finished surface. Boxes in contact with earth or exposed to the weather shall be of 2 mm. mild steel and hot dip galvanized after fabrication. Separate screwed earth terminal shall be provided in the box for earthing purpose. All boxes shall have adequate no. of knock out holes of required diameter for conduit entry. Switch boxes to receive switches, socket outlets, power outlets, telephone outlets, fan regulators, etc. shall be fabricated to the approved shape and size to accommodate all the devices without overcrowding. Outlet boxes to receive ceiling fan shall be fitted with adequately sized rod / hook to fix ceiling fan. The boxes shall be of minimum depth of 65 mm.

1.6.3 COVER PLATE:

The cover of the boxes to receive outlet points shall be of best anodized sheet cut to shape and size or plate of approved manufacturers of switches.

1.6.4 CABLES:

The cables shall conform to IS : 694. For all internal wiring FRLS wires of 650 / 1100 volts grade, single core shall be used.

The conductors shall be plain annealed copper conductors complying with IS : 1554.

The conductors shall be circular copper conductor.

The insulation shall be PVC complying with the requirements of IS : 694. It shall be applied by an extrusion process and shall form a compact homogenous body.

The thickness of PVC insulation shall be as set out in the relevant standards

The cores of all cables shall be identified by colours in accordance with the following sequence.

Single phase	-	Red
Three phase	-	Red, Yellow, Blue

Neutral	-	Black
Earth	-	Green or Green/Yellow

Means of identifying the manufacturer shall be provided throughout the length of cable.

Unless otherwise specified in the drawings the size of the cables used for internal wiring shall be as follows:
In case of circuit wiring for lights, exhaust fans, convenience socket outlet points (P+N+E) :

3 nos. of 1.5 mm.² -From switch boards to outlet points

1.6.5 SWITCHES:

Switches shall conform to IS: 3854, IS: 1293 and IS : 4615. The switches shall be single pole, single or two way and shown on the drawings or as specified. They shall be of piano (tissino type) type rated for 250 volt, and of full 5 / 15 A capacity. They shall be provided with insulated dollies and covers.

The switches shall be rocker operated with a quite operating mechanism with bounce free snap action mechanism enclosed in an arc resistant chamber. The switches shall have pure silver and silver cadmium contacts. The switches shall be flush modular type the make of the switches shall be as indicated in the drawings or BOQ or make of material or as suggested and approved by the client. The switches installed in outdoor area shall be industrial, metal clad type, and shall be provided in weatherproof enclosures, complete with weatherproof gasketed covers.

1.6.6 SOCKETS:

The sockets shall conform to IS: 1293. Each socket shall be provided with control switch of appropriate rating. The sockets shall be piano(tissino type) type, rated for 250 volts, and either of full 5 A or 15 A capacity, as mentioned on the drawings.

Sockets shall be of three pin type, the third in being connected to earth continuity conductor. The socket shall be flush modular type. The sockets installed in machine room, plant room or wet / damp area shall be metal clad weatherproof type. The finishing and make of all the sockets shall be same as light switch. The socket shall have fully sprung contacts and solid brass shrouded terminals to ensure positive electrical connections.

The sockets shall be provided with automatic shutters, which opens only when earth pit of the plug inserts in the socket.

The socket shall be provided with three pin plug top suitable to the socket and of the same make as socket.

1.7 DRAWING OF CONDUCTORS

The drawing and joining of copper conductor or wires shall be executed with due regard to the following precautions, while drawing insulated wires into the conduits, care shall be taken to avoid scratches and kinks which may cause breakage of conductors. There shall be no sharp bends.

Insulation shall be shaved off for a length of 15 mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting it square or ringing.

PVC insulated copper conductor wire ends before connection shall be properly soldered (at least 15 mm length) with soldering flux / copper solder, for copper conductor. Strands of wires shall not be cut for

connecting to the terminals. The connecting brass-screws shall have flat ends. All looped joints shall be soldered and connected through terminals block / connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductors having nominal cross section are exceeding 4 sq. mm shall always be provided with crimping type cable sockets. At all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connections.

Only certified wire man and cable jointers shall be employed to do joining work.

For all internal wiring PVC insulated wires of 650 / 1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in looping system and no joint shall be allowed in the length of the conductors. No wire shall be drawn into any conduit, until all work of any nature that may cause injury to wire is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Before the wires are drawn into the conduits the conduits shall be thoroughly cleaned of moisture, dust, and dirt or any other obstruction by forcing compressed air through the conduits.

Maximum permissible number of 1100 volt grade PVC insulated wires that may be drawn into rigid nonmetallic, or PVC Conduits are given below:

Size of wires Nominal Cross	Maximum number of wires within conduit size(mm)				
section Area (Sq. mm.)	20	25	32	40	50
1.5	5	10	14	--	--
2.5	5	8	12	--	--
4	3	7	10	--	--
6	2	5	8	--	--
10	--	3	5	6	--
16	--	2	3	--	6
25	--	--	2	4	6
35	--	--	--	3	5

1.8 JOINTS

The wiring shall be by looping back system, and hence all joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. **No joints shall be made inside conduits and junction boxes.** Joints where unavoidable, due to any specified reasons, prior permission in writing shall be obtained from the client before making such connections. Joints by twisting conductors are prohibited.

1.9 LOAD BALANCING

Balancing of circuit in three phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

1.10 EARTHING

All earthing systems shall be in accordance with IS: 3043 - 1985 code of practice for earthing.

1.11 TESTING OF INSTALLATION

Before a completed installation is put into service, the following tests shall be complied with.

1.11.1 INSULATION RESISTANCE

The insulation resistance shall be measured by applying 500-volt megger with all fuses in places, circuit breaker and all switches closed.

The insulation resistance in giga ohms of an installation, measured shall not be less than 50 mega ohms divided by the number of points on the circuit.

The insulation resistance shall be measured between

EARTH TO PHASE

EARTH TO NEUTRAL

PHASE TO NEURAL

PHASE TO PHASE

1.11.2 EARTH CONTINUITY PATH:

The earth continuity conductors shall be tested for electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit-breaker, measured from the connection, with the earth electrode to any point in the earth continuity conductor in the completed installation and shall not exceed one ohm.

1.11.3 POLARITY OF SINGLE POLE SWITCHES:

A test shall be made to verify that every no-linked, single pole switch is connected to one of the phase of the supply system.

1.11.4 COMPLETION CERTIFICATES:

All the above tests shall be carried out in presence of client and the results shall be recorded in a prescribed form. Any default during the testing shall be immediately rectified and that section of the installation shall be retested. The completed test result form shall be submitted to the client for approval.

On completion of an electric installation a certificate shall be furnished by the contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out. This certificate shall be in a prescribed form as required by the local electric supply authority.

2. DISTRIBUTION BOARDS

DISTRIBUTION BOARDS (DB's)

Distribution Boards (DB's) shall be suitable for operation on 3 Phase/single phase, 415/240 volts, 50 cycles, neutral grounded at transformer. The DB shall be minimum di-electric strength of 2.5 KV / Sec. All Distribution Boards shall be manufactured by a manufacturer listed in Appendix-I.

DB's shall comply with the latest Relevant Indian Standards and Electricity Rules and Regulations and shall be as per IS-13947-1993.

2.1 CONSTRUCTION FEATURES

DB's shall be IP 43& made out of 1.6 mm thick high quality CRCA sheet steel and shall be pre-treated and powder coated sheet steel used in the construction of DB shall be folded and braced as necessary to provide a rigid support for all components. DB shall be suitable for indoor / outdoor installation, wall mounting free standing type, in double door construction. The Distribution Boards shall be totally enclosed, completely dust and vermin proof and shall be with hinged doors, Neoprene gasket, padlocking arrangement. All removable/ hinged doors and covers shall be grounded by 4.0 sq mm tinned stranded copper connectors. Distribution Boards shall be suitable for the climatic conditions. Joints of any kind in sheet metal shall be seam welded, all welding, slag shall be rounded off and welding pits wiped smooth with plumber metal. The general construction shall conform to IS-8623-1977 (Part-1) for factory built assembled switchgear & control gear for voltage up to and including 1100 V AC.

All panels and covers shall be properly fitted and square with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with wing nuts. Self-threading screws shall not be used in the construction of DBs.

Three phase boards shall have phase barriers and a wire channel on three sides. Neutral bars shall be solid tinned copper insulated bars with tapped holes and chase headed screws. For 3 phase DB's, 3. Independent neutral insulated bars shall be provided. All DB's shall be internally pre-wired using copper insulated PVC wires brought to a terminal strip of appropriate rating for outgoing feeders.

Knockout holes of appropriate size and number shall be provided in the DB's in conformity with the location of cable/conduit connections. Detachable sheet steel gland plates shall be provided at the top / bottom to make holes for additional cable entry at site if required.

Distribution Boards shall comprise of the following:

1.1.1 A panel for mounting where appropriate incoming supply circuit breaker & other auxiliaries for Control & distribution as required.

1.1.2 Installation accessories shall be part of the DB for fixing conductor and rails for mounting MCB's and RCCB's etc. neutral bus bars & earthing bus bars required in the circuit. All busbars in the FDB shall be insulated type.

1.1.3 Service cable /interconnection shall be part of the Distribution Boards.

1.1.4 The board shall be installed at a height such that the operating is within reach of the normal human height i.e., 1.2 to 1.8 meters from finish floor level.

1.1.5 Degree of protection shall be IP-52 for indoor application, IP-54 for kitchen & laundry and IP-55 for outdoor application.

1.1.6 All three phase distribution boards shall have 4 rows and single-phase distribution boards shall have single rows for housing of MCB's and RCCB's unless noted otherwise.

1.1.7 Phase segregation to be maintained in all three phase distribution boards.

1.1.8 Earthing shall be provided in each FDB's.

2.2 MINIATURE CIRCUIT BREAKER (MCB)& MCCB

MCB

Miniature Circuit Breaker shall comply with IS-8828-1996/IEC898-1995. Miniature circuit breakers shall be quick make and break type for 240/415 VAC 50 Hz application with magnetic thermal release for over current and short circuit protection. The breaking capacity shall not be less than 10 KA at 415 VAC. MCBs shall be DIN mounted. The MCB shall be Current Limiting type (Class-3). MCBs shall be classified (B,C,D ref IS standard) as per their Tripping Characteristic curves defined by the manufacturer. The MCB shall have the minimum power loss (Watts) per pole defined as per the IS/IEC and the manufacturer shall publish the values. MCB shall ensure complete electrical isolation & downstream circuit or equipment when the MCB is switched OFF.

The housing shall be heat resistant and having a high impact strength. The terminals shall be protected against finger contact to IP20 Degree of protection. All DP, TP, TPN and 4 Pole miniature circuit breakers shall have a common trip bar independent to the external operating handle.

MCB should be having an integrated label holder with dual side din rail locking facility. Incoming & Outgoing should have facility for termination of Busbar & Cable separately.

Cable termination facility should be up to 35 sq. mm.

MCCB

The MCCB shall be thermal magnetic having features of indication and protection for overload, short circuit, earth fault. MCCB should be confirming to IS 13947 or IEC-947.

Important Parameters

Sr No	Parameters	Data
1.	Rated Operating Voltage	500 V
2.	Rated Insulation Voltage	1000 V
3.	Rated Impulse Withstand voltage	8 Kv
4.	Rated ultimate short ckt breaking capacity @ 415V	35 kA
5.	Rated Short time withstand current for 1sec	35kA
6.	Rated Short time withstand current for 3 Seconds	--
7.	Rated short circuit making capacity @ 440V ac	105kA
8.	Protection range for overload and short circuit	from 40% to 100%
9.	Utilization category	B
10.	Mechanical Life operations without Maintenance	4000
11.	Mechanical Life operations with Maintenance	4000
12.	Electrical Life operations @ 440V without maintenance	4000
13.	Number of poles	3 or 4 as applicable

The MCCB shall be with protections and having various setting range as below with 2NO+2NC auxiliary contacts.

Protection	Current Adjustment	Time Adjustment
Overload (I _r)	0.4 – 1 times I _n	Min.5 Setting
Short circuit	1.5 – 10 times I _r .	Min 4 Setting
Instantaneous	1.5 – 11 times I _n	Fixed
Earth fault	0.2 – 1 times I _n	Min. 4 Setting

Following constructional features are required:

- Trip free mechanism
- Total segregation between power and front shield so as to guarantee maximum operational safety.
- Operating lever should indicate true position of contacts.
- Provision for ROH with door interlock facility and pad lock facility. Adjustable shaft for ROH.

2.3 RESIDUAL CURRENT CIRCUIT BREAKER CURRENT OPERATED TYPE (RCCB)

I. System of Operation

Residual Current Circuit Breaker shall conform to IEC 61008. RCCB shall work on the principle of core balance transformer. The incoming shall pass through the toroidal core transformer. As long as the currents in the phase and neutral shall be the same, no electromotive force shall be generated in the secondary winding of the transformer. In the event of a leakage to earth, an unbalance shall be created which shall cause a current to be generated in the secondary winding, this current shall be fed to a highly sensitive miniature relay, which shall trip the circuit if the earth leakage current exceeds a predetermined critical value. RCCB shall be current operated independent of the line voltage, current sensitivity shall be of 30 / 100 mA at 240/415 volts AC and shall have a minimum of 20,000 electrical operations.

It should provide full protection as envisaged by IE rules – 61-A, 71 – ee, 73 – ee, 1985 and also rule 50 of IE rule 1956.

II. Mechanical Operation

The moving contacts of the phases shall be mounted on a common bridge, actuated by a rugged toggle mechanism. Hence, the closing / opening of all the three phases shall occur simultaneously. This also shall ensure simultaneous opening of all the contacts under tripping conditions.

II. Neutral Advance Feature

The neutral moving contact shall be so mounted on the common bridge that, at the time of closing, the neutral shall make contact first before the phases; and at the time of opening, the neutral shall break last after allowing the phases to open first. This is an important safety feature which is also required by regulations.

MCB should be having an integrated label holder with dual side din rail locking facility. Incoming & Outgoing should have facility for termination of Busbar & Cable separately.

Cable termination facility should be up to 35 sq. mm.

IV. Testing Provision

A test device shall be incorporated to check the integrity of the earth leakage detection system and the tripping mechanism. When the unit is connected to service, pressing the test knob shall trip the ELCB / RCCB and the operating handle shall move to the "OFF" position.

2.4 EARTHING

Earthing shall be provided as per IS:3043-1987.

2.5 PAINTING

All sheet steel work shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphating, passivating (seven tank processing) and then painted with electrostatic paint (Powder coating). The shade of colour of panel inside/outside shall be of Siemens gray paint shade no. RAL-7032 of IS Code No.5.

2.6 LABELS

Engraved PVC labels shall be provided on all incoming and outgoing feeder. Circuit diagram showing the arrangements of the circuit inside the distribution panels shall be pasted on inside of the panel door and covered with transparent plastic sheet.

2.7 TESTING

Testing of panels shall be as per following codes:

IS: 8623 (Part -I) 1977 for factory-built assemblies of switch gear for voltages upto and including 1000 VAC.

IS: 13947: 1993 Degree of protection

2.8 WIRING

In wiring a distribution panel it shall be insured that total load of various distribution panel and/or consuming devices is divided evenly between the phases and number of ways as per consultants drawing.

3. MEDIUM VOLTAGE CABLES

3.1 SCOPE

This section shall cover supply of medium voltage cables.

3.2 STANDARDS

The following standards and rules shall be applicable:

- | | |
|-----------|---|
| IS : 1554 | PVC insulated electric cables (heavy duty). |
| IS : 1753 | Aluminium conductors for insulated cables. |
| IS : 3961 | Recommended current ratings for cables. |
| IS : 8130 | Aluminium conductors for insulated cables |

Indian Electricity Act and Rules.

3.3 MEASUREMENTS

The cables will be measured in meters. The unit rate shall include cutting the cable into required lengths, packing, loading , unloading, insurance, transportation, delivery to stores/site as per work order, stocking in stores, testing of cables at stores etc. of medium voltage cable.

3.4 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 instructions. The cables shall be delivered at site in original drums with manufacturer's name, size, and type, clearly written on the drums.

3.5 MATERIAL

The MV cables shall be cross linked polyethylene (XLPE) insulated PVC sheathed of 1100 volts grade aluminium or copper conductor, armoured and unarmored heavy duty, conforming to IS : 7098 Part I IS : 1988 Part I. as asked for in the schedule of quantities.

3.5.1 All XLPE Aluminium/Copper Power cables shall be 1100Volts grade, multi core constructed as per IS : 7098 Part-I of 1988 as follows :

- Stranded Aluminium /Copper conductor of high conductivity upto 4 mm.² size, the conductor shall be solid and above 4 mm.², conductors shall be concentrically stranded as per IEC : 328.
- Cores laid up
- The inner sheath should be bonded over with thermo-plastic material for protection against mechanical and electrical damage.
- Armoring should be provided over the inner sheath to guard against mechanical damage. Armoring should be Galvanized steel wires or galvanized steel strips. (In single core cables used in A.C. system armoring should be non-magnetic hard aluminium Wires/Strips. Round steel wires

- should be used where diameter over the inner sheath does not exceed 13 mm; above 13 mm flat steel armour should be used. Round wire of different sizes should be provided against specific request.)
- e) The outer sheath should be specially formulated heat resistant black PVC compound conforming to the requirement of type ST2 of IS : 5831-1984 extruded to form the outer sheath.
- 3.5.2 Conductor shall be of electrolytic Aluminium/Copper conforming to IS : 8130 and are compact circular or compact shaped.
- 3.5.3 Insulation shall be of XLPE type as per latest IS general purpose insulation for maximum rated conductor temperature 70 degree centigrade.
- 3.5.4 In Inner sheath laid up cores shall be bonded over with thermoplastic material for protection against mechanical and electrical damage.
- 3.5.5 Insulation, inner sheath and outer sheath shall be applied by extrusion and lapping up process only.
- 3.5.6 Armouring shall be of galvanized steel wire/flat.
- Galvanized steel flat strip / round wires applied helically in single layers complete with covering the assembly of cores.
- For cable size upto 25 Sq. mm. : Armour of 1.4 mm dia G.I. round wire
- For cable size above 25 Sq. mm. : Armour of 4 mm wide 0.8 mm thick G.I. strip
- 3.5.7 Repaired cables shall not be used.
- 3.5.8 Current ratings of the cables shall be as per IS : 3961.
- 3.5.9 The XLPE insulated cables shall conform to latest revision IS read along with this specifications. The Conductor shall be stranded Aluminium/Copper circular/ sector shaped and compacted. In multi core cables the core shall be identified by red, yellow, blue and black coloring of insulation as following.
- CORE IDENTIFICATION:
- | | | |
|-------------|---|-----------------------------|
| Two core | : | Red and Black |
| Three core | : | Red, Yellow and Blue |
| Four core | : | Red, Yellow, Blue and Black |
| Single core | : | Green, Yellow for earthing |
- Black shall always be used for neutral.
- 3.5.10 The XLPE insulated 1100 Volts grade power cables shall conform to latest IS and shall be suitable for a steady conductor temperature of 70 degree centigrade. The conductor shall be stranded Aluminium/Copper as called for in the Schedule of quantities. The outer sheath shall be as per the requirement of type ST-2 of IS:5831 of 1984.
- 3.5.11 The cables shall be suitable for laying in racks, ducts, trenches, conduits and underground buried installation with uncontrolled back fill and chances of flooding by water.
- 3.5.12 Progressive automatic in line sequential marking of the length of cables in meters at every one meter shall be provided on the outer sheath of all cables.
- 3.5.13 Cables shall be supplied in non-returnable wooden drums as per IS : 10418.
- 3.5.14 Both ends of the cables shall be properly sealed with PVC/Rubber caps so as to eliminate ingress of water during transportation, storage and erection.
- 3.5.15 The product should be coded as per IS :- 7098 Part-I as follows :-

Aluminium Conductor	A
XLPE Insulation	2X
Steel round wire armour	W
Steel strip armour	F
Steel Double round wire armour	WW
Steel Double strip armour	FF
Non-magnetic (Al.) round wire armour	Wa
Non-magnetic (Al.) strip armour	Fa
PVC outer sheath	Y

3.6 GENERAL

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.

3.7 TESTING

3.7.1 FINISHED CABLE TESTS AT MANUFACTURER'S WORKS:

The finished cables shall be tested at manufacturer's works. Following routine tests for each and every length of cable and copy of test results shall be furnished for each length of cable alongwith supply. If specified, the cables shall be tested in presence of clients representative.

(a) VOLTAGE TEST:

Each core of cable shall be tested at room temperature at 3 KV A.C. R.M.S. for a duration of 5 minutes.

(b) CONDUCTOR RESISTANCE TEST:

The D.C. Resistance of each conductor shall be measured at room temperature and the results shall be corrected to 20° c. to check the compliance with the values specified in IS 8130 - 1976.

Prior to dispatching cables, and at the time of delivering the cables at stores, following tests shall be carried out:-

Insulation Resistance test between phases and phases to Neutral and phase to earth.

Continuity test of all the phases, neutral and earth continuity conductor.

Sheathing continuity test.

Earth resistance test of all the phases and neutral.

All tests shall be carried out in accordance with relevant Indian Standard Code of practice and Indian Electricity Rules. The Vendor shall provide necessary instruments, equipments and labour for conducting the above test and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the client and results shall be recorded in the prescribed forms.

3.8 CABLE MARKING

EMBOSSING ON OUTER SHEATH:

The outer sheath shall be legibly embossed with following legend:

ELECTRIC CABLE: 1100 V, SIZE : 3.5 C x ----- mm ².

Manufacturer's Name & year of manufacturing.

3.9 SEALING, DRUMMING& PACKING

After tests at the manufacturer's works, both ends of the cable shall be sealed to prevent the ingress of moisture during transportation and storage.

Cable shall supply in length of 500 ± 10% meters on packed non-returnable drums of sufficiently sturdy construction.

Cables of length more than 250 meters shall also be supplied on non-returnable drums.

The spindle hole shall be 110 mm minimum 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 shall also be clearly visible. 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.

4. LIGHTING FIXTURES & ACCESSORIES

The light fixtures and fittings shall be assembled and installed in position complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the Project Manager.

4.1 SCOPE:

Scope of work under this section shall include inspection at suppliers/manufacturer's premises at site, receiving at site, safe storage, transportation from point of storage to point of erection, erection and commissioning of light fittings, fixtures and accessories including all necessary supports, brackets, down rods and painting etc. as required.

4.2 STANDARDS:

The lighting and their associated accessories such as lamps, reflectors, housings, ballasts etc., shall comply with the latest applicable standards, more specifically the following:

General and safety requirements for Luminaries:

Part-1 Tubular fluorescent lamps	-	IS – 1913 (Part-1)
Bi-pin lamp holders for tubular fluorescent lamps	-	IS - 3323
Electronic Ballasts for fluorescent lamps –		
General & Safety requirement	-	IS – 13021 (Part-1)
Electronic Ballasts for fluorescent lamps –		
Performance requirement	-	IS – 13021 (Part-2)
Tubular Fluorescent lamps	-	IS - 2418 (Part-1to4)
Luminaries – General requirement	-	IS – 10332 (Part-1)
Luminaries – Constructional requirement	-	IS – 10332 (Part-2)
Luminaries – Screw and Screwless termination	-	IS – 10332 (Part-3)
Luminaries – Methods of Tests	-	IS – 10332 (Part-4)
Particular requirement – General purpose Luminaries	-	IS–10332(Part-5 / Sec - 1)
Particular requirement – Recessed Luminaries	-	IS–10332 (Part-5 / Sec – 2)
Particular requirement – Luminaries for Road and Street lighting	-	IS–10332 (Part-5/Sec-3)
Particular requirement – Portable General-purpose Luminaries	-	IS–10332 (Part-5/Sec-4)

4.3 LIGHT FITTINGS-GENERAL REQUIREMENTS:

- a). Fittings shall be designed for continuous trouble-free operation under atmospheric conditions without reduction in lamp life or without deterioration of materials and internal wiring. Degree of protection of enclosure shall be IP-65 for outdoor fittings except bulkhead fitting. Bulkhead fitting shall be provided with IP-54 protection.
- b) Fittings shall be so designed as to facilitate easy maintenance including cleaning, replacement of lamps/ ballasts.
- c). All fittings shall be supplied complete with lamps. All mercury vapour and sodium vapour lamp fittings shall be complete with accessories like ballasts, power factor improvement capacitors, starters, etc. Outdoor type fittings shall be provided with weatherproof junction boxes (IP-55) and IP-54 Control gear boxes.
- d) Each fitting shall have a terminal block suitable for loop-out connection by 1100 V PVC insulated copper conductor wires up to 4 sq.mm. the internal wiring should be completed by the manufacturer by means of standard copper wire and terminated on the terminal block.
- e) All hardware's used in the fitting shall be suitably plated or anodized and passivated.
- f) Earthing: Each lighting fitting shall be provided with an earthing terminal. All metal or metal enclosed parts of the housing shall be bonded and connected to the earthing terminal so as to ensure satisfactory earthing continuity throughout the fixture.
- g) Painting/Finish: All surfaces of the fittings shall be thoroughly cleaned and degreased, and the fittings shall be free from scale, rust, sharp-edges, and burns.
- h) The housing shall be powder coated/stove-enameled or anodized as required. The surface shall be scratch resistant and shall show no sign of cracking or flaking when bent through 90 deg. over 12 mm dia mandrel.

- i) Metal used in BODY of lighting fixtures shall be not less than 32 SWG or heavier if so required to comply with specification of 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 burns and tool marks. Solder shall not be used as mechanical fastening device on any part of the fixture.

4.4. LIGHT FITTINGS – SPECIAL REQUIREMENTS

Box Channel Type Industrial Fittings

Box type slim line channel must be in screw less construction manufactured from M.S. CRCA sheet steel powder coated with MS CRCA cover, powder coated white. Light reflection surface in Box/Channel type fittings shall be in a POLYESTER PRECOATED STEEL having a reflection factor of not less than 80%. SCREWLESS DESIGN & CONSTRUCTION Light fixtures shall be preferred due to their ease of maintenance, especially for box/channel for box/channel type fixtures.

Moisture Proof Industrial Fittings

Surface mounted totally enclosed moisture proof fixtures must be in polycarbonate body and diffuser with transparent prismatic interior and smooth exterior and frosted end. Fixture must be completely sealed with polyurethane double gasket to achieve IP 65 protection. Fixture is complete with CRCA steel white powder coated / enameled finish reflector.

18 W / 36 W Fluorescent and 36 W CFL Low Glare Light Fittings

Recessed mounted, modular fluorescent lighting fixture made of CRCA Sheet steel powder coated (white) housing, electro chemically brightened and anodized reflector, three dimensional cross louvers with concave contours, fresnel top at louver saddle to increase efficiency. The luminance of $<200 \text{ cd/M}^2$ at 63 degree viewing angle in all directions so as to confirm Cat-2 classification of CIBSELG3

4.5 ACCESSORIES FOR LIGHT FITTINGS REFLECTORS

The reflectors shall be made of CRCA sheet steel/aluminium /Silvered glass/Chromium plated sheet copper as required. The thickness of reflectors shall be as per relevant standards. Reflectors made of steel shall have stove enameled/ vitreous enameled/epoxy coating finish. Aluminium used for reflectors shall be anodized/epoxy stove enameled /mirror polished. The finish for the reflector shall be as specified. The reflectors shall be free from scratches / blisters and shall have a smooth and glossy surface having optimum light reflecting coefficient. Reflectors shall be readily removable from the housing for cleaning and maintenance without use of tools.

4.6 LAMPS

4.6.1 TLD

Lamp shall be environment friendly low pressure mercury discharge lamp with mercury content less than or equal to 5 mg. The lamp shall have minimum lumen maintenance of 85 and CRI of 85. The lamp must comply to ROHS (Restriction of Hazardous substances) and covered by WEEE. Lamp should be fully recyclable. The lamp should be low on maintenance with life of 40 K hours in case of electromagnetic ballast and 65 K hours in case of HF ballast up to 10% failure. The discharge glass shall be lead free.

TLD Lamps shall be minimum tri-phosphor type and have bi-pin bases. Colour spectrum of light shall be equivalent to "PHILIPS color 84 or color 86 color 82 or "OSRAM color 21 or color 11 or color 41 (as required at site)".

The fluorescent Tubes (TLD) should have cool daylight colour designation. But Architects reserve the right to prescribe either Cool Daylight or Bright White or Incandescent Colour Designations for TLD. NO extra payment will be made over the quoted rate of bidder for this. The 36 W fluorescent tubes will have Nominal Luminous Flux of not less than 3350 lumens whether so mentioned in the Schedule of Quantities or not.

T 5 – HIGH EFFICIENCY ECO-FRIENDLY LAMPS

T-5 lamp shall be environment friendly low pressure mercury discharge lamp with mercury content less than or equal to 3 mg. lamp should have lowest CO₂ emission compared to any other comparable light source (40% less than a TL-D standard lamp, 26% less than TL-D / 80). T-5 lamp shall be 100% lead free. T-5 lamp shall be designed for operation with electronic gear and well suited for dimming. Maximum lumen output to be reached at approx. 35°C in free burning position. T-5 lamp can be ignited from -15°C to + 50°C. Lamp should be fully recyclable and must comply to ROHS (Restriction of Hazardous substances) and shall be covered by WEEE. T-5 shall have 16 mm in diameter service life of TL-5 lamp should be 10% more than TL-D lamps. T-5 lamp shall have lumen efficacy of up to 104 Lux / W and shall have excellent colour rendering to En 12464 (Ra 80 to 89).

4.6.2 Compact fluorescent lamp shall have same luminous flux and power consumption as fluorescent tubes but less than half the length and more compact than U-shaped and circulator lamps. CFL shall be suitable for use with conventional control gear & standers and for HF electronic control gear. CFL lamp shall be non integral type of OSRAM / PHILIPS only.

4.7 HIGH FREQUENCY ELECTRONIC BALLAST

High frequency electronic ballast shall be used with fluorescent / Compact Fluorescent Lamps wherever specified in the schedule of quantities. High frequency electronic ballast shall comply to the following:

- IEC 927, IEC 928 for ≤10% total harmonic distortion.
 - EMI / RFI – Confirming to FCC / VDE Class A/B.
 - Line Transient as per IEEE C62.41.
 - Ballast Crest Factor C1.7%.
 - No Stroboscopic Effect
 - Constant Wattage / Light output between 240 V ± 10%.
 - Circuit protection for surge current and inrush current.
 - Short circuits, open lamp protection
 - PF > 70 for fluorescent / T5 lamp and CFL.
 - Deactivated lamp protection
 - Suitable for use with single and twin lamps
 - RFI < 30 MHz
- EN 55015

- Total Harmonic Distortion (THD) $\leq 10\%$
- Immunity to interference EN 61547
- Safety EN 60928 / IEC 928 / IS 13021 (Part I)
- Performance EN 60929 / IEC 929 / IS 13021 (Part II)
- Vibrations & Bump tests IEC 68-2-6 FC
IEC 9001
- Quality Standard ISO 9001
- Environmental Standard ISO 14001
- DC Operation EN 60924
- Emergency Lighting Operation VDE 0108

Total System consumption (lamps + ballast) for
1 x 28 W T-5, shall not exceed 32 W

5. EARTHING

5.1 EARTHING

The system shall be TNS with four wire supply system (R,Y,B,N and 2 Nos. E) brought from the main L T Panel. All the non-current carrying metal parts of electrical installation and all metal conduits trunking, cable sheaths, switchgear, distribution panels, light fittings and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. All metal work such as pipelines, ducts, cable trays, staircaserailing etc. shall be bonded to earth. All earthing shall be in conformity with IS:3043 1987, and the basic system of earthing shall be TNS.

5.2 EARTHING CONDUCTORS

Earthing conductors shall be of copper / GI as mentioned in schedule of quantities and shall be protected against mechanical injury and corrosion.

5.3 SIZING OF EARTHING CONDUCTORS

The cross-sectional area of earthing conductor shall not be smaller than half of the largest current carrying conductor subject to an upper limit of 80 Sq.mm. If the area of the largest current carrying conductor or bus bar exceeds 160 sq.mm then two or more earthing conductors shall be used in parallel, to provide at least half the cross sectional area of the current carrying conductor or bus bars. All fixtures, outlet boxes, junction boxes and power circuits up to 15 amps shall be earthed with PVC insulated copper wire.

All 3 phase switches and distribution panels up to 60 amps rating shall be earthed with 2 Nos. distinct and independent 4 mm dia copper / GI wires. All 3 phase switches and distribution panels up to 100 amps rating shall be earthed with 2 Nos. distinct and independent 6 mm dia copper / GI wires. All switches, bus bar, ducts and distribution panels of rating 200 amps and above shall be earthed with minimum of 2 nos separate and independent 25 mm x 3 mm copper / GI tape.

5.4 CONNECTION OF EARTHING CONDUCTORS

Main earthing conductors shall be taken from the earth connections at the main L T panel to an earth electrode with which the connection is to be made. All joints in tapes shall be with four rivets and shall be brazed in case of copper and by welding bolting in case of GI, wires shall be connected with crimping lugs, all bolts shall have spring washers. Sub- mains earthing conductors shall run from the main distribution panel to the sub distribution panel. Final distribution panel earthing conductors shall run from sub-distribution panel.

Circuit earthing conductor shall run from the exposed metal of equipment and shall be connected to any point on the main earthing conductor, or its distribution panel. Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to distribution panel at which they originate, or otherwise at the commencement of the run by an earthing conductor in effective electrical contact with cable sheathing. Where equipment is connected by flexible cord, all exposed metal parts of the equipment shall be earthed by means of an earthing conductor enclosed with the current carrying conductors within the flexible cord. Switches, accessories, lighting fitting etc. which are rigidly secured in effective electrical contact with a run of metallic conduit shall not be considered as a part of the earthing conductor for earthing purposes, even though the run of metallic conduit is earthed.

The plate/pipe electrode, as far as practicable, shall be buried below permanent moisture level but in no case not less than 2.5 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.

19 mm. dia. G.I. pipe for watering, shall run from top edge of the plate / pipe 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 copper / Hot dip G.I.) inside the building shall properly be clamped / supported on the wall with Galvanised Iron clamps and Mild Steel Zinc Passivated 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.

The earth conductors shall be in one length between the earthing grid and the equipment to be earthed.

EARTH LEADS AND CONNECTIONS :

Earth lead shall be bare copper or Galvanised steel as specified with sizes shown on drawings. Copper lead shall have a phosphor content of not over 0.15 %. G.I strips buried in the ground shall be protected with bitumen and hessian wrap or polythene faced hessian and bitumen coating. At road crossing necessary Hume pipes shall be laid. Earth lead run on surface of wall or ceiling shall be fixed on saddles so that strip is at least 8 mm away from the wall surface.

The complete earthing system shall be mechanically and electrically bonded to provide an independent return path to the earth source.

5.5 PROHIBITED CONNECTIONS

Neutral conductor, sprinkler pipes, or pipes conveying gas, water or inflammable liquid, structural steel work, metallic enclosures, metallic conduits and lightning protection system conductors shall not be used as a means of earthing an installation or even as a link in an earthing system. The electrical resistance measured between earth connection at the main L T panel and any other point on the completed installation shall be low enough to permit the passage of current necessary to operate or circuit breakers and shall not exceed 1 ohm. All switches carrying medium voltage shall be connected with earth by two separate and distinct connections. The earthing conductors inside the building wherever exposed shall be properly protected from mechanical injury by running the same in G I pipe of adequate size. The overlapping in strips at joints where required shall be minimum 75 mm. The joints shall be riveted and brazed in case of copper and by welding / bolting in case of GI in an approved manner. Sweated lugs of adequate capacity and size shall be used for termination of all conductor wires above 6 sq.mm size. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substances and properly tinned. Equipotent bonding of all metallic structures shall be done.

5.6.EARTHING

The following must always be ensured in earthing system.

- All earths must be interconnected at the earth pits. This includes generator neutrals, transformer neutrals, transformer body, lightning protection system earths, UPS earths etc.
- Extraneous conductive parts such as gas pipes, other service pipes and ducting risers and pipes of fire protection equipment and exposed metallic parts of the building structure.

5.7The Contractor shall get the soil resistivity test done at his own cost of the area where earthing pits are to be located before starting the installation.

5.8 RESISTANCE TO EARTH

The resistance of earthing system shall not exceed 1 ohm.

5.9 SPECIFICATION FOR HOT DIP GALVANIZING PROCESS FOR MILD STEEL USED FOR EARTHING FOR ELECTRICAL INSTALLATION

GENERAL REQUIREMENTS

I. Quality of Zinc

Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS: 209-1992.

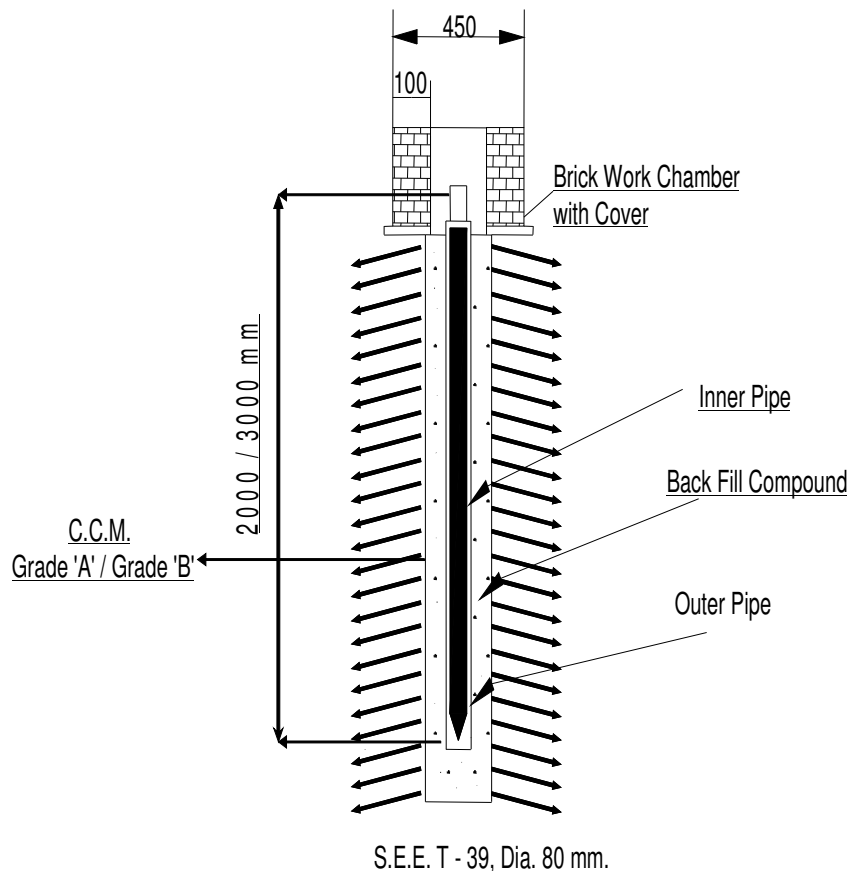
II. Coating Requirement

Minimum weight of zinc coating for mild steel flats with thickness upto 6 mm in accordance with IS:6745-1972 shall be 400 g/sqm.

The weight of coating expressed in grams per square metre shall be calculated by dividing the total weight of Zinc by total area (both sides) of the coated surface.

The Zinc coating shall be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs, rust stains bulky white deposits, blisters.

Mild steel flats / wires shall undergo a process of degreasing pickling in acid, cold rinsing and then galvanizing. Jointing of earthing tape shall be by welding. All joints and cut ends shall be properly painted with aluminium paint.



SCALE: NOT TO SCALE

5.10 TEST:

The entire earthing installation shall be tested as per requirements of Indian Standard Specification IS : 3043.

The following earth resistance values shall be measured with an approved earth megger and recorded.

- 1) Each earthing stations
- 2) earthing system as a whole
- 3) Earth continuity conductors

Earth conductor resistance for each earthed equipment shall be measured which shall not exceed 5 ohm in each case.

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 client's representative.

Conformity to IE Act, IE Rules, and Standards

All Electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 2003 and Indian Electricity Rules, 1956 amended up to date (Date of call of tender unless specified otherwise). List of Rules of particular importance to Electrical Installations under these General Specifications is given in Appendix C for reference.

Point wiring for light / fan /bell / primary point with 2-1.0 sq. mm & earth wire of 1.0 sq. mm (green) both are of ISI marked FR PVC insulated multistrand copper wires, in existing pipe duly erected, complete with 6A Tissino Type ISI marked flush type switch

The point wiring shall be confirm IS: - 1970. A point shall consist of the branch wiring from the branch distribution board (switch board) together with a switch as required, as far as and including the ceiling rose to socket- outlet or suitable termination. A three –pin socket- outlet point shall include, in addition, the connecting wire or cable from the earth pin to earth stud of the branch distribution board.

The installation shall generally be carried out in conformity with the requirements of the Indian Electricity Act. 1910, as amended up to date and the Indian Electricity Rules, 1956.

The point wiring shall be carried out in the under mentioned manner:

- (a) Supply, installation, fixing of conduits with necessary accessories, junction/switch/outlet boxes.
- (b) Supplying and drawing of wires of required size including insulated earth continuity wire.
- (c) Supply, installation and connection of flush type switches, sockets, cover plants; switch plants fan regulators etc. as specified.
- (d) The point shall be complete with branch wiring from the first switch- board to outlet point through other loop. Switch boards if necessary in a circuit, conduit with accessories, junction, inspection boxes, control switch, socket outlet boxes, ceiling roses, connector etc.

Unless otherwise mentioned, the system of wiring shall consist of single core 650/1100 volt grade PVC insulated wire with Aluminum/copper conductor laid through exposed surface mounted/concealed in wall and ceiling rigid PVC pipe/rigid steel conduits/PVC oral conduit/PVC casing-N-Capping/trucking etc. as specified.

The rigid PVC pipe shall confirm to IS: 9537 with minimum wall thickness of 1.5mm. The corresponding accessories shall confirm to IS: 3419. The minimum diameter of pipe shall be 20 mm.

The steel conduit and accessories shall confirm to IS: 1653-1954 and IS: 3837-1966 as amended up-to-date respectively.

The PVC trucking (PVC casing-N-Capping) shall be with double locking arrangement with grooves of size not below 1.5mm. in height confirm BS:4678 part-4 of 1982 and with accessories of PVC/Resin polypropylene not below 1.8mm. Thick duly sealed at joints.

The wiring shall be as per colour code viz. Red for R phase, Yellow for Y phase, Blue for B phase, Black for neutral, Green for earth, Grey for control, white for bell point and all off wires shall be same as phase wire. The wiring shall be done in a looping manner. All looping shall be made Only in switch boards.

The switches and socket outlets shall be shockproof flush type either tissino type/Modular type/ plate type with silver-coated contacts with IS marked IS: 3854.

The conduit run on surface shall be supported on metallic 1.2mm thick saddles/heavy duty PVC saddles which in turn shall securely screwed to 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. No cross-over of conduits shall be allowed. Unless it is unavoidable. The entire conduit installation shall be clean and neat in appearance.

The conduits embedded into the wall shall be fixed by means of staples at intervals of not more than 500mm. chases in the walls shall be neatly made with electrically operated masonry wall cutter and shall be refilled after laying the conduit with suitable mortar and brought to the finish of the wall, Conduit buried in concrete structure shall be put in position and securely fastened to the reinforcement proper care shall be taken to ensure that the conduits are neither dislocated nor choked out at the time of pouring concrete necessary fish wire shall be drawn in all conduit run.

The all materials and accessories used shall confirm to Indian Standard Specification. All types of wiring shall be capable of easy inspection. The open (unconcealed) wiring shall run along with walls should run as neat the ceiling as possible. All runs of wiring and the exact positions of all points and switch boards shall be first marked on the building and got approved from the in charge electrical engineer before actual commencement of work.

The conduit for point wiring shall have a nominal cross-sectional area not less than either 1.00 mm² copper or 1.5-mm² aluminum as specified. For open type switch boards shall not be erected within 2.5 meter of any washing unit or in bathrooms lavatories on toilets or kitchens. The switch block shall be PWD type with best valsadi seasoned teak wood or other durable wood with solid back thoroughly protected both inside and outside with good insulating varnish shall be provided. There shall be a cleat distance of not less than 25mm between the teak wood board and cover, all the joints of board shall be dovetailed. The wooden block shall be covered with 3 mm thick laminated sheet firmly screwed on four corners with the help of chrome plated counter shunt round headed steel screws. For large size switch switchboards shall be recessed in the wall for concealed type wiring, The front t shall be fitted with 3 mm thick laminated sheet, Ample room shall provided at the back for connection and at the front between the accessories mountings. The concealed base shall be for either 16 gauge M.S. or teak wood as specified or instructed.

The maximum load of each circuit shall not exceed 800 watts and maximum points of each circuit shall not exceed 10 Points. Where wiring passes through wall, care shall be taken to see that wire pass very freely through protective pipe rigid steel conduit / rigid pvc pipe / porcelain tube } and that the wires pass through without any twist or cross in wires, or either ends of holes.

The general and technical specifications given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing the work.

One 5 pin 5A 250 Volt Socket outlet point controlled by 6 A switch on board

The 5/15 A socket outlet shall be of 6 pin type (5A & 15 A Combined) in same unit & shall be controlled by 15 A single pole toggle type switch with necessary inter connections & earth continuity. The socket shall conform IS: 1293. The switch & socket shall be erected on polished wooden board with 3 mm thick laminated sheet.

The socket outlets shall have provisions not to receive the matching plug unless the grounding pin is in correct position.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing work.

Electronic hum free five steps EME fan regulator

Ceiling Fan with Regulator

The ceiling fans shall conform Indian Standard Specification IS:374-1979. The enclosure of motors of ceiling fans shall be of the totally enclosed type. The enclosure of regulators shall be ventilated type. The stamping of fan motors shall be made electrical steel sheet. The ceiling fans shall have three numbers well balanced blades made from metal or other suitable material. The blades and motors shall be securely fixed so that they do not loosen in operation.

The size of ceiling fans shall be as specified. The ceiling fans shall be suitable for operation on electric A.C. single phase 230 Volt, 50 Hz power supply. Proper type of lubrication bearing bearings shall be used to ensure a reasonable amount of silent operation.

The earthing terminal shall be provided on the suspension system. The live parts shall not be accessible in the assembled fan and regulator. Capacitor of the fan shall conform IS:1709-1960. The suspension system shall be either bolted or screwed at the motor end and the suspension end. The suspension system of the ceiling fans shall be of adequate strength to withstand a tensile load of 1000 Kg. without breakage and a torsion load of 500 Kg without breakage current carrying parts and other metal parts shall be corrosion resistant under normal conditions. The terminals shall be prepared from stainless steel or other corrosion resistant alloys. Radio and television interference suppressors shall be fitted.

The regulators shall be capable of reducing the speed of the fan at least 50 percent of the full speed. The regulators shall be provided with an off position and minimum five running positions excepts in case of continuously variable electronic type speed regulators the regulator handle or knob shall either be of insulating material or adequately electrically and thermally insulated metal. The mechanism of the regulator shall be so designed to ensure positive contact at each running position. The voltage drop across the electronic type regulators at the maximum speed position shall not exceed shall not exceed 2 % of the service value at the test voltage and at full speed shall be as per I.S.S.

The ceiling fans shall be connected with ISI marked twin twisted flexible wire of size not less than 24/0.2mm.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing work.

Shockproof tissino type single pole switch 6/16A universal plug socket as per wiring specification**Switches**

Switches shall conform to IS: 3854, IS: 4615. The switches shall be single pole, single or two way and shown on the drawings or as specified. They shall be of moulded type rated for 250 volt, and of full 6 / 16 A capacity. They shall be provided with insulated dollies and covers.

The switches shall be rocker operated with a quite operating mechanism with bounce free snap action mechanism enclosed in an arc resistant chamber. The switches shall have pure silver and silver cadmium contacts. The switches shall be flush modular type. The make of the switches shall be as indicated in the drawings or BOQ or make of material or as suggested and approved by the architect/consultant. The switches installed in outdoor area shall be industrial, metal clad type, and shall be provided in weather proof enclosures, complete with weather proof gasketed covers.

Sockets

The sockets shall conform to IS: 1293. Each socket shall be provided with control switch of appropriate rating. The sockets shall be moulded type, rated for volts, and either of full 5 A or 16 A capacity, as mentioned on the drawings.

Sockets shall be of three pin type; the third in being connected to earth continuity conductor. The socket shall be flush modular type. The sockets installed in machine room, plant room or wet / damp area shall be metal clad weatherproof type. The finishing and make of all the sockets shall be same as light switch. The socket shall have fully spring contacts and solid brass shrouded terminals to ensure positive electrical connections.

The sockets shall be provided with automatic shutters, which open only when earth pit of the plug inserts in the socket. The socket shall be provided with three pin plug top suitable to the socket and of the same make as socket.

6A/10A/16A/20A/25A/32A/ single pole Modular MCB Switch for A.C.

The metal clad distribution boards shall have incoming of MCB 40 Amp. Double pole switch & out going MCB of 6 Amp to 32 Amp operating & short circuit tripping elements of breaking capacity of 10 KA conforming of ISS 8828/1996 with ISI mark suitable size of neutral link of tinned copper bus bar link with all necessary interconnections. MCB should be erected in surface type in 16 G MS sheet cover complete suitable integral single piece constriction with suitable category mentioned in tender schedule "B" and approved make as per list of tender booklets should be given on angle iron frame with necessary earthing.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing work.

Two pin /RJ -11 Telephone socket with top

The Telephone plug & socket shall confirm Indian Standard Specification or IS:1293 The telephone socket outlet shall be two points type. The dimension of socket and plug shall have silver coated pins & pin seating of exact dimensions. so that pin of plug shall firmly fitted to seat in socket & no loose contact may arise. The connections to socket with telephone cable shall be made by tinned / silvered soldering. The socket shall be of flush mounted tissino type / moulded plate type / modular type as specified.

The telephone socket shall be erected on seasoned teak wood block or on concealed box covered with 3mm thick laminated sheet as the case may be. The general specification give in tender booklet shall also

be considered as a part of agreement. The telephone plug & socket shall be of approved make as specified in the tender booklet or approved by in-charge electrical.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

Providing & laying Rigid PVC pipe confirming to I.S.S., erected with necessary fittings fixed with adhesive solution with 16 G. GI fish wire

(a) For concealed in wall / slab / Flooring with necessary cementation.

20 mm Size (3/4")

25 mm Size (1")

The rigid PVC pipe shall confirm IS: 2509 or ISI marked a specified rigid PVC pipe shall be 1.5 mm to 1.6 mm thick manufactured from high grade virgin PVC the diameter of PVC pipe shall be as per specified. Fittings for rigid PVC pipe such as bends, elbows, nipples, couplings, reducers, plugs etc. shall be specifically designed and manufactured for their particular application. All fittings shall confirm to IS: 3415.

The rigid PVC pipe shall be erected on wall / ceiling with properly screwed heavy duty rigid PVC saddles at the intervals not more than 500 mm. and pipes to pipes and pipes too fittings shall be fixed with adhesive solution. 16 gauge G.I. fish wire shall be erected with erection of pipe as a drawer wire. The installation of pipes shall be as per IS: 4648, IS: 732 and IS: 1646.

The general and technical specifications given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

Breaking slab/masonry walls for prov. holes to pass main line wiring & reinstating the same as per original condition etc. complete.

The relevant specifications of Description No. 1 and 2 shall be followed.

Supply and laying of main lines with ISI marked Copper conductor FRLS / ZHFR PVC insulated copper wire in existing pipe erected with earth continuity wire as specified in specification for following size.

(a) 2 wire 1.5 mm² with 1.5 mm² Cu. earth wire

(b) 2 wire 2.5 mm² with 1.5 mm² Cu. earth wire

(c) 2 wire 4.0 mm² with 14 SWG / 3 mm² Cu. earth wire

Wire & Cables

The wiring shall be done with single core, FRLS / ZHFR insulated, 650/1100 volt grade, copper conductor wires / cables lay through PVC / Steel conduits as directed. The cables shall conform to IS: 694. The plain annealed copper conductors shall comply with IS: 1554. The FRLS compound shall comply with the requirements of IS: 694. It shall be applied by an extrusion process and shall form a compact homogenous body. Manufacturers name shall be provided throughout the length of cable.

Following color of wire shall be used for the identification of power circuit.

Single phase
Three phase
Neutral

Red
Red, Yellow, Blue
Black

Earth

Green

Unless otherwise specified in the drawings the following size of the wire/cables shall be used for internal wiring.

For the wiring for lights, exhaust fans, ceiling fans, bell, convenience socket outlet points etc.

From D.B. to switch boards	2.5 mm ²
From switch boards to Fan / Exhaust Fan points, convenience socket outlet points.	1.0 mm ²
From switch boards to Light points	1.0 mm ²
Earth wire switch board to Out let point	0.75/1.0 mm ²

For the wiring of power socket outlet having not more than two 15 A power outlets

From D.B. to first floor outlet	4.0 mm ²
From first power outlet to second power outlet	2.5 mm ²
power socket outlet circuit having single 15 A power outlet (like water heater)	4.0 mm ²
Earth wire	14 SWG or 3.0 mm ²

Separate circuit shall run for each water heater, kitchen equipment, window air conditioner, and similar outlets at location as shown on drawings.

The earth continuity conductor shall be similar to circuit cables and shall be drawn through conduit along with other circuit cables. The size of the earth continuity conductor shall be as follows

Normal cross-section area of largest associated copper circuit conductor mm ²	Normal cross-sectional area of earth continuity conductor. mm ²
1.5	1.5
2.5	1.5
4.0	2.5
6.0	2.5
10	6.0
16	6.0
25	16
35	16
50	16

General

The cable shall be supplied in single length i.e. without any intermediate joint. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.

Installation

Cable shall be laid in the routes as directed by in charge Electrical Engineer.

Cable running indoors shall be laid on walls or ceiling as per the site situation. Cables shall be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500mm. interval with chrome plated screws.

In case of cables buried directly in ground, cables shall be laid in an excavated trench not less than 900 mm from G.L., over sand on soft earth cushion to provide protection against abrasion.

In case cables entering the building or one room to another in would be done through porcelain / PVC pipes. After erection the pipes shall be sealed with M-seal.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing work.

Providing and laying of Telephone Cable

(a) 2 Pair Telephone Cable

Scope

The scope of work shall cover supply, installation, commissioning and testing of :

Telephone cables

Telephone Tag Blocks

Telephone wiring in conduits

The telephone exchange and the handsets shall be supplied by the clients.

Conduits

Conduits shall be as given below:

Indoor: medium gauge Rigid PVC conduit.

The conduit shall generally be as specified under section 'CONDUIT WIRING'.

Cables and Wires

The type of cables and the services shall be as follows:

Indoor Multi pair, PVC insulated sheathed armored and sheathed.

Inside Twin core PVC insulated with conduit twisted cores.

All multi core cables and wires shall be of tinned copper conductor of not less than 0.5 mm dia and shall be colour coded twisted pairs with rip cord.

The conductor resistance shall be less than 150 ohms per KM and the insulation resistance between the conductor's not less than 50 megohms and the nominal capacitance of about 0.1 micro farad per kilometer.

Cables laid underground or locations subject to dampness and flooding shall be filled with polyethylene compound and shall have sufficient protection against moisture and water ingress.

All armoring shall be of galvanized steel wires and protected against corrosion by an outer sheath of PVC in the case of indoor cables and polyethylene in the case of outdoor cables. Outer sheathing must be fire retarding and anti-termite.

All unarmoured single core cables and inner sheath of armored cables shall be provided with rip cord.

All single pair cables for final extension to the telephone outlet box shall be unarmoured tinned copper conductors of not less than 0.6 mm. diameter and shall be drawn in conduits. All telephone outlets shall consist of 2 A 2 pair polythene connector in G.I box with 6 mm perspex cover with beveled edges and chromium plated brass hardware.

Tag blocks

The telephone tag blocks shall be suitable for the multi core telephone cables and shall have two terminal blocks, cross connect type. All incoming and outgoing cables shall be terminated on separate terminal blocks and termination shall be silver soldered. The cross-connecting jumpers shall be insulated wires of same diameter and screw connected.

The tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove enameled.

Installation

The installation of conduits shall generally be as specified under section 'CONDUIT WIRING'.

All cables shall be on cable racks and neatly stitched together.

The connection at the tag blocks shall be silver soldered so as to achieve minimum contact resistance.

The final branch connections with single pair cables in conduits and the maximum number of cables in each conduit shall be as follows

Conduit diameter		Max. No. of cables
inch	mm.	
3/4"	20	2 Nos. single pair
1"	25	6 Nos. single pair
1¼"	32	12 Nos. single pair
1½"	40	18 Nos. single pair

Mode of measurement

The main telephone cables shall include supply and laying of multi pair cables on ceiling/wall/on cable trays/racks including all supports and shall be measured and paid on running length basis. Cable trays/racks shall be paid for separately.

The multi pair tag blocks shall consist of two telephone connectors strips, jumpered interconnections silver soldered enclosure etc. and shall be measured and paid as one unit.

The conduit wiring for telephone shall include single pair 0.6 diameter cable in heavy duty rigid, PVC conduits and shall include junction boxes, pull boxes, 2 pair 2 A connector in GI box, perspex cover etc. and shall from one point.

Approved make Ceiling fan with condenser A.C. 50 Cys. 1400 mm. sweep complete, canopy and 30 cms. Down rod erected on existing hook or clamp with 24/0.2 flat 3 core flexible wires with earthing (or R.C. Rate)

Down Rod for Fan

The Down Rod shall be made of 19 / 20mm nominal bore "B" class G.I. pipe white painted suitable for erection of ceiling fan. The length of the down rod shall be 45 cm. according to the requirement of site.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work

Supplying & erecting approved make 1 x 40 watt white stove enameled patti type fluorescent fitting made of M.S. Sheet 0.8 mm thick white or reflector side. Complete with 40 watts polyester heavy duty copper wound ballast, lock type tube holders, starter, duly wired for use on 250 volt A.C. supply and erected if required on varnish P.W. block/P.V.C. block with lead wires and connections.

The Patti shall be made of M.S. sheet 0.8 mm thick & coated white and reflector. It shall be complete with 40 watts polyester heavy duty copper wound ballast. It shall have lock type tube holders with proper fittings. It shall have provide with starter, duly wired for use on 250 volt A.C. supply. Erection should be made properly in level with necessary fittings & erection shall be made on varnish P.W. Block/ P.V.C. block (if required) with lead wires and connection as directed by an engineer in charge.

Four pole MCB type change over switch 415 V, 25A with powder coated MS enclosure confirming to I.S.13947 erected on polished wooden block.

The double/ four pole 240 V MCB 240V/250V having breaking capacity of 10 KA and confirms to IS 13947.

The Double / Four Pole MCB should be of approved make and accessories as per list attached in tender booklet.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

Providing and erecting Sheet Steel powder coated MCB distribution board

The MCB should be with ISI mark of Indian standard specification No. IS: 8828/1996.

MCB should be with overload and short circuit tripping elements. The breaking capacity of fault current of MCB should not be less than 10000 Amp. at an electric pressure of 230 volt.

Miniature circuit breaker single pole, double pole or four pole should be suitable to operate on 230/415 V A.C. system and having overload and short circuit tripping elements and breaking capacity 10KA to be erected in existing M.S. box confirming to IS 8828/1996 with ISI Mark.

MCB / ELCB distribution board should be metal clad having modular double doors with DIN rails, epoxy powder coated finish metal frame & door assembly with S.S. door spring & hinged pins complete with required PVC sleeved 63A copper Bus strips without MCB / ELCBs The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Supply, Erection of Miniature circuit breaker single pole 6A to 32A type B curve suitable to operate on 230 V. A.C. system and having overload and short circuit tripping elements and breaking capacity 10 KA to be erected in existing M.S. box confirming to

Miniature circuit breakers shall be quick make and break and break type conform with British standard BS : 3871 (Part-I) 1965 and IS :8825. The housing of MCBs shall be heat resistant and having a high impact

strength. The fault current of MCBs shall not be less than 9000 amps, 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.

The circuit breaker dollies shall be of trip free pattern to prevent closing the breaker on a fault current.

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 3 as for over current and short circuit protection. The over load or short circuit devices shall have a common trip bar in the case of DP and TPN miniature circuit breakers. All the MCB's shall be tested and certified as per Indian Standard, prior to Installation.

Copper plate type earthing as per IS 3043 and as per specification

The earthing of an installation shall conform to I.E. Electricity Rules, IS-3043, latest edition and I.E.E. the copper earth plates should be tinned before installation. The earth plates of Cast iron, having size of 30 x 30 x 0.35 cms. In separate pit. Specially prepared 2.5 mtr deep with necessary to real moist earth surface. The earth pit should be provided with 38 mm dia GI pipe 2 mtr long. Alternative layers of salt and coke shall be provided surrounding the plate.

The pits shall be filled when the plates are in position and in presence of Engineer in charge. The earthing resistance of each earth plate should be measured by resistance megger in the presence of Engineer in charge. Three days after the completion of earthing work the value should conform to regulations.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing work.

Providing & erecting Nominal Bore 16 gauge steel conduit painted black pipe with necessary saddles, screws, bends, junction boxes with 16 G GI fish wire etc. 50 mm

The Light class pipe shall be of galvanized iron "A" Grade pipe having 25/50 mm. to be erected on road crossing or on floor as directed for laying cable.

The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specifications and shall be approved by the Electrical Engineer in charge before executing work.

PVC Insulated Cable 2, 3, 3½ & 4 core

Scope: - The Scope of work should cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling.

All Cables should be as per relevant Indian Standard with ISI Mark.

Materials: - All cables should be 1100 volt grade PVC insulated, PVC sheathed aluminum or copper conductor with or without armoring as specified and with an outer PVC protective sheath heavy duty. Cables should have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standard. Type designation and core identification of cables should be as per relevant Indian Standard.

All cables should be new without any kind of visible damage. The manufacturers name, insulating materials, conductor size, voltage class and ISI mark should be marked on the surface of the cable at every 600MM length.

General: -The cable should be supplied in single length i.e. without any intermediate joint. The cable ends should be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.

Installation: - Cable should be laid in the routes as directed by in charge Electrical Engineer. Cable running indoors should be laid on walls or ceiling as per the site situation. Cables should be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500 MM. interval with chrome plated screws.

In case of cables buried directly in ground, cables should be laid in an excavated trench not less than 900 MM from G.L., over a sand or soft earth cushion to provide protection against abrasion.

In case cables entering the building or one room to another it would be done through porcelain/PVC pipes. After erection the pipes should be sealed with M-seal.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Cable Laying

Scope: - The Scope of work should cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling.

All Cables should be as per relevant Indian Standard with ISI Mark.

Materials: - All cables should be 1100 volt grade PVC insulated, PVC sheathed aluminum or copper conductor with or without armouring as specified and with an outer PVC protective sheath heavy duty. Cables should have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standard. Type designation and core identification of cables should be as per relevant Indian Standard.

All cables should be new without any kind of visible damage. The manufacturers name, insulating materials, conductor size, voltage class and IS mark should be marked on the surface of the cable at every 600MM length.

General: -The cable should be supplied in single length i.e. without any intermediate joint. The cable ends should be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.

Installation: - Cable should be laid in the routes as directed by in charge Electrical Engineer. Cable running indoors should be laid on walls or ceiling as per the site situation. Cables should be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500 MM. interval with chrome plated screws.

In case of cables buried directly in ground, cables should be laid in an excavated trench not less than 900 MM from G.L., over a sand or soft earth cushion to provide protection against abrasion.

In case cables entering the building or one room to another it would be done through porcelain/PVC pipes. After erection the pipes should be sealed with M-seal.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Brass Cable Gland & Lug

The cable gland should be of polished brass, double compression type and ends should be shrouded. The inner size of gland should be suitable to received suitable size of cables. The cable glands should be heavy duty and should be fixed with switch fuse unit with suitable brass washers with rubber ring/gasket.

Rigid PVC Pipes

The Rigid PVC Pipe should confirm IS: 2509 or ISI marked a specified Rigid PVC Pipe should be 1.5 MM to 1.6 MM thick manufactured from high grade virgin PVC. The diameter of PVC pipe should be as specified. Fittings for Rigid PVC Pipe such as bends, elbows, nipples, couplings, reducers, plugs etc. should be specifically designed and manufactured for their particular applications. All fittings should confirm to IS: 3415.

The Rigid PVC Pipe should be erected on wall / ceiling with properly screwed heavy duty Rigid PVC Saddles at the intervals not more than 500 MM. and pipes to pipes and pipes to fittings should be fixed with adhesive solution. 16 SWG G.I. fish wire should be erected with erection of pipe as a drawer wire. The installation of pipes should be as per IS: 4648, IS: 732 and IS: 1646.

The general and technical specifications given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Earthing

The Earthing of an installation should confirm to I.E. Electricity Rules, IS-3043, latest edition and I.E.E. The copper earth plates should be tinned before installation. The earth plates of **Cast iron, having size of 0.45 x 0.45 x 0.35 cm. in separate pit.** It should be specially prepared 2.5 mtr deep with necessary to real moist earth surface. The earth pit should be provided with 38 MM dia GI Pipe 2 mtr long. Alternative layers of salt and coke should be provided surrounding the plate.

The pits should be filled when the plates are in position and in presence of Engineer in Charge. The earthing resistance of each earth plate should be measured by resistance meggar in the presence of Engineer in Charge. Three days after the completion of earthing work the value should conform to regulations.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Copper Earth Wire

The copper wire of 8 to 16 SWG should be use for earthing of switchgear. The wire should be Annealed bare Copper Wire. The copper wire should be erected as per the requirement and instruction of Engineer in charge.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

16 SCOPE OF WORK AND SPECIAL CONDITIONS

1. INCOMING LOAD FLEXIBILITY

The garbage collected from various sites will be brought to the refuse transfer station by RMC or by the agencies appointed by RMC. The approximate load that will be brought by RMC will be **300 TPD from Surrounding wards as decided and finalized by RMC**. Due to seasonal variations the load might increase or decrease by about 15 - 25%. The successful tenderer shall operate the number of compactors proposed taking variation of incoming of waste into consideration.

2. REFUSE TRANSFER STATION COMPACTORS

- 2.1 The tenderer has to provide adequate numbers of Refuse transfer station compactor unit to cater the load of 300 TPD as per BOQ & design the transfer station in such a way that unloading of incoming primary collection vehicles shall be done within 5 minutes time.
- 2.2 The tenderer has to provide compacting unit having hopper, which shall be capable of receiving waste from one to two vehicle at transfer station. The tenderer shall provide minimum one refuse transfer station compactor unit for use during maintenance / failure of any of the operating units.
- 2.3 The tenderer shall operate the compaction unit so as to compact garbage received at transfer station. The proposed Refuse transfer station compactor shall be capable of handling proposed incoming of garbage. The proposed Refuse transfer station compactor shall have cycle time of 30 seconds with charge box volume of 3.0 - 4.0 m³. Thrust power of ram shall be 30 to 35 ton. Noise level of compactor unit shall be less than 85 db. Container compaction time for each container should not be more than 20 min.
- 2.4 The compaction unit shall be the proven & established product of the principal manufacturer & shall be tested for relevant characteristics. The test certificates shall be produced prior to installation as well as after the test-run before final commissioning of the units. The successful tenderer shall complete the work of supply, installation, erection and commissioning of the refuse transfer station within 365 calendar days from the date of the work-order issued by RMC.
- 2.5 The tenderer shall submit bar chart to RMC, within a week from the date of work- order, a bar chart for work schedule defining work activities to match specified commissioning period.
- 2.6 The tenderer shall ensure the conformity with the requirements and perform functional tests for handling more than 300 TPD / day / transfer station quantity of garbage during working hours.
- 2.7 Suitable leachate handling system (collection and disposal to main sewer) shall be provided with compactor.
- 2.8 Tenderer shall provide Compactor with automatic hydraulic type guillotine door operating system and hydraulic coupling claws to clamp and fix container with compactor.

3. WEIGH BRIDGE

- 3.1 Contractor has to provide 02 Weigh Bridge at entrance of transfer station of 50 MT capacity for weighing primary vehicle. RMC shall install weighbridge at disposal site for weighing loaded and empty hook loader vehicle used for secondary transportation (under scope of this contract). The successful tenderer shall ensure that the weight of outgoing vehicles shall not exceed 'GVW- Gross Vehicular Weight' of the vehicle and as per prevailing RTO norms.
- 3.2 The successful tenderer shall arrange its staff to check incoming garbage vehicle for its contents before leaving the weighbridge. The successful tenderer can refuse entry and unloading of vehicles which have brought debris/silt/hazardous waste. The supervisor, on duty, shall intimate the same to the RMC staff at the weighbridge of transfer station, who in turn shall divert /unload the same at the suitable site.
- 3.3 The successful tenderer shall guide the incoming refuse vehicle to the desired static compactor after its weight is noted.

4. CONTAINER

- 4.1 The tenderer shall provide mild steel container of 20 m³ capacity (inside volume) of appropriate size and take equal to or more than 15 MT of load.
- 4.2 The container shall be made of high-quality CRC steel, with one coat of epoxy, spray painted from outside. The container shall have reinforced ribs, thickness of side walls of the container shall be minimum 3 mm. thick, the floor board shall not be less than 6 mm thick & underlay I beam for roll on roll off operation and perforated MS plate at bottom for leachate drain out to leachate collection tray.
- 4.3 The tenderer shall provide upward sliding door (Guillotine type) arrangement to the container to fit the lifting arrangement of the container-handling unit. The container shall have facilities inline with/ beneficial to container-handling unit.
- 4.4 The design of the container shall be such a way so as to able the hook-lift vehicle to lift the same for transportation and shall have arrangement to lock to the hook lift vehicle during transportation.
- 4.5 The container shall have heavy duty rear door opening arrangement by ratchet and lifting cylinder for unloading of refuse at landfill sites.
- 4.6 Proper sealing arrangement shall be provided to the container to avoid spillage of garbage & leachate during transportation.
- 4.7 The container shall have arrangement to collect leachate formed during compaction and the same shall not spill on road during transportation.
- 4.8 The container shall be painted with anti-corrosive paint from inside. The containers shall be painted from outside every 06 months by shade approved by RMC.
- 4.9 All the containers shall be numbered for an identification & record purpose.
- 4.10 The successful tenderer shall use materials as per IS standards and container drawings and designs shall be submitted for approval before commencing the fabrication work.

5. HOOK-LIFT VEHICLE

- 5.1 The tenderer shall provide adequate nos. hook-lift brand new vehicles of TATA/Ashok Leyland/AMW/Eicher or equivalent make, having GVW not more than 25 MT. These vehicles shall be used for transportation of container with compacted refuse from the transfer station to the assigned landfill site/processing plants.
- 5.2 The vehicles shall be diesel/CNG operated having power steering and shall comply BS VI emission norms as specified by RTO.
- 5.3 The hook-lift installed shall have lifting capacity of minimum 25-ton capacity with 10% safety factor with appropriate hook height, for ease of operation.
- 5.4 The hook-lift vehicle shall have telescopic lifting arm suitable to work under 4.7 mt. clear height (floor to beam soffit height) and arrangement to secure loaded / unloaded container at the proper position during transportation and unloading of container at the landfill site/processing plants.
- 5.5 The hook-lift vehicle shall be roadworthy all the time and certified by Regional Transport Authority (RTO), Rajkot conforming to the rules and regulations prescribed in this regard from time to time regarding use of fuel or pollution control norms or other relevant modifications. The vehicles shall be yearly passed from the RTA and expenses for the same shall be borne by the tenderer. The vehicles shall be got registered in Rajkot within three months from the receipt of work order and shall be operated within RMC. jurisdiction or to the designated site.
- 5.6 The successful tenderer shall provide a signboard indicating that the vehicle is on RMC, duty, publicawareness slogans, approved by RMC" shall be painted on the sides of the vehicle.

6. LEACHATE COLLECTION

- 6.1 The tenderer shall arrange to collect leachate generated during compaction of garbage by suitable pipe network and dilute as per parameters mentioned in SWM Rule 2026 before discharging into a nearest MH of main sewer line or disposing into nearest STP.
- 6.2 The tenderer shall also arrange to collect the leachate oozing out of the garbage from the container during transportation and dilute as per parameters mentioned in SWM Rule 2016&2026 before discharging into a nearest MH of main sewer line or disposing into nearest STP.
- 6.3 The tenderer shall ensure that the parameters set by GPCB / Central Pollution Control Board / SWM Rule 2016/2026 / NGT Orders / Rules / Acts / Guidelines / Advisories / Notifications amended from time to time by Government of Gujarat, MoUD, Government of India for handling of MSW is scrupulously followed at the transfer station.

7. WASHING OF VEHICLE

- 7.1 The tenderer shall make arrangements for washing of hook-lift Vehicles, containers at the transfer station. Civil work for washing platform, shed shall be constructed by contractor and High-pressure washing machines shall be installed for the purpose.
- 7.2 The tenderer has to provide Grease trap chamber for separating solid / Grease from wastewater & discharge it to the nearest sewer line of Rajkot Municipal Corporation.

8. DISINFECT AND ODOUR CONTROL

- 8.1 The tenderer shall provide system for odour control to neutralize foul, nauseating smell. The successful tenderer shall spray eco-friendly disinfectants on all refuse vehicles, leaving the transfer station.
- 8.2 The chemicals used for disinfections, leachate treatment etc. shall be eco- friendly products preferably using essential oils and plant extracts and having deodorant property, which shall be stable for at least 10 hours.
- 8.3 The successful tenderer shall provide nozzle system at hopper area, inside the building, at compactor area, near emergency platform, with appropriate pipe fittings, near the exit gate for effective spraying of disinfectants / deodorants with the help of portable spray pumps on outgoing vehicles.
- 8.4 The tenderer shall provide high pressure reciprocating pumps (1000psi), NORMIST (TURKEY) polyamide tubings, Brass nozzles with SS Orifice, Brass fittings and hi-pressure SS filter.

9. ELECTRIC SUPPLY

- 9.1 The RAJKOT MUNICIPAL CORPORATION will only assist for getting electric supply (load requirement shall be given by contractor) through PGVCL / electric power Supply Company. However, the tenderer shall fulfill all the requirements of supply company considering prevailing conditions implemented by PGVCL and also including laying of pipes for main cable upto the service position, construction of service cabin, switch gear, earthing etc. at their cost including all outgoings.
- 9.2 The tenderer shall calculate the electric load considering operation at the transfer station for 24 hours. The tenderer shall also provide the necessary illumination.
- 9.3 The tenderer shall make payments of actual electric consumption bills to the electric supply company, as and when the same are demanded after issue of letter of acceptance. In case of non-payment of electric bill & supply company issues notice for disconnection, the bill amount will be recovered from the regular monthly bill or security deposit of contractor.
- 9.4 The electrical installation shall be carried out through license electrician/wiremen only and all precautions shall be taken to avoid any accidents/mishap.
- 9.5 The tenderer shall follow all the mandatory condition of electric supply of company & take all the safety precautions as per statutory requirements.

- 9.6 In case of power failure, contractor shall operate RTS using power supply from DG Set / Generator installed at RTS. The fuel / diesel for operating DG Set / Generator shall be borne by contractor.

10. WASTEWATER

- 10.1 The piping arrangements to collect waste water, dirty water, sewerage due to cleansing operation shall directed to the nearest manhole.
- 10.2 The storm / rainwater collection & disposal system shall be constructed as per the drawing / actual site condition.

11. CIVIL WORKS

- 11.1 The successful tenderer shall setup office for supervisory staff and its own staff on duty at the transfer station. The main computer and all records shall be kept in this office.
- 11.2 The successful tenderer shall submit detail construction drawings / as built drawing along with the tender documents.

12. TOOLS & TACKLES

- 12.1 The successful tenderer shall provide all the required tools and tackles for the installation & commissioning of the equipments and vehicles at the transfer station.

13. OTHERS

- 13.1 Communication system / equipments including GPS shall be provided so as to have effective communication between weigh bridge operator, floor attendant, static compactor operator and container handling unit operator. A public address system shall also be provided to enable the RTS in-charge to guide the staff working at the site in the event of any emergency, mishap etc.
- 13.2 The software to be installed for the capturing the data at the refuse transfer station should integrate the data of all weigh bridges, RFID tag and CCTV camera.
- 13.3 In order to maintain high standard of public image, the successful tenderer shall fix a schedule for cleanliness and maintenance of the equipments. Sanitary conditions shall be maintained throughout the period, with hygiene and environment getting the top priority. The entire area of the RTS including the open passages, roads, water entrants, drainage system, etc. shall be regularly cleaned and the entire area shall be maintained.
- 13.4 Advisory directional signboards shall be provided at all the necessary locations at the Refuse Transfer Station (RTS) so as to avoid any ambiguity and confusion.
- 13.5 The entire RTS shall be well equipped with fire prevention and safety system satisfying all the conditions, rules and regulations as recommended by the Chief Fire Officer. A certificate from the CFO shall be displayed in the RTS office, and a copy of the same shall be submitted to RMC.
- 13.6 The successful tenderer shall provide small size plantations wherever possible inside the RTS for better and clean environment.

14. PROVISION OF GPS MECHANISM

- 14.1 Contractor shall provide GPS (Vehicle tracking system) mechanism at his cost in each vehicle as well as at control room location with required network (Hardware & Software) facility and have to provide necessary data as per requirements of Rajkot Municipal Corporation during the contract period.
- 14.2 The software to be installed for capturing the data at the refuse transfer station should integrate the data of all weigh bridges, RFID tag and CCTV camera.
- 14.3 Contractor shall bare necessary data connectivity changes during entire O &M period.

15. FIRE HYDRANT SYSTEM

The following are the items which should be provided for fire hydrant system.

- 15.1 **Motor driven fire pumps:** End suction type, horizontally mounted centrifugal pump (as per IS 1520), TAC approved each capable to deliver 150 cum/hour (2500 lpm) of clear water at minimum 70 M TDH, coupled to a suitably electric motor mounted on a common base frame and antivibration pads coupling, coupling guard and fixing bolts etc. Motor HP to be suitably selected to suit minimum discharge and residual head at the topmost hydrants. The characteristic curve should have a large range of discharge points for different heads. The pumps shall be provided by the contractor.
- 15.2 **CI Sluice Valve:** CI 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.
- 15.3 **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.
- 15.4 **GM Valves:** Gun metal components of the peets valves i.e. Gate Valves, Check Valves i.e. non-return valves, and Globe valves etc shall be of Gun Metal conforming to Grade 2 of IS 318. The valves shall be having flanged or screwed ends, hand wheel with open-close indications etc all conforming to Class-2 Valves of IS 778 (ISI marked) or imported as per ASTM.
- 15.5 **CI non return valves:** 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.
- 15.6 **MS Pipes and Fittings:** All M S pipes shall be as per IS 1239 (heavy/medium quality as mentioned in the schedule of items upto 150 mm N B, as per IS 3589 (minimum 6 mm thick) above 150 mm N B, and the fittings shall be of all welded construction, butt weld type flanges shall conform to IS 6392 and gaskets of synthetic moulded rubber approved by Fire Standard. All pipes outside the building shall be laid underground at a depth of 1 mtr (approx.) and laying shall be as per layout drawing, excavation, back filling of earth, cutting holes in existing structure where necessary, providing puddle collars/pipes as required & making good the damages including making the concerned portion of the structure water tight. Erection of over ground piping shall be complete with necessary pipe supports hangers with MS angles/plate/nut bolts/clamps etc with fabrication as required including providing MS puddle pipes/collars as required for punctures through walls/slabs etc. Erection of pipe lines shall also include chipping of wall; making holes inside RCC or brick walls, slabs and necessary civil works for restoration of the surface after completion of erection. The quoted tender rate shall include all the above works, as well as the cost of route markers for under ground pipe lines as per following specifications. Route marker with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) of size 60 cm x 60 cm at bottoms and 50 cm x 50 cm at the top with a thickness of 10 cm including inscription duly engraved as required (spacing approx. 15 mtr or as directed at site). No extra payment will be made on this account. The opening of the pipeline shall be provided near compactor at ground floor level and near hopper at 5.5 m level.
- 15.7 **Pressure Gauges:** Pressure gauges with controlling cocks etc. shall be of approved make having pressure range, bourdon material and dial size as specified in schedule of items.
- 15.8 **Pressure Switches** Pressure switches with accessories shall be of approved make and design and shall actuate ('cut-off' and/or 'make contact' as required) at pre-set pressures.
- 15.9 **Landing Valves (Hydrant Valve)** Gun metal landing valve (internal/external Fire-Hydrants) with oblique type single outlet as per schedule of quantities complete with hose coupling adaptor of 63 mm size, instantaneous spring lock arrangement and blank cap with chain conforming to IS 5290. External Fire-Hydrants to be provided with stand posts as specified in schedule of

quantities. Orifice plates may be provided where inlet pressure is required to be reduced as per WBFS requirement.

- 15.10 **Branch Pipe:** Gun metal, short type, instantaneous pattern branch pipe to suit fire hose delivery coupling of 63 mm size complete with G M nozzle of 20 mm nominal size conforming to IS 903.
- 15.11 **Hose with Coupling:** 63 mm nominal internal dia hose, rubber lined woven - jacketed coupling with Type-II (Reinforced Rubber lined type) of IS 636, firefighting delivery hose 15 M long each, fitted with gun metal coupling of 63 mm size with multi serrated tail and double instantaneous spring lock arrangement comprising of male half at one end and female half at other end complete with rubber cup washer and conforming to IS 903.
- 15.12 **Hose Reel:** Swinging hose reel conforming to IS 884 & comprising of 3 ply rubber hose of length specified in schedule of items, 20 mm (3/4") nominal bore (25 kg/cm²/350 psi bursting pressure), mild steel pressed reel with 170 degree swinging, nozzle of GM chromium plated, with non-jamming controlling handle which shall stay at the 'ON' 'OFF' position as set, wall brackets with 'U' shaped reel carrier made of C I complete with 25 mm NB G M valve at the inlet, and orifice plates (if necessary for reducing pressure).
- 15.13 **Air Vessel:** Mild steel air vessel adequate size to take care of pressure surges during operation of the system and venting of entrapped air in the system shall be complete with air relief valve, pressure gauge, drain valve and shut off valve at the inlet.
- 15.14 **Valve Chamber:** Valve chamber of adequate size to accommodate external valves shall be constructed as directed per site condition.
- 15.15 **Fire-Brigade Connections:** Fire-Brigade connections (inlets) to Riser and Under Ground Reservoir shall be with two numbers of 63 mm instantaneous inlets for each connection as per TAC norms. Other aspects of the connection shall be as per IS 904.
- 15.16 **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. 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.
- 15.17 **Fire alarm system:** The alarm should be placed at the office building so as to alert the people working in case of any disaster takes place at transfer station. Each component of the fire alarm system shall be supervised for improper operation including open or short circuits by the fire alarm panel. The fire alarm panel shall also supervise itself for low battery voltage and loss of normal building power. Upon any of the above conditions, the trouble indicator on the fire alarm panel shall indicate the improper status by both an audible and visual signal. The audible indication shall continue until the condition is acknowledged by an operator at the fire alarm panel. Visual indication shall continue until the trouble condition is corrected. Upon confirmation of an alarm from any initiation device, the following functions shall be performed without delay:
1. All alarm signaling devices shall sound until silenced by an operator at the fire alarm panel or after ten (10) minutes of operation. Silencing signals shall not prevent the signals from sounding on a subsequent alarm.
 2. Display an alarm status on the alphanumeric display of the fire alarm panel and sound an audible signal at the panel. Signal shall sound until alarm is acknowledged by an operator.
 3. Shut down all required air handling units. All smoke dampers shall be closed, and the smoke removal system shall be activated.
 4. Transmit a signal to the local fire department having responsibility by the most expedient method acceptable to the local authority having jurisdiction unless directed by a specific method within these specifications or drawings.
 5. Cause doors held open electrically to close without time delay.
16. **GARDENING:** Development of Gardening shall be done by the contractor at his own cost. Utmost care shall be taken for proper watering of plants, cleanliness of gardening, plantation of proper

trees etc.

17. To get approval for authorization certificate from GPCB (if required) is under scope of contractor i.e. approval of installation and commissioning of RTS & MRF, from the statutory authorities like GPCB, PGVCL, RMC etc.

Important Note:

- Contractor has to incur all cost/expenditure for Supply, Installation, Testing & Commissioning of the project as a whole (civil, mechanical, electrical, instrumentation, etc.) for period of 01 years (defect liability period) after completion of project. RMC will not incur any expenditure for any damage / repairing work up to defect liability period.
- The tools and plants, spares required in machinery shall be supplied by Manufacture at its own cost for the period of 05 Years. Required quantity of all consumable tools and plants, spare shall be made available at site/workshop all the time. On completion of contract, the spares, tools and plants which are unused or available in inventory shall be handed over to RMC.

17 PROCUREMENT REQUIREMENT & SPECIFICATIONS OF SYSTEM

Static compactors, Hook loader units and containers to be procured is mentioned below. However, actual number of procurements will be at the sole discretion of RMC.

Requirement of vehicles and Equipments (number)		
Static compactor	Hook lift system (vehicle + lifting mechanism)	20 CMT Containers
03	07	20

- Note:** 1. The waste carrying capacity of Container is taken from 12 to 15 MT. The number of Compactors to be deployed at transfer station shall be proportionate to incoming of waste i.e. it shall not be less than quantity mentioned in the table above.
2. The number of Vehicles and equipments shall be supplied as per the quantity mentioned above at the transfer stations. If any of the equipment and vehicle is supplied in less quantity than required quantity mentioned above, the payment shall not be made for the same.

Emission Norms for Chassis:

Bidder must have to quote for chassis **having BS-VI norms or latest applicable RTO norms of Rajkot City** as applicable at the time of registration and supply the unit mounted on BS-VI or RTO norms as applicable at the time of registration chassis, otherwise it will not be accepted.

Procurement period (i.e. Delivery Period)

The total procurement period is 120 days. For Hook loader unit Delivery period will commence from the date of invoice of chassis to the unit manufacturer by chassis supplier. However, unit manufacturer must have to issue complete procurement order (as per the requirement of chassis supplier) to the chassis supplier immediately within 7 days from the date of receipt of RMC order. Otherwise, late delivery will be considered for such delay period.

Delivery Schedule

As per requirement RMC will give delivery schedule (if delivery required in staggered manner/delay) to the successful bidder. The price quoted in price bid will be valid for the entire procurement period, which will be binding to the supplier.

Delivery location: MOTAMOVA, Rajkot Municipal Corporation, Gujarat

Taxes and duties

It shall be included in the indicated price. Bidder has to quote the total price, net including of all taxes & duties etc. and for evaluation and finalization purpose, the total price will be taken in to consideration. Transportation, Packing, Forwarding, Insurance charges are included in the indicated price.

Warranty Period

Supplier shall warrant that the supply against faulty materials and workmanship for static compactor, Hook Loader unit and container system for a period of 12 months from the date of successful commissioning / commercial commencement of plant.

Inspection

The bidder will make arrangement for inspection of the static compactor, Hook Loader unit and container system by Third Party (if required) along with RMC, before delivery, at factory site also before color work as required. Inspection of the static compactor, Hook Loader unit and container system will also be carried out at Rajkot at delivery site specified by RMC. If any discrepancy is found in the material supplied and technical specifications approved, the same lot shall be rejected, and bidder will collect rejected material within

seven days. No claim for the rejected material shall be entertained. Inspection charges including third part charges to be borne by bidder.

Liquidated damages for delay

Supplier in accordance with the schedule specified in the tender shall make delivery of the equipments. An unexcused delay by the supplier in the supply of its delivery obligations, supplier will be hold liable and RMC can take actions to forfeit of his performance security, imposition of liquidated damages and/or termination of the contract by default.

If the supplier fails to deliver any or all of the equipments within the said period, RMC shall deduct from the contract price as liquidated damages, a sum equivalent to 2 percent of the delivery price of the delayed goods per month or part thereof on the value of the delayed work will be recovered from the supplier without any reference to the supplier. **The amount of Liquidated damages will be however subject to the maximum of 10% of the total contract sum. However, Delay in excess of one hundred fifty (150) days after completion of delivery period may be cause for termination of contract and forfeiture of all security for performance.**

Signature of the Contractor with seal

**Environment Engineer
Solid Waste Management Department**

Place: Rajkot Municipal Corporation

Date:

18 SPECIFICATIONS OF MECHANICAL COMPONENTS

General Description of Transfer Station

As of 2022, most of the Indian cities and towns still use an open plot which acts as an intermediate storage/transfer point for solid waste collected within the city. As per SWM Manual 2016, general thumb rule says that if the one-way travel distance to disposal is over 15 km or over 30 minutes, the need for transfer stations should be assessed. Since 2022, **300 TPD** of waste was generated in Motamova Rajkot city which was collected by the primary collection vehicles and sent to the existing transfer point. Considering the existing and projected waste generation in the city, Rajkot Municipal Corporation has accessed the need for designing a refuse transfer station in the city as an intermediate transfer point for waste transportation at Motamova. A government plot at Motamova was found as an ideal site for construction of the RTS.

At the transfer station, the loose garbage being transported by the smaller vehicles / Dumper Placers will be unloaded into a hopper through a suitable size chute. The batches of measured volumetric capacity will be prepared in hopper & compressed by electro hydraulically operated static compactor into the container having 20 cum volumetric capacity. Hook Loader Equipment mounted on the truck chassis lifts the filled container. The chassis will carry this container from Transfer Station to processing site / final disposal site. The hook mounted on chassis will further use to unload and tilt the container so that it can be emptied, loaded and unloaded quickly and promptly. The empty container will have to be shifted back to Transfer Station site and hook loader shall place the empty container for next cycle of operation.

1) Item No. 1

Supply, delivery, installation & testing and commissioning of static compactor having minimum capacity of 250 cu.m/hr (proven & established unit) inclusive of hopper & chute, static compactor, charge box etc. complete as per specification and approved as per engineer in charge.

Specification
1. GENERAL DESCRIPTION:
The Municipal solid waste collected from door to door/littering and transported by Dumper Placers and other smaller vehicles like Tipper Vans shall be emptied into hopper which is fixed on elevated platform. From hopper, the waste will be transferred to the charge box of Static compactor where it will be compressed. The static compactors, installed at transfer stations, will fill the garbage in large containers. The static compactors should be compatible with containers. Below mentioned is the minimum requirement.
2. TECHNICAL DESCRIPTION: -
The static compactor will have 4 major assemblies whose details are given below. (1) Hopper The hopper is a large container wherein incoming MSW will be unloaded directly by vehicles. This should be firmly fixed to the charge box body & supported ensure adequate stability. It would be made of minimum 6 mm thick ms sheets the capacity should not be less than 10 CMT. The hopper opening area at the top should be designed in such a way that unloading of minimum two vehicles is possible at a time. The hopper would be well supported by MS structure of appropriate size to take self-weight & Garbage. (2) Charge Box The unloaded MSW collected in Hopper will be pushed through charge box to compatible with HL containers by to & fro movements of the compactor head, which is attached to charge box. The charge box volume should be minimum 3.0 CMT. The construction of charge box should be with 6 mm MS construction

with necessary stiffeners. There should be provision for grouting the static compactor on the foundation. The charge box must have the provision for mechanically locking the Hook Loader container to it to ensure trouble free operation during the compacting cycle. It shall possess all required safety arrangements. Entire static compactor shall be imported and proven model from the reputed manufacturer.

(3) Control Panel

Heavy-duty electrical control panel with International approved standard electrical items and wires, switch gears etc. shall be provided and shall be suitable to run minimum 10 KW electric motor with all the required overload protection & alarms.

(4) Hydraulic compacting Mechanism.

This will consist of a hydraulic ram that will travel through the charge box length and push the MSW into the container. The ram of hydraulic compacting mechanism should be of suitable size & capable to generate a density of 0.7 to 0.8 T/M³ compacting garbage. The compaction time of one container shall not be more than 24 – 26 minutes. The hydraulic ram shall be of standard make with standard dimensions having heavy-duty raw materials and capable enough to run for continuous operation of about 16 hr/day.

2) Item No. 2

Supply and delivery, testing & commissioning of Heavy duty transfer station containers of 20 cu m volumetric capacity compatible with the static compactor and hook loader mechanism for lifting heavy duty hook, sides made of 4mm thick MS plate, 6mm base plate, optimum number of cross stiffener, having guillotine arrangement, openable gate, leachate disposal valves, painting etc. complete as per specification and as approved by the engineer in charge

Specification	
1- GENERAL DESCRIPTION: -	
The closed top, rear loading type containers will be compatible with Hook loader as well as static compactor to be installed at transfer stations. The container will have rear door opening by ratcheting arrangement for loading refuse at processing site. It shall also have mechanical locking arrangements to lock them with static compactor while loading the refuse.	
2- TECHNICAL SPECIFICATION:	
<ul style="list-style-type: none"> • Volumetric Capacity • Base/Floor • Floor Plate • Side Panels • Rollers • Material • Weight • Dimensions: <p>However, these dimensions shall be approx. and actual dimensions shall be as per the design of the manufacturer which bidder has to submit with tender. Further it should match with offered chassis, HLE and Local RTO norms.</p>	20 cu m 6 mm as per ISMB 200 1 no split type 2 no. rear side As per BIS 2062 Not less than 3000 Kg. Approx: L: 4000 mm W: 2000 mm H: 2300 mm

The container would be used for storage and transportation of compacted of municipal solid wastes. Container should be of 20 cu m volumetric capacities. The lifting hook shall be integrated within the frame and be capable of taking the specified load.

1. Container should be of 20 CMT. Volumetric capacity and should be strengthen enough to handle the garbage of its maximum capacity. It shall be capable enough to take care of the compaction pressure of the Static compactor during the compaction process. Material should not deform.
2. Container shall have its: -
 - Bottom plate (i.e. floor) of 6 mm thick M.S. plate.
 - Sides, front and top portion of 4 mm thick M.S. sheet.
 - There should be optimum number of cross stiffener / cross members. Along the Width of the container with end to end.
3. There must be Longitudinal MS Section beneath the floor to strengthen the floor and for roll on roll off operation.
4. Hooks for container lifting: The hook for lifting the container would be integral to the framework of the container. It shall be provided with the necessary reinforcement to handle the design weight for lifting with adequate factor of safety. The shape and size would be as per the design of the lifting tackle (Hook lifter). Necessary safety provision shall be provided so that container should not slide from the hook lifter during transportation.
5. The design of the container shall be suitable for hook lift vehicle for transportation and have arrangement to lock to the hook lift vehicle during transportation. Further container shall have heavy duty rear door opening arrangement by ratchet and lifting cylinder for unloading of refuse at treatment/disposal site.
6. All the Plate / Sheet Joints at container edge / border must be supported properly should be fully welded by means of proper MIG welding method. All welding work must be finished properly for better look and strength purpose.
7. Container rear door shall have ratcheting arrangement lock and should be strong enough to handle the rigorous working operation.
8. Container shall have 2 Nos. of rollers with required pin and bracket arrangement at the rear side of heavy-duty material for roll on and roll off operation.
9. Container shall have arrangement to collect leachate formed during compaction.
10. Container shall have upward sliding door (Guillotine) arrangement. It shall be having proper sealing also.
11. For fabrication of container normal engineering standards and practice will have to be used by the contractor. Container should have minimum weight of 3000 Kg.
12. Container outer sides shall be colored with Green as per SWM Scheme.
 Painting: The inside of the containers to be coated with two-coat black colour fiber reinforced plastic resin or equivalent polyurethane resin. Bottom of the container shall also be painted with black anti-corrosive colour. The outside shall be painted "GREEN" (or as per RMC requirement) with minimum 1 coat of first quality synthetic paint to ensure long lasting structure suitable for use of handling raw garbage under corrosive conditions. Prior to painting coat of anti corrosive zinc rich primer shall be applied as per the paint manufacturing standard. The supplier should paint number on container and messages on the body.
13. Contractor shall provide RMC Logo and Numbering as per RMC instruction.
14. Contractor has to first provide the sample container and on approval of the same balance quantity should be manufactured.
15. If any suggestion / instruction given by Municipal Commissioner and / or his authorized representative during inspection, it shall be implemented by contractor.

- All welding work must be MIG welding only. All necessary finishing shall be carried out prior painting. Welding wire shall be of ESAB/ADOR/L&T only.
- All angle and channels and other raw materials are as per Indian Standards IS- 2062
- All MS Material shall be of TATA/ SAIL/ Jindal/ Vishakhapatnam steel/Essar/Ispat /(for angle/channel if not available of above brand then it shall be of IS/ISO approved make) only. Contractor has to submit necessary test report and/or invoice copies.
- Paint must be of standard brand only like Asian, Nerolac, Berger, ICI and Shalimar only.

3) Item No. 3

Supply, delivery, testing and commissioning of Hook Loader / hook lift system comprising Hook loader Equipment with lifting mechanism unit of capable enough to handle the load of 20 MT with at least 10% safety factor, able to accommodate container of length 4000 mm, having arm type hook mechanism for loading and unloading the container and other ancillaries (proven & established unit) mounted on heavy duty hook loader 3 Axle truck chassis of 25 MT GVW, BS-VI or as per RTO norms in Rajkot applicable at the time of registration of Tata/Ashok Leyland/ Eicher or Equivalent with Non-Sleeper Driver Cabin fitted with PTO and hydraulic Pump, having RTO passing, insurance and paid necessary taxes etc. complete as per specification and approved as per engineer in charge.

HOOK LOADER:

General Specification: Hook Loaders are fabricated in accordance to the CE machine regulations and ensures the safety of its operator and its environment.

• Hook Loader

Bottom Frame The bottom frame comprises two longitudinal main runners and cross reinforcement. To the rear of the system the pivot point of the tipping frame is attached. The pivot point is situated as low as possible into the bottom frame. Hence the tipping capacity of the cylinders is augmented. The bottom frame has several container rollers divided over the full length, which supports the container's lower main frame. As well at the front of the bottom frame high tensile steel slide supports are placed to support the container over a big surface. At the front of the frame the cylinder bridge construction is located, providing a strong and solid attachment for the main cylinders. The tipping frame automatically locks onto the bottom frame during the unloading procedure.

• Tipping Frame:

The tipping frame enables the system to tip the containers. The tipping frame rotates at the rear of the system's bottom frame and has its high tensile anti-wear rollers on which the container is supported. At the tipping frame a steel locking device is constructed in order to lock to the main off-loading frame. These two components are locked together for tipping the container.

• Off – loading frame:

The off-loading frame has the hook mast, which slides front and backwards. The off-loading frame enables the system to roll off the container. The off-loading frame rotates in the middle of the main frame at the front of the tipping frame. During the operation the hook masts moves backwards and unlocks the offloading frame from the tipping frame. After this the two double acting main cylinders will rotate the off-loading frame and enables the system to roll-off the container.

• Hook Mast:

The hook mast can move front – and backwards inside the off-loading frame. By this the system is able to transport different various length of container. The hook mast will also unlock the off-loading frame from the tipping frame, which enables the system to roll – off the container. Further the system has synthetic

bearing to have the maintenance free bearing of the sliding. The high tensile wear resistance steel hook mounted into the hook mast is been placed at a height of 1570 mm. a special designed lock ensures that the hook eye of the container will be secured during tipping, on and off rolling and thus cannot be dropped out.

Providing and Fixing of Hook Loader Equipment over Truck Chassis

General Description:

The Hook Loader Equipment mounted on a Truck chassis (HLE) shall be used for lifting, loading the closed containers of various capacities (General 20 cum vol. Capacity) and discharging the contents (solid waste materials like garbage, garden waste, debris and other like refuse materials) by tilting the container at the desired location. The hydraulically operated HLE shall be capable of loading/unloading the steel container on/from chassis having, by hooking and rolling on/off principle. HLE shall be capable enough to handle the load of 20 MT with at least 10% safety factor. Minimum requirements are as under:

Technical Description:

- HLE shall be provided with an arm type hook mechanism for loading and unloading the container.
- The HLE will have a central frame assembly located with an outer structure to handle and to tip the container. It shall have telescope jib with heavy-duty hook, 2 main rams for lifting/tipping, standard containers locking arrangement, hydraulic pump, stabilizers and other by hydraulic elements as per functional need.
- The hydraulic pump will be driven by the vehicle engine gear box thro the power takes off (PTO) unit.
- A pair of roller assembly located at the rear end of the HLE will facilitate and guide the main beam sections of container during loading/unloading of the container.
- Necessary safety locking arrangement (Mechanical/hydraulic) shall be provided to lock the container with the HLE. Tipping operation of the container shall be done after effective locking.
- All safety control like holding valves, check valves / relief valves, Electric Hydraulic / Pneumatic functional interlocking arrangements will be provided for operational reliability.
- It shall have all required hydraulic connections for loading – unloading – locking - emptying of the container.
- All control levers shall be provided at a convenient location in/near driver cabin for easy operation.

HLE Capacity	Minimum 20 Ton
Container Length that can be accommodated	4000 mm or shall be compatible with hook loader as per standards.
Hydraulic Pump Capacity	As per the requirement of system
Operating Pressure (Minimum)	200 bar
Hydraulic Tank Capacity (Minimum)	100 Litres

The hook loader equipment on chassis shall be as per rules & regulation prescribed by local transport authorities (Rajkot).

- These specifications only show the requirement in brief. Each tenderer shall attach descriptive literature and specifications along with a detailed description of the machine covering all the salient features.
- Providing nipples etc. to all moving parts with adequate means of lubrication.
- All reciprocating parts shall be suitably guarded
- The equipment shall be capable of being operated under average conditions for at least 16 hrs. Continuously without any ill effects on its component.
- However, imported components shall be approved by principals and international organization with

certificates. The rear body shall be painted from outside with Asian/ Nerolac / Berger / ICI/Shalimar/Dulux. The colour scheme will be intimated later. The under-chassis parts and the portion shall be painted with anticorrosiveblack. Complete unit including cross and super structure member shall be painted with superior quality anti-rust paint. All the paint material shall confirm to ISI specifications and shall be of specified makes. The cabin shall be painted with Asian/ Nerolac / Berger / ICI /Shalimar/Dulux paint externally and internally. The colour scheme will be informed at the time of fabrication

- All welding work must be MIG welding only. All necessary finishing shall be carried out prior painting. Welding wire shall be of ESAB/ADOR/L&T only.
- All angle and channels and other raw materials are as per Indian standard.
- All MS material shall be of Tata / SAIL / Jindal / Vishakhapatnam steel/ Essar/Ispat/Hardox/as suggested in the tender (for angle/ channel if not available of above brand then it shall be of IS/ISO approved make) only. Contractor has to submit necessary test report and/or invoice copies. Paint must be of standard brand only like Asian, Nerolac, Berger, ICI, Dulux and Shalimar only.

Truck Chassis with Driver Cabin

Specifications:

- Make and Model of Chassis **(Tenderer has to Specify)**
- Country of Origin for Hook Lifter **(Tenderer has to Specify)**

General Description:

The chassis shall be rugged and durable, shall incorporate the latest technological features offered by the manufacturer/supplier. The vehicle should have minimum 25 ton pay load (GVW) capacity must be suitable for fixing of Hook lifter equipment as detailed below. Below mentioned are minimum requirements.

Basic Specification:

Any HCV chassis with full forward driver cabin and load should meet the following specification:

- A) Gross vehicle weight: minimum 25000Kg.
- B) Engine: Fuel efficient, Turbo charged 4- stroke, 6- cylinder water-cooled, direct injection diesel engine delivering around 135 BHP at rated RPM & manufacturer's duty point. It must have minimum BS-VI emission norms as may be applicable to RTO RMC, Rajkot
- C) Clutch: Single plate dry friction type.
- D) Gear Box Type: Synchromesh
- E) No. Of gears: 5 forward and 1 reverse.
- F) Front Axle: Heavy duty forged I- reverse. (Or as per approval of ARAI/CMVR)
- G) Rear Axle: Two live rear axles, single speed fully floating spiral bevel gears, (Or as per approval of ARAI/CMVR)
- H) Steering: Power steering.
- I) Brakes:
 - Service Brakes: Dual circuit full air S-Cam brakes.
 - Parking Brakes: Spring actuated on rear wheels.
 - Engine Exhaust Brake: Pneumatically operated with foot control valve
 - Frame: Ladder type heavy duty frame with riveted/bolted cross members.
 - Side members of channel sections.
- J) Suspension: Semi elliptical leaf spring at front and rear with auxiliary springs at rear only.
- K) Shock absorber: Hydraulic double acting telescopic type at front.
- L) Wheels & tyres
 - Wheelbase: minimum 4600 mm

- Tyres: 10.00*20-16PR with diagonal ply. (Or as per approval of ARAI/CMVR)
- No. Of wheels: Front: 2, Rear: 8, Spare: 1 (Lockable)
- M) Fuel Tank Capacity: Minimum 180 liters approximately.
- N) Cab: All steel fully forward control drivers' Cabin with adjustable seatshaving seats belts. Cab should have all standard accessories like openableside windows, rear view door mirrors, laminated windscreen. MinimumTwo speed windshield wipers, fuel gauge multiple warning lamps andbuzzer low oil pressure coolant level etc.
- O) Electric system:
Voltage: 12/24 volts.
- P) Battery Capacity: 12 volts-180 amps/hr 24 volts-80amps/hr. (Or as perapproval of ARAI/CMVR)
- Q) Alternator Capacity: minimum 65amps. (Or as per approval of ARAI/CMVR)
Head lights: 2 nos. with Head light protection frame. Turn Signal: Front andrear.
Reverse alarm: 1 No.
- R) Painting:
Paint & painting process shall be superior quality to ensure long lastingstructure resistant to rust, weathering and breakage.
- S) Color shade: Purchaser choice from standard colors offered by suppliers.

4) Item No. 4

Design, Supplying, installation, testing and commissioning of complete Material Recovery Facility (MRF) system for segregation of municipal solid waste comprising of **moving belt feeders with VFD panels, belt conveyors, trommel screens of 100 mm, 75 mm and 35 mm sizes, air blower, sorting platforms with staircase, railings and structural supports, operating control panels**, including all allied electrical, mechanical components, fittings, fixtures and fastening, along with **erection & commissioning of trommel screening plant**, as per specifications and direction of Engineer-in-Charge.

1. Moving Bed Conveyor with Hopper:

This is the first equipment of Pre-sorting section. Fresh Receipt of MSW is fed on to hopper chute of this moving bed conveyor , which carries the fresh MSW in to the feeder conveyor. This is the robust chain belt type conveyor specially designed to handle homogeneous materials in MSW.

Technical data for Moving bed Conveyor with Hopper:

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Hopper Chute & Side Guards, Covers etc	M S Sheet 12 & 14 SWG
Fabrication	As Per IS-801
Gear Box Type	WGR; Type: -Worm Shaft, Helical, geared motor.
Motor	Hydraulic Radial Piston type; Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Chain	Specially made Heavy duty; 3" pitch; a. Bushed & Roller Chain b. Power Transmit - 98% efficiency for all working loads under lubricated condition

	c. Parts: light weight & Compact pins & bushing Carburized & case hardened for wear.
Belt	1500mm width; 9000mm length, 3 ply to resist abrasion & cutting, 12mm thick, with top covering 2mm Resistant to oil, heat & fires, with bottom covering 1.5mm & Chemical grade 1& 2, Brand: ISI; Grade –M 24; and Belt tension as per IS 11592.
Sprockets	3 "Pitch; a. Material: - EN8 x 22 mm Thick. b. Heat treatment after Fabrication & Machining. c. No. of Teeth: 16
Surface	Blasting & Pickling
Primary & Paint	Epoxy Primer & Epoxy Paint. All steel surfaces exposed to weather will be mechanically cleaned to remove all rust and scale & then 2 coats of anti-corrosive Zinc Chromate Red Oxide each 20-micron layer. Then 2 coats of Industrial grade Enamel paint of reputed make i.e. Asian, Berger etc. the colour will be of the customer's choice.
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings. Return Line Filter: - Standard Make.
Power & Speed	7.5 HP & 3 +/- 1 rpm
Note	Length & Discharge Height may be varied as per site conditions.

2. 100mm Trommel Screen (Rotary Trommel)

This is the Rotary Screen which separates material on the basis of over size (>75mm), rejects (>75mm size) materials will be carried to undersized materials through belt conveyor system.

Technical data for 100mm Trommel Screen:

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc
Covers	M. S Sheet , 10 , 12 & 14 Gauge
Drive	Friction drive with Solid Rubber, rubber special grade shore hardness 90, in Both system Electric & Hydraulic.
Hydraulic Motor	Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Tyres	Specially made , Heavy duty , Solid Rubber Tyres
Screen	100 mm size holes in Diagonal
Ring	Fabricated heavy duty
Surface	Blasting & Pickling
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings.
Primer & Paint	Epoxy Primer , Epoxy Paint.
Length	5 mts screen Length & 1 mts length on both end (7mts in total length)
Diameter	2500mm Dia
Height	Around 4.5 mts
Speed	8 +/- 1 rpm
Drum Cleaning	Wire Brushes and , bag cutting blades for bag tearing provision
	Fully covered heavy duty dust covers & easily replaceable screens.

3. Rejection Conveyor of >100mm:

This conveyor carries all the materials which are >75 mm size

Technical data (>100 mm) :

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC
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	75 etc.
Speed	12 + - rpm
Fabrication	As Per IS-801
Gear Box Type	WGR ; Type: -Worm Shaft, Helical, geared motor.
Motor	Hydraulic Radial Piston type ; Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Chain (Inclined Chain belt Conveyor)	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain b). Power Transmit - 98% efficiency for all working loads under lubricated condition c). parts : light weight & Compact pins & bushing Carburized & case hardened for wear.
Belt	1200mm width ; 13000mm length 3 ply to resist abrasion & cutting , 10mm thick , with top covering 2mm Resistant to oil , heat & fires, with bottom covering 1.5mm & Chemical grade 1&2 , Brand : ISI ; Grade –M 24 ; and Belt tension as per IS 11592.
Sprockets	3 " Pitch ; a) Material: - EN8 x 22 mm Thick. b) Heat treatment after Fabrication & Machining. c) No. of Teeth :- 12
Surface	Blasting & Pickling
Primary & Paint	Epoxy Primer & Epoxy Paint. All steel surfaces exposed to weather will be mechanically cleaned to remove all rust and scale & then 2 coats of anti corrosive Zinc Chromate Red Oxide each 20 micron layer. Then 2 coats of Industrial grade Enamel paint of reputed make i.e. Asian, Berger etc. the colour will be of the customer's choice.
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings. Return Line Filter: - Standard Make .
Power	Hydraulic
CHAIN LINER (UHMW)	Special anti friction synthetic liner to reduce friction, (OR) 8 mm thick bright steel EN8 flat as a liner which has better result & less maintenance & easy to replace.
Note	Length & Discharge Height may be varied as per site condition & Height of the Discharge point .

4. Process Conveyor to Carry <100 mm

Technical data:

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Hopper Chute	M S Sheet 12 & 14 SWG (Side Guards, Covers etc)
Fabrication	As Per IS-801
Gear Box Type	WGR ; Type: -Worm Shaft, Helical, geared motor.
Motor	Hydraulic Radial Piston type ; Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Chain (Z Type Chain belt Conveyor)	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain b). Power Transmit - 98% efficiency for all working

	loads under lubricated condition c). parts : light weight & Compact pins & bushing Carburized & case hardened for wear.
Belt	1200mm width ; 8500mm length , 3 ply to resist abrasion & cutting , 12mm thick , with top covering 2mm Resistant to oil , heat & fires, with bottom covering 1.5mm & Chemical grade 1&2 , Brand : ISI ; Grade –M 24 ; and Belt tension as per IS 11592.
Sprockets	3 “ Pitch ; a) Material: - EN8 x 22 mm Thick. b) Heat treatment after Fabrication & Machining. c) No. of Teeth :- 16
Surface	Blasting & Pickling
Primary & Paint	Epoxy Primer & Epoxy Paint. All steel surfaces exposed to weather will be mechanically cleaned to remove all rust and scale & then 2 coats of anti corrosive Zinc Chromate Red Oxide each 20 micron layer. Then 2 coats of Industrial grade Enamel paint of reputed make i.e. Asian, Berger etc. the colour will be of the customer's choice.
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings. Return Line Filter: - Standard Make .
Power & Speed	Hydraulic & 3 + - rpm
CHAIN LINER (UHMW)	Special anti friction synthetic liner to reduce friction, (OR) 8 mm thick bright steel EN8 flat as a liner which has better result & less maintenance & easy to replace.
Note	Length & Discharge Height may be varied as per site condition & Height of the Trommel.

5. Control Panel Board :

Control system consists of different Electrical panels to give easy control. All control Panels should have push button type control

Technical data for Electrical Control System :

Body	All MS as per : IS 2062 sheet 12 & 14 swg.
Control elements & Electrical accessories	Standard Make ; MVB Electrical Unit
Enclosure	As per IPSS & as per std IP 65
Display	Temp , Voltage , On , Off display
Indicator	3 Phase indicator with protector

6. 75mm Trommel Screen (Rotary Trommel)

This is the Rotary Screen which separates material on the basis of over size (>75mm), rejects (>75mm size) materials will be carried to undersized materials through belt conveyor system.

Technical data for 75mm Trommel Screen:

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc
Covers	M. S Sheet , 10 , 12 & 14 Gauge
Drive	Friction drive with Solid Rubber, rubber special grade shore hardness 90, in Both system Electric & Hydraulic.
Hydraulic Motor	Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Tyres0	Specially made , Heavy duty , Solid Rubber Tyres
Screen	75 mm size holes in Diagonal

Ring	Fabricated heavy duty
Surface	Blasting & Pickling
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings.
Primer & Paint	Epoxy Primer , Epoxy Paint.
Length	5 mts screen Length & 1 mts length on both end (7mts in total length)
Diameter	2500mm Dia
Height	Around 4.5 mts
Speed	8 +- 1 rpm
Drum Cleaning	Wire Brushes and , bag cutting blades for bag tearing provision
	Fully covered heavy duty dust covers & easily replaceable screens.

7. Rejection Conveyor of >75mm:

This conveyor carries all the materials which are >75 mm size

Technical data (>75mm) :

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Speed	12 +- rpm
Fabrication	As Per IS-801
Gear Box Type	WGR ; Type: -Worm Shaft, Helical, geared motor.
Motor	Hydraulic Radial Piston type ; Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Chain (Inclined Chain belt Conveyor)	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain b). Power Transmit - 98% efficiency for all working loads under lubricated condition c). parts : light weight & Compact pins & bushing Carburized & case hardened for wear.
Belt	1200mm width ; 13000mm length 3 ply to resist abrasion & cutting , 10mm thick , with top covering 2mm Resistant to oil , heat & fires, with bottom covering 1.5mm & Chemical grade 1&2 , Brand : ISI ; Grade –M 24 ; and Belt tension as per IS 11592.
Sprockets	3 " Pitch ; a) Material: - EN8 x 22 mm Thick. b) Heat treatment after Fabrication & Machining. c) No. of Teeth :- 12
Surface	Blasting & Pickling
Primary & Paint	Epoxy Primer & Epoxy Paint. All steel surfaces exposed to weather will be mechanically cleaned to remove all rust and scale & then 2 coats of anti corrosive Zinc Chromate Red Oxide each 20 micron layer. Then 2 coats of Industrial grade Enamel paint of reputed make i.e. Asian, Berger etc. the colour will be of the customer's choice.
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings. Return Line Filter: - Standard Make .
Power	Hydraulic
CHAIN LINER (UHMW)	Special anti friction synthetic liner to reduce friction, (OR) 8 mm thick bright steel EN8 flat as a liner which has better result & less maintenance & easy to replace.
Note	Length & Discharge Height may be varied as per site condition &

	Height of the Discharge point .
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8. Process Conveyor to Carry <75 mm

Technical data:

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Hopper Chute	M S Sheet 12 & 14 SWG (Side Guards, Covers etc)
Fabrication	As Per IS-801
Gear Box Type	WGR ; Type: -Worm Shaft, Helical, geared motor.
Motor	Hydraulic Radial Piston type ; Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Chain (Z Type Chain belt Conveyor)	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain b). Power Transmit - 98% efficiency for all working loads under lubricated condition c). parts : light weight & Compact pins & bushing Carburized & case hardened for wear.
Belt	1200mm width ; 8500mm length , 3 ply to resist abrasion & cutting , 12mm thick , with top covering 2mm Resistant to oil , heat & fires, with bottom covering 1.5mm & Chemical grade 1&2 , Brand : ISI ; Grade –M 24 ; and Belt tension as per IS 11592.
Sprockets	3 " Pitch ; a) Material: - EN8 x 22 mm Thick. b) Heat treatment after Fabrication & Machining. c) No. of Teeth :- 16
Surface	Blasting & Pickling
Primary & Paint	Epoxy Primer & Epoxy Paint. All steel surfaces exposed to weather will be mechanically cleaned to remove all rust and scale & then 2 coats of anti corrosive Zinc Chromate Red Oxide each 20 micron layer. Then 2 coats of Industrial grade Enamel paint of reputed make i.e. Asian, Berger etc. the colour will be of the customer's choice.
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings. Return Line Filter: - Standard Make .
Power & Speed	Hydraulic & 3 + - rpm
CHAIN LINER (UHMW)	Special anti friction synthetic liner to reduce friction, (OR) 8 mm thick bright steel EN8 flat as a liner which has better result & less maintenance & easy to replace.
Note	Length & Discharge Height may be varied as per site condition & Height of the Trommel.

9. Control Panel Board :

Control system consists of different Electrical panels to give easy control. All control Panels should have push button type control

Technical data for Electrical Control System :

Body	All MS as per : IS 2062 sheet 12 & 14 swg.
Control elements & Electrical accessories	Standard Make ; MVB Electrical Unit
Enclosure	As per IPSS & as per std IP 65

Display	Temp , Voltage , On , Off display
Indicator	3 Phase indicator with protector

Note : Electrical Cables and other Hydraulic lines should be standard make only.

10. Trommel with 35mm Screen

Technical data for 35 mm Trommel Screen:

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc
Covers	M. S Sheet , 10 , 12 & 14 Gauge
Drive	Friction drive with Solid Rubber, rubber special grade shore hardness 90, in Both system Electric & Hydraulic.
Hydraulic Motor	Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Tyres	Specially made , Heavy duty , Solid Rubber Tyres
Screen	35 mm size holes in Diagonal
Ring	Fabricated heavy duty
Surface	Blasting & Pickling
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings.
Primer & Paint	Epoxy Primer , Epoxy Paint.
Length	3.7 mts screen Length & 1 mt length on both end (5.7 mts in total length)
Diameter	2000mm Dia
Height	Around 4.5 mts
Speed	8 +- 1 rpm
Drum Cleaning	Wire Brushes and , bag cutting blades for bag tearing provision
	Fully covered heavy duty dust covers & easily replaceable screens.

11. Reject Conveyor (> 35mm to rejects)

Technical data for Rejects Conveyor (>35 mm mass):

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Covers	M. S Sheet , 10 & 12 Gauge
Gear Box	Shaft Mounted (SGR)
Motor & Drive	Hydraulic Drive
Chain	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain
Belt	800mm width & 6600mm length , 2 ply , with 8 mm thick , rubberized
Sprockets	3 " pitch
Power	3 HP
Speed	12 + - rpm
Note	Length & Discharge Height may be varied as per site condition & Height of the Trommel.

12. Air Density Separator with chute to avoid Spillage :

Technical data for Air Density Separator:

Structure	Casted base plate & Links, Various rolled Steel sections
Covers	M. S Sheet , 12 & 14 SWG
Drive Mode	Electrical Motor
Screen	Blower Duct
Fan	M.S. fabricated
Surface	Blasting & Pickling

Power	10 Hp
Capacity	10 TPH
Note	Easy maintainability , Balanced fans to give Minimum Vibrations and all steel equipment's confirms IS : 2062

13. Process Conveyor:

Technical data (> 35 mass)

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Covers	M. S Sheet , 10 & 12 SWG
Gear Box	Shaft Mounted (SGR)
Motor	Electrical / Hydraulic
Chain	Specially made Heavy duty; 3" pitch ; a). Bushed & Roller Chain
Belt	800mm width & 4800mm length , 2 ply , with 8 mm thick , rubberized
Sprockets	3 " pitch
Power	3 HP
Speed	12 + - rpm
Note	Length & Discharge Height may be varied as per site condition & Height of the discharge

14. Reject Conveyor to Dense Material:

Technical data for Dense Material Conveyor (ADS Rejects of > 35 mass):

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Covers	M. S Sheet , 10 & 12 Gauge
Gear Box	Shaft Mounted (SGR)
Motor & Drive	Hydraulic Drive
Chain	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain
Belt	800 mm width & 2700mm length , 2 ply , with 8 mm thick , rubberized
Sprockets	3 " pitch
Power	3 HP
Speed	12 + - rpm
Note	Length & Discharge Height may be varied as per site condition & Height of the Trommel..

15. Process Conveyor < 35mm

Technical data :

Structure	Various rolled steel sections As per IS2062 GR 2A , ISMC 125, ISMC 75 etc.
Hopper Chute	M S Sheet 12 & 14 SWG (Side Guards, Covers etc)
Fabrication	As Per IS-801
Gear Box Type	WGR ; Type: -Worm Shaft, Helical, geared motor.
Motor	Hydraulic Radial Piston type ; Hydraulic working on constant displacement and achieve high torque at low speed, motor plus hydraulic power into work which is expressed in the direct relation between flow rate, speed, pressure and torque.
Chain (Z Type Chain belt Conveyor)	Specially made Heavy duty ; 3" pitch ; a). Bushed & Roller Chain b). Power Transmit - 98% efficiency for all working loads under

	lubricated condition c). parts : light weight & Compact pins & bushing Carburized & case hardened for wear.
Belt	800mm width ; 14320mm length , 3 ply to resist abrasion & cutting , 10 mm thick , with top covering 2mm Resistant to oil , heat & fires, with bottom covering 1.5mm & Chemical grade 1&2 , Brand : ISI ; Grade –M 24 ; and Belt tension as per IS 11592.
Sprockets	3 “ Pitch ; a) Material: - EN8 x 22 mm Thick. b) Heat treatment after Fabrication & Machining. c) No. of Teeth :- 12
Surface	Blasting & Pickling
Primary & Paint	Epoxy Primer & Epoxy Paint. All steel surfaces exposed to weather will be mechanically cleaned to remove all rust and scale & then 2 coats of anti corrosive Zinc Chromate Red Oxide each 20 micron layer. Then 2 coats of Industrial grade Enamel paint of reputed make i.e. Asian, Berger etc. the colour will be of the customer's choice.
Hydraulic Line	Hydraulic Piping & Fittings: - Seamless Pipes & Std. Make fittings. Return Line Filter: - Standard Make .
Power & Speed	Hydraulic & 3 + - rpm
CHAIN LINER (UHMW)	Special anti friction synthetic liner to reduce friction, (OR) 8 mm thick bright steel EN8 flat as a liner which has better result & less maintenance & easy to replace.
Note	Length & Discharge Height may be varied as per site condition & Height of the Trommel.

1. Variable Frequency Drive Systems

Model VH6-4___-B	5P5	7P5	011	015	018	022	030
Adaptivemotor(KW)	5.5	7.5	11.0	15.0	18.5	22.0	30.0
Inputrated current(A)	14.6	20.5	26.0	35.0	38.5	46.5	62
Powersupplycapacity (KVA)	8.9	11.0	17.0	21.0	24.0	30.0	40.0
Outputrated current(A)	13.0	17.0	25.0	32.0	37	45	60

General specification:

Item		Specification
Input	Ratedvoltage, frequency	Threephase380V:threephase380V,50Hz/60Hz
	Allowablevoltage fluctuationrange	-15%~+15%,voltageunbalancerate<3%
Output	Voltage	0~inputvoltage
	Frequency	0~500Hz
	Controlmotortype	Asynchronousmotor,permanentmagnetsynchronousmotor,variable frequencymotor

Item		Specification		
Control	Control performance	Vector control with speed sensor (FVC)	Vector control without speed sensor (SVC)	V/F control (VVF)
	Speed accuracy	±0.2%	±0.5%	±1%
	Speed fluctuation	±0.2%	±0.3%	±0.5%
	Speed range	1: 2000	1: 100	1: 50
	Startup torque	0Hz: 180%	0.5Hz: 150%	1.0Hz: 150%
	Torque accuracy	±5% of rated torque	±10% of rated torque	//
	Torque response	≤10ms	≤20ms	//
	Overloadability	150% of rated current: 60s 180% of rated current: 3s		
	Frequency accuracy	Low frequency operation mode: 0.01Hz High frequency operation mode: 0.1Hz		
	Frequency resolution	Low frequency operation mode: digital setting--0.01Hz, Analog setting--max frequency × 0.1% High frequency operation mode: digital setting--0.1Hz, analog setting--max frequency × 0.1%		
Control terminal input	Digital input channel	Up to 7 channels of digital input X. Card A has 4 channels (X1-X4) as standard, and the resolution is no more than 2ms. Card B can expand 3 channels (X5-X7). The X4 terminal can support the maximum 50kHz high-speed pulse input		
	Analog input channel	Up to three channels of analog input AI are supported. Card A is equipped with two channels (AI1, AI2) as standard, and the resolution is no more than 20mV. Card B can expand one channel (AI3). AI1 and AI2 support 0~10V or 0~20mA input, AI3 supports -10V~10V input and can be used as PT100 input		
Control terminal output	Digital output channel	Up to 4 channels of digital output Y, card A is equipped with 1 channel (Y1) + 1 channel (TA1TB1TC1) as standard, and card B is expandable with 1 channel (Y2) + 1 channel (TA2TB2TC2). Y2 terminal can support the maximum 50 kHz high-speed pulse output		
	Analog output channel	Up to two channels of analog output AO are supported, including one channel (AO1) for card A and one channel (AO2) for card B. AO1 to AO2 can output 0~10V or 0~20mA		
	Startup command setting	Communication setting (Modbus, CANopen, EtherCAT), operate panel setting, terminal setting		
	Frequency setting mode	Communication setting (Modbus, CANopen, EtherCAT), operate panel setting, terminal setting, analog AI setting, multi-speed setting, simple PLC setting, PID setting, main and auxiliary setting		

Item		Specification
Function	Typicalfunction	Frequency main and auxiliary operation, reverse inhibition, torque boost,nine kinds of V/F curve settings, five segments of AI curve settings,acceleration and deceleration curve settings, terminal delay and filtering,terminalmulti-functioninputandoutput,DCbraking,energyconsumptionbraking, inching operation, 16 segments of speed, built-in two channels ofPID,speedtrackingrestart,carriermodulation,faultrecording,faultself reset,pre-excitationstart,30 groupsofuserdefinedparameters
	Importantfunction	Carrier modulation, torque control, motor auto-tuning, current limitingcontrol,over-voltagecontrol,undervoltagecontrol,speedtracking,droopcontrol,vibration suppression,over-voltageandover-currentstallcontrol, automaticvoltagegeregulation(AVR),automaticenergy-savingoperation,etc
	Protectionfunction	Power on motor short-circuit detection, input and output phase lossprotection, over-current protection, over-voltage protection, under voltageprotection, overheat protection, overload protection, under load protection,over-currentandvoltagestallprotection,relayclosingprotection,terminal protection,instantaneouspowerfailureonstop, etc
	Energy consumption braking	380Vleveldriver:action voltageofbrakeunit:650~750V 5.5kw ~ 30kw power level is equipped with built-in braking unit asstandard, which onlyneeds to connectbraking resistorbetweenP+andPB
	DCreactor	18.5kwand above arebuilt-in DC reactors
	CommonDC bus	Whenthefrequencyconverterdecelerates,itsharestheregenerativeenergy,improvesthebrakingability,achievesthepurposeofenergysaving andsavesthe additional space andcostrequiredbytheresistance
Specialfunctions	Multi-bus	MainunitModbus,extensibleEtherCATandCANopen
	Multi-encoder	Differentialinputencoder,OCinputencoderandresolvertransformer
	LCD panel	LCDdisplay,parametersetting,statusmonitoring,parametercopy,fault analysisandlocation,programdownload,massstorageofparameters
	Non stop wheninstantaneous power failure	In case of instantaneous power failure, the load feedback energycompensatesforthedecreaseofvoltageand keepsthe inverterrunning for a shorttime
	Timingcontrol	Timingcontrolfunction:thetimerangeis0.1Min~6500.0Min
	Multi-motorswitching	Twosetsofmotorparameterscanrealizetheswitchingcontroloftwo motors
	Motoroverheat protection	AI3supportsPT100 sensorfunction

Item		Specification
	Flexible and diversified terminal functions	Multifunction terminal X has 51 types, Y has 41 types, A has 19 kinds of logic function selection, meet the general inverter control function requirements
	Communication customization parameters	It is convenient for users to read and write the inverter parameters continuously
	Software	Rich background monitoring function, convenient for field data collection and debugging
Display and keyboard	Keyboard display	It can display the set frequency, output frequency, output voltage, output current, input and output status and other parameters
	Button locking	Realize the partial or total locking of keys to prevent false triggering
	Parameter copy	Standard LED single display numeric keyboard, optional LCD English display keyboard (parameter download)
	Optional accessories	LCD keyboard, mainstream protocol communication card (EtherCAT, CANopen), encoder PG card (incremental pulse, resolver)
Environment	Using place	Indoor, free from direct sunlight, dust, corrosive gas, combustible gas, oil mist, water vapor, dripping or salt, etc
	Altitude	Below 1000 meters. (derating is required when the height is higher than 1000m, and the output current will be reduced by about 10% of the rated current when the height is increased every 1000m.)
	Ambient temperature	-10°C~+40°C (When the ambient temperature is between 40°C and 50°C, please reduce the rating or enhance the heat dissipation)
	Ambient humidity	Less than 95% RH, no condensation
	Vibration	Less than 5.9 m/s ² (0.6G)
	Storage temperature	-40°C~+70°C
	Protection level	IP20
	Cooling mode	Forced air cooling
Installation mode		Wall mounted and embedded

Note: This is minimum tentative list of equipments /machineries required for the proposed capacity 150 TPD MRF plant. The contractor has to Design, Supplying, Installation, Testing and Commissioning equipments /machineries according to his technology and scheme for Operation and Maintenance.

Insurance, Transportation, taxes and RTO Formalities

- Bidder has to quote the total price, net including of all taxes, GST and Duties etc. and for evaluation and finalization purpose, the total price will be taken into consideration. Transportation, packing, forwarding, insurance charges are included in the indicated price.
- The bidder is responsible for transit and all other insurance till the machines and equipment are delivered at the delivery location
- Bidder must make their own arrangements to obtain import license, if necessary
- The vehicle bidder and equipment manufacturer shall be responsible regarding transit insurance, third party insurance, RTO passing charge, premises of RMC.
- A prototype certificate has to be produced by the manufacturer so that machine can be registered with

- the local transport authority at the Bidder's cost.
- For cab chassis with PTO the invoice of the chassis manufacturer shall be submitted on the receipt of the chassis at the fabricator's / bidder's factory premise.
- For Truck Chassis – submission of all relevant documents like TPI reports, registration book, third party insurance, all taxes, RTO formalities etc. to office of RMC, SWM.
- The bidder shall provide coverage for all items against transits risk, accident to acquisition, transport delivery up to destination and accident in trail and testing
- The vehicle bidder and equipment manufacturer has to submit all necessary valid documents as per the requirements of local RTO, Rajkot and have to cooperate at their level best to get the vehicle registered in time. If RTO will not register vehicles due to design and/or other problem, same will be rejected by RMC.

Inspection, testing and documentation

- Equipment inspection shall be carried out by authorized representative of RMC or the TPI agency appointed by RMC.
- The duly authorized representative of RMC or TPI agency shall at all reasonable time have access to the bidder's premises and shall have the power at all reasonable time to inspect and examine the materials and workmanship of the equipment/machineries during manufacturing process or afterwards as decided
- The bidder shall furnish complete address of premises of his office, go down and workshop where inspection can be made together with name and address of the person who is to be contacted for the purpose.
- The bidder will have to make arrangement including lodging, boarding, and transportation for inspection of the mechanical equipment of RTS by the TPI along with RMC official before delivery at factory site as required. Inspection of the mechanical equipment will be carried out at Rajkotat delivery sites specified by RMC. If any discrepancy is found in the material supplied and technical specifications approved, the same lot shall be rejected, and bidder will collect rejected material within seven days. No claim for the rejected material shall be entertained.
- An authenticated test certificate in confirmation to the specifications of the tender for which testing at site is not possible has to be produced by the bidder. The bidder has to furnish all drawings and certificates and xerox copies of bills of materials those are required and demanded by engineer-in-charge of RMC or TPI agency.
- Articles not approved during inspection or testing shall be rejected and will have to be replaced by the bidder at his own cost within the time.
- VEHICLE SHALL BE REGISTERED IN THE NAME OF RMC WITH RTO WITH ALL THE FORMALITIES AND PAID FULL INSURANCE FOR ONE YEAR.**

Appendix-1

Sr. No.	Description	Transfer Station at MOTAMOVA
1	Proposed transfer station capacity:-	300 MT
2	Expected volume of garbage / vehicle: - (MT)	800 kg to 1200 kg
3	Density of incoming refuse (Variable):-	0.25 t/m ³ to 0.5 t/m ³
4	Operating hours of refuse transfer station:-	7:00 am to 10:00 pm
5	Present peak hour time:-	7:00 am to 11:30 am 4:00 to 8:00 pm
6	Composition of waste:-	Heterogeneous mixed waste
7	Compacted garbage density:-	0.60 t/m ³ to 0.75 t/m ³
8	Distance to landfill/processing plant & back:- (Km)	30 km
9	Total traveling time of Hook Lift vehicle (Hr):-	2
10	G V W of Hook Lift vehicle:-	25 MT
11	Total Refuse transfer station plot area (Sq m):-	14,000

Signature of the Contractor with seal

Place:

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

19 OPERATION AND MAINTENANCE OF REFUSE TRANSFER STATION AND MATERIAL RECOVERY FACILITY

Important Note:

Contractor has to incur all cost/expenditure for operation and maintenance of the project as a whole (civil, mechanical, electrical, instrumentation, MRF, O & M etc.) for period of 05 Years. RMC will not incur any expenditure for any services or work for the contract period of O & M.

DETAIL SPECIFICATION:

The contractor shall be responsible for smooth and satisfactory operation and maintenance of the Transfer station and Material Recovery Facility Unit for 365 days round the year for a period of **05 (Five)** years from the date of commissioning of Transfer station project.

More specifically, the contractor shall be responsible for the following: -

1. To operate and maintain the Transfer Station and Material Recovery Facility as per norms notified under SWM Rules 2026 notified by Ministry of Environment, Forest and Climate Change (MoEF & CC) of GoI, CPHEEO Manual, NGT Orders and Guidelines, Relevant Rules, Acts, Advisories, Guidelines and its amendments from time to time and as per the norms laid down by the State Pollution Control Board of Gujarat through Consent to Establish / Consent to Operate. The equipment, plant & machinery covered under the above contract will be totally attended to, by the contractor including any "Trouble shooting" to ensure smooth and trouble-free operation.
2. The contractor shall prepare and implement, an effective operation and maintenance programme in consultation with Rajkot Municipal Corporation (RMC). RMC will not provide any skilled or unskilled work force, machinery or equipment. It is absolute responsibility of contractor to look after all sorts of maintenance whether preventive or break-down.
3. The contractor shall determine operating parameters for compaction and transportation of solid waste received at transfer station, **Proper segregation of dry waste at Material Recovery Facility design capacity 150 TPD**, Disposal of Inert, wet waste, unsegregated waste to Sanitary Landfill Cell, treatment plant, dumping ground or as directed by SWM Department, RMC and disposal of diluted leachate to nearest manhole of drainage network of RMC or as directed by RMC engineer in charge.
4. For the smooth operation of the transfer station and material recovery facility, all the required equipment, machineries, units, accessories, consumables including grease, lubricating oils, cleaning agents, required quantity of whitewash, oil paint colour, all types of epoxy paint, material required for housekeeping and cleaning etc. are to be brought by the contractor. Other than machinery and equipment contractor shall also be responsible for maintenance and housekeeping of total transfer station campus including internal road recarpeting as per minor, major and periodic maintenance schedule for all Civil structures and leachate collection pipeline.
5. The contractor shall be responsible for keeping up-to-date record of documents including day to day weight slip of all the vehicles entering and leaving disposal site as per format given by RMC. The contractor shall maintain and update logbook, in which details of operational parameters are recorded in every shift and at regular interval or as decided mutually. The Contractor shall maintain separate check list register for daily, weekly, fortnightly, monthly, quarter yearly, half yearly and yearly activities. Also, during checking if any abnormalities found it must be brought to the notice of RMC officer in charge and rectified by the contractor.
6. The contractor shall be responsible to carry out day to day as well as periodic maintenance, necessary to ensure smooth and efficient performance/running of all equipments, machinery at transfer station as per manufacturer's specification and maintaining the record of the same.

7. The contractor shall have to issue identity cards with photographs, uniform to all the staff employed for Operation and Maintenance including Transportation of waste.
8. The tools and plants, spares required in machinery shall be supplied by Manufacturer during O&M contract period at its own cost. Required quantity of all consumable tools and plants, spare shall be made available at site/workshop all the time. On completion of O&M Period / contract, the spares, tools and plants which are unused or available in inventory shall be handed over to client.
9. The processing / treatment of waste in Material Recovery Facility shall follow the norms laid in Solid Waste Management Rules 2026 notified by Ministry of Environment, Forest and Climate Change (MoEF & CC) of GoI, CPHEEO Manual, Acts, NGT Orders, Advisories and Guidelines etc. and its amendments from time to time.
10. The liquid, solid and gaseous emissions emanating from the refuse transfer station and material recovery facility shall meet the Pollution Control Board norms and the good industry practice.
11. **Bidder shall have right to dispose segregated waste, recyclables, compost, recoverable / recyclable material, and RDF etc to authorized agency only.**
12. **Bidder shall submit Daily and Monthly progress report showing input of waste, weighment of different fraction of waste processed / recovered, details of recovered waste disposed to authorized agency with its name and undertaking and weighment of inert disposed in Sanitary Landfill Cell.**
13. Bidder shall handover any domestic hazardous waste, Biomedical, C&D waste to concerned Authority / treatment plant for disposal, if found during processing at MRF.
14. The following data should form part of the reports submitted by the Contractor on daily and monthly basis
 - a) Municipal Solid Waste Received
 - b) Municipal Solid Waste segregated at MRF
 - c) Type of Material Recovered
 - d) Inert, wet waste, unsegregated waste to Sanitary Landfill Cell, treatment plant, dumping ground or as directed by SWM Department, RMC.
 - e) Any other details as and when asked by RMC Engineer in Charge / TPI / PMC agency.

IMPORTANT NOTE:

1. The contractor shall employ minimum, but not limited to following staff for operation and maintenance of Transfer Station and Material Recovery Facility (for each shift).

NO.	POSITION	MIN. NO. OF STAFF REQUIRED	QUALIFICATION OF STAFF TO BE DEPLOYED
1	MANAGER	1	Graduate having min. 2 years experience in the field
2	MRF OPERATOR	2	Min. 2 year experience in operating heavy machinery
3	RTS OPERATOR	3	Min. 2 year experience on heavy machinery
4	WEIGHBRIDGE OPERATOR	2	Having Experience of operating computer.
5	SECURITY GUARD	2	Min 2 year experience on operating weighbridge.
6	SWEEPER FOR RTS	4	Healthy, experienced
7	BELDAR FOR MRF	10	Healthy, experienced
8	FITTER	2	Min.2 year experience in this field (Company trained operator for maintenance and trouble shooting)

9	CLERICAL SUPPORT	1	Graduate or equivalent.
10	Drivers	7	
11	Cleaner with Driver	7	

Relaxation in qualification and number of staff shall not be allowed. The above staff shall be available at site during operation as per mutual agreement between contractor and RMC. As per agreement Nos. of staff in shift should always remain present otherwise penalty towards absence of any staff shall be levied and recovered from the contractor. The arrangement of reliever for weekly off/holiday etc. shall be made by the contractor. The presence of staff in each shift should be marked in muster to be maintained at each transfer station office of RMC at site which shall be considered as final. The contractor staff must mark their presence in this muster. The contractor shall maintain a separate register for his own purpose.

2. The Manager of contractor shall always remain in contact with the Engineer in charge of the Solid Waste Department of the RMC and follow their instructions. All staff member of the contractor shall be in Uniform and identity card.
3. Unsatisfactory and inefficient running of the machinery and equipment in Transfer station and Material Recovery Facility supported by the reasons which are under control of contractor will be highly objected. In such cases Environmental Engineer Solid Waste Management Department decision will be final and binding to the contractor.
4. A technical expert of the contractor shall visit the transfer station on every fortnight and will suggest if required, to improve process of compacting, transporting MSW and efficiency and working of the equipment and machinery. The visit must be recorded at RMC document and out come of the visit / minutes of meeting should be got signed by RMC authorized representative without which the visit shall not be considered.
5. Contractor shall comply with all safety rules and regulations, and all inter disciplinary measures as followed by the RMC. All the necessary safety equipments, materials shall be brought by the contractor.
6. The RMC shall not be responsible for any accident / injury to the staff of the contractor. It is contractor's responsibility to take insurance of his employee, medical facility, work compensation etc. as per workman compensation act and all other relevant laws. Further the RMC will not provide any insurance, medical facility, workman compensation, etc. to the staff of contractor.
7. Due to strike by the contractor's employees, the operation and maintenance of plant must not be affected, and the property of Rajkot Municipal Corporation should not be damaged. In such case any dispute/discrepancy occurs the decision of Environmental Engineer Solid Waste Management Department will be final and will be binding to the contractor. Also, if any expense is required to be made on this account by Rajkot Municipal Corporation, it will be deducted from Contractor's bill/SD.
8. All Central / State Government / Semi-Government / Local Body's Rules and Regulations pertaining to this contract shall be strictly followed and observed by the contractor without any extra cost to the RMC.
9. Accommodation / guest house / transportation facility shall not be provided by the RMC to the contractor.
10. The duration of the contract shall be for 05 Years from the date of commissioning of transfer station. However RMC reserves the right to terminate the contract at any time by giving 90 days' notice to the

contractor with valid and legal reason.

11. The contractor shall employ operation and maintenance staff on commissioning of transfer station and material recovery facility, or else payment shall not be made. In such case period for payment shall be reckoned from the date of employment of full nos. of staff.
12. The contractor shall have to hand over the RCC ramp, platform, godown cum office building, office building, toilet blocks, Weigh Bridge and office, material recovery shed structure and its allied machineries installed etc. in working and good condition to Rajkot Municipal Corporation after completion of contract. If any dispute arises the decision of Environmental Engineer Solid Waste Management Department will be final and binding to contractor. Housekeeping of all buildings and office used by the contractor and RMC staff shall be carried out by the contractor at his own cost.
13. The scope of work also includes cleaning of complete transfer station campus and material recovery facility area including transfer station RCC platform, staircase, service roads, ramp, unloading area, area around unloading hopper, compactor area, site office, washing and cleaning area, railing, flooring, door, windows, light fixtures and ceiling, sanitaryware etc.
14. This work is inclusive of but not limited to operation, maintenance, housekeeping, cleaning, preparing data, recording, correspondence work with Rajkot Municipal Corporation and the Government Departments, etc. All these works shall be done as per standard practices and by following SWM Rule 2026, labour, factory, electrical, GPCB, and all other old and new law and order, Indian standards etc. as applied by Local, State and Central Govt. of India.

15. PAINTING:

This work is also inclusive of painting of compactor, container, vehicles, tools and plants as per following schedule and paint shall be of the same specification as described in respective unit/mechanism specification.

Item	Duration
Painting of vehicle and container.	As per CPHEEO manual and Regional Transport Office Rules and regulations. Color shade of all the vehicles and equipment shall get approved by RMC engineer in charge
All Process Equipment with its accessories.	Every 1 year

NOTE: - However, if any unit/mechanism will be found to have some defect in paint work at any time, the Contractor has to repaint the same under the instruction of Solid Waste Management Engineer at his own cost.

All the necessary correspondence with all the government authorities, i.e. factory inspector, electrical inspector, GPCB, etc. for having NOC, consent, Hazard waste concern, getting certificate / license, approval etc. shall be done by the contractor. Moreover, necessary legal fees (excluding penalty) to all government authorities shall be borne by contractor.

16. Guilty person or indisciplined person shall not be employed by the contractor.
17. The contractor shall have to take prior permission, from RMC to employ or to terminate his personals. However, right is reserved by the RMC to instruct the contractor regarding suspension, dismissing, and termination of any person employed by him.
18. Watch & ward, safety, insurance, security, storage, housing accommodation etc. shall not be provided by RMC. These will be responsibility of contractor.

19. Contractor shall have to make all the facilities to collect sample of waste and other test as specified in SWM rule 2026, Act, GPCB norms at his own cost.
20. The Contractor shall produce valid labour license & any other relevant license from statutory bodies as required for this type of contract within a period of 15 days from the date of award of the contract.
21. Successful bidder will have to follow all the provisions of P.F. Act, E.S.I. Act, WCP Act etc. & have to incorporate changes made if any during contract period also.
22. Contractor will have to strictly follow the provisions of Factory Act 1947, wages Payment Act 1936, Bonus Act 1965, Employees Provident Fund & Miscellaneous Provisions Act 1952 & other Industrial & Labour Laws with latest amendments related to this Operation & Maintenance Work & will have to inform accordingly to the Environmental Engineer, Solid Waste Management Department. Contractor will not be given any relaxation regarding these provisions.
23. Not later than forty-five (45) days before the beginning of each Accounting Year the Contractor shall provide RMC its proposed program of preventive and other scheduled maintenance or the Project subject to the minimum Maintenance Requirements necessary to maintain the Project at all times in conformity with the Specifications and Standards (the "Maintenance Program").
24. Routine / preventive / break-down maintenance of compactor, hook loaders, containers, electrical and mechanical work, trommels, conveyor belt, equipments installed for material recovery facility etc. are in the scope of Contractor.
25. Such Maintenance Programmed shall include but not be limited to the following.
 - a. Intervals and procedures for the carrying out of inspection of all elements of the Project.
 - b. Criteria to be adopted for deciding maintenance needs.
 - c. Preventive maintenance schedule.
 - d. Intervals at which the Contractor shall carry out periodic maintenance.
 - e. Intervals for major maintenance and the scope thereof.
26. Contractor shall have to do minor and major repairing of the vehicles and machineries.

Minor Repairing: Routine service, spare parts replacement, electrical work, external leakages (oil/water/diesel), mechanical/hydraulic settings, vehicle & transmission related job, brake job, tyre-tube puncture, wheel replacement etc.

Major repairing: Structural damages, Fabrication work, Major chassis repairing, Engine or/h related, Vacuum/suction side major work including pump repairing/replacement work, etc. Change of compactor parts, container repairing, hook loader rear jack, hook loader system etc.

Routine Services: It shall be carried out as per the SoP / Schedule given by Manufacturer service manual.
27. The spare parts replacement / minor repairing will have to be done within 48 hours failing which a punitive action will be taken by RMC.
28. All moving parts shall be provided with adequate means of lubrication by providing nipples etc. All reciprocating parts shall be suitably guarded.
29. The replacement of such parts will be carried out by the successful tenderer under the proper supervision and as per the recommendations of the manufacturers.
30. The Hydraulic Oil for replacement & topping up will have to be supplied by the successful tenderer.

31. The successful tender will take out the necessary insurance of all the vehicles, mechanical components for risk against fire, theft etc. for the entire tenure of 05 years of Operation and Maintenance.
32. Contractor has to ensure periodic maintenance/servicing of all vehicles, compactor, container, hook loader, hopper, MRF equipment and machineries etc. every 6 months from the Authorized service station Manufacturer Only. It will be necessary for the successful tenderer to submit periodical reports of the maintenance works carried out and to maintain all records pertaining to maintenance (History Maintenance Card).
33. If any mechanical equipment remains in unrepaired condition for more than 48 Hours, punitive action shall be taken by RMC.
34. In case of major repairing & servicing including accidents, the vehicle will be allowed to take into their workshop of tenderer. If the vehicle duly repaired in all respect is not delivered / returned, or replacement of the vehicle is done within 7 days from the delivery, then punitive action shall be taken by RMC.
35. The successful tenderer will have to inspect and check all the components of Mechanical equipments daily. However, inspection report in triplicate shall be prepared monthly and same shall be submitted to RMC. The program for the same will be submitted to the department in advance.
36. According to the inspection report, the spare parts required for healthy maintenance of vehicle shall be arranged in advance by the contractor.
37. All the parts removed from the vehicles shall be fitted duly repaired. In case, if the removed part is required to be replaced with new one, same shall be of Original make, capacity. If the removed part of same make is not available or outdated from the market, same shall be replaced with equivalent make and capacity. However, same shall be justified by the contractor and approved by respective concerned officer of RMC.
38. The bidder shall submit the operation & maintenance manual of the supplied model of the equipment showing detailed operation procedures including list of Do's and Don'ts, blown up views of all major components and sub-assembly, detailed procedure for overhauling and replacement of each component, trouble shooting and remedies lubrication schedule and preventive maintenance checklist for daily, Monthly , Quarterly & Annual schedule, Successful bidder shall provide 2 set of O & M Manual with each machine.
39. CIVILREPAIRINGWORKS: Bidder shall submit the schedule for civil repairing minor and major maintenance work schedule. The bidder shall include all the items related to civil maintenance work and shall be implemented accordingly. Failing to do so, RMC may take punitive action.
40. Nothing in above in any way release the supplier from any warranty or other obligations under this contract.
41. All types of transportation inside and outside of final disposal site shall be carried out by contractor without any extra cost.
42. Various register and records required under the law shall be properly maintained. Contractor shall have to maintain all the readings/results, records and registers properly and produce as when required by officials of Rajkot Municipal Corporation.
43. All stationary items like logbook/sheet, Check list register, visit book register, History card, transparent / brown tap, paper weight, etc. are provided by the contractor at his own cost as directed by plant in

charge.

- 44.** All the moving parts of RTS and MRF machineries which are exposed / kept open viz roller of conveyor belt, side face of trommel etc. shall be well caged or protected to avoid direct contact point and accident.
- 45.** The other terms and condition described in this complete tender documents, wherever applicable shall remain unchanged.
- 46.** At the end of O&M contract period, the contractor shall hand over vehicles in roadworthy condition, machineries, tools and plants in working condition. The vehicles and machineries shall be painted, lubricated properly and repaired properly. The tyres of vehicles shall get replaced if worn out. The vehicle shall get inspected by RTO Rajkot and RMC workshop department and accordingly, fitness certificate of each vehicle shall be collected from RTO and RMC workshop department. Failing to do so may lead to penalty and amount shall be deducted from Security Deposit amount deposited by contractor.

47. PENALTY

1. Penalties pertaining to Capital Works: -

Sr. No.	Particulars	Penalty
1	Delay in commencement of the project after completion of mobilization & construction period i.e. (1.5 Year Excluding Monsoon Period from 15th day of the issued LOA/LOI)	Zero Point two percent (0.2%) of the contract price per day maximum up to ten percent (10%) of the contract price

2. Penalties pertaining to O&M Works: -

1. The contractor shall be liable for penalty as under if he fails to perform his contractual obligations besides any other action; The Municipal Commissioner / Environment Engineer, Solid Waste Management Department of RMC may decide to take as per the terms of the contract.
2. Penalty shall be imposed on the contractor for delay in transportation of containers or for non-maintenance of vehicles, stationary compactors &/or containers also.
3. All minor repairing & preventive maintenance shall be carried out within 24 Hrs. otherwise penalty will be imposed as per penalty shown in penalty table, which will be deducted from the monthly bill of the contractor. Preventive maintenance schedule shall be prepared in coordination with workshop department.
4. All major repairing shall be carried out within 7 days otherwise penalty will be imposed as per penalty shown in penalty table, which will be deducted from the monthly bill of the contractor.
5. Minor work for Stationary compactor, hook loader & container: Routine service, Hose replacement, electrical work, normal fabrication/body work, external leakages (oil/water/diesel), mechanical/hydraulic settings, transmission job, brake/ steering job, brush repairing / replacement, etc., fan belts replacement, motor servicing, electrical fault etc. for vehicle as well as for compactor unit and container. These shall be carried out at site or at RTS.
6. Major work for (Stationary compactor, hook loader & container) Structural damages, compaction mechanism job, Control panel replacement, motor repairing, Engine o/h related, sc hydraulic cylinder work.etc. shall be done at authorized service station or by authorized engineer of company.
7. Other than above repair job (for minor/major), it will be decided by Central Workshop department based on the job and will be binding to contractor.
8. The contractor shall be required to take full insurance for all the vehicles, machines, containers & infrastructure etc. available at RTS. During the contract period. It will be the responsibility of the successful tenderer to have insurance coverage of their operating staff also. There will not be any reimbursement in this regard by RMC. If any mishap / accident occurs on the road or at site, the successful tenderer will have to shoulder the complete responsibility of the same, right from registration of Police complaint, lodging / follow up of the insurance claim and facing the court trials etc. It shall be the responsibility of successful tenderer to set right the vehicles/containers/machine without raising any extra bills / claim against the same for reimbursing the same from RMC. However, they shall be liable to receive all the payments received by RMC against the settlement of insurance claims from the Insurance Institutions. RMC authorities shall give the full cooperation to the successful tenderer by signing the requisite documents necessary for raising the insurance claim up to settlement of the same.
9. The penalty will be deducted from the monthly bill of the contractor. Further in above circumstances RMC will be at liberty to use other vehicles as an alternate arrangement. During such circumstances if any damage occurs to the machine/RTS, same also must be set right by the

contractor for which no extra payment / claim will be reimbursed to the contractor by RMC. This shall be binding on the contractor.

10. The tenderer / contractor shall keep the vehicles, Stationary Compactor and containers in perfect working condition to the satisfaction of Central Workshop.

Sr. No.	Type of default	Penalty to be imposed
1	In case the contractor fails to provide on the Hook lift vehicle "On Rajkot Municipal Corporation Duty" board.	Penalty at RS. 200/- per Hook-lift vehicle per shift will be levied.
2	The Containers and hook loader vehicle shall be exclusively used for RMC only. Any deviation from this shall attract penalty.	Rs. 1000/- for first such incidence and then after Rs. 5000/- for such incidence.
3	In case the contractor fails to paint the Hook-lift vehicle and container every twelve months.	Penalty of RS.500/- per vehicle per day will be levied till the vehicles are painted.
4	Failure to spray disinfectant and deodorant on outgoing refuse vehicles.	Penalty of Rs. 500/- for each of such instance, per vehicle.
5	If any of the contractor's staff at the RTS and / or MRF is found to be working without the prescribed safety gear, uniform, ID Card etc.	Rs. 100/- per person for that shift/event.
6	If contractor fails to provide the driver or operating staff as per the requirement of RMC for the period of 10 years.	Rs. 500/- per person for that shift/event.
7	If it is observed that leachate / garbage is spilled on road during transportation to land-fill site / disposal, Site processing plant.	Penalty of Rs. 1000/- shall be levied for each such instance per vehicle.
8	If the RTS attendant / supervisor is not found on the work during the prescribed working hours.	Rs. 500/- per such incidence.
9	If the minor and major repairing work is not carried out as per the schedule given in tender.	Rs. 10,000/- per instance and RMC shall deduct the repairing cost from RA Bills of O&M Works.
10	Failing to treat / dilute leachate as per the MSW Rules 2026.	Penalty of Rs. 5000/- for each of such instance.
11	If Desired output of Dry waste recovered from MRF is not disposed to authorized / legal vendors in scientific manner.	Penalty of Rs. 2000/- per MT
12	If contractor fail to do regular servicing / Repairing / maintenance of equipment, vehicles, machineries, containers or in the case when lack of spareparts for equipment / vehicles / containers / MRF Machines etc.	Rs. 10,000/- per each instance & if contractor failed to do repairing / maintenance of vehicles, equipment and machineries, containers within 15 days than RMC shall repair / service / conduct maintenance of equipment, vehicles, machineries and the expense incurred to RMC will be deducted from contractors RA Bill of O&M work.
13	If the contractor fails to transfer MSW as per the scope of work (i.e. timely compaction &/or transfer of MSW by secondary transportation)	Rs. 50/- per MT will be levied for pending MSW at RTS.
14	Child labour is engaged in the work / or any operation for the said work.	Penalty of Rs. 20,000/- for first incident. Thereafter, Rs. 30,000/- per incident or punitive action as per the act / law.
15	If backlog of segregated / processed waste is found	Rs 10,000/- per day after 24 hours will be

Sr. No.	Type of default	Penalty to be imposed
	in storage area for more than 24 hours.	levied
16	If contractor is found processing waste other than waste received from Door to Door waste collection Vehicle to RTS or waste given by RMC or any other type of waste other than MSW.	Penalty of Rs.5000/- Per MT will be levied.
17	If Electrification work is not maintained properly	Rs. 1000/- per day.
18	If weighbridge / computer system or software is not working properly.	Rs. 5000/- per day / system till repaired.

The maximum amount of penalty shall be limited to 10% of Monthly Billing during whole contract period.

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. **No claim for any extra or compensation for damage will be entertained on account of such variation, except where the quantity is increased/decreased by more than 15-25%.** No claim for any extra or compensation for damages will be entertained on account of such variation where the quantity is decreased to any percentage or where the item is totally deleted.

Signature of the Contractor with seal
Place:
Date:

Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation

20 DETAILED TECHNICAL SPECIFICATIONS OF ITEM TAKEN FOR EXECUTION

A. RTS BUILDING & RAMP	
Sr. No.	Description
(A) RCC ELEVATED PLATFORM AREA	
1	<p>Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.</p> <p>A. 0 to 1.50 m depth</p> <p>B.1.5 to 3.0 mt. Depth</p>
	<p>General Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such implement or organic soil, gravel, silt sand turf loam, clay peat etc. fall under this category.</p> <p>Clearing the Site 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 stacking as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with hot asphalt. The rate of site clearance is deemed to be included in temperature of earth work for which no extra amount will be paid.</p> <p>Classification of Excavated Material Classification: All materials involved in excavation shall be classified by the Engineer in the following manner:</p> <p>a) Soil, Sand, Murrum etc.: This shall comprise topsoil, turf, sand, silt, loam, clay, mud, peat, black cottons oil, soft shale or moorum, a mixture of these and similar material which yield to the ordinary application of pick, spade and/or shovel, rake or other ordinary digging equipment. Removal of gravel or any other modular material having dimension in any one direction not exceeding 75 mm shall be deemed to be covered under this category.</p> <p>b) Ordinary Rock / Soft Rock (not requiring blasting) this shall include: i) rock types such as laterites, shales and conglomerates, varieties of limestone and sandstone etc., which may be quarried or split with crow bars, also including any rock which in dry state may be hard, requiring blasting but which, when wet, becomes soft and manageable by means other than blasting; ii) macadam surfaces such as water bound and bitumen/tar bound; soling or roads, paths, etc. and hard core; compact moorum or stabilized soil requiring grafting tool or pick or both and shovel, closely applied; gravel and cobble stone iii) lime concrete, stone masonry in lime mortar and brick work in lime/cement mortar below ground level, reinforced cement concrete which may be broken up with crow bars or picks and stone masonry in cement mortar below ground level; and iv) boulders which do not require blasting found lying loose on the surface or embedded in river bed, soil, talus, slope was hand terrace material or dissimilar origin.</p> <p>Setting Out After clearing the site, the centre lines will be given the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the</p>

A. RTS BUILDING & RAMP	
Sr. No.	Description
	<p>work. The contractor shall supply materials etc. required for setting out the reference material and bench marks and shall maintain them as long as required and directed.</p> <p>Excavation The excavation in foundation shall be carried out in traveling and level and shall have the width and depth as shown the drawings or as directed. The contractor shall do the necessary shorting and shuttering at his own cost and as approved by the Engineer-in-charge or his Consultant. The payment for much 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 bring it to level, if by mistake or any other reason 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 up to 1.5 Mts. depth shall be measured under this Description. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.</p> <p>Disposal of Excavated Materials: No materials excavated from the foundation trenches, of whatever kind they be, are to be placed even temporarily up to 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 purpose. The site shall be left clean of all debris on completion.</p> <p>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. from the edge of plinth / Building line as directed. Useful materials obtained from clearing site & excavation shall be slacked 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 rate the schedule of rates.</p> <p>Mode of Measurement and Payment 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 by the Engineer-in-charge of as directed. No payment shall made for surplus excavation made 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.</p> <p>No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions / climate.</p> <p>The rate shall be for a unit of one cubic meter.</p>
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)

A. RTS BUILDING & RAMP	
Sr. No.	Description
	<p>Materials Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Stone aggregate 40 mm nominal size shall conform to M-12.</p> <p>Workmanship General Before starting to concrete the bed of foundation trenches shall be cleared of all loose materials, leveled, Watered and rammed as directed.</p> <p>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.</p> <p>Mixing The concrete shall be mixed in a mechanical mixer is 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 breakdown of machineries and in the interest of the work, it shall be carried out 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 ½ to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.</p> <p>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.</p> <p>Compacting The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filed with mortar.</p> <p>Curing After the final set, the concrete shall be kept continuously wet, if required by pending for a period of not less than 7 days from the date of placement.</p> <p>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.</p>
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	<p>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. Coarse aggregate shall conform M-12.</p> <p>The shuttering to be provided shall be of ordinary timber planks and shall conform to M-26.</p>

A. RTS BUILDING & RAMP				
Sr. No.	Description			
	<p>The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.</p> <p>General: 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, 1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.</p> <p>The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. By weight (0.0342 Cu. M.) for different proportions of mix shall be as under:</p>			
	1. Grade of concrete	2. Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, 3. maximum	4. Proportion of fine aggregate to coarse aggregate	5. Quantity of water per 50 Kgs. Of cement maximum.
	6. 1	7. 2	8. 3	9. 4
	10. M-100 (1:3:6)	11. 300 Liters	12. Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to and upper limit	14. 34 Liters
	15. M-150 (1:2:4)	16. 220 "		17. 32 "
	18. M-200 (1:1 ½:3)	19. 160 "	13. of 1:1 ½ and lower limit 1:3	20. 30 "
	21. M-250 (1:1:2)	22. 100 "		23. 27 "
	<p>The water cement ratios shall not be more than those specified in the above 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.</p> <p>Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.</p> <p>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 corners of the form.</p> <p>For reinforced concrete work, coarse aggregate having a nominal size of 20 mm. are generally considered satisfactory.</p>			

A. RTS BUILDING & RAMP																									
Sr. No.	Description																								
	<p>For heavily reinforced concrete members as in the case of 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.</p> <p>Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.</p> <p>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.</p> <p>The form work shall conform to the shape lines and dimension as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding bracing etc. shall be as per design.</p> <p>Cleaning & Treatment of forms: All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the form before the concrete is placed and the form work in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done, Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively, a coat of raw linseed oil or form oil of approved manufacture may be applied in case steel shuttering is used. Soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforcement bars.</p> <p>Stripping time: In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.</p> <table><tr><td>(a)</td><td>Sides of walls columns and vertical faces of beam</td><td>24 to 48 hours.</td></tr><tr><td>(b)</td><td>Beam soffits. (Props left under)</td><td>7 days.</td></tr><tr><td>(c)</td><td>Removal of props slabs</td><td></td></tr><tr><td>(i)</td><td>Slabs spanning up to 4.5 m.</td><td>7 days.</td></tr><tr><td>(ii)</td><td>Spanning over 4.5 mm.</td><td>14 days.</td></tr><tr><td>(d)</td><td>Removal of props to beams and Arches</td><td></td></tr><tr><td>(i)</td><td>Spanning up to 6 m.</td><td>14 days.</td></tr><tr><td>(ii)</td><td>Spanning over 6 m.</td><td>21 days.</td></tr></table> <p>Procedure when removing the form work “Stripping time”. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffit form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.</p> <p>Centering:</p>	(a)	Sides of walls columns and vertical faces of beam	24 to 48 hours.	(b)	Beam soffits. (Props left under)	7 days.	(c)	Removal of props slabs		(i)	Slabs spanning up to 4.5 m.	7 days.	(ii)	Spanning over 4.5 mm.	14 days.	(d)	Removal of props to beams and Arches		(i)	Spanning up to 6 m.	14 days.	(ii)	Spanning over 6 m.	21 days.
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A. RTS BUILDING & RAMP	
Sr. No.	Description
	<p>The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept seeing that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.</p> <p>The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.</p> <p>The centering and form work shall be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to the work, injury to life and damage to property.</p> <p>Scaffolding: All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to act and shall be subject to the approval of the Engineer-in-charge. However, contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.</p> <p>The scaffolding, hoisting arrangements and ladders shall allow easy approach to the work spot and afford easy inspection.</p> <p>The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:</p> <ul style="list-style-type: none"> (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal. (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. widths to beams, columns and the like. (c) Temporary opening in the forms for pouring concrete, if required, removing rubbish etc. (d) Dressing with oil to prevent adhesion of concrete with shuttering, and (e) Raking or circular cutting. <p>Re-Use: Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.</p> <p>Mix Design: General: The relevant specifications of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350, & M-400, with prefix controlled added to it. The letter 'M' refers to mix and numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg/cm².</p>

A. RTS BUILDING & RAMP																										
Sr. No.	Description																									
	<p>The proportion of cement, sand and coarse aggregates shall be determined by weight the weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design.</p> <p>The strength requirements of different grades of concrete shall be as under:</p> <table border="1"> <thead> <tr> <th>Grade of Concrete</th><th colspan="2">Compressive strength of 15cm cubes in kg/cm² at 28 days, conducted in accordance with I.S. 516-1959.</th></tr> <tr> <th></th><th>Preliminary test Min.</th><th>Work test Min.</th></tr> </thead> <tbody> <tr> <td>M-150</td><td>200</td><td>150</td></tr> <tr> <td>M-200</td><td>260</td><td>200</td></tr> <tr> <td>M-250</td><td>320</td><td>250</td></tr> <tr> <td>M-300</td><td>380</td><td>300</td></tr> <tr> <td>M-350</td><td>440</td><td>350</td></tr> <tr> <td>M-400</td><td>500</td><td>400</td></tr> </tbody> </table> <p>In all cases, the 28 days compressive strength specified in above table is the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes as concrete belonging to the lower of the two grades between which its strength lies.</p> <p>Workmanship:</p> <p>The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that the supply of properly graded aggregate of uniform quality can be maintained till the completion of work. Grading of aggregate shall be controlled by obtaining the coarse aggregates, in different sizes and being in them in the right proportions as required. Aggregate of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.</p> <p>In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighted separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipments shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.</p> <p>It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge, according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in concrete shall not be less than 320 Kg/M³ in plain concrete and not less than 380 Kg/M³ in reinforced concrete.</p> <p>If Quantity of pouring concrete at site is equal to or more than 5 CU M, than only Ready Mix</p>		Grade of Concrete	Compressive strength of 15cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.			Preliminary test Min.	Work test Min.	M-150	200	150	M-200	260	200	M-250	320	250	M-300	380	300	M-350	440	350	M-400	500	400
Grade of Concrete	Compressive strength of 15cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.																									
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A. RTS BUILDING & RAMP																												
Sr. No.	Description																											
	<p>Concrete is allowed and shall be used.</p> <p>Mode of measurement 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 includes cost of form work. The rate shall be for a unit of one cubic meter</p>																											
4	<p>CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>(A) Columns</p> <p>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. Coarse aggregate shall conform M-12.</p> <p>The shuttering to be provided shall be of ordinary timber planks and shall conform to M-26.</p> <p>The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.</p> <p>General: 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, 1:1½:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.</p> <p>The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. By weight (0.0342 Cu. M.) for different proportions of mix shall be as under:</p> <table><tr><th>Grade of concrete</th><th>Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum</th><th>Proportion of fine aggregate to coarse aggregate</th><th>Quantity of water per 50 Kgs. Of cement maximum.</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>M-100(1:3:6)</td><td>300 Liters</td><td>Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to upper limit of 1:1½ and lower limit 1:3</td><td>34 Liters</td></tr><tr><td>M-150(1:2:4)</td><td>220"</td><td></td><td>32"</td></tr><tr><td>M-200(1:1½:3)</td><td>160"</td><td></td><td>30"</td></tr><tr><td>M-250(1:1:2)</td><td>100"</td><td></td><td>27"</td></tr></table> <p>The water cement ratios shall not be more than those specified in the above 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.</p>				Grade of concrete	Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. Of cement maximum.	1	2	3	4	M-100(1:3:6)	300 Liters	Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to upper limit of 1:1½ and lower limit 1:3	34 Liters	M-150(1:2:4)	220"		32"	M-200(1:1½:3)	160"		30"	M-250(1:1:2)	100"		27"
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Sr. No.	Description									
	<p>Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.</p> <p>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 corners of the form.</p> <p>For reinforced concrete work, coarse aggregate having a nominal size of 20 mm. are generally considered satisfactory.</p> <p>For heavily reinforced concrete members as in the case of 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.</p> <p>Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.</p> <p>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.</p> <p>The form work shall conform to the shape lines and dimension as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding bracing etc. shall be as per design.</p> <p>Cleaning & Treatment of forms: All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the form before the concrete is placed and the form work in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done, Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively, a coat of raw linseed oil or form oil of approved manufacture may be applied in case steel shuttering is used. Soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforcement bars.</p> <p>Stripping time: In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.</p> <table><tr><td>(a)</td><td>Sides of walls columns and vertical faces of beam</td><td>24 to 48 hours.</td></tr><tr><td>(b)</td><td>Beam soffits. (Props left under)</td><td>7 days.</td></tr><tr><td>(c)</td><td>Removal of props slabs</td><td></td></tr></table>	(a)	Sides of walls columns and vertical faces of beam	24 to 48 hours.	(b)	Beam soffits. (Props left under)	7 days.	(c)	Removal of props slabs	
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	<p>(i) Slabs spanning up to 4.5 m. 7 days.</p> <p>(ii) Spanning over 4.5 mm. 14 days.</p> <p>(d) Removal of props to beams and Arches</p> <p>(i) Spanning up to 6 m. 14 days.</p> <p>(ii) Spanning over 6 m. 21 days.</p> <p>Procedure when removing the form work "Stripping time". All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffit form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.</p> <p>Centering:</p> <p>The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept seeing that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.</p> <p>The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.</p> <p>The centering and form work shall be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to the work, injury to life and damage to property.</p> <p>Scaffolding:</p> <p>All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to act and shall be subject to the approval of the Engineer-in-charge. However, contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.</p> <p>The scaffolding, hoisting arrangements and ladders shall allow easy approach to the work spot and afford easy inspection.</p> <p>The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:</p> <p>(a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal.</p> <p>(b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. widths to beams, columns and the like.</p> <p>(c) Temporary opening in the forms for pouring concrete, if required, removing rubbish etc.</p> <p>(d) Dressing with oil to prevent adhesion of concrete with shuttering, and</p> <p>(e) Raking or circular cutting.</p> <p>Re-Use:</p> <p>Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained.</p>

A. RTS BUILDING & RAMP										
Sr. No.	Description									
	<p>The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.</p> <p>safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to the work, injury to life and damage to property.</p> <p>Scaffolding: All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to act and shall be subject to the approval of the Engineer-in-charge. However, contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.</p> <p>The scaffolding, hoisting arrangements and ladders shall allow easy approach to the work spot and afford easy inspection.</p> <p>The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:</p> <p>(a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal.</p> <p>(b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. widths to beams, columns and the like.</p> <p>(c) Temporary opening in the forms for pouring concrete, if required, removing rubbish etc.</p> <p>(d) Dressing with oil to prevent adhesion of concrete with shuttering, and</p> <p>(e) Raking or circular cutting.</p> <p>Re-Use: Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.</p> <p>Mix Design: General: The relevant specifications of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350, & M-400, with prefix controlled added to it. The letter 'M' refers to mix and numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg/cm².</p> <p>The proportion of cement, sand and coarse aggregates shall be determined by weight the weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design.</p> <p>The strength requirements of different grades of concrete shall be as under:</p> <table border="1"> <thead> <tr> <th rowspan="2">Grade of Concrete</th><th colspan="2">Compressive strength of 15 cm cubes in kg/cm² at 28 days, conducted in accordance with I.S. 516-1959.</th></tr> <tr> <th>Preliminary test Min.</th><th>Work test Min.</th></tr> </thead> <tbody> <tr> <td>M-150</td><td>200</td><td>150</td></tr> </tbody> </table>		Grade of Concrete	Compressive strength of 15 cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.		Preliminary test Min.	Work test Min.	M-150	200	150
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	Preliminary test Min.	Work test Min.								
M-150	200	150								

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	M-200	260	200
	M-250	320	250
	M-300	380	300
	M-350	440	350
	M-400	500	400
	<p>In all cases, the 28 days compressive strength specified in above table is the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes as concrete belonging to the lower of the two grades between which its strength lies.</p> <p>Workmanship: The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that the supply of properly graded aggregate of uniform quality can be maintained till the completion of work. Grading of aggregate shall be controlled by obtaining the coarse aggregates, in different sizes and being in them in the right proportions as required. Aggregate of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of course and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.</p> <p>In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighted separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipments shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.</p> <p>It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge, according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in concrete shall not be less than 320 Kg/M3 in plain concrete and not less than 380 Kg/M3 in reinforced concrete.</p> <p>If Quantity of pouring concrete at site is equal to or more than 5 CU M, than only Ready-Mix Concrete is allowed and shall be used.</p> <p>Mode of measurement 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 includes cost of form work. The rate shall be for a unit of one cubic meter.</p>		
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)		

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Sr. No.	Description																											
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	<p>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. Coarse aggregate shall conform M-12.</p> <p>The shuttering to be provided shall be of ordinary timber planks and shall conform to M-26.</p> <p>The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.</p> <p>General: 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, 1:1½:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.</p> <p>The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. By weight (0.0342 Cu. M.) for different proportions of mix shall be as under:</p> <table><tr><th>Grade of concrete</th><th>Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum</th><th>Proportion of fine aggregate to coarse aggregate</th><th>Quantity of water per 50 Kgs. Of cement maximum.</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>M-100(1:3:6)</td><td>300 Liters</td><td>Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to and upper limit of 1:1½ and lower limit 1:3</td><td>34 Liters</td></tr><tr><td>M-150(1:2:4)</td><td>220"</td><td></td><td>32"</td></tr><tr><td>M-200(1:1½:3)</td><td>160"</td><td></td><td>30"</td></tr><tr><td>M-250(1:1:2)</td><td>100"</td><td></td><td>27"</td></tr></table> <p>The water cement ratios shall not be more than those specified in the above 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.</p> <p>Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.</p> <p>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 corners of the form.</p>				Grade of concrete	Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. Of cement maximum.	1	2	3	4	M-100(1:3:6)	300 Liters	Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to and upper limit of 1:1½ and lower limit 1:3	34 Liters	M-150(1:2:4)	220"		32"	M-200(1:1½:3)	160"		30"	M-250(1:1:2)	100"		27"
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	<p>Centering: The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept seeing that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.</p> <p>The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.</p> <p>The centering and form work shall be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to the work, injury to life and damage to property.</p> <p>Scaffolding: All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to act and shall be subject to the approval of the Engineer-in-charge. However, contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.</p> <p>The scaffolding, hoisting arrangements and ladders shall allow easy approach to the work spot and afford easy inspection.</p> <p>The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:</p> <ul style="list-style-type: none"> (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal. (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. widths to beams, columns and the like. (c) Temporary opening in the forms for pouring concrete, if required, removing rubbish etc. (d) Dressing with oil to prevent adhesion of concrete with shuttering, and (e) Raking or circular cutting. <p>Re-Use: Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.</p> <p>Mix Design: General: The relevant specifications of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350, & M-400, with prefix controlled added to it. The letter 'M' refers to mix and numbers specify 28 days works cube compressive strength of 150 mm.</p>

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Sr. No.	Description																								
	<p>cubes of the mix expressed in Kg/cm².</p> <p>The proportion of cement, sand and coarse aggregates shall be determined by weight the weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design.</p> <p>The strength requirements of different grades of concrete shall be as under:</p> <table><tr><th>Grade of Concrete</th><th colspan="2">Compressive strength of 15 cm cubes in kg/cm² at 28 days, conducted in accordance with I.S. 516-1959.</th></tr><tr><th></th><th>Preliminary test Min.</th><th>Work test Min.</th></tr><tr><td>M-150</td><td>200</td><td>150</td></tr><tr><td>M-200</td><td>260</td><td>200</td></tr><tr><td>M-250</td><td>320</td><td>250</td></tr><tr><td>M-300</td><td>380</td><td>300</td></tr><tr><td>M-350</td><td>440</td><td>350</td></tr><tr><td>M-400</td><td>500</td><td>400</td></tr></table> <p>In all cases, the 28 days compressive strength specified in above table is the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes as concrete belonging to the lower of the two grades between which its strength lies.</p> <p>Workmanship:</p> <p>The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that the supply of properly graded aggregate of uniform quality can be maintained till the completion of work. Grading of aggregate shall be controlled by obtaining the coarse aggregates, in different sizes and being in them in the right proportions as required. Aggregate of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.</p> <p>In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighted separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipments shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.</p> <p>It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge, according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in concrete shall not be less than 320 Kg/M³ in plain</p>	Grade of Concrete	Compressive strength of 15 cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.			Preliminary test Min.	Work test Min.	M-150	200	150	M-200	260	200	M-250	320	250	M-300	380	300	M-350	440	350	M-400	500	400
Grade of Concrete	Compressive strength of 15 cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.																								
	Preliminary test Min.	Work test Min.																							
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	<p>concrete and not less than 380 Kg/M3 in reinforced concrete. If Quantity of pouring concrete at site is equal to or more than 5 CU M, than only Ready Mix Concrete is allowed and shall be used.</p> <p>Mode of measurement 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 includes cost of form work. The rate shall be for a unit of one cubic meter</p>																							
5	Rubble Stone filling with 33% Murrum in specified thickness with watering, compaction etc. complete																							
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter</p>																							
7	CC work M-25 for RCC Bottom Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)																							
	<p>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. Coarse aggregate shall conform M-12.</p> <p>The shuttering to be provided shall be of ordinary timber planks and shall conform to M-26.</p> <p>The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.</p> <p>General: 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, 1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.</p> <p>The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. By weight (0.0342 Cu. M.) for different proportions of mix shall be as under:</p> <table><tr><th>Grade of concrete</th><th>Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum</th><th>Proportion of fine aggregate to coarse aggregate</th><th>Quantity of water per 50 Kgs. Of cement maximum.</th></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>M-100(1:3:6)</td><td>300 Liters</td><td>Generally 1:2 for fine aggregate to coarse</td><td>34 Liters</td></tr><tr><td>M-150(1:2:4)</td><td>220"</td><td>aggregate by</td><td>32"</td></tr><tr><td>M-200(1:1½:3)</td><td>160"</td><td></td><td>30"</td></tr></table>				Grade of concrete	Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. Of cement maximum.	1	2	3	4	M-100(1:3:6)	300 Liters	Generally 1:2 for fine aggregate to coarse	34 Liters	M-150(1:2:4)	220"	aggregate by	32"	M-200(1:1½:3)	160"		30"
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	M-250(1:1:2)	100"	volume but subject to and upper limit of 1:1½ and lower limit 1:3 27"
	<p>The water cement ratios shall not be more than those specified in the above 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.</p> <p>Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.</p> <p>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 corners of the form.</p> <p>For reinforced concrete work, coarse aggregate having a nominal size of 20 mm. are generally considered satisfactory.</p> <p>For heavily reinforced concrete members as in the case of 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.</p> <p>Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.</p> <p>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.</p> <p>The form work shall conform to the shape lines and dimension as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding bracing etc. shall be as per design.</p> <p>Cleaning & Treatment of forms: All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the form before the concrete is placed and the form work in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done, Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively, a coat of raw linseed oil or form oil of approved manufacture may be applied in case steel shuttering is used. Soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforcement bars.</p>		

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	<p>Stripping time: In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.</p> <p>(a) Sides of walls columns and vertical faces of beam 24 to 48 hours. (b) Beam soffits. (Props left under) 7 days. (c) Removal of props slabs (i) Slabs spanning up to 4.5 m. 7 days. (ii) Spanning over 4.5 mm. 14 days. (d) Removal of props to beams and Arches (i) Spanning up to 6 m. 14 days. (ii) Spanning over 6 m. 21 days.</p> <p>Procedure when removing the form work "Stripping time". All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffit form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.</p> <p>Centering: The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safely of the form work and concrete work before, during and after pouring concrete. Watch should be kept seeing that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.</p> <p>The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.</p> <p>The centering and form work shall be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to the work, injury to life and damage to property.</p> <p>Scaffolding: All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to act and shall be subject to the approval of the Engineer-in-charge. However, contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.</p> <p>The scaffolding, hoisting arrangements and ladders shall allow easy approach to the work spot and afford easy inspection.</p> <p>The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as: (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal. (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. widths</p>

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	<p>to beams, columns and the like.</p> <p>(c) Temporary opening in the forms for pouring concrete, if required, removing rubbish etc.</p> <p>(d) Dressing with oil to prevent adhesion of concrete with shuttering, and</p> <p>(e) Raking or circular cutting.</p> <p>Re-Use:</p> <p>Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.</p> <p>Mix Design: General:</p> <p>The relevant specifications of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350, & M-400, with prefix controlled added to it. The letter 'M' refers to mix and numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg/cm2.</p> <p>The proportion of cement, sand and coarse aggregates shall be determined by weight the weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design.</p> <p>The strength requirements of different grades of concrete shall be as under:</p> <table><tr><th rowspan="2">Grade of Concrete</th><th colspan="2">Compressive strength of 15 cm cubes in kg/cm² at 28 days, conducted in accordance with I.S. 516-1959.</th></tr><tr><th>Preliminary test Min.</th><th>Work test Min.</th></tr><tr><td>M-150</td><td>200</td><td>150</td></tr><tr><td>M-200</td><td>260</td><td>200</td></tr><tr><td>M-250</td><td>320</td><td>250</td></tr><tr><td>M-300</td><td>380</td><td>300</td></tr><tr><td>M-350</td><td>440</td><td>350</td></tr><tr><td>M-400</td><td>500</td><td>400</td></tr></table> <p>In all cases, the 28 days compressive strength specified in above table is the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes as concrete belonging to the lower of the two grades between which its strength lies.</p> <p>Workmanship:</p> <p>The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that the supply of properly graded aggregate of uniform quality can be maintained till the completion of work. Grading of aggregate shall be controlled by obtaining the coarse aggregates, in different sizes and being in them in the right proportions as required. Aggregate of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as</p>		Grade of Concrete	Compressive strength of 15 cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.		Preliminary test Min.	Work test Min.	M-150	200	150	M-200	260	200	M-250	320	250	M-300	380	300	M-350	440	350	M-400	500	400
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	<p>frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.</p> <p>In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighted separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipments shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.</p> <p>It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge, according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in concrete shall not be less than 320 Kg/M3 in plain concrete and not less than 380 Kg/M3 in reinforced concrete.</p> <p>If Quantity of pouring concrete at site is equal to or more than 5 CU M, than only Ready Mix Concrete is allowed and shall be used.</p> <p>Mode of measurement 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 includes cost of form work. The rate shall be for a unit of one cubic meter</p>
8	<p>Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost</p>
	<p>Materials Thermo Mechanically Twisted (TMT) steel bars (High yield strength steel deformed bars) shall conform to M-19. Mild steel bars shall conform to M-18; mild steel binding wires shall conform to M-21. The steel shall be of FE-500D grade of TATA, SAIL or any approved Make.</p> <p>Workmanship The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawing or as directed. Steel shall be clean and free rust and loose mill scale at the time of fixing in a positions and subsequent concreting.</p> <p>Reinforcing steel shall conform accurately to the dimensions given in the bar bending scheduled shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or /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 matter that will injure the material. Bars bent during transport of handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified a "type hook at the end bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be takes as the diameter of circle having an equivalent effective area. The hooks shall be suitably excused to prevent any splitting of the concrete.</p>

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	<p>All the reinforcement bars shall be accurately placed in exact position 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 hanger 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 no corrodible material. Wooden and metal supports shall not extent to the surface of concrete except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progress for adjusting bar spacing shall not allowed. Pieces of broken stone or brick and 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 placing position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent and displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cove shall be provided as indicated on drawings. All the bars precluding from concrete and to which other areas to be splice and which are likely to be exceeding 10 days shall be protected by a thick cement of neat cement grout.</p> <p>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.</p> <p>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 part by 95 mm or 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete 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 then span where neither shear nor bending moment is maximum.</p> <p>Whenever indicated on the drawing or desired by the Engineer-in-charge, bars shall be joint 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 up set for sufficient length so not less than the nominal cross- section of the bar. Threads shall be standard threads. Steel for coupling shall conform to IS 226.</p> <p>When permitted or specified on the drawings, joints of reinforcement. Bars shall butt-weld so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding a process which excludes air from the molten metal 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 is two or three stages. Provisions 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 conform to IS 814 weld pieces of reinforcement shall be rested. Specimen shall be taken from the actual site and number and frequency of test shall be as directed.</p>

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	<p>Cold twisted steel bars shall be used with or without hooks at the ends. Deformed bars without hooks shall, however comply with relevant a charge requirement.</p> <p>Mode of Measurement and Payment For the purpose of calculating consumption, wastage shall not be permitted beyond 7 ½ percent. Excess consumption over 7.5% will be charged at penal rate 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 of lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement.</p> <p>From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per, M-19 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 Descriptions be deemed to be included in the rate for reinforcement.</p> <p>The rate for reinforcement include cost of steel binding wires its carting from department store to work site, cutting bending placing, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved positions, cost of joining as per approved method and all wastage and spacer bars.</p> <p>The rate shall be for a unit of one kg.</p>
9	<p>Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.</p>
10	<p>Removal of Excavated Stuff within RMC limit as directed by Engineer-in-Charge</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.</p>
11	<p>Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete.</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment:</p>

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	Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.
12	<p>Providing & laying controlled cement concrete M250 proportions of ingredients as per mix design by weigh batching and curing complete including the cost of formwork but excluding the cost of reinforcement for reinforced concrete work in</p> <p>Column</p> <p>Ground floor (level -0.3 to 5.0 mt.)</p> <p>First floor</p> <p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>Beam</p> <p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for RCC Bottom Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>Ground floor slab</p> <p>Workmanship: The relevant specifications of item description no. 06 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for RCC Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>First Floor level</p> <p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for Partition, Parsdment, railing etc. using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>RCC ELEVATION WALL</p> <p>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. Coarse aggregate shall conform M-12. The shuttering to be provided shall be of ordinary timber planks and shall conform to M-26.</p>

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	<p>The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.</p> <p>General: 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, 1:1½:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.</p> <p>The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. By weight (0.0342 Cu. M.) for different proportions of mix shall be as under:</p> <table><tr><th>Grade of concrete</th><th>Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum</th><th>Proportion of fine aggregate to coarse aggregate</th><th>Quantity of water per 50 Kgs. Of cement maximum.</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>M-100(1:3:6)</td><td>300 Liters</td><td>Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to and upper limit of 1:1½ and lower limit 1:3</td><td>34 Liters</td></tr><tr><td>M-150(1:2:4)</td><td>220"</td><td></td><td>32"</td></tr><tr><td>M-200(1:1½:3)</td><td>160"</td><td></td><td>30"</td></tr><tr><td>M-250(1:1:2)</td><td>100"</td><td></td><td>27"</td></tr></table>				Grade of concrete	Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. Of cement maximum.	1	2	3	4	M-100(1:3:6)	300 Liters	Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to and upper limit of 1:1½ and lower limit 1:3	34 Liters	M-150(1:2:4)	220"		32"	M-200(1:1½:3)	160"		30"	M-250(1:1:2)	100"		27"
Grade of concrete	Total quantity of dry aggregate by volume per 50 Kgs. Of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. Of cement maximum.																									
1	2	3	4																									
M-100(1:3:6)	300 Liters	Generally 1:2 for fine aggregate to coarse aggregate by volume but subject to and upper limit of 1:1½ and lower limit 1:3	34 Liters																									
M-150(1:2:4)	220"		32"																									
M-200(1:1½:3)	160"		30"																									
M-250(1:1:2)	100"		27"																									
	<p>The water cement ratios shall not be more than those specified in the above 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.</p> <p>Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.</p> <p>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 corners of the form.</p> <p>For reinforced concrete work, coarse aggregate having a nominal size of 20 mm. are generally considered satisfactory.</p> <p>For heavily reinforced concrete members as in the case of 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</p>																											

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	<p>whichever is smaller.</p> <p>Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.</p> <p>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.</p> <p>The form work shall conform to the shape lines and dimension as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding bracing etc. shall be as per design.</p> <p>Cleaning & Treatment of forms:</p> <p>All rubbish, particularly chippings shaving and saw dust shall be removed from the interior of the form before the concrete is placed and the form work in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done, Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively, a coat of raw linseed oil or form oil of approved manufacture may be applied in case steel shuttering is used. Soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforcement bars.</p> <p>Stripping time:</p> <p>In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.</p> <table><tr><td>(a)</td><td>Sides of walls columns and vertical faces of beam</td><td>24 to 48 hours.</td></tr><tr><td>(b)</td><td>Beam soffits. (Props left under)</td><td>7 days.</td></tr><tr><td>(c)</td><td>Removal of props slabs</td><td></td></tr><tr><td>(i)</td><td>Slabs spanning up to 4.5 m.</td><td>7 days.</td></tr><tr><td>(ii)</td><td>Spanning over 4.5 mm.</td><td>14 days.</td></tr><tr><td>(d)</td><td>Removal of props to beams and Arches</td><td></td></tr><tr><td>(i)</td><td>Spanning up to 6 m.</td><td>14 days.</td></tr><tr><td>(ii)</td><td>Spanning over 6 m.</td><td>21 days.</td></tr></table> <p>Procedure when removing the form work “Stripping time”. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffit form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.</p> <p>Centering:</p> <p>The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safely of the form work and concrete work before, during and after pouring concrete. Watch should be kept seeing that behavior of centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.</p>	(a)	Sides of walls columns and vertical faces of beam	24 to 48 hours.	(b)	Beam soffits. (Props left under)	7 days.	(c)	Removal of props slabs		(i)	Slabs spanning up to 4.5 m.	7 days.	(ii)	Spanning over 4.5 mm.	14 days.	(d)	Removal of props to beams and Arches		(i)	Spanning up to 6 m.	14 days.	(ii)	Spanning over 6 m.	21 days.
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	<p>The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.</p> <p>The centering and form work shall be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to the work, injury to life and damage to property.</p> <p>Scaffolding: All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to act and shall be subject to the approval of the Engineer-in-charge. However, contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.</p> <p>The scaffolding, hoisting arrangements and ladders shall allow easy approach to the work spot and afford easy inspection.</p> <p>The rate is applicable to all conditions of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:</p> <ul style="list-style-type: none"> (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering, strutting, propping bolting, nailing, wedging, easing, striking and removal. (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm. widths to beams, columns and the like. (c) Temporary opening in the forms for pouring concrete, if required, removing rubbish etc. (d) Dressing with oil to prevent adhesion of concrete with shuttering, and (e) Raking or circular cutting. <p>Re-Use: Before-re-use, all forms shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned, and joints gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.</p> <p>Mix Design: General: The relevant specifications of ordinary concrete shall be followed except that the concrete mix shall be designed from preliminary tests, the proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350, & M-400, with prefix controlled added to it. The letter 'M' refers to mix and numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg/cm².</p> <p>The proportion of cement, sand and coarse aggregates shall be determined by weight the weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design.</p> <p>The strength requirements of different grades of concrete shall be as under:</p>

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	<table><tr><th>Grade of Concrete</th><th colspan="2">Compressive strength of 15 cm cubes in kg/cm² at 28 days, conducted in accordance with I.S. 516-1959.</th></tr><tr><th></th><th>Preliminary test Min.</th><th>Work test Min.</th></tr><tr><td>M-150</td><td>200</td><td>150</td></tr><tr><td>M-200</td><td>260</td><td>200</td></tr><tr><td>M-250</td><td>320</td><td>250</td></tr><tr><td>M-300</td><td>380</td><td>300</td></tr><tr><td>M-350</td><td>440</td><td>350</td></tr><tr><td>M-400</td><td>500</td><td>400</td></tr></table> <p>In all cases, the 28 days compressive strength specified in above table is the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for all purposes as concrete belonging to the lower of the two grades between which its strength lies.</p> <p>Workmanship: The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work in question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that the supply of properly graded aggregate of uniform quality can be maintained till the completion of work. Grading of aggregate shall be controlled by obtaining the coarse aggregates, in different sizes and being in them in the right proportions as required. Aggregate of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by the Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.</p> <p>In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighted separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipments shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.</p> <p>It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge, according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates, I.S. 2389 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in concrete shall not be less than 320 Kg/M3 in plain concrete and not less than 380 Kg/M3 in reinforced concrete.</p> <p>If Quantity of pouring concrete at site is equal to or more than 5 CU M, than only Ready Mix Concrete is allowed and shall be used.</p> <p>Mode of measurement and payment:</p>	Grade of Concrete	Compressive strength of 15 cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.			Preliminary test Min.	Work test Min.	M-150	200	150	M-200	260	200	M-250	320	250	M-300	380	300	M-350	440	350	M-400	500	400
Grade of Concrete	Compressive strength of 15 cm cubes in kg/cm ² at 28 days, conducted in accordance with I.S. 516-1959.																								
	Preliminary test Min.	Work test Min.																							
M-150	200	150																							
M-200	260	200																							
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M-300	380	300																							
M-350	440	350																							
M-400	500	400																							

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	The concrete shall be measured for its length, breadth and depth limiting dimensions to those specified on plan or as directed. The rate includes cost of form work. The rate shall be for a unit of one cubic meter.
13	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost.
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one kilo gram.</p>
14	Brick Masonry work in Cement: Mortar 1:6
	<p>Materials Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Bricks shall conform to M-15. Cement mortar shall conform to M-11.</p> <p>Workmanship Proportion: The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume. 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. 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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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 meter over the rest of the work. Where this is not possible, the work shall break 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.</p> <p>Joints: Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not expose 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</p>

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	<p>dropping removed.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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 false of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.</p> <p>MODE OF MEASUREMENTS & PAYMENT:</p> <p>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. 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 ---</p> <p>Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.</p> <p>Opening not exceeding 1000 Sq.Cm.</p> <p>Wall plate sand bed plates, bearing of slab, chajja, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.</p> <p>Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.</p> <p>Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.</p>

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	<p>Forming charges of section not exceeding 700 Sq.Cm. in masonry.</p> <p>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.</p> <p>The rate shall be for a unit of one Cubic Meter.</p>
15	<p>Half brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4 (1- Cement: 4 - coarse sand) in foundation and plinth (B) Conventional</p>
	<p>MATERIALS Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Bricks shall conform to M-15. Cement mortar shall conform to M-11.</p> <p>WORKMANSHIP Proportion : The proportion of cement mortar shall be 1:4 (1 cement, 4 Coarse sand) by volume.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, mason'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.</p> <p>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 meter over the rest of the work. Where this is not possible, the work shall break 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.</p> <p>Joints: Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not expose 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.</p>

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	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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 false of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.</p> <p>MODE OF MEASUREMENTS & PAYMENT: 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. 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 --- Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm. Opening not exceeding 1000 Sq.Cm. Wall plate sand bed plates, bearing of slab, chajja, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.</p> <p>Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.</p> <p>Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.</p> <p>Forming charges of section not exceeding 350 Sq.Cm. in masonry.</p> <p>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.</p>

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	The rate shall be for a unit of one Square Meter.
16	Providing and laying Precast Lightweight concrete hollow core wall with hollow core concrete unit of approved make & size of 120 mm thick, 600 mm wide and 2400 mm / 2600 mm / 2850 mm / 3000 mm / 3300 mm in length made from of controlled cement concrete M20 having cube compressive strength not less than 20 MPa jointing with high strength & tensile adhesion non-shrink cementitious joint compound / P.U. Foam. (Plaster not required)
	<p>Materials Water shall conform to M :1, cement shall conform to M :3, sand shall conform to M :6, mortar shall conform to M :11, aggregate shall conform to M :12, GI wire shall conform to M:21, shuttering shall conform to M :26.</p> <p>Workmanship It shall be of cement concrete 1:1.5:3 (1 cement: 1.5 coarse sand: 3 graded stone aggregate 6 mm nominal size) reinforced with 1.6 mm dia GI wire, unless otherwise specified. The thickness of wall shall be as specified in the Description. The wall shall be set in position true to line and level before the jamb's sills and soffits of the opening are plastered. It shall then be properly cemented with cement mortar 1:3 (1 cement: 3 sand) and rechecked for levels. Finally, the jambs sills and soffits shall be plastered gripping the wall uniformly on all sides.</p> <p>Mode of Measurement and Payment The rate shall be for a unit of one square meter</p>
17	Cement Plaster 12 mm thick using Cement: Mortar in proportion 1:3 with Niru Finishing curing, etc. complete.
	<p>Materials Water M-1. The cement mortar of portion 1:3 shall conform to M-11.</p> <p>Workmanship: Scaffolding: Wooden bellies, 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.</p> <p>Preparation of background: The surface shall be cleaned of all dust, loose mortar droppings, traces of angles, a fluorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking 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 are left on the surface. Trimming of projections on brick / concrete surface where necessary shall be carried out to get an even surface.</p> <p>Ranking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.</p> <p>The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.</p> <p>For external plaster, the plastering operation shall be started from top floor and carried</p>

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	<p>downward. For internal plaster the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster of walls.</p> <p>Applications of plaster: The plaster about 15 x 15 cms. Shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane 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 movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowel ling or overwork the float shall be avoided. All corners arise angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises junctions etc. shall be carried out with proper templates to the size required.</p> <p>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.</p> <p>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 scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and coping as these invariably lead to leakage. No portion of the surface shall be left out initially to be peaked up later on.</p> <p>Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Socking of 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 or dry weather shall be prevented by handing matting or gunny bags on the outside of the plaster and keeping them wet.</p> <p>Mode of measurements & payment: The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operation described under workmanship.</p> <p>All plastering shall be measured in square meters unless otherwise specified. Length, breadth or height shall be measured correct a centimeter.</p> <p>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.</p> <p>This Description includes plastering up to floor two levels.</p> <p>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.</p>

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	<p>Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.</p> <p>For jambs, soffits, still etc. for opening not exceeding 0.5 sq.mt. Each in area for ends of joints, beams posts, girders steps, etc. not excluding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt in each area deductions and additions shall be made in the following manner:</p> <p>No deductions shall be made for ends of joints beams posts etc. and opening not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits sills etc. of these opening for finish to plaster around ends of joints, beams posts etc.</p> <p>Deduction for opening exceeding 0.5 sq. mt. but no exceeding 3 sq.mt. Each shall be made as follows and no addition shall be made for relevant, jambs, soffits, sills etc. of these openings.</p> <p>When both faces of all wall are plastered with different types of plaster or if one faces is plastered and the other pointed.</p> <p>When two faces of wall are plastered with different types of plasters or if one faces in plastered and the other pointed deduction shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of relevant 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 is equal, deductions of 50% of area of opening on each face shall be made from area of plaster and / or pointing as the case may be.</p> <p>For opening having doorframes equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the soil.</p> <p>In case of opening of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and stills shall be measured.</p> <p>The rate shall be for a unit of one square meter.</p> <p>CELLING Materials Water M-1. The cement mortar of portion 1:3 shall conform to M-11. Workmanship: Scaffolding: Wooden bellies, 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.</p> <p>Preparation of back ground The surface shall be cleaned of all dust, loose mortar droppings, traces of angles, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking 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 retardeers in left on the surface. Trimming of projections on brick / concrete surface where necessary shall be carried out to get an even surface.</p>

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	<p>Ranking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.</p> <p>The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.</p> <p>For external plaster, the plastering operation shall be started from top floor and carried downward. For internal plaster the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster of walls.</p> <p>Applications of plaster</p> <p>The plaster about 15 x 15 cms. Shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane 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 movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or sandy granular texture is required. Excessive overwork the float shall be avoided. All corners arise angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners arises junctions etc. shall be carried out with proper templates to the size required.</p> <p>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.</p> <p>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 scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and coping as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.</p> <p>Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Socking of 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 or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.</p> <p>Mode of measurements & payment:</p> <p>The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operation described under workmanship.</p> <p>All plastering shall be measured in square meters unless otherwise specified. Length, breadth or height shall be measured correct a centimeter.</p> <p>Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in</p>

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	<p>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.</p> <p>This Description includes plastering up to floor two level.</p> <p>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.</p> <p>Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.</p> <p>For jambs, soffits, still etc. for opening not exceeding 0.5 sq.mt. each in area for ends of joints, beams posts, girders steps, etc. not excluding 0.5 sq.mt. each in area and for openings exceeding 0.5 sq.mt. and not exceeding 3.00 sq.mt in each area deductions and additions shall be made in the following manner:</p> <p>No deductions shall be made for ends of joints beams posts etc. and opening not exceeding 0.5 sq.mt. each and no addition shall be made for reveals, jambs, soffits sills etc. of these opening for finish to plaster around ends of joints, beams posts etc.</p> <p>Deduction for opening exceeding 0.5 sq.mt. but no exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for relevant, jambs, soffits, sills etc. of these openings.</p> <p>(i) When both faces of all wall are plastered with different types of plaster of if one faces is plastered and the other pointed.</p> <p>(ii) When two faces of wall are plastered with different types of plasters or if one faces in plastered and the other pointed deduction shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of relevant 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 area of plaster and / or pointing as the case may be.</p> <p>For opening having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the sall.</p> <p>In case of opening of area above 3 sq.mt. each, deduction shall be made for opening but jambs, soffits and stills shall be measured.</p> <p>The rate shall be for a unit of one square meter.</p>
18	<p>20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed).</p>
	<p>Materials:</p> <p>WatershallconformtoM-12.CementmortarshallconformtoM-11.</p> <p>Workmanship:</p>

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	<p>The work shall be carried out in the coats. The backing coat (base coat) shall 12 mm. thick in C.M. 1:3. The relevant specification of Description No. 28 shall be followed except that the thickness of back coat shall be 12mm. averages 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 tapers and close shall be made on the surface.</p> <p>The 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.</p> <p>The second coat shall be completed to 8 mm. thickness in C.M. 1:1 as described above, including raising cement facing by applying wooden gutka of the size as directed by Engineer – in – charge or his consultant. The plaster edge at openings shall be chamfered in second coat. Width of chamfering shall be 10 to 12 mm . The sample of cement face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.</p> <p>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.</p> <p>Mode of measurements & payment: The relevant specifications of Description No. 28 shall be followed except that the sand face plaster on outside up to M. above ground level shall be measured under this Description.</p>
19	Plastic Emulsion Paint (Two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger etc. of approved type) (with Prime Coat) (A) For wall
	<p>Materials Water shall conform to M-1. The plastic emulsion shall conform to I.S. 5411-1969 (part I)</p> <p>Workmanship</p> <p>Scaffolding Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be plastic emulsion paint. A properly secured strong and well tied suspended platform (Zoola) may be used for plastic emulsion paint. Where ladders are used, pieces of old gunny bag shall be used at top and bottom to prevent scratches to the floors and walls. For plastic emulsion paint of coatings proper stage scaffolding shall be erected where necessary.</p> <p>Preparation of surface The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before plastic emulsion paint is to be applied.</p> <p>The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.</p> <p>Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes. All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such</p>

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	<p>portion shall be wetted and allowed to dry. They shall then be given one coat of whitewash.</p> <p>All unnecessary nails shall be removed, the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared.</p> <p>Preparation of mix This shall be done as per manufacturer's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacture instructions.</p> <p>Application Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.</p> <p>The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and laying off consist of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction 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. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.</p> <p>The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the preceding coat has become sufficiently hard to resist marking by brush being used.</p> <p>The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks paint drops etc.</p> <p>Precautions Old brushes if they are to be used with emulsion paints shall be completely dried of turpentine oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.</p> <p>In the preparation of wall for plastic emulsion painting. No oil base putties shall be used in filling cracks holes etc. (c) Splashes on floor etc. shall be cleaned out without delay as they will be difficult to remove after hardening. (d) Washing of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.</p> <p>Protective measures The surface of doors, windows, floors, articles of furniture etc. and such other parts of the building not to be whitewashed shall be protected from being splashed upon. Such surfaces shall be cleaned of white wash splashed if any.</p> <p>Mode of measurements & payments</p>

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	<p>All the work shall be measured in the decimal system as under: Dimensions shall be measured to the nearest 0.01 M. Area in individual Descriptions shall be worked out the nearest 0.01 Sq.m. All the work shall be measured in Sq.mt. Deductions for jambs, soffits, sills, etc. for opening not exceeding 0.5 sq.mt. each in area for ends of joints, posts, beams, girders steps etc. not exceeding 0.5 sq.mt. each in area and for opening exceeding 0.3 sq.mt. and not exceeding 3.0 sq.mt. each in area deduction and additions shall be made as under.</p> <p>No deductions shall be made for ends of joints beams, posts etc. and opening not exceeding 0.5 sq.mt. each No. addition shall be made on reveals, jambs, soffits sills etc. of these opening nor for finish arounds ends of joints beams posts etc.</p> <p>Deduction for opening exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings (a) When both the faces or walls are provided with finish, deduction shall be made for one face only. (b) When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width or reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.</p> <p>When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than one the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.</p> <p>In case of area of opening exceeding 3 sq.mt each deduction shall be made for opening but jambs, soffits, shall be measured.</p> <p>No deductions shall be made for attachment such as casing, pipe, conducts, electric wiring and the like.</p> <p>Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas.</p> <p>Corrugated steel sheets 14% Corrugated A.C. Sheet 20% Semi corrugated A.C. Sheets 10% Nainital pattern roof (Plain sheeting with rolls) 10% (E) Nainital pattern roof (with corrugated sheet) 25%</p> <p>Cornices and other wall features, when they are not picked out in a different finish / colour shall be girthed and included in the general area.</p> <p>The rate shall include the cost of all materials labour, scaffolding, protective measures etc. involved in all the operations described above. The rate shall be for unit of one square meter.</p>								
20	Water	Proofing	Treatment	on	Terrace	and	Wall	sides	with
	smooth finishing including material-labour etc. complete								

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	<p>Material and Workmanship: The existing R.C.C. surface of slab shall be cleaned thoroughly. 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 .</p> <p>Laying cement concrete using broken bricks/brick bats 25mm to 100mm size with 50 % of cement mortar 1:5 (1 Cement : 5coarse sand) admixed with proprietary water proofing compound conforming IS 2645. over 20mm thick layer of C.M 1:5 (1 Cement : 5coarse sand) admixed with proprietary water proofing compound conforming to IS 2645 to required slope and treating similarly the adjoining walls up to 300mm height including rounding of junctions of walls and slabs.</p> <p>After two days of proper curing, applying a second coat of cement slurry admixed with proprietary water proofing compound conforming to IS 2645.</p> <p>Finishing the surface with 20mm thick joint less cement mortar of mix 1:4 (1 Cement : 4coarse sand) admixed with proprietary waterproofing compound conforming to IS 2645. than applying glazed tiles pieces over cement mortar and finally finishing the surface with trowel with white cement slurry.</p> <p>The whole terrace so finished shall be flooded with water for a minimum period of two weeks of curing and for final test. All above operations to be done in order and as directed and specified by the engineer in charge.</p> <p>Mode of Measurement and Payment The rate shall be paid per square meter.</p>
21	<p>Providing and applying Epoxy Paint of approved make to concrete surface for RCC of structure including cleaning the surface by scrapping and air blower to the satisfaction of Engineer in charge necessary scaffolding etc. complete with all leads and lifts and giving satisfactory hydraulic test for water tightness as per IS codes.</p> <p>1. For new surface - Two coat</p>
	<p>Materials The water shall conform to M-1. Cement water proofing shall conform to I.S code.</p> <p>Scaffolding Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bag shall be used at top and bottom to prevent scratches to the floors and walls. For white washing of coatings proper stage scaffolding shall be erected where necessary.</p> <p>Preparation of surface The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied. The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.</p>

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	<p>All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.</p> <p>All unnecessary nails shall be removed; the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared.</p> <p>The colour wash shall be submitted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.</p> <p>Preparation of paint</p> <p>Portland cement shall be prepared by adding paint power to water and stirring to obtain a thick paste, which shall then be diluted to a brush able consistency. Generally equal volumes to paint powder and water make a satisfactory paint. In all cases, the manufacturer's instructions shall be followed. The paint shall be mixed in such quantities as can used up within an hour of mixing as otherwise the mixture will set and thickness, affecting flowing and finish. The libs of cement paint drums shall be kept tightly when not in use.</p> <p>Application of paint</p> <p>No painting shall be done when the paint is likely to be exposed to a temperature of below 70 C with 48 hours after application.</p> <p>When weather conditions are such as to cause damage the work shall be carried out "in the shadow" as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.</p> <p>To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.</p> <p>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 cut 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 to gather shall constitute one coat. The subsequent coats shall be applied after time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surfaces shall be even and uniform without patches, brush marks; distemper drops etc.</p> <p>The finished surface shall be even and uniform in shade, without patches, brush masks, paint drops etc.</p> <p>The cement paint shall be applied with a brush with relatively short stiff hog or fiber bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.</p> <p>Water proof cement paint shall not be applied on surface already treated with white wash colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood or metal surfaces.</p>

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	<p>Curing Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damages by sprinkling of water sahy about 12 hours after the application.</p> <p>Preparation of surface. The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied. The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes. All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.</p> <p>All unnecessary nails shall be removed; the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared.</p> <p>Mode of measurements & payments All the work shall be measured in the decimal system as under: (a) Dimensions shall be measured to the nearest 0.01 M. (b) Area in individual Descriptions shall be worked out the nearest 0.01 Sq.M All the work shall be measured in Sq.mt. Deductions for jambs, soffits, sills, etc. for opening not exceeding 0.5 sq.mt. each in area for ends of joints, posts, beams, girders steps etc. not exceeding 0.5 sq.mt. each in area and for opening exceeding 0.3 sq.mt. and not exceeding 3.0 sq.mt. each in area deduction and additions shall be made as under. No deductions shall be made for ends of joints beams, posts etc. and opening not exceeding 0.5 sq.mt. each No. addition shall be made on reveals, jambs, soffits sills etc of these opening nor for finish around ends of joints beams posts etc.</p> <p>Deduction for opening exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings (a) When both the faces or walls are provided with finish, deduction shall be made for one face only. (b) When each faces of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width or reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish. (c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than one the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.</p> <p>In case of area of opening exceeding 3 sq.mt each deduction shall be made for opening but jambs, soffits, shall be measured.</p>

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	<p>No deductions shall be made for attachment such as casing, pipe, conducts, electric wiring and the like.</p> <p>Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas.</p> <p>(a) Corrugated steel sheets 14%</p> <p>(b) Corrugated A.C. Sheet 20%</p> <p>(c) Semi corrugated A.C.Sheets 10%</p> <p>(d) Nainital pattern roof (Plain sheeting with rolls) 10%</p> <p>(e) Nainital pattern roof (with corrugated sheet) 25%</p> <p>Cornices and other wall features, when they are not picked out in a different finish / colour shall be girthed and included in the general area.</p> <p>The rate shall include the cost of all materials labour, scaffolding, protective measures etc. involved in all the operations described above.</p> <p>The rate shall be for a unit of one Square meter.</p>
22	<p>Providing and Fixing of colour coated aluminium-zinc alloy sheets (Galvalume) of ASTM – A792 Grade D, Coating AZ-150 with 0.5mm thickness, 0.90m to 1.20m width and length up to 12m with factory cut and fixing to the roof polymer coated galvanized hex head self drilling screws with integral washers and EPDM seals fasteners for support for sheet etc., complete as directed including cost of sheets For roofing, with necessary fixtures and accessories, hangers, skylights etc complete as per drawing and design.</p>
	<p>Roofing/ Cladding Material: Type of Roofing Material: Colour Coated Aluminium-Zinc Alloy Sheet (Galvalume) of ASTM – A792, Grade D, Coating – AZ150.</p> <p>Outside Colour coating / Inside Colour coating: As per availability/Ivory</p> <p>Laying of sheets: The sheets shall be laid into 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 flushing or by projecting drip course.</p> <p>The laps at end shall be provided as per manufacture guideline.</p> <p>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.</p> <p>Fixing of sheets: Sheets shall be fixed to the other roof members such as hips or valley rafter etc. with necessary fitting, accessories.</p> <p>Mode of measurements and payment The measurements of the sheet roof shall be taken for finished work in superficial area in general</p>

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	<p>plane (not girthed on the roof). The laps between the Sheets both at their ends and along the side edges shall not be measured. The overlaps of sheets over the valley piece and their under lap under the ridge, hip and flashing piece shall be included in the measurements.</p> <p>No deductions in measurements shall be made for openings for chimney stacks, sky light, turbo vantilator 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.</p> <p>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 accessories.</p> <p>The rate shall be for a unit of one sq. meter Accessories:</p> <ol style="list-style-type: none"> 1. Hangers to be fixed based on area to support Cables & Light fixtures 2. Skylights to be fixed based on area and as per design and drawing 3. Turbo-ventilators to be fixed based on area & no. of air rotations as per design and drawing. <p>General notes.</p> <p>Design of structure should strictly comply.</p> <p>The end wall tie beams on one side of the building should be kept open for entry of equipments for erection for roofing. The final plan for erection should be discussed with the engineer in charge.</p> <p>Installation will be undertaken only after successful completion of Entire proposed Site at curing to the support structure. Installation will be done only after 15 days of curing to the last casted beam.</p> <p>Roofing Installation shall not be carried out in the event of wind velocity above 20 Km/hr.</p> <p>Minor colour peeling / chipping / scratching can happen due to Onsite Fabrication & Erection. The same will be rectified by applying Epoxy lacquer.</p> <p>Proper storage of Coils on Plastic/Wooden Pellets under covered conditions with clean atmosphere away from dust & water. Unloading of coils to be strictly made by Hydra / Crane.</p> <p>Mishandling of coil can damage its shape and change the Inner Diameter. Any damage to coil during unloading will be sole responsibility of the Contractor.</p>
23	<p>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 the like</p>
	<p>Materials & Workmanship</p> <p>The relevant specification of Description No30(A) shall be followed except that the steel work shall be done by welding.</p> <p>Welding shall generally be done by electric process. Gas welding shall be resorted to using oxyacetylene flame with specific approval. Gas welding shall not be permitted for structural steel work.</p> <p>The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded shop and site welders as well as type of electrodes to be used.</p>

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	<p>Symbol for welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must be done after improper welding that is likely to be done due to heights and difficult position on scaffoldings etc.</p> <p>The welding work shall conform to I.S. 816-1969.</p> <p>Preparation of surfaces: Surface 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.</p> <p>Assembly of welding: Before welding is commenced, the plates shall first be brought together and firmly clamped or spot welded at specified distance. The temporary connection has to be strong enough to hold the plates accurately in place without displacement.</p> <p>Precautions: All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968.</p> <p>The following points shall be borne in mind during the process of welding</p> <ol style="list-style-type: none"> 1.welds shall be made in flat position wherever practicable. 2.Are length, voltage and smperge shall be suited to the thickness of material, type of groove and other circumstances of the work. 3.The segments of welding shall be such be considered harmful to the strength shall cut out and rewelded. <p>The defective welds which shall be considered harmful to the strength shall cut out and rewelded. Finished welds and adjacent parts shall be protected with clean boilde linseed oil and after all stage has been removed welds and adjacent parts shall be painted after the same are approved. All the members shall be thoroughly cleaned of rust scales, dust etc. and given a priming coat of red lead paint before fixing them in position.</p> <p>Mode of measurements & payments The relevant specifications of Description No. 30(A) shall be followed. The rate shall be for a unit of Kg.</p> <p>Materials & Workmanship The relevant specifications of Description No. 25 shall be followed except hat the work shall be for trusses and trussed purlins up to 25m. Span and 15 m. overall height.</p> <p>Mode of measurements & payments The relevant specifications of Description No. 25 shall be followed. The rate shall be for a unit of Kg.</p>
24	<p>Providing and Casting Controlled cement concrete M 250 proportions of ingredients as per mix design by weigh batching for pavement wearing coat 75 mm thick including floor finishing with a floating of neat cement complete. TREMIX VD SYSTEM including providing and fixing channels as per required levels and slope, leveling poured concrete between channels with Double Beam screed vibrators removing excess water using VD Pump finishing the surface with power trowel and power floater including cutting the groove of size 5mm x 10mm at required distance and providing and filling the same with bitumen as per practices etc. complete at all levels Excluding steel reinforcement.</p>
	<p>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.</p>

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	<p>Workmanship The wearing coat shall consist of providing and laying average 75mm thick RCC M250, FE 500D TMT reinforcement and filling of joints as shown in detailed drawings.</p> <p>In preparations of mix specifications given under Paragraph of this description, shall be followed It shall be as per IS:1195 & IS:1196.</p> <p>General The Contractor shall improve the quality of all concrete floor slabs by placing the concrete according to the Tremix System as indicated on the contract drawings and as specified herein.</p> <p>Technical Assistance/Training of Labour During the placement of concrete, the Contractor shall have a minimum of one person present at all times who has been adequately trained by a representative of the equipment manufacturer. This person shall be experienced in the vacuum dewatering process and in the operation of all related equipment and shall direct all concrete dewatering work performed.</p> <p>The Contractor shall provide the services of a representative from the manufacturer of the vacuum dewatering equipment on site for a period of at least 3 working days. The manufacturer's representative shall provide technical assistance for the vacuum dewatering process on the initial 3 days of operation.</p> <p>Equipment for Compacting, Placing, Vacuum Processing and Finishing of Slab All process equipment to be used shall be of a design representative of the state of the art, and shall be subject to the approval of the engineer. Equipment shall be Tremix or approved equal. System shall have a demonstrated five-year history of performing such work. The vacuum pumps shall be able to generate a minimum vacuum of 600mm (24 inches) of mercury (0.80 atmospheres) in actual operation using the maximum number and size of suction mats required for this work.</p> <p>The Contractor shall have at the job site sufficient equipment (vacuum pumps, mats, filter pads and accessories) to ensure that the vacuum dewatering process continues uninterrupted to completion. Stand by equipment is sometimes required.</p> <p>Mix Design The Contractor is responsible for the mix design of the class as called for on the Contract Drawings and must submit the mix proposed for use in the Contract before any work is started. All mix parameters must conform to the values specified.</p> <p>The Contractors shall utilize a knowledgeable and experienced concrete technician for the design and production of mix (mixes) meeting all the requirements of the specifications. Do not deliver any concrete to the construction site until all the approvals have been obtained.</p> <p>Quality Control The Contractor has the responsibility for achieving the quality of concrete specified by controlling the concrete mixes, placing, vacuum process finishing and curing. The concrete technician in charge must be present at the site when work is in progress. The Contractor shall be responsible for mix adjustments, performing necessary tests, correcting deficiencies and trouble shooting in general. The Contractor shall be required to maintain control charts showing individual test results for aggregate gradation, slump, and cement content and compressive strength. The engineer will</p>

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	<p>supply data for slump and compressive strength. Planning of Placing The Contractors shall submit for review shop drawings for floor slabs detailing the location of all construction joints and the sequence of the slab placement, and manufacturer's literature describing the equipment to be used. In addition to the shop drawings, the Contractor shall indicate the quantity of each piece of dewatering equipment that will be located at the construction site and shall include the dimensions of all suction mats.</p> <p>Before concreting is started the work should be planned with a view to determine areas to be placed daily, the required amount of equipment, size of vacuum mats, length of vacuum hoses, arrangement</p> <p>of rails, if any, or screeds etc. Crew required for the vacuum process is two men to handle the mats and the pump. Note that placing, vibration, vacuum treatment and floating follow immediately behind each other.</p> <p>Method Statement</p> <p>General The work shall be planned and executed so that there is no delay between the placement, screeding, dewatering and floating of the concrete. Concrete to be vacuum dewatered shall be handed and placed so as to prevent segregation. The concrete shall be internally vibrated prior to screeding.</p> <p>Leveling Immediately following placement, the concrete shall be leveled with a vibrating screed running on a true surface, set at the proper elevation required to provide the specified finished elevation. The concrete surface shall be screeded high by 2% of the slab's thickness to compensate for the compaction caused by the vacuum dewatering process. (Slabs to have an aggregate hardener shall have compensation made to maintain elevation). The vibrating screed shall be moved forward as rapidly as proper consolidation allows. The proper surcharge of concrete must be maintained in front of the leading edge of the screed.</p> <p>Vacuum Immediately after leveling, the concrete shall be covered with filter pads and suction mats in strict accordance with the recommendation of the manufacturer to have the slab fully dewatered. The suction mat shall extend 100mm beyond the edge of the filter pad on all sides. The pads shall extend to within 100mm of the edge of concrete slab, and the mats shall cover entire slab. Before connecting the hose on the suction mat to the vacuum pump, the edges of the mat shall be smoothed to enable an airtight seal to be created. A vacuum pump, the edges of the mat shall be smoothed to enable an airtight seal to be created. A vacuum shall then be applied to the mat. After a minute the gauge on the vacuum pump should indicate a minimum vacuum of 0.700 atmospheres (500mm/Hg) and if not, the mat must be checked for leakage. For concrete that dewater readily the vacuum should then be maintained at 0.70-0.80 atmospheres (500/600mm/Hg) for concrete which dewater less efficiently the vacuum shall then be reduced to 0.50-0.60 atmospheres (300-400mm/Hg). After approximately 10 minutes the vacuum can then be increased to 0.80 atmospheres. The vacuum shall be maintained for at least 1 minute per cm feed, sufficient moisture shall be maintained to meet manufacturer's requirements). The suction mats and filter pads shall then be</p>

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	<p>removed and moved to the next section in a leapfrog manner. Stop the vacuum dewatering when light footprints only are left in the concrete when stepped upon.</p> <p>Floating Upon removal of the suction mats and filter pad the concrete surface shall be power-floated without delay until all imprints from the vacuum process are removed. If crusting occurs, the floating operation must be delayed till the concrete carries the machine. The higher speed is recommended for the floating operation. Two passes with the floating disc should be made in the junction of two mats in order to avoid risk for cracking.</p> <p>Finishing The waiting time after the floating operation depends on concrete temperature and humidity and various from 10 minutes to 2 hours. The troweling operation cannot take place before the concrete has hardened enough to carry the machine; i.e. the troweling blades will not leave any marks on the concrete. Repeated troweling, with intervals between the passes which are adapted to the setting of the concrete, greatly improves the surface characteristics. The surface will be more wear-resistant and less dusty. At least two passes are recommended for floors which are not to be covered.</p> <p>Curing Vacuum dewatered concrete should be cured like any other quality concrete in order to achieve a good final result. Use ponding or wet burlap.</p> <p>Equipment specifications Poker/Needle Vibrators: Vibrators with more than 12500 vibrations/minute with drive length exceeding Bay width by at least 1m shall be used.</p> <p>Surface Vibrators: Double beam Surface Vibrator with beam spacing of 300 mm. Beam Height of 100mm. with Weight not exceeding 15kg / Running meter, Profile: Hollow to avoid loss of vibrations with vibrator unit of 2360 vibrations/min. having adjustable fly weight torque from 1.5 to 5.0kg /cm and adjustable centrifugal force from 1350 to 4600N. The Surface Vibrator will be equipped with suitable arrangement to remove sagging due to self weight and usage related stress fatigue. The surface vibrator will have a travel speed of about 1Rm/min.</p> <p>Vacuum Pump: The Vacuum Pump shall have a Priming tank with Separate suction and discharge compartment, having special filter arrangements to avoid entry of dirt in the pump body, The pump should run at > 280 RPM and produce vacuum up to 600mm/Hg (-0.70 Atmospheres) An appropriate gauge should be provided to indicate the level of vacuum achieved. A valve to adjust the vacuum will be provided on the vacuum pump to control the vacuum created. The suction and discharge hoses should be provided with leak proof couplings and should be capable to withstand the pressure. The suction hose should also be provided with a valve to prevent backflow of water. The pump shall be capable to dewater concrete surface area of 24m² with single connection and 48m² max. with double connection without any extra modification. The pump unit shall be mounted on a trolley for ease in shifting during the course of work and should be less than 150kg. in weight (DRY) for easy handling and operation.</p> <p>The suction Mat-Top Cover should be made of calendared PVC/PE Sheet Reinforced with Nylon/PP/LDPE fibers for withstanding the Pressures and provides flexibility for effective sealing to allow for proper vacuum creation. For a mat size of 24m² the centrally Provided Suction net</p>

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	<p>area shall be minimum 0.5m² to evenly distribute the vacuum. This suction net area shall have suitable openings for effective vacuum and will have a set of Nylon wire mesh to create sufficient cross sectional area for water to flow through. The suction pipe fitted on top cover should be fixed with appropriate gaskets to avoid any leakage.</p> <p>The filter pads should be made from Calendared Plastic Sheets with non-collapsible distance cushions to allow sufficient cross sectional area for effective flow of water. The filter pads shall have markings to indicate overlap distances for ease in usage by labour/operators handling the same.</p> <p>The finishing Equipment - Skim floaters should not exceed 100 kg/m² weight, so as to avoid disturbing the freshly laid dewatered concrete. The machines shall have 2 speeds to regulate the level and quality of finish. The machine should be capable of doing both functions floating and troweling for faster output and ease of operation. The floating disc will have a gentle curvature and oscillating motion to achieve better level control and effectively seal the capillary pores of dewatered concrete. The machine should be capable of after grinding hydrated cement to result in improved wear resistance. The troweling blades should be adjustable in tilt to increase or decrease the contact area of the trailing edge to achieve the desired finish and better abrasion resistance. The machine handles shall be at least 2m in length with arrangements to increase or decrease the height for ease in operation and to allow reaching the concrete surfaces with minimum stepping upon concrete surface.</p> <p>Quality Control & Testing Side Form: Side form shall be rigid enough to ensure that it does not Bulge/Collapse during the concreting. The top edge level guide shall be straight to achieve final floors in the level tolerance of + 6mm per 4meters on Transverse or linear directions.</p> <p>Equipment: The equipment shall be as per equipment manufacturers specifications of Aquarius "Tremix" make or equivalent and shall be in proper working condition. The Authority will have a right to get the same inspected and certified through the manufacturer at any time during the course of work for its performance and genuinely, any cost towards such inspection/certification will be borne by the contractor. The concrete after vacuum dewatering and finishing shall give a minimum increase of 25% in compressive</p> <p>strength - vis a vis to reference concrete and a minimum 50% increase in abrasion resistance vis-a-vis to reference concrete. This may be either checked by cast in situ cubes or by cores taken after 7-14 & 28 days. Depending upon the total volume of work suitable quantities of samples shall be taken and checked. The testing should be a mandatory requirement as the cost paid towards equipment application is solely for the purpose of improved quality. Contractors at their expenses (Refer Frequency of Test) will do the entire arrangements for such sampling & testing.</p> <p>Special Terms & Conditions The equipment will be Aquarius "Tremix" make or equivalent as per equipment specifications and performance. The Authorities will have the right to get the same inspected and certified through approved certification Agency and the costs of such inspections Certifications will be borne by the Contractor. Any defects found by the Certification Agency will be rectified immediately without which any further work execution will not be allowed. The costs of such rectifications will be borne by the contractor.</p>

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	<p>Test panel before start of work shall be executed by the Contractor at his own costs and only after satisfactory 7 day results the actual work will be started in case of test panel results not being satisfactory one more chance will be provided before rejection of work / agency.</p> <p>All test samples for the test panel and actual work - either by way cast in situ cubes or cores will be tested by approved testing authorities only and the costs for such tests will be borne by the contractor. The necessary arrangements for test samples such as sufficient quantities of cube moulds / core drills etc. etc. will be arranged for by the contractor at his own</p> <p>The Engineer-in-Charge of site will have the right to demand samples from any working day's concrete at any time and the same will be provided by the Contractor immediately at his own cost.</p> <p>In case of samples of actual work failing to achieve the demanded results a 30% deduction in case if the failure is up to 25% of specifications and total rejection in case if the failure is more than 25% of specifications of the specific work will be made. In case of rejection/deduction the cost calculation will be on the basis of material cost + reinforcement cost + equipment operating cost + labour cost (Not on equipment operating + labour only).</p> <p>Mode of Measurements & Payment</p> <p>The rate shall include the cost of all materials and labour involved in all the operations described above. No deduction shall be made or extra paid for any opening up to 0.1. sq. mt. In area in the floor, nothing extra shall be paid for laying the floor at different levels in the same room or the courtyard.</p> <p>The rate shall be for unit of one cubic meter.</p>
(B) RCC RAMP AREA	
WORK UPTO PLINTH LEVEL	
25	<p>Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.</p> <p>A. 0.0 to 1.5mt depth</p> <p>B. 1.5 to 3.0 mt. depth</p> <p>Workmanship:</p> <p>The relevant specifications of item description no. 01 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment:</p> <p>The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
26	<p>CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)</p> <p>Workmanship:</p> <p>The relevant specifications of item description no. 02 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment:</p> <p>The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
27	<p>CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p>

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	<p>Workmanship: The relevant specifications of item description no. 03 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 03 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
28	<p>CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>(A) Columns</p> <p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>(B) Beams</p>
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
29	<p>Rubble Stone filling with 33% Murrum in specified thickness with watering, compaction etc. complete</p>
	<p>Workmanship: The relevant specifications of item description no. 05 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 05 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
30	<p>CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)</p>
	<p>Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
31	<p>CC work M-25 for RCC Bottom Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p>
	<p>Workmanship: The relevant specifications of item description no. 06 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>

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32	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
33	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	<p>Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
34	Removal of Excavated Stuff within RMC limit as directed by Engineer-in-Charge
	<p>Workmanship: The relevant specifications of item description no. 09 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
35	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete.
	<p>Workmanship: The relevant specifications of item description no. 10 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
WORK ABOVE PLINTH LEVEL	
36	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Column
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Beam
	<p>Workmanship: The relevant specifications of item description no. 05 of Transfer Station shall be followed.</p>

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	<p>Mode of Measurement and Payment: The relevant specifications of item description no. 05 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for RCC Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>Slab</p> <p>Workmanship: The relevant specifications of item description no. 06 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for Partition, Parsdment, railing etc. using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>Pardi</p> <p>Workmanship: The relevant specifications of item description no. 11 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
37	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
38	Construction of cement concrete kerb with top and bottom width 115 and 165mm respectively, 400mm high in M20 grade. kerb stone laid with kerb laying machine (I-Section)
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter</p>
39	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete.
	<p>Workmanship: The relevant specifications of item description no. 16 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 16 of Transfer Station shall be followed. Rate shall be for a unit of one Square meter.</p>
40	Plastic Imulsion Paint (Two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger etc. of approved type) (with Prime Coat) (A) For wall

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	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one Square meter.</p>
41	<p>Providing and applying Epoxy Paint of approved make to concrete surface for RCC of structure including cleaning the surface by scrapping and air blower to the satisfaction of Engineer in charge necessary scaffolding etc. complete with all leads and lifts and giving satisfactory hydraulic test for water tightness as per IS codes. 1. For new surface - Two coat</p>
	<p>Workmanship: The relevant specifications of item description no. 20 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 20 of Transfer Station shall be followed. Rate shall be for a unit of one Square meter.</p>
42	Oil bound Distemper two coat with Primer Coat
	<p>Materials The dry distemper and primer shall be approved brand and manufacture. The dry distemper shall be of required colour and shade and the same shall conform to I.S. 427-1965. Whiting shall conform to I.S. 63-1964.</p> <p>Workmanship Scaffolding Wherever scaffolding is required it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bag shall be used at top and bottom to prevent scratches to the floors and walls. For white washing of coatings proper stage scaffolding shall be erected where necessary.</p> <p>Preparation of surface The undecorated surface to be distempered shall be thoroughly brushed free from dust dirt grease, mortar, dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry at least 2 months, before application of distemper.</p> <p>All unnecessary nils 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, fungi, algee lichem, efforcemece etc. shall be treated in accordance with I.S. 2395 (PART-I) 1966 before applying distemper. Any unevenness shall be good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulations & then pepering the same after it is dry.</p> <p>Priming coat: A Priming coat of whiting shall be applied as per Description No. 47 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.</p> <p>Application of plaster shall be done as under</p>

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	<p>The primer shall be applied with a brush one the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes 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 dry for atleast 48 hours before oil bound distemper or paint is applied.</p> <p>Distemper is not recommended to be applied within six months of the completion of wall plaster. Proportion of Distemper: The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufactures only. Sufficient quality of distemper required for one day's work shall be prepared.</p> <p>Application of Distemper coat</p> <p>For undecorated surfaces, after the primer coat is dired 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 cut the priming coat. All loose particles shall be dustled off after rubbing. Miimum two coats of distemper shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which to gether shall constitute one coat. The subsequent coats shall be applied after time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surfaces shall be even and uniform without patches, brush marks; distemper drops etc.</p> <p>Sufficient quality or distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finishde in one operation and no wkr shall be started in any room which cannot be completed on the same day.</p> <p>double distemper brush shall be ued. After the day work, brushes shall be thoroughly washed in got water with a soap solution and hang down to dry. Old brushes which are dirt and caked with distemper shall not be used on the work.</p> <p>Protective measure:</p> <p>The surface of doors, windows, floors, articles of furniture etc. and such other parts of the building as are not distempered shall be protected from being aplashed upon. Such surfaces shall be cleaned of distemper aplashes if any.</p> <p>Mode of measurements & payments</p> <p>Priming coat of distemper, Primer scraping of surface spoiled by smoke soot, removal of oil and grease spots, treatment for infection of effloresces, mouldmoss, fungi, algee, algee and litoben and patches repairs to plaster shall be include in this Description for which nothing extra shall be paid.</p> <p>All the work shall be measured net in the decimal as in places subject to the following limits unless otherwise stated hereinafter.</p> <p>Dimensions shall be measured to the nearest 0.01 M.</p> <p>Area in individual Descriptions shall be worked out the nearest 0.01 Sq.m.</p> <p>All the work shall be measured in Sq.mt. Deductions for jambs, soffits, sills, etc. for opening not exceeding 0.5 sq.mt. each in area for ends of joints, posts, beams, girders steps etc. not exceeding 0.5 sq.mt. each in area and for opening exceeding 0.3 sq.mt. and not exceeding 3.0 sq.mt. each in area deduction and additions shall be made as under.</p>

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	<p>Deduction for opening exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings When both the faces or walls are provided with finish, deduction shall be made for one face only.</p> <p>When each faces of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width or reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.</p> <p>When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than one the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.</p> <p>In case of area of opening exceeding 3 sq.mt each opening of deductions shall be made for openings but jambs, sills and soffits shall be measured. No deduction shall be made for attachments such as casing, conduits, pipes electric wiring and the like.</p> <p>Description includes removing nails, making good holes, cracks, patches with materials, similar in composition to the distemper. The rate includes cost of all materials, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handling, unloading storing etc.</p> <p>The rate shall be for a unit of one square meter.</p>
43	<p>Providing & fixing approved quality & designed rolling shutters with necessary top cover, fittings, single coat red lead, double coat silver or oil paint (with bearing)</p>
	<p>Materials: The rolling shutter shall conform to M-32.</p> <p>Workmanship: Brackets shall be fixed on the lintel or under the lintel as specified with raw, plugs, & screws, bolts etc. The shaft along with the spring shaft than be fixed on the brackets. The lath portion (shutter) shall be laid on ground and the side guide channels shall be bound with ropes etc. The shutter shall then be placed in position & top fixed with pipe shaft with bolts & nuts. The side guide channels & cover frames shall then be fixed to the walls through the plate welded to the guides. These plates & bracket shall be fixed by means of steel screws; bolts & raw plugs concealed in plaster to make their location invisible. Fixing shall be done accurately in workmen like manner that the operation of the shutter is easy & smooth.</p> <p>Mode of Measurement and Payment: Clear width & clear height of the opening for the rolling shutter shall be measured correct to mm. The clear distance between the seal & soffit (bottom of lintel) of the opening shall be the clear height.</p>

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	<p>The area shall be calculated in square meter Correct to two places of decimal.</p> <p>The rate shall include the cost of materials & labour involved in all the operation describe above including cost of top cover & spring except ball bearing & mechanical device of chain & crank operation, which shall be paid for separately.</p>
44	Plastic Imulsion Paint (Two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger etc. of approved type) (with Prime Coat)
	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one Square meter.</p>
45	Providing and Fixing metal expansion joints as per standard drawing. Details of expansion joint 50 x50 x 6mm size tow IS and 100 x6mm MS plate with 6 x 20x 25mm long hold fast @ 50cm/cc on both sides of expansion joints.
	<p>General Expansion Joints shall be constructed according to the details shown on the drawings.</p> <p>Fabrication a.Open Joints. Open Joints shall be constructed at the locations shown on the drawings using a wood strip, metal plate, or other suitable material, which is subsequently removed. When removing the material, care shall be exercised to avoid chipping or breaking the corners of the concrete. The edge of the concrete at the joints shall be edge finished. Reinforcement shall not extend across on open joint.</p> <p>b.Filled Joints. The filler material shall conform to Clause 2(d) here in below. When preformed filler is shown on the drawings, the, filler shall be placed in correct position before concrete is placed against the filler. The filler material shall form part of the joint and while concreting slab care shall be taken to prevent the former, from being displaced. After the work is completed, the exposed face of the joint shall be cleaned of all loose material sticking to it.</p> <p>c.Steel Work. Steel Plates, angles, or other structural shapes provided in the expansion joints shall conform to the provisions in relevant 1.5. Specifications. All metallic parts used in fabrication and installation for fixing in devices of the joint shall be accurately shaped to the section indicated and all parts as above said shall be hot-dip galvanized. Positive methods shall be employed in placing the assemblies, to keep them in correct position during the placing of concrete. Care shall be taken to avoid impairment of the clearances in any manner.</p> <p>d.Filler Material Expansion Joints. The material used for filling expansion joint shall be as per MoRT& H Specification. The rate shall include the cost of all material, labour, equipment, galvanizing all metallic elements and other incidental charges for fixing the joints complete in all respects as per this specification and as shown on the drawings.</p> <p>Measurements of Payment The expansion joint shall be measured in running meters.</p> <p>Rates</p>

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	The rate shall include the cost of all material, labour, equipment, galvanizing all metallic elements and other incidental charges for fixing the joints complete in all respects as per this specification and as shown on the drawings.
46	Providing and fixing post and pipe railing as per detailed drawing including 3 coats of painting to steel works complete.
	<p>Materials: Galvanized mild steel tube of specified dia nominal bore and fitting shall conform to I.S. 1239-1968.</p> <p>Workmanship Cutting, laying and jointing. When the tubes are to be cut or rethreaded, the end shall be carefully filed out so that no obstruction to bore is offered. The ends of the tubes shall then be treading conforming to the requirements of I.S. 554-1955 with pipe dies and taps carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.</p> <p>The taps and dies shall be used only for straightening screw threads which have become bent or damaged and dies shall not be used for turning of the treads so as to make them slacks as the latter procedure may not result in watertight joints. The screw threads for tube and fittings shall be protected from edge until they are fitted.</p> <p>In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapped around with a few turns of fine-spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all pipes and fittings are properly jointed so as to make the joints complete watertight and pipes are kept at all times free from dust and dirt during fixing. But joints shall be removed after screwing. After laying, the open ends of the pipes shall be temporarily plugged to prevent access of water, soil or any other foreign matter.</p> <p>Any treads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion.</p> <p>The width and depth of the trenches for different diameters of the tubes shall be as under. For 15 to 80 mm dia tubes width of trenches shall be 30 cm and depth of trenches 60 cms.</p> <p>At joints, the trenches 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 earthwork in trenches.</p> <p>The pipes shall be painted with two coats of anticorrosive bitumastic paint of approved quality. The pipes shall be laid on a layer of 75 mm sand filled up to 150 mm above the pipe so specified. The remaining portion of trenches shall be then filled with excavated earth. The surplus earth shall be disposed of as directed.</p> <p>When the excavation is done in rock, the bottom shall be cut deep enough to permit the pipe to be laid and cushion of sand 75 mm in case of bigger dia. Of tube where the pressure is very high, thrust block of cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate of 20 mm nominal size) shall be constructed on all bends to transmit the hydraulic</p>

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	<p>thrust without impairing the ground and spreading it over a sufficient area if so specified.</p> <p>Testing of joints. After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone, and all leaking pipes removed and replaced without extra cost</p> <p>The pipes and fittings as they are laid shall be tested to hydraulic pressure of 6 kg/sq.cm. The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stopcock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fittings shall be tested in sections as the work of laying proceeds keeping the joints exposed for inspection during the testing.</p> <p>Mode of measurements and payment The relevant specifications of Description No.63 shall be followed. The authorized quantities shall be measured.</p> <p>For purpose of calculating cubic content cross sections shall normally be taken at suitable intervals i.e. at manhole or wall chamber intervals except in abnormal cases like sudden change in strata or undulating ground, etc., when they may be taken at closer intervals as approved by the Engineer in charge whose decision shall be final conclusive and binding.</p> <p>Authorized width.</p> <p>a. Up to one meter depth, the width of the trenches for the purpose of measurement of excavation shall be arrived at by adding 40 cms, to the external diameter of the tube (not the socket) where a pipe is laid on concrete bed/ cushioning layer. The authorized width shall be the external diameter of tube plus 40 cms or the width of the concrete bed- cushioning layer whichever is more</p> <p>b. For depths exceeding one meter an allowance of 5 cms per meter of depth for each side of the trench shall be added to the authorized width (i.e. external diameter of pipe of plus 40 cms) This allowance shall apply to the entire depth of the trench. The authorized width in such cases shall therefore be, equal to the depth of trench, plus external diameter or tube plus 40 cms.</p> <p>c. When more than one tube is laid, the diameter shall be reckoned as the horizontal distance for outside to outside of the outer most pipes.</p> <p>d. Where sheeting, etc., has been provided the authorized width of the trenches at bottom shall be increased to accommodate for sheeting etc. so that the clear width available between faces of sheeting is as per provision of (a)(b)(c) above.</p> <p>e. If the side of the trench are not vertical, the toes of the side slopes shall end at the top of pipe and vertical sided trench of authorized width as per (a) (b) (c) and (d) above shall be excavated from these down to the bed of trenches.</p> <p>Where the tubes are laid in trenches, the work of excavation and refilling shall be paid for separately. The rate also does not include painting of pipes and sand filling all round tubes for which separate payment shall be made. The length shall be measured on running meter basis.</p> <p>The rate shall be for a unit of one running meter</p>
47	Providing and fixing premoulded compressible filler board in black colour confirming to MoRT&H

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	Specifications (Clause 1015), having minimum density 95kg/cum. non-staining with less than 1% water absorption & compression recovery of 93% minimum as per specification for 20 mm wide expansion joint including cutting to required size and shape at all levels etc. complete as directed.
	<p>The material used for filling expansion joint shall be as per MoRT& H Specification. The rate shall include the cost of all material, labour, equipment, galvanizing all metallic elements and other incidental charges for fixing the joints complete in all respects as per this specification and as shown on the drawings.</p> <p>Mode of Measurement and payment shall be for one square meter.</p>
48	<p>Providing and Casting Controlled cement concrete M 250 proportions of ingredients as per mix design by weigh batching for pavement wearing coat 75 mm thick including floor finishing with a floating of neat cement complete. TREMIX VD SYSTEM including providing and fixing channels as per required levels and slope, leveling poured concrete between channels with Double Beam screed vibrators removing excess water using VD Pump finishing the surface with power trowel and power floater including cutting the groove of size 5mm x 10mm at required distance and providing and filling the same with bitumen as per practices etc. complete at all levels Excluding steel reinforcement.</p>
	<p>Workmanship: The relevant specifications of item description no. 23 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 23 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
49	<p>Providing PVC 100 mm diameter water spouts including necessary iron grating as per drawings</p> <p>Material for the waterspout shall be as mentioned in the Description and shall be got approved from the Engineer-in-charge.</p> <p>Waterspout shall have 100mm internal diameter. Cast iron grating shall be provided at the entry and shall be fixed in the recess so as to be flush with the road surface as per drawing enclosed. The quality and size of the grating shall be got approved from the Engineer-in-charge. The water spots shall be interconnected and shall be rigidly fixed in concrete member. The grating and GI pipes shall be painted with two coats of anticorrosive black bitumen paint.</p> <p>Measurement shall be per number of waterspouts fixed.</p> <p>Unit rate includes cost of all materials, labour and tools to complete the work.</p>
50	<p>Providing and fixing to wall, ceiling and floor 10.0 Kg/sq.cm working pressure polythene pipes (PVC) of the following outside dia low density complete with special flange compression type fittings, wall clips etc.</p>
	75 mm dia
	110 mm dia.
	<p>Materials The low-density polythene pipe of specified diameter with 6kg/sq.cm working pressure shall conform to IS 3076-1968. The special sand fitting required shall be of best quality.</p> <p>Workmanship The P.V.C. pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. pipes, due allowance shall be made particularly in over ground pipelines for any</p>

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	<p>change in length of pipeline which may occur during installation or when pipe line is in service.</p> <p>Above ground installation of rigid P.V.C. Pipe should be undertaken after preparations are observed for their protection against direct sunrays and mechanical damage.</p> <p>The rigid P.V.C. pipeline should not be kept exposed above ground when it passes through public places, railway lines roadside and footpaths.</p> <p>P.V.C. pipes shall be supported at the following intervals.</p> <p>20mm dia-500mm, 25mm dia-750mm and 32mm dia-900mm</p> <p>Closer support spacings shall be provided if recommended by the manufacturer.</p> <p>The guidelines indicated by the manufacturer of regarding, handling, transportation, storing laying and jointing of pipes shall be kept in view during execution.</p> <p>P.V.C. pipes shall be fixed on wall with wooden plugs and suitable plastic clamps.</p> <p>Jointing the pipes</p> <p>The pipes and sockets shall be accurately cut. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper, and then solvent cement joint. Since solvent cement is aggressive to PVC care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Empty solvent cement tins, brushes, or paper impregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they can provide to be a hazard to animals, which may chew them.</p> <p>If manufacturer recommends its own method of jointing the same shall be adopted after necessary approval from the Engineer – in – charge.</p> <p>Laying pipes in Trenches</p> <p>The pipes shall be laid over uniform relatively soft fine-grained soil found to be free of presence of hard objects such as large flints, rocky projections, large tree roots, etc. The width of the trenches shall be minimum width required for working.</p> <p>The pipes laid underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to deflection. Any deviation required shall be obtained by using proper type of rubber ring joints.</p> <p>Mode of measurements and payment</p> <p>The description of each shall unless otherwise stated, be held to include where necessary, conveyance, and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size; testing fitting in position, straight, cutting and waste, return of packing, etc.</p> <p>The length shall be measured on running meter basis of finished work. The length shall be taken along the center line of the pipe and fittings, The pipes fixed to walls, ceiling, floors, etc. shall be measured and paid under this Description.</p> <p>All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated.</p> <p>i. Dimensions shall be measured to the nearest 0.01 meter.</p> <p>ii. Area shall be worked out to the nearest 0.01 sq. meter.</p> <p>All measurements of cuttings shall unless otherwise stated be held to include the consequent waste in</p>

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	<p>case of fitting unequal bore, the largest bore shall be measured for the test.</p> <p>Testing of pipelines fittings and joints include for providing all plant and appliances necessary for obtaining access to the work to be tested and carrying out the tests.</p> <p>The rate includes galvanized steel tubing with screwed socket joints, together with all fittings (such as bends, sockets, springs, elbows, tees, crosses, short pieces, clamps and plugs union etc.) and fixing complete with clamping wall-hooks wooden plug etc. and also cutting, screwing and waste and for making forged (or handmade) bends on piping as required. Connector shall be inserted, where required or directed. The rate also includes cutting through walls, floors, etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing. Where tubes are to be fixed to wall, ceiling and flooring, the rate shall not include painting of pipes providing sleeves and sand filling under floor for which separate payment shall be made.</p> <p>The unit rate shall be for a unit of one running meter.</p> <p>U-PVC PIPE</p> <p>Material</p> <p>The U-PVC soil and waste pipe of specified diameters shall conform to I.S. 13592/92. The specials and fittings required shall conform to I.S. 13592/92.</p> <p>Workmanship</p> <p>The U-PVC pipe of specified diameter shall be fixed as directed. U-PVC pipes shall be supported at 1.50m interval by using PVC pipe clip fixed on wooden patt for vertical line and at 50cm. interval for horizontal line.</p> <p>The guideline indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be followed during execution. All the specials and fittings like single or double 'Y' with door, coupler, reducer, single 'T' with door bend shall be fixed as per instruction of engineer in charge.</p> <p>Jointing of Pipe</p> <p>The pipe and socket shall be accurately cut, clean the outside of the pipe, spigot and inside of the sealing groove of the fitting. Apply the lubricant uniformly to the spigot end, sealing ring and pass the spigot end into the socket containing sealing ring until fully home. Mark the position of socket edge with the pencil or felt tip pen on the pipe then withdraw the pipe from the socket by approx. 10mm (towards thermal expansion gap). The wall / concrete slots should allow for a stress-free installation, pipes and fittings to be inserted into the slots without a cement base have to be applied first within coat of PVC solvent cement followed by sprinkling of dry sand. Allow it to dry. This process gives a sound base for cement fixation. This process is repeated while jointing PVC materials to C.I. / A.C.</p> <p>Testing of pipes</p> <p>Seal hermetically all opening below the top of the section to be tested. The water level shall then be raised to a height of not less than three meter above the highest point of the section being tested or as the Engineer in charge direct every joint shall be carefully examined for leakage. The connection between main pipe and branch pipe shall be made by using branches and bend with access door for cleaning.</p> <p>The rates includes U-PVC pipe together with all fitting (such as bends with or without door, single or double 'Y' with door, single 'T' with door, reducer, coupler, short pieces, W.C. and T.</p>

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	connector Pipe, pipeclips fixed on wooden patti etc. and fixing complete with clamping the pipeclips, wooden patti etc. connector shall be inserted where required or directed. The rate also includes cutting through walls, floors etc. and their making good the same. The rate shall be for a unit of one running meter.
LEACHATE COLLECTION TANK	
51	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed. A. 0 to 1.5 mt depth
	Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
52	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
53	CC work M25 for RCC Bottom slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) (A) Base Slab
	Workmanship: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M25 for RCC Partition, Parsdment, railing etc. using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) (B) Wall
	Workmanship: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M25 for RCC slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) (C) Top Slab
	Workmanship: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Mode of Measurement and Payment:

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	The relevant specifications of item description no. 06 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
54	Cement Concrete flooring (IPS) 50 mm thick in proportion of 1:2:4 with a floating coat of neat cement, finishing, curing etc. complete
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.</p>
55	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
56	20 mm thick sand faced cement plaster with water proofing material in cement mortar with proportion recommended by the manufacturer on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement :3-sand) and 8mm thick finishing coat of C.M.1:1(1-cement:1-sand) etc. complete
	<p>Workmanship: The relevant specifications of item description no. 17 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 17 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
57	RCC precast cover with supply, fitting, fixing with complete as per specification 10ton size 700/550/60-90mm.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Numbers.</p>
58	RCC precast frame with supply, fitting, fixing with complete as per specification 10ton size 700/550/60-90mm
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Numbers.</p>

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PIPE LAYING	
59	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	0.00 to 1.50 mt depth
	1.5 to 3.0 mt depth
	<p>Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
60	Providing bedding incl. ramming, watering, levelling, consolidating etc. Complete as per standard and instruction of engineer incharge as above with required quality Sand brought from outside including all lead
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter</p>
61	HDPE (PE-100) Pipes in standard length suitable for sewage, industrial Effluent & Rising mains
	HDPE- 6kg/cm ² - Dia 160 mm
	<p>Excavation: Therelevant specificationsofItemshallbefollowed.</p> <p>LayingpipesinTrenches: The pipe shall be laid over uniform relatively soft fine-grained soil found to be free of presenceof hardobjectssuchhaslargeflints,rockyprojections,largetreeroots,etc.The width of the trenches shall be minimum width required for working.</p> <p>The pipes laying underground shall not be less than one meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to deflection.Anydeviationrequiredshallbe obtainedby using proper typeofrubber ringjoints.</p> <p>The guidelines indicated by the manufacturer of regarding, handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.</p> <p>Jointingthepipes: The pipes and sockets shall be accurately cut. The endsof the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittingsshallthencaremustbetakentoavoidapplyingexcessivecement totheinsideof pipe sockets asanysurplus cement cannot bewipedoff after jointing.Emptysolventcementtins, brushes have, or paper impregnated with cement should not be buried in the trenches.They should be gathered, not left scattered about, as they can provide to be a hazard to animals, which may chew them.</p> <p>If manufacture recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.</p>

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	<p>Mode of measurement and payment: The relevant specifications of item shall be followed except that P.V.C pipes of specified dia shall be paid under this item.</p> <p>The unit rates shall be for a unit of one running meter</p> <p>HDPE Pipe 160mm dia (PE100) HDPE pipe shall be procured as per 4984-1987. The pipe shall be got approved by engineer in charge before use. Pipe shall be produced in length of 6.00 M. The pipe shall be free from any defect, crack, contraction etc. Laying & jointing of pipes shall be done as directed and as per requirement. Rate will be paid per M of pipe supplied and so fixed.</p>
62	Lowering, laying and jointing HDPE pipes and specials of following class and diameter (By butt fusion welding method) including cost of conveyance from stores to site of works at all level including cost of labour, giving satisfactory hydraulic testing etc. complete
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Running meter.</p>
63	Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm ² in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm internal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slab with 1:2:4 mix (1-cement :2-coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete. (i) Inside dimensions 500mm x 700mm and 450mm deep for pipe line with one or two inlets.
	<p>Material Water shall conform to M-1. Cement shall conform to M-3. Coarse sand shall conform to M-6. Brick shall conform to M-15. Stone aggregate shall conform to M-12. M.S. bar shall conform to M-18.</p> <p>Workmanship The chamber shall be of size 455mm. x 610mm. internal clear dimensions between the masonry wall faces. The height of 600mm. shall be measured from the top of the bed concrete to the top of the C.I. frame.</p> <p>The excavations shall be done true to dimensions and levels shown on the plans or as directed.</p> <p>Bed concrete shall be 15 cms. thick C.C. 1:5:10 (1 cement; 5 coarse sand; 10 grade stone aggregates). The projection of bed concrete beyond the masonry walls shall be 10 cms.</p> <p>The walls of chamber shall be constructed in brick work with C.M. 1:5 and 23 cms. thick as per relevant specifications of brick masonry works.</p>

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	<p>The walls and bed concrete of chamber shall be plastered inside with 15mm. thick cement plaster 1:3 (1 cement; 3 fine sand) finished smooth.</p> <p>The cover slab of RCC 1:2:4 (1 cement; 2 coarse sand; 4 graded stone aggregate 20 mm. nominal size) 15 cms thick reinforced with 10mm. bars at 15 cms. C/C both ways, surface and edges finished fair, full bearing equal to the width of the wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in RCC slab so that the top of the frame remains flush with the top of RCC slab.</p> <p>Mode of measurement and payment The earth work and excavation, providing and construction complete chamber, cost of connecting pipes with the chamber etc. included in the rate of the Description.</p> <p>The rate includes all labour and materials required for the satisfactory completion of this Description as described above.</p> <p>The rate shall be for a unit of one number.</p>
64	Extra over items 24.44 for every additional depth of 0.1 M. Of part thereof beyond 450 mm depth for Brick masonry chamber.(ii) for 500mm x 700mm size.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Numbers.</p>
65	Refilling of Pipeline trenches Refiling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within state limit.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Numbers.</p>
ELECTRIC WORK	
66	Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete
67	Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe

A. RTS BUILDING & RAMP	
Sr. No.	Description
	erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories. NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2. [II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete
68	Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories. [I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III. NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.
69	Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed (a) 20 mm (b) 25 mm
70	Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) With medium class Rigid PVC pipe and accessories (a) 2 wire 1.5 sq. mm (b) 2 wire 2.5 sq. mm
71	providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) with medium class Rigid PVC pipe and accessories (a) 2 wire 4 sq. mm
72	Supplying and erecting Flexible PVC insulated multi strand multi core 1.1 kv grade ISI marked copper wires of following size to be erected as directed. e) 1.50 Sq.mm 3 core round PVC sheathed (i) 2.50 Sq.mm 4 core round PVC sheathed
73	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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy> 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.)(A) Tube Light with integral driver(iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III
74	Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage

A. RTS BUILDING & RAMP	
Sr. No.	Description
	of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V, Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K, Uniformity ratio >0.45, Luminaire efficacy > 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer incharge may select any wattage capacity between the ranges shown.) (B) Flood Light (IP-65), Surge protection -4KV integral and ,Light must have 440VAC line supply with over-voltage protection. (v) above 120 to 160 watts CAT- III
75	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv) 12 way (B) three phase incoming and single phase horizontal type outgoing Per phase isolation type (PPI) (b) sheet steel double door (v) 16 way
76	Providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. conforming to IS 8828/1996 with ISI Mark Cat. III
77	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (B) 40 Amp. CAT-III
78	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on single phase 240 V, 50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component. for following Max. rating erected as directed. (ii) 40Amps. DP CAT-III
79	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V, 50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed. (ii) 40Amps. FP CAT-III
80	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
81	Supplying & erecting earth pit of minimum bore dia. 150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I. Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)-

A. RTS BUILDING & RAMP	
Sr. No.	Description
	Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphar content:- <2%(C) Back fill Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b)For Electrical installation up to 11 KV in normal soil. Length of Pipe : 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.
82	Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (A) 4 core 16 Sq. mm (B) 4 core 25 Sq. mm
83	Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (G) 3 1/2 core 150 Sq. mm (70 Sq. mm 1/2 core)
84	Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Copper conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe at road crossing or floor of following size of cable. (A) 3 core 2.5 Sq.m.m
85	Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable (A)50 mm outer dia (B)63mm outer dia
86	Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground.
87	Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables (D) 2 to 4 core 16 Sq. mm (E) 2 to 4 core 25 Sq. mm
88	Providing and, fixing heavy duty flange type brass double compression type cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables. (F) 3 & 1/2 core 150 Sq. mm
89	Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (C) 16/25 Sq.mm. (H) 150 Sq.mm.
90	Providing & erecting weather proof, dust & vermin proof, floor mounted front operated indoor type cubical panel board necessary IP-42 and above protection as per approval from engineer incharge made from 14 SWG thick CRC M.S. sheet for outer body & doors, 16 SWG thick CRC M.S.sheet for internal partitions with necessary accesories , supporting angles/ flats channel including cutting, bending, drilling, welding, riveting with internal partitions & cable alley as per requirements & instruction of engineer-in-charge with erection of supplied switch gears, BUSBARS, suitable size of inter connecting PVC copper wire / copper-aluminium strips, rubber grommets, rib,

A. RTS BUILDING & RAMP	
Sr. No.	Description
	<p>bakelite control fuses/MCB for measuring instruments, earth bus & earth bolts, foundation flange - bolts-base Plates, sufficient nos. of hinged doors, handles with locking arrangement and rubber gasket, heavy duty end terminal connection, danger notice board, necessary ventilation, earthing strip complete. The Panel shall be painted with epoxy powder coating.</p> <p>(The rates excludes the cost of switchgears, bus bars, inter connecting mains & Copper Aluminium strips, meters, Fuses etc. The dimension shall be measured excluding base beams) The panel shall be supplied with following approved manufacturers with following size floor level to above 400mm up panel stand.</p> <p>(B) The standard companies switch gear shall be used and only manufacturers at CPRI approved factory</p> <p>(i) with 350mm depth</p>
91	providng and erecting Approved make. energy meter 3 phase 4 wire unbalanced load 500 V.50A / 100A complete erected as directed with necessary earth wire. Cat III
92	<p>Supplying and erecting triple pole & neutral 440V/ 500V panel mounting Aluminium Busbars with four equal Nos. of bus having current density not more than 0.8 Amp. / sq.mm (Rated current / cross section area) duly wrapped with colour insulating tape for phase sequence of following current carrying capacity, erected with necessary bus bar supports /insulators, main cable socket to each busbar,erected in existing cubical panel with necessary connections.</p> <p>(A) Suitable for 100 Amp. Capacity</p> <p>(C) Suitable for 300 Amp. Capacity</p>
93	Providing and erecting Approved make Four pole moulded case circuit breaker having breaking capacity ICU of 35 KA. at 415 V. having Normal current rating 250A.with variable Thermal & magnetic release suitable to work on A.C.supply 50 c/s. with all internal connections, spreader tinned copper & complete erected in existing 16 G.M.S.housing ICS=100% of ICU only Cat III
94	Providing and erecting Approved make Four pole moulded case circuit breaker having breaking capacity ICU of 25 KA. at 415 V, having normal current rating up to 25 A to 100A. with Fixed thermal & magnetic release suitable to work on A.C. supply 50 c/s. with all internal connections, spreader tinned copper & complete erected in existing 16 G.M.S. housing. ICS=100% of ICU only Cat III
95	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat-III
96	Providing & erecting High Voltage Danger Notice Board sticker as per language suggested by engineer incharge of standard size-as per IS 2551
<p>The relevant specifications of above electric item description of respective components shall be followed.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit as per Standard Practice.</p>	
A. MATERIAL RECOVERY FACILITY	

Sr. No.	Description
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	A. 0 to 1.5mt depth
	B.1.5 to 3.0 mt. Depth
	Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 03 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 03 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
4	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) Columns
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) Beams
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
5	CC work M25 for RCC Bottom slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(C) Slab at PL
	Workmanship:

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	<p>The relevant specifications of item description no. 06 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 06 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
6	<p>Providing and Casting Controlled cement concrete M 250 proportions of ingredients as per mix design by weigh batching for pavement wearing coat 75 mm thick including floor finishing with a floating of neat cement complete. TREMIX VD SYSTEM including providing and fixing channels as per required levels and slope, leveling poured concrete between channels with Double Beam screed vibrators removing excess water using VD Pump finishing the surface with power trowel and power floater including cutting the groove of size 5mm x 10mm at required distance and providing and filling the same with bitumen as per practices etc. complete at all levels Excluding steel reinforcement.</p>
	<p>Workmanship: The relevant specifications of item description no. 23 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 23 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
7	<p>Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost</p>
	<p>Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
8	<p>Rubble Stone filling with 33% Murrum in specified thickness with watering, compaction etc. complete</p>
	<p>Workmanship: The relevant specifications of item description no. 05 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 05 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
9	<p>Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete</p>
	<p>Workmanship: The relevant specifications of item description no. 09 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
10	<p>Removal of Excavated Stuff within RMC limit as directed by Engineer-in-Charge</p>
	<p>Workmanship: The relevant specifications of item description no. 10 of Transfer Station shall be followed.</p>

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	<p>Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
11	Brick Masonry work in Cement:Mortar 1:6(1) Wall
	<p>Workmanship: The relevant specifications of item description no. 14 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 14 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
12	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	<p>Workmanship: The relevant specifications of item description no. 17 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 17 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
13	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
14	Distempering with dry distemper of approved brand and manufacture (two coats) and of required shade on wall surfaces of given an even shade, over and including a priming coat of whiting after thoroughly brooming the surface free from mortar dropping and other foreign matter.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Numbers.</p>
15	<p>Design, Fabrication and Painting (as per IS code) and supply of Built-Up Primary Members, all hot rolled members including brace rods, struts, flange braces, wall support members, suspenders, base plates, and cage ladders as per relevant specifications. This includes the necessary hardware such as connection bolts (8.8 grade), and miscellaneous components like cage ladders, anchor bolts, bracing, cleats, and tie beams. The scope also covers the design, fabrication, and supply of secondary members made of pre-galvanized cold-formed sections such as Z or C purlins, girts, eave struts, and flange bracing.</p> <p>The work includes providing and fixing color-coated galvalume roofing sheets (PPGL) with a thickness of 0.50mm TCT and a strength of 550 MPA, complete with flashing, screws, sealant, and roof sheeting accessories such as filler blocks, end closures, inseal tape, and silicon sealant. Similar</p>

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	provisions apply for color-coated galvalume wall cladding (PPGL) with the same specifications. Additionally, accessories such as ridge profiles, flashing, eave gutters, downspout pipes, etc., are to be supplied and installed.
	The supply and installation of 2mm thick polycarbonate sheets with high impact resistance, 24-diameter turbovents with a 2mm thick polycarbonate base, and the provision of a cage ladder for roof access.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter</p>
ELECTRICAL WORK	
16	<p>Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete</p>
17	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.</p> <p>[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete</p>
18	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
19	<p>Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed</p> <p>(a) 20 mm</p> <p>(b) 25 mm</p>
20	Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	<p>conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) With medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 1.5 sq. mm</p> <p>(b) 2 wire 2.5 sq. mm</p>
21	<p>Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) with medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 4 sq. mm</p>
22	<p>Supplying and erecting Flexible PVC insulated multi strand multi core 1.1 kv grade ISI marked copper wires of following size to be erected as directed.</p> <p>e) 1.50 Sq.mm 3 core round PVC sheathed</p>
23	<p>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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy > 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.)(A) Tube Light with integral driver(iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III</p>
24	<p>Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V,Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K,Uniformity ratio >0.45, Luminaire efficacy > 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.)</p> <p>(B) Flood Light (IP-65), Surge protection -4KV integral and ,Light must have 440VAC line supply with over-voltage protection.</p> <p>(v) above 120 to 160 watts CAT- III</p>
25	<p>Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for</p> <p>(A) single phase incoming and horizontal single phase outgoing</p> <p>(b) sheet steel double door (IP-43)</p> <p>(iv)12 way</p> <p>(B) three phase incoming and single phase horizontal type outgoing Per phase isolation type (PPI)</p> <p>(b) sheet steel double door</p> <p>(v) 16 way</p>
26	<p>Providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark</p>

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	Cat. III
27	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (B) 40 Amp. CAT-III
28	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on single phase 240 V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component. for following Max. rating erected as directed. (ii) 40Amps. DP CAT-III
29	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed. (ii) 40Amps. FP CAT-III
30	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
31	<p>Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- <2%(C) Back fill</p> <p>Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b)For Electrical installation up to 11 KV in normal soil. Length of Pipe : 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.</p>
32	<p>Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables</p> <p>(A) 4 core 16 Sq. mm</p> <p>(B) 4 core 25 Sq. mm</p>
33	<p>Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Copper conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe at road crossing or floor of following size of cable.</p> <p>(A) 3 core 2.5 Sq.m.m</p>
34	<p>Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable</p> <p>(A)50 mm outer dia</p>
35	Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground.
36	Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	armoured cable complete with out going tails, insulating tape etc for following size of cables (D) 2 to 4 core 16 Sq. mm (E) 2 to 4 core 25 Sq. mm
37	Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (C) 16/25 Sq.mm.
38	Providing & erecting weather proof, dust & vermin proof, floor mounted front operated indoor type cubical panel board necessary IP-42 and above protection as per approval from engineer incharge made from 14 SWG thick CRC M.S. sheet for outer body & doors, 16 SWG thick CRC M.S.sheet for internal partitions with necessary accesories , supporting angles/ flats channel including cutting, bending, drilling, welding, riveting with internal partitions & cable alley as per requirements & instruction of engineer-in-charge with erection of supplied switch gears, BUSBARS, suitable size of inter connecting PVC copper wire / copper-aluminium strips, rubber grommets, rib, bakelite control fuses/MCB for measuring instruments, earth bus & earth bolts, foundation flange - bolts-base Plates, sufficient nos. of hinged doors, handles with locking arrangement and rubber gasket,heavy duty end terminal connection,danger notice board,necessary ventilation,earthing strip complete. The Panel shall be painted with epoxy powder coating. (The rates excludes the cost of switchgears, bus bars, inter connecting mains & Copper Aluminium strips, meters, Fuses etc. The dimension shall be measured excluding base beams) The panel shall be supplied with following approved manufacturers with following size floor level to above 400mm up panel stand. (B) The standard companies switch gear shall be used and only manufacturers at CPRI approved factory (i) with 350mm depth
39	providng and erecting Approved make. energy meter 3 phase 4 wire unbalanced load 500 V.50A / 100A complete erected as directed with necessary earth wire. Cat III
40	Supplying and erecting triple pole & neutral 440V/ 500V panel mounting Aluminium Busbars with four equal Nos. of bus having current density not more than 0.8 Amp. / sq.mm (Rated current / cross section area) duly wrapped with colour insulating tape for phase sequence of following current carrying capacity, erected with necessary bus bar supports /insulators, main cable socket to each busbar,erected in existing cubical panel with necessary connections. (B) Suitable for 200 Amp. Capacity
41	Providing and erecting Approved make Four pole moulded case circuit breaker having breaking capacity ICU of 35 KA. at 415 V. having Normal current rating 200A.with variable Thermal & magnetic release suitable to work on A.C.supply 50 c/s. with all internal connections, spreader tinned copper & complete erected in existing 16 G.M.S.housing ICS=100% of ICU only Cat III
42	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat-III
43	Providing & erecting High Voltage Danger Notice Board sticker as per language suggested by engineer incharge of standard size-as per IS 2551
The relevant specifications of above electric item description of respective components shall be followed.	
Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-	

A. MATERIAL RECOVERY FACILITY	
Sr. No.	Description
	Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit as per Standard Practice.

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	(A) Up to 1.5 Mt. Depth
	(B) 1.5 to 3.0 Mt. Depth
	Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
2	Rubble Stone filling with 33% Murrum in specified thickness with watering, compaction etc. complete
	Workmanship: The relevant specifications of item description no. 05 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 05 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
3	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
4	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 03 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 03 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
5	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMNS
	Workmanship:

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>(B) BEAMS :</p>
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
6	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost.
	<p>Workmanship: The relevant specifications of item description no. 13 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 13 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
7	Brick Masonry work in Cement:Mortar 1:6
	<p>Workmanship: The relevant specifications of item description no. 14 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 14 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
8	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	<p>Workmanship: The relevant specifications of item description no. 09 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
9	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
10	Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials. (A) For wall</p>
	<p>Materials Thewatershallconform toM-1.CementwaterproofingshallconformtoI.S.5410-1969.</p> <p>Scaffolding Whereverscaffoldingisnecessaryitshallbeerectedinsuchawaythatastafaraspossibleon part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Whereladdersareused,piecesofoldgunnybagshallbeusedat topandbottom toprevent scratches to the floors and walls. For white washing of coatings proper stage scaffolding shall be erected where necessary.</p> <p>Preparationofsurface The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied. Thesurfacespoiledbysmokesootshallbescrapedwithsteelwirebrushesorsteelscrapers orshallberubbedwithover-burntsurkhiorbrickbats.Thesurfaceshallbethenbroomedto remove all dust, dirt and shall be washed with clean water. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes. All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portionshallbewettedandallowedtodry.They shall thenbegivenonecoat of whitewash. Allunnecessarynailsshallberemoved;theholescrackspatchesetc.shallbemadegood with materials similar in composition to the surface to be prepared. The colour washshallbesubmittedwithwaterproofingcementpaint.Thesurfaceshallbethoroughly wetted with clean water before cement water proofing paint is applied.</p> <p>Preparationofpaint Portland cement shall be prepared by adding paint power to water and stirring to obtain a thickpaste,whichshallthenbedilutedtoabrushableconsistency.Generallyequalvolumes topaintpowder andwatermakeasatisfactorypaint.Inallcases,themanufacturer'sinstructions shallbefollowed.Thepaintshallbemixedinsuchquantitiesascanusedupwithinanhour of mixing as otherwise the mixture will set and thickness, affecting flowing and finish. The libs of cement paint drums shall be kept tightly when not in use.</p> <p>Applicationofpaint Nopaintingshallbedonewhenthepaintislikelytobeexposedtoatemperatureofbelow 70 C with 48 hours after application.</p> <p>Whenweatherconditionsaresuchastocausdamagetheworkshallbecarriedout"intheshadow"asfaraspossible.This helpstheproper hardeningofthepaintfilmbykeepingthe surface moist for a longer peri</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.</p> <p>For undecorated surfaces, after the primer coat is dried for at least 48 hours the surfaces shall be lightly sanded and papered to make them smooth for receiving the distemper, taking care not to rub cut 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 to gather shall constitute one coat. The subsequent coats shall be applied after time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surfaces shall be even and uniform in shade, without patches, brush marks; distemper drops etc.</p> <p>The cement paint shall be applied with a brush with relatively short stiff hog or fiber bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamp shall be well brushed out.</p> <p>Waterproof cement paint shall not be applied on surface already treated with white wash colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood or metal surfaces</p> <p>Curing</p> <p>Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by sprinkling of water say about 12 hours after the application.</p> <p>Preparation of surface.</p> <p>The surfaces shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied.</p> <p>The surfaces spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.</p> <p>Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.</p> <p>All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portions shall be wetted and allowed to dry. They shall then be given one coat of white wash.</p> <p>All unnecessary nails shall be removed; the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared.</p> <p>Mode of measurements & payments</p> <p>All the work shall be measured in the decimal system as under:</p> <p>a. Dimensions shall be measured to the nearest 0.01 M.</p> <p>b. Area in individual Descriptions shall be worked out to the nearest 0.01 Sq. M. All the work shall be measured in Sq. mt. Deductions for jambs, soffits, sills, etc. for opening not exceeding 0.5 sq. mt. each in area of ends of joints, posts, beams, girders step etc. not exceeding 0.5 sq. mt. each in area and for opening exceeding 0.3 sq. mt. and not exceeding 3.0 sq. mt. each in area deduction and additions shall be made as under.</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>No deduction shall be made for ends of joints beams, post etc. and opening not exceeding 0.5 sq.mt. each. No addition shall be made on reveals, jambs, soffits sill set of these opening nor for finish around ends of joints beams posts etc.</p> <p>Deduction for opening exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings</p> <p>a. When both the faces or walls are provided with finish, deduction shall be made for one face only.</p> <p>b. When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width or reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.</p> <p>c. When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than one the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.</p> <p>In case of area of opening exceeding 3 sq.mt. each deduction shall be made for opening but jambs, soffits, shall be measured.</p> <p>No deduction shall be made for attachments such as casing, pipe, conducts, electric wiring and the like.</p> <p>Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultants shall be included with the general areas.</p> <p>a. Corrugated steel sheets 14%</p> <p>b. Corrugated A.C. Sheet 20%</p> <p>c. Semi corrugated A.C. Sheets 10%</p> <p>d. Nainital pattern roof (Plain sheeting with rolls) 10%</p> <p>e. Nainital pattern roof (with corrugated sheet) 25%</p> <p>Cornices and other wall features, when they are not picked out in a different finish / colour shall be girthed and included in the general area.</p> <p>The rates shall include the cost of all materials labour, scaffolding, protective measures etc. involved in all the operations described above.</p> <p>The rates shall be for a unit of one Square meter.</p>
11	<p>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 conneted to common rafters and the like</p>
	<p>Workmanship: The relevant specifications of item description no. 23 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 23 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
12	<p>Applying priming coat over new steel and other metel surface after and including preparing the surface by throughly cleaning, oil, grease, dirt and other foreign matter and scoured with brushes fine steel wood, scrapers and sand paper with ready mixed priming paint brushing red lead.</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.</p>
13	Painting two coats (excluding priming coat) on new steel and other metal surface with enamel paint, brushing, interior to give an even shade including cleaning the surface an even shade including clean the surface of all dirt, dust and other foreign matter.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.</p>
14	Supply and install/commission fully automatic on finished foundation 01 No. UNIQUE, EVERY, EAGLE, APPLE, Matrix or equivalent make pit-less type fully Electronic weighbridge platform size 9 m x 3 meters for 60 MT capacity including applying oil paint, etc complete as per specification and instruction of engineer in charge.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.</p>
OFFICE BUILDING UPTO PLINTH LEVEL	
15	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	(A) Up to 1.5 Mt. Depth
	(B) 1.5 to 3.0 Mt. Depth
	<p>Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
16	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	<p>Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
17	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc.

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	complete (without reinforcement)
	<p>Workmanship: The relevant specifications of item description no. 03 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 03 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
18	CC work M-25 for Column using aggregate of size 10-20 mm,centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMNS
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS :
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M-25 for Coping using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Coping
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
19	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
20	Brick Masonry work in Cement:Mortar 1:6
	<p>Workmanship: The relevant specifications of item description no. 14 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 14 of Transfer Station shall be followed. Rate</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	shall be for a unit of one cubic meter.
21	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	<p>Workmanship: The relevant specifications of item description no. 09 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
22	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete.
	<p>Workmanship: The relevant specifications of item description no. 11 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
23	Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.
	<p>Workmanship: The relevant specifications of item description no. 10 of Weigh Bridge office shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Weigh Bridge office shall be followed. Rate shall be for a unit of one square meter.</p>
OFFICE BUILDING ABOVE PLINTH LEVEL	
24	CC work M-25 for Column using aggregate of size 10-20 mm,centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMN
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M-25 for RCC Bottom Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	(C) SLAB AT PL
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for RCC Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(D) TOP SLAB
	Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Lintel using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(E) LINTEL
	Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Chajja using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(F) CHHAJJA
	Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
25	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.
26	Brick Masonry work in Cement:Mortar 1:6
	Workmanship: The relevant specifications of item description no. 14 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 14 of Transfer Station shall be followed. Rate

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	shall be for a unit of one cubic meter.
27	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	(A) For wall
	(B) For ceiling and soffits of stair & Chhja
	(c) inside cupboard in CM 1:3 (1 cement : 3 sand)
	Workmanship: The relevant specifications of item description no. 17 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 17 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.
28	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.
29	Providing throating or plaster drip and moulding to R.C.C. Chhajja.
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of running meter.
30	Decorative Groove Work in Cement Plaster
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of running meter.
31	Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-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. (A) 25mm thick
	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. Polished Kota stone M-49. Workmanship 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

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>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 Description but not less than 20 mm. at any place of the slab.</p> <p>Bedding for the kotah stone slabs shall be cement mortar 1:6 (1 cement: 6 coarse sand) or L.M. 1:1.5. of average thickness 20 mm. as given in the description of the Description. Sub grade shall be cleaned, wetted and mopped. Mortar of the specified mix and thickness shall be 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 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 wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.</p> <p>The floor shall be kept wet for a minimum period of 7 days. So that bedding and joints set properly.</p> <p>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.</p> <p>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 polish machine fitted with bobs shall be run over it.</p> <p>The holes required for Nahni traps, pipes any other fittings shall be made without any extra cost.</p> <p>Mode of measurements & payment: 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 of decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for any opening in floor of areas up to 0.1 sq. mt.</p> <p>The rate shall be for a unit of one Square meter.</p>
32	Providing & Fixing Marble stone 20 mm thick 1000 mm X 450 mm size including fixing in cement mortar 1:3 (1 cement : 3 sand)
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of running meter.</p>
33	Providing and fixing 35 mm thick shutters for Doors, windows and clearstory windows including

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	blackenamelled M.S. butt hinges with necessary screws. (A) Indian teak wood. (i) Fully Panelled.
	<p>Materials:</p> <p>Wood for shutter shall conform to M-29.</p> <p>Workmanship:</p> <p>The item covers the requirement of preparation of shutters of doors, windows, clerestory windows their supply and fixing.</p> <p>Shutters</p> <ol style="list-style-type: none"> 1 Panelled 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 All members of the shutters shall be straight wrap or bow and shall have smooth, well planed faces at right angles to each other. 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. <p>Timbering panelling:</p> <ol style="list-style-type: none"> 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 shutter while fixing the panels in it. 2 The faces of the panel as well as various pieces of the panel shall be closely fitted to the size of the grooves. 3 Finishing of the corners of raised panel edges shall be done as shown in drawings or as directed. <p>Fixtures & Fastening:</p> <ol style="list-style-type: none"> 1 The rate shall include blackenamelled M.S. butt hinges with necessary screws and including necessary fixing. <p>Mode of measurements & payment:</p> <p>The rate for shutter includes cost of providing block and clear for keeping the shutter in open position as directed. The dimensions of the shutter shall be measured clear size of the shutter in close position between the grooves of the frame.</p> <p>The rate shall be for a unit of one sq.metre</p>
34	Constructing a platform 60 cm width and 70 cm high resting on B.B.Masonry walls 23 cm.thick in C.M.(1:6) with (ii) Fixing black kadappa stone 30mm thick laid on precast R.C.C. (1:2:4) slab with plastering on exposed faces of wall in C.M. (1:4) etc complete. (i) cooking platform
	<p>Workmanship:</p> <p>The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of running meter.
35	Providing and fixing 35 mm thick shutters for Doors, windows and clearstory windows including blackenamelled M.S. butt hinges with necessary screws. (A) Indian teak wood. (i) Fully Panelled.
	Workmanship: The relevant specifications of item description no. 33 of Weigh Bridge Office shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 33 of Weigh Bridge Office shall be followed. Rate shall be for a unit of one cubic meter.
36	aluminium section window work (with 3 track mosquito net) (jindal)(with necessary all fittings)
	Workmanship: Therelevant specifications of M 31 shall be followedPreparing the surface for the fixing of aluminum frame. Providing and fixing aluminum door frame as per the details of instruction given by the site in charge with proper alignment and precautions. Providing and fixing sheet glass with acid frosting as per architects detail and as per the details or instruction give by the Engineer in charge with necessary precautions. Aluminum doors, frame, glass etc. shall be cleaned after the completion of work as per instruction of Engineer in charge. Mode of Measurement and Payment: Rates include all materials, labour and tools including providing and fixing aluminum sheet, nails etc. complete. The measurement shall be taken for the finished product. RateshallbeforaunitofoneSquaremeter
37	Providing and fixing glazed louvered glass windows and ventilators with teak wood frame 10cm. x 7cm. size including 3 coats of oil painting to wood work etc.complete.
	Materials IndianTeakwoodshallconformtoM-29.GlassshallconformtoM-38. Workmanship: TherelevantspecifiedItemaboveshallbefollowedforframeworkexceptthattheframeworks of10x7cms.Sizeofrequiredsizeventilatorsshallbeprovidedwithglazedglasslouvers.The glasslouversshall beprovidedas directed.Inthegrooveof1.25 cms.depthmadeinframes thethickness of glass shall be5mm.andglass shall be glass of best quality The ventilation blades shall slope down towards the outside at an angle 45 0 Modeofmeasurements&payment: Theareaofopeningwithin theframe inwhichlouversarefixedshall be measuredinsq.metre.Therateincludespainting3coatsofwoodworkwith ready mix paint. Therateshallbeforaunitofonesquaremeter.
38	Distemping with dry distemper of approved brand and manufacture (two coats) and of required shade on wall surfaces of given an even shade, over and including a priming coat of whitening after thoroughly brooming the surface free from mortar dropping and other foreign matter
	(A) For wall

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	(B) For Ceilings and soffits of stairs
	<p>Materials The dry distemper and primers shall be approved brand and manufacture. The dry distemper shall be of required colour and shade and the same shall conform to I.S. 427-1965. Whiting shall conform to I.S. 63-1964.</p> <p>Workmanship</p> <p>Scaffolding Wherever scaffolding is required it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bag shall be used at top and bottom to prevent scratches to the floors and walls. For white washing of coatings proper stages scaffolding shall be erected where necessary.</p> <p>Preparation of surface The undecorated surface to be distempered shall be thoroughly brushed free from dust dirt grease, mortar, dropping and other foreign matter and sand papered smooth. New plaster surfaces shall be allowed to dry at least 2 months, before application of distemper.</p> <p>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 grade sand paper and made smooth. The surface affected by mould, moss, fungi, algae, 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 & then preparing the same after it is dry.</p> <p>Priming coat: A priming coat of whiting shall be applied as per Description No. 38 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. 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 strokes 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 dry for at least 48 hours before oil bound distemper or paint is applied. Distemper is not recommended to be applied within six months of the completion of wall plaster.</p> <p>Proportion of Distemper: The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer only. Sufficient quality of distemper required for one day's work shall be prepared.</p> <p>Application of Distemper coat For undecorated surfaces, after the primer coat is dried for at least 48 hours the surface shall be lightly sand papered to make them smooth for receiving the distemper, taking care not to rub cut 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</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>vertical strokes which to gather shall constitute one coat. The subsequent coats shall be applied after time interval of at least 24 hours between consecutive coats to permit proper drying of the preceding coat. The finished surface shall be even and uniform without patches, brush marks; distemper drop etc. Sufficient quality or distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room which cannot be completed on the same day.</p> <p>15 cm. double distemper brush shall be used. After the day work, brushes shall be thoroughly washed in hot water with a soap solution and hang down to dry. Old brushes which are dirt and caked with distemper shall not be used on the work.</p> <p>Protective measure: The surface of doors, windows, floors, articles of furniture etc. and such other parts of the building as are not to be distempered shall be protected from being splashed upon. Such surfaces shall be cleaned of distemper splashes if any.</p> <p>Mode of measurements & payments Priming coat of distemper, Primer scraping of surface spoiled by smoke soot, removal of oil and grease spots, treatment for infection of effloresces, mould, moss, fungi, algae, algae and lichen and patches repair to plaster shall be included in this Description for which nothing extra shall be paid. All the work shall be measured net in the decimal as in places subject to the following limits unless otherwise stated hereinafter.</p> <p>Dimensions shall be measured to the nearest 0.01 M.</p> <p>a. Area in individual Description shall be worked out to the nearest 0.01 Sq.m</p> <p>All the work shall be measured in Sq.mt. Deductions for jambs, soffits, sills, etc. for opening not exceeding 0.5 sq.mt. each in area for ends of joints, posts, beams, girders steps etc. not exceeding 0.5 sq.mt. each in area and for opening exceeding 0.3 sq.mt. and not exceeding 3.0 sq.mt. each in area deduction and additions shall be made as under.</p> <p>Deduction for opening exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no additions shall be made for reveals, jambs, soffits etc. of these openings</p> <p>b. When both the faces and walls are provided with finish, deductions shall be made for one face only.</p> <p>c. When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width or reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.</p> <p>d. When only one face of wall is treated and the other face is not treated, full deductions shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than one the untreated side neither deductions nor additions shall be made for reveals, jambs, soffits, sills etc.</p> <p>In case of area of opening exceeding 3 sq.mt each opening of deductions shall be made for openings, but jambs, sills and soffits shall be measured.</p> <p>No deduction shall be made for attachments such as casing, conduits, pipes electric wiring and the like. Description includes removing nails, making good holes, cracks, patches with materials, similar in composition to the distemper.</p> <p>The rate includes cost of all materials, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handling, unloading</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	storing etc. The rates shall be for a unit of one square meter.
39	Finishing wall with water proofing cement paint of on wall surfaces (Three coats) to give an approved brand and manufacture and of required shape even after shade thoroughly brushing the surface to remove all dirt and remains of loose powdered materials.
	<p>Workmanship: The relevant specifications of item description no. 10 of Weigh Bridge office shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Weigh Bridge office shall be followed. Rate shall be for a unit of one square meter.</p>
40	Water Proofing Treatment on Terrace and Wall sides with smooth finishing including material-labour etc. complete
	<p>Workmanship: The relevant specifications of item description no. 20 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 20 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
41	Providing and fixing to wall ceiling and floor 10.0 Kg. F/Cm ² working pressure polythene pipes of the following outside Dia. Low density, complete with special flange compression type fittings, wall clip set etc. including making good the wall ceiling and floor.(F) 75mm
	<p>Workmanship: The relevant specifications of item description no. 50 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 50 of Transfer Station shall be followed. Rate shall be for a unit of one running meter.</p>
42	Providing and fixing to wall, ceiling and floor galvanised Mild steel tubes (Medium grade) of the following nominal bore, tube fitting and clamps including making good the wall ceiling and floor.(A) 15mm
	<p>Workmanship: The relevant specifications of item description no. 50 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 50 of Transfer Station shall be followed. Rate shall be for a unit of one running meter.</p>
43	Providing erecting and fixing double coated ISI water tank of required capacity each with all necessary fittings and connection etc. complete on terrace.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of each numbers.</p>

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
44	Grill work for doors - windows etc. as per design on site with fitting & fixing.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of running meter.</p>
45	White Poreselin Urinal with required plastic waste pipe fitting and fixing
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of running meter.</p>
ELECTRICAL WORK	
46	<p>Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete Cat III</p>
47	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
48	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
49	Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
	<p>pipe erected with 6A Modular type switch and hum free EME step type electronic fan regulator mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D.Connector as directed.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat-III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
50	providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat III
51	<p>Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed</p> <p>(a) 20 mm</p> <p>(b) 25 mm</p>
52	<p>Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) With medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 1.5 sq. mm</p> <p>(b) 2 wire 2.5 sq. mm</p>
53	<p>providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) with medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 4 sq. mm</p>
54	Providing & erecting Approved make Ceiling Fan with double ball bearing ISI mark with Condenser 230 volt A.C.50 Hz 1200 mm sweep complete having 3 blades aluminium body and blade sets having ornamental design shanks , canopy erected with earthing. [Make shall be approved by Engineer in Charge]
55	<p>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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy> 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.)</p> <p>(A) Tube Light with integral driver</p> <p>(iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III</p>
56	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed.
	(ii) 40Amps. FP CAT-III

A. WEIGH BRIDGE WITH OFFICE BUILDING	
Sr. No.	Description
57	Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity (ii) 6 to 32Amps. Cat III
58	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat III
59	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv)12 way
60	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
61	Providing and erecting required size HOT deep Galvanised iron strip for earthing of H.T. , OCB/ ACB/ Transformer LT panel board, Motors etc. using proper clamp.
62	Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- <2%(C) Back fill Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b)For Electrical installation up to 11 KV in normal soil. Length of Pipe : 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.
The relevant specifications of above electric item description of respective components shall be followed.	
Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.	
Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit as per Standard Practice.	

A. TRUCK WASH& MAINTENANCE AREA	
Sr. No.	Description
WORK UP TO PLINTH LEVEL	
1	Excavation of Foundation in Hard Murrum from 0.0 mtr. to 1.50 mtr depth including dewatering with lifting and laying in RMC limit as instructed

A. TRUCK WASH& MAINTENANCE AREA	
Sr. No.	Description
	A. 0 to 1.5mt depth
	B.1.5 to 3.0 mt. Depth
	Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Workmanship: The relevant specifications of item description no. 03 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 03 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
4	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) Columns
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) Beams
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.
	Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M25 for RCC Bottom slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(C) Slab at PL
	Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.

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	Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
5	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.
6	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	Workmanship: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
7	Removal of Excavated Stuff within RMC limit as directed by Engineer-in-Charge
	Workmanship: The relevant specifications of item description no. 10 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
8	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	Workmanship: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
WORK ABOVE PLINTH LEVEL	
9	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Column
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Beam/ Lintel /Chajja etc

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	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p> <p>CC work M-25 for Stair Caseusing aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>Slab/ Staircase/lending etc</p>
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
10	Brick Masonry work in Cement:Mortar 1:6
	<p>Workmanship: The relevant specifications of item description no. 14 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 14 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
11	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 13 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 13 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
12	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	(A) For wall
	(B) For ceiling and soffits of stair
	<p>Workmanship: The relevant specifications of item description no. 17 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 17 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
13	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringingout Plaster work on RCC, required tipping work should be carried out as instructed)
	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall</p>

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	be for a unit of one square meter.
14	Providing and laying Precast Lightweight concrete hollow core wall with hollow core concrete unit of approved make & size of 92 mm thick, 600 mm wide and 2400 mm / 2600 mm / 2850 mm / 3000 mm / 3300 mm in length made from of controlled cement concrete M20 having cube compressive strength not less than 20 MPa jointing with high strength & tensile adhesion non-shrink cementitious joint compound / P.U. Foam. (Plaster not required)
	<p>Workmanship: The relevant specifications of item description no. 16 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 16 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
15	Distempering with dry distemper of approved brand and manufacture (two coats) and of required shade on wall surfaces of given an even shade, over and including a priming coat of whitening after thoroughly brooming the surface free from mortar dropping and other foreign matter.
	(A) For wall
	(B) For Ceilings and soffits of stairs
	<p>Workmanship: The relevant specifications of item description no. 38 of Weigh Bridge with office building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 038 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
16	Providing and fixing to wall ceiling and floor 10.0 Kg. F/Cm2 working pressure poluthene pipes of the following outside Dia. Low density, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor.(G)110 mm
	<p>Workmanship: The relevant specifications of item description no. 50 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 50 of Transfer Station shall be followed. Rate shall be for a unit of one running meter.</p>
17	Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm2 in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm intenal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slab with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(i) Inside dimensions 455mmx 610mm and 450mm deep for single pipe line.
	<p>Workmanship: The relevant specifications of item description no. 063 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 63 of Transfer Station shall be followed. Rate shall be for a unit of one each number.</p>
18	Providing laying (to level or slopes) and jointing reinforced concrete Light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints

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	including testing of joints complete.(B) 150mm
	<p>Workmanship:</p> <p>Materials:</p> <p>The reinforced concrete non pressure pipes of specified diameter shall be confirmed to relevant is: 458. Material shall be of the 1st quality of the approved make or equivalent as approved by the Consultants.</p> <p>Carting and Handling</p> <p>The pipes and other materials required shall be transported from the factory to the work sites at places along the alignment of pipeline as directed by the engineer-in-charge. The contractor shall be responsible for the safety of pipes and fittings/specials in transit, loading / unloading. Every care shall be exercised in handling pipes to avoid damage. While unloading, the pipes and fittings/specials shall not be thrown down from the truck o the hard surfaces. They shall be unloaded on timber skids with steadying ropes or by any approve means. Padding shall be provided between coated pies, fittings/specials and timber skids to avoid damage to the coating. Suitable gaps between pipes should be left at intervals in order to permit access from one side to the other. In case of spigot socket pipes, care should be taken regarding orientation of pipes while unloading. As far as possible pipes shall be unloaded on one side of the trench only. The pipes shall be checked for any visible damage while unloading and shall be sorted out. Any pipe which shows sufficient damage to preclude it from being used shall be discarded. Dragging of pipes and fittings/specials along concrete and similar pavement with hard surfaces shall be prohibited.</p> <p>New pipes can be brought to site only after the mandatory tests (i.e cube tests, three edge bearing tests, hydrostatic tests, dimension test water absorption test etc.) are completed.</p> <p>Storage:</p> <p>Each stack of pipe shall contain only pipes of same class and size, with consignment or batch number marked on it with particulars of suppliers wherever possible. Storage shall be done on firm level and clean ground and wedges shall be provided at the bottom layer to keep the stack stable. The stack shall be in pyramid shape or the pipes laid lengthwise and crosswise in alternate layers. The pyramid stack shall be made for smaller diameter pipes for conserving space in storing them. The height of the stock shall not exceed 1.5 m.</p> <p>Laying:</p> <p>The pipes shall be lowered into the trenches carefully, Mechanical appliances may be used. Where necessary pipe shall be laid in straight lines or with easy curves and true to line and gradient as specified. The laying of pipe shall precede upgrade of a slope. In the pipe with loose collar, the collars shall be slipped on before the next pipe is laid.</p> <p>In case where the foundation conditions are unusual such as the proximity of trees or holes, under existing or proposed around in 150 mm thick cement concrete 1:5:10 (1 cement: 5 fine sand: 10 graded stone aggregate 40mmnominalsize) or compacted sand or gravel.</p> <p>In case where the natural foundation is inadequate the pipe shall be laid either in concrete cradle, supported on proper foundation or on any other suitably designed structure. If concrete bedding issued, the depth of concrete below bottom of the pipe shall be at least 1/4th of the internal diameter of the pipe subject to a minimum of 100 mm and maximum 300 mm. The concrete shall be extended up to the sides of the pipe at least a distance of 1/4th of the out sided diameter for pipes 300mm and over in diameter.</p>

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	<p>The pipes shall be laid in the concrete bedding before the concrete has set. Pipes laid in trenches in earth shall be bedded evenly and firmly as far as up to the haunches of the pipe as to safely transit the load expected from the backfill through the pipe to the end. This shall be done either by excavating the bottom of the trenches to fit the curve of the pipe or by compacting the earth under round curve of the pipe to form an even bed. Necessary provision shall be made for joints wherever required.</p> <p>Jointing: The joints shall be done by slipping the collar over and clear of the end of the pipe. The recess of the end of the pipe shall be filled with jute threading dipped in hot bitumen. The new pipe shall then be brought forward until bitumen ring in recess of first pipe is set into the recess of the second pipe. This process shall be repeated for two or three pipes which shall then be jacked up so as to thoroughly compress the bitumen. The quantity of jute and bitumen shall be just enough to fill the recess when pressed hard by jacking care being taken that no off set of the jute braiding shall be visible either enough to fill the recess when pressed hard by jacking care being taken that no offset of the jute braiding shall be visible either outside or inside of pipe. The collar shall then be set up over the joints covering equally both the pipe and leaving an even caulking space all around cement and sand mortar 1:1 ½ shall then be well punched or pressed home with a caulking tool within the caulking space. Care shall be taken that the underside of the joints is properly filled with mortar.</p> <p>Curing: Every joint shall be kept wet for about 10 days for maturing, the section of the pipe line laid and jointed shall be covered immediately to protect from weather effects, Minimum bore of 100 mm is considered adequate.</p> <p>The joints shall be left exposed for observation.</p> <p>Testing of joint: The pipeline shall be tested as directed. If any leakage is visible, the defective part of the work shall be made good at no extra cost. A slight amount of sweating which is uniform may be overlooked, but excessive scattng forma particular pipe or joints shall be watched for and taken as indicating a defect to be made good.</p> <p>Mode of measurements and payment: The rate shall be for a unit of one running meter (Including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (As per IS-458 latest version)</p> <p>Pounding or bottoming of the net without any allowance for cutting and waste. The length of bends, junctions and other connections shall be included in the total length of the drainpipes. Nothing extra shall be paid for the same.</p> <p>The rate shall be for a unit of one running meter</p>
19	Cast iron manhole with fixing
	<p>Materials C.I. manhole cover of 0.610 x 0.455 cms size shall be of best quality. The weight of C.I. cover and frame shall not be less than 35 kg. The C.I. manhole cover shall be of light duty and conform</p>

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	<p>relevant IS.</p> <p>Workmanship C.I. manhole cover shall be fixed as per relevant specifications except that the C.I.cover size & shall be fixed as and where directed.</p> <p>Mode of measurements and payment The rate includes cost of all labour and materials required for satisfactory completion of this Description. The rate shall be for a unit of one number.</p>
OIL & GREASE COLLECTION TANK	
20	<p>Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.</p> <p>A. 0 to 1.5mt depth</p>
	<p>Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
21	<p>CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)</p>
	<p>Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
22	<p>CC work M25 for RCC Bottom slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>(A)Base Slab</p>
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	<p>CC work M25 for RCC Partition, Parsdment, railling etc. using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p> <p>(B)Wall</p>
	<p>Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	<p>CC work M25 for RCC slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)</p>

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	(C)Top Slab
	<p>Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
23	Cement Concrete flooring (IPS) 50 mm thick in proportion of 1:2:4 with a floating coat of neat cement, finishing, curing etc. complete
	<p>Workmanship: The relevant specifications of item description no. 54 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 54 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
24	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
25	20 mm thick sand faced cement plaster with water proofing material in cement mortar with proportion recommended by the manufacturer on walls upto height 10 metres above ground level consisting of 12mm thick backing coat of C.M. 1:3 (1-cement :3-sand) and 8mm thick finishing coat of C.M.1:1(1-cement:1-sand) etc. complete
	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
26	RCC precast cover with supply, fitting, fixing with complete as per specification 10ton size 700/550/60-90mm.
	<p>Workmanship: The relevant specifications of item description no. 57 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 57 of Transfer Station shall be followed. Rate shall be for a unit of one each number.</p>
27	RCC precast frame with supply, fitting, fixing with complete as per specification 10ton size 700/550/60-90mm
	<p>Workmanship: The relevant specifications of item description no. 58 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment:</p>

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	The relevant specifications of item description no. 58 of Transfer Station shall be followed. Rate shall be for a unit of one each number.
PIPE LAYING	
28	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed. 0.00 to 1.50 mt depth 1.5 to 3.0 mt depth
	Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
29	Providing bedding incl. ramming, watering, levelling, consolidating etc. Complete as per standard and instruction of engineer incharge as above with required quality Sand brought from outside including all lead
	Workmanship: The relevant specifications of item description no. 60 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 60 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
30	HDPE (PE-100) Pipes in standard length suitable for sewage, industrial Effluent & Rising mains HDPE- 6kg/cm2- Dia 160 mm
	Workmanship: The relevant specifications of item description no. 61 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 61 of Transfer Station shall be followed. Rate shall be for a unit of one running meter.
31	Lowering, laying and jointing HDPE pipes and specials of following class and diameter (By butt fusion welding method) including cost of conveyance from stores to site of works at all level including cost of labour, giving satisfactory hydraulic testing etc. complete
	Workmanship: The relevant specifications of item description no. 62 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 62 of Transfer Station shall be followed. Rate shall be for a unit of one running meter.
32	Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm2 in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm intenal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slabe with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(i) Inside dimensions 500mmx 700mm and 450mm deep for pipe line wih one or two intes.
	Workmanship:

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	<p>The relevant specifications of item description no. 63 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 63 of Transfer Station shall be followed. Rate shall be for a unit of one number each.</p>
33	<p>Extra over items 24.44 for every additional depth of 0.1 M. Of part thereof beyond 450 mm depth for Brick masonry chamber.(ii) for 500mm x 700mm size.</p>
	<p>Workmanship: The relevant specifications of item description no. 64 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 64 of Transfer Station shall be followed. Rate shall be for a unit of depth as per SOR.</p>
34	<p>Refilling of Pipeline trenches Refiling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within state limit.</p>
	<p>Workmanship: The relevant specifications of item description no. 65 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 65 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
ELECTRIC WORK	
35	<p>Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete Cat III</p>
36	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
37	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat</p>

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	<p>III.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
38	<p>Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected with 6A Modular type switch and hum free EME step type electronic fan regulator mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D.Connector as directed. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat-III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
39	providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat III
40	<p>Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed (a) 20 mm</p> <p>(b) 25 mm</p>
41	<p>Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) With medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 1.5 sq. mm</p> <p>(b) 2 wire 2.5 sq. mm</p>
42	<p>providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) with medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 4 sq. mm</p>
43	<p>Supplying and erecting Flexible PVC insulated multi strand multi core 1.1 kv grade ISI marked copper wires of following size to be erected as directed.</p> <p>(e) 1.50 Sq.mm 3 core round PVC sheathed</p>
44	<p>Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables</p> <p>(A) 4 core 16 Sq. mm</p>
45	<p>Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables</p> <p>(D) 2 to 4 core 16 Sq. mm</p>
46	<p>Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner.</p> <p>(C) 16/25 Sq.mm.</p>
47	<p>Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing</p>

A. TRUCK WASH& MAINTENANCE AREA	
Sr. No.	Description
	cable (A)50 mm outer dia
48	Providing & erecting Approved make Ceiling Fan with double ball bearing ISI mark with Condenser 230 volt A.C.50 Hz 1200 mm sweep complete having 3 blades aluminium body and blade sets having ornamental design shanks , canopy erected with earthing. [Make shall be approved by Engineer in Charge]
49	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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy> 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Tube Light with integral driver (iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III
50	Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V,Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K,Uniformity ratio >0.45, Luminaire efficacy> 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.)(B) Flood Light (IP-65), Surge protection -4KV integral and ,Light must have 440VAC line supply with over-voltage protection. (iv) above 90 to 120 watts CAT- III
51	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed. (ii) 40Amps. FP CAT-III
52	Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity (ii) 6 to 32Amps. Cat III
53	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat III
54	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv)12 way
55	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
56	Providing and erecting required size HOT deep Galvanised iron strip for earthing of H.T. , OCB/ ACB/ Transformer LT panel board, Motors etc. using proper clamp.
57	Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes

A. TRUCK WASH& MAINTENANCE AREA	
Sr. No.	Description
	<p>having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- <2%(C) Back fill</p> <p>Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency.</p> <p>(b)For Electrical installation up to 11 KV in normal soil.</p> <p>Length of Pipe : 2.00 mtrs</p> <p>Back filling Compound :1 no. Bag of 25 Kg.</p>
<p>The relevant specifications of above electric item description of respective components shall be followed.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit as per Standard Practice.</p>	

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
WORK UP TO PLINTH LEVEL	
1	<p>Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.</p> <p>A. 0 to 1.5mt depth</p> <p>B.1.5 to 3.0 mt. Depth</p> <p>Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
2	<p>CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)</p> <p>Workmanship: The relevant specifications of item description no. 02 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 02 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
3	<p>CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without</p>

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	reinforcement)
	<p>Workmanship: The relevant specifications of item description no. 03 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 03 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
4	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) Columns
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) Beams
	<p>Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
	CC work M25 for RCC Bottom slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(C) Slab at PL
	<p>Workmanship: The relevant specifications of item description no. 07 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 07 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
5	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 08 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 08 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
6	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	<p>Workmanship: The relevant specifications of item description no. 09 of Transfer Station shall be followed.</p>

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	Mode of Measurement and Payment: The relevant specifications of item description no. 09 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
7	Removal of Excavated Stuff within RMC limit as directed by Engineer-in-Charge
	Workmanship: The relevant specifications of item description no. 10 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
8	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	Workmanship: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 11 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
WORK ABOVE PLINTH LEVEL	
9	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Column
	Workmanship: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 04 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Beam/ Lintel /Chajja etc
	Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
	CC work M-25 for Stair Case using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Slab/ Staircase/lending etc
	Workmanship: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Mode of Measurement and Payment: The relevant specifications of item description no. 12 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.
10	Brick Masonry work in Cement:Mortar 1:6
	Workmanship:

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	<p>The relevant specifications of item description no. 14 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 14 of Transfer Station shall be followed. Rate shall be for a unit of one cubic meter.</p>
11	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	<p>Workmanship: The relevant specifications of item description no. 13 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 13 of Transfer Station shall be followed. Rate shall be for a unit of one Kilo gram.</p>
12	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	(A) For wall
	(B) For ceiling and soffits of stair
	<p>Workmanship: The relevant specifications of item description no. 17 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 17 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
13	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	<p>Workmanship: The relevant specifications of item description no. 18 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
14	Providing throating or plaster drip and moulding to R.C.C. Chhajja.
	<p>Workmanship: The relevant specifications of item description no. 01 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 01 of Transfer Station shall be followed. Rate shall be for a unit of one running meter.</p>
15	Decorative Groove Work in Cement Plaster
	<p>Workmanship: The relevant specifications of item description no. 29 of Weigh Bridge with Office Building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 29 of Weigh Bridge with Office Building shall be followed. Rate shall be for a unit of one running meter.</p>
16	Supply, Fixing & Polishing of Kota Stone work thickness 20-25 mm to be fixed in Lime:Mortar 1:2

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	and liquid Cement and as instructed
	<p>Workmanship: The relevant specifications of item description no. 31 of Weigh Bridge with Office Building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 31 of Weigh Bridge with Office Building shall be followed. Rate shall be for a unit of one square meter.</p>
17	Providing and fixing 35 mm thick shutters for Doors, windows and clear story windows including anodised aluminium butt hinges with necessary screws.(A) Indian Teak Wood (1) Fully Panelled
	(1) Fully paneled
	<p>Workmanship: The relevant specifications of item description no. 33 of Weigh Bridge with Office Building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 33 of Weigh Bridge with Office Building shall be followed. Rate shall be for a unit of one square meter.</p>
18	Aluminium section window work (with 3 track mosquito net) (jindal)(with necessary all fittings)
	<p>Workmanship: The relevant specifications of item description no. 36 of Weigh Bridge with Office Building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 36 of Weigh Bridge with Office Building shall be followed. Rate shall be for a unit of one square meter.</p>
19	Providing & fixing approved quality & designed rolling shutters with necessary top cover, fittings, single coat red lead, double coat silver or oil paint (with bearing)
	<p>Materials: The rolling shutter shall conform to M-32.</p> <p>Workmanship: Brackets shall be fixed on the lintel or under the lintel as specified with raw, plugs, & screws, bolts, bearing etc. The shaft along with the spring shaft than be fixed on the brackets.</p> <p>The lath portion (shutter) shall be laid on ground and the side guide channels shall be bound with ropes etc.</p> <p>The shutter shall then be placed in position & top fixed with pipe shaft with bolts & nuts. The side guide channels & cover frames shall then be fixed to the walls through the plate welded to the guides.</p> <p>These plates & bracket shall be fixed by means of steel screws; bolts & raw plugs concealed in plaster to make their location invisible. Fixing shall be done accurately in workmen like manner that the operation of the shutter is easy & smooth.</p> <p>Mode of Measurement and Payment:</p>

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	<p>Clear width & clear height of the opening for the rolling shutter shall be measured correct to mm. The clear distance between the seal & soffit (bottom of lintel) of the opening shall be the clear height.</p> <p>The area shall be calculated in Square meter Correct to two places of decimal.</p> <p>The rate shall include the cost of materials & labour involved in all the operation describe above including cost of top cover & spring except ball bearing & mechanical device of chain & crank operation, which shall be included in rate.</p>
20	<p>Distempering with dry distemper of approved brand and manufacture (two coats) and of required shade on wall surfaces of given an even shade, over and including a priming coat of whiting after thoroughly brooming the surface free from mortar dropping and other foreign matter.</p> <p>(A) For wall</p> <p>(B) For Ceilings and soffits of stairs</p>
	<p>Workmanship: The relevant specifications of item description no. 38 of Weigh Bridge with Office Building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 38 of Weigh Bridge with Office Building shall be followed. Rate shall be for a unit of one square meter.</p>
21	<p>Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.</p> <p>(A) For wall</p>
	<p>Workmanship: The relevant specifications of item description no. 10 of Weigh Bridge with Office Building shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Weigh Bridge with Office Building shall be followed. Rate shall be for a unit of one square meter.</p>
22	<p>Water Proofing Treatment on Terrace and Wall sides with smooth finishing including material-labour etc. complete</p> <p>Workmanship: The relevant specifications of item description no. 20 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 20 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
23	<p>Providing and fixing to wall ceiling and floor 10.0 Kg. F/Cm2 working pressure poluthene pipes of the following outside Dia. Low densidy, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor.(G)110 mm</p> <p>Workmanship: The relevant specifications of item description no. 50 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 50 of Transfer Station shall be followed. Rate</p>

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	shall be for a unit of one running meter.
24	Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm ² in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm intenal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slabe with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(i) Inside dimensions 455mmx 610mm and 450mm deep for single pipe line.
	<p>Workmanship: The relevant specifications of item description no. 63 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 63 of Transfer Station shall be followed. Rate shall be for a unit of one each number.</p>
25	Providing laying (to level or slopes) and jointing reinforced concrete Light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete.(B) 150mm
	<p>Workmanship: The relevant specifications of item description no. 18 of Truck Wash & Maintenance Area shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 18 of Truck Wash & Maintenance Area shall be followed. Rate shall be for a unit of one running meter.</p>
26	Cast iron manhole with fixing
	<p>Workmanship: The relevant specifications of item description no. 19 of Truck Wash & Maintenance Area shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 19 of Truck Wash & Maintenance Area shall be followed. Rate shall be for a unit of one each number.</p>
27	Grill work for doors - windows etc. as per design on site with fitting & fixing.
	<p>Workmanship: The relevant specifications of item description no. 44 of Transfer Station shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 44 of Transfer Station shall be followed. Rate shall be for a unit of one square meter.</p>
ELECTRIC WORK	
28	Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point

A. GENERATOR AND ELECTRICAL ROOM									
Sr. No.	Description								
	wiring	Item	No	1-1-1	to	1-2-6	&	1-5-1	& 1-5-2.
	(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete Cat III								
29	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>								
30	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.[I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>								
30	<p>Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected with 6A Modular type switch and hum free EME step type electronic fan regulator mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D.Connector as directed.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat-III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>								
31	providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat III								
32	<p>Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed</p> <p>(a) 20 mm</p> <p>(b) 25 mm</p>								
33	<p>Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) With medium class Rigid PVC pipe and accessories</p> <p>(a) 2 wire 1.5 sq. mm</p> <p>(b) 2 wire 2.5 sq. mm</p>								
34	providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper								

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) with medium class Rigid PVC pipe and accessories (a) 2 wire 4 sq. mm
35	Providing & erecting Approved make Ceiling Fan with double ball bearing ISI mark with Condenser 230 volt A.C.50 Hz 1200 mm sweep complete having 3 blades aluminium body and blade sets having ornamental design shanks , canopy erected with earthing. [Make shall be approved by Engineer in Charge]
36	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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy > 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Tube Light with integral driver (iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III
37	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed.(ii) 40Amps. FP CAT-III
38	Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity (ii) 6 to 32Amps. Cat III
39	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat III
40	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv)12 way
41	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
42	Providing and erecting required size HOT deep Galvanised iron strip for earthing of H.T. , OCB/ ACB/ Transformer LT panel board, Motors etc. using proper clamp.
43	Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistane mentioned in test Certificate) &having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphar content:- <2%(C) Back fill

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b)For Electrical installation up to 11 KV in normal soil. Length of Pipe : 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.
44	Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (I) 3 1/2 core 240 Sq. mm(120 Sq. mm 1/2 core)
45	Supplying & erecting XLPE(IS:7098)(I)-88 ISI unarmoured copper cable 1.1 KV grade to be erected as directed of following size. (J) 4 core 2.5 Sq. mm
46	Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable (C)90 mm outer dia
47	Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground.
48	Providing and, fixing heavy duty flange type brass double compression type cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables. (H) 3 & 1/2 core 240 Sq. mm
49	Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (J) 240 Sq.mm.
50	Providing & erecting weather proof, dust & vermin proof, floor mounted front operated indoor type cubical panel board necessary IP-42 and above protection as per approval from engineer incharge made from 14 SWG thick CRC M.S. sheet for outer body & doors, 16 SWG thick CRC M.S.sheet for internal partitions with necessary accesories , supporting angles/ flats channel including cutting, bending, drilling, welding, riveting with internal partitions & cable alley as per requirements & instruction of engineer-in-charge with erection of supplied switch gears, BUSBARS, suitable size of inter connecting PVC copper wire / copper-aluminium strips, rubber grommets, rib, bakelite control fuses/MCB for measuring instruments, earth bus & earth bolts, foundation flange - bolts-base Plates, sufficient nos. of hinged doors, handles with locking arrangement and rubber gasket,heavy duty end terminal connection,danger notice board,necessary ventilation,earthing strip complete. The Panel shall be painted with epoxy powder coating. (The rates excludes the cost of switchgears, bus bars, inter connecting mains & Copper Aluminium strips, meters, Fuses etc. The dimension shall be measured excluding base beams) The panel shall be supplied with following approved manufacturers with following size. (B) The standard companies switch gear shall be used and only manufacturers at CPRI approved factory (iii)with 750 mm. Depth
51	providng and erecting Approved make. energy meter 3 phase 4 wire unbalanced load 500 V. 500A/5 CT complete erected as directed with necessary earth wire. Cat III
52	Supplying and erecting triple pole & neutral 440V/ 500V panel mounting Aluminium Busbars with four equal Nos. of bus having current density not more than 0.8 Amp. / sq.mm (Rated current /

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	cross section area) duly wrapped with colour insulating tape for phase sequence of following current carrying capacity, erected with necessary bus bar supports /insulators, main cable socket to each busbar,erected in existing cubical panel with necessary connections. (A) Suitable for 100 Amp. Capacity (D) Suitable for 400 Amp. Capacity
53	Providing and erecting Approved make Four pole moulded case circuit breaker having breaking capacity ICU of 50 KA and above at 415 V having Normal current rating 400A. with variable Thermal & magnetic release suitable to work on A.C.supply 50 c/s. With all internal connections, spreader tinned copper & complete erected in existing 16 G.M.S. housing. ICS=100% of ICU only Cat III
54	Providing and erecting Approved make Four pole moulded case circuit breaker having breaking capacity ICU of 35 KA. at 415 V. having normal current rating 200A. with Fixed thermal & magnetic release suitable to work on A.C.supply 50 c/s. with all internal connections, spreader tinned copper & complete erected in existing 16 G.M.S. housing. ICS=100% of ICU only Cat III
55	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat-III (c)63 Amp. Cat-III
56	Providing & erecting High Voltage Danger Notice Board sticker as per language suggested by engineer incharge of standard size-as per IS 2551
56	Supplying and erecting, commissioning and testing of Diesel Generating set confirming to IS: 4722:1968 & BS:5514 having continuous rating, 3 phase, 415 volts, 50 cycles A.C. supply comprising of a totally enclosed air/water cooled diesel engine with multi-cylinders developing suitable BHP not less than following capacity at 1500 RPM with 10% overload for one hour in 24 hours with standard accessories like fly wheel, lubricating oil cooler, "A" class governor, heavy duty fuel wheel and lubricating oil filter, oil bath air filler, lubricating oil pressure gauge, end exhaust manifold, standard set of tools with adjustable spanners, screw drivers, cylinder head to cover, joint cylinder head to exhaust, element lube oil filter, 12 / 24 volts electric starting equipment complete with standard heavy duty battery, dynamo, cut-outs, ammeter, necessary wiring, pressure gauge, starter etc and heavy duty Residential type exhaust silencer (With DEF System) and vertical hot air duct both logged with asbestos rope, save oil trays, exhaust piping of required length, standard wall/floor mounted fuel with level indicator and piping and drip proof alternator, self excited, self regulated, screen protected, with excitation system, capable of delivering the rated system output at 415 volts, 3 phase, 0.8 PF, 50 Hz, 4 wire, running at 1500 RPM, conforming to IS-4722- 1968 with voltage regulation +/- 5% of rated voltage from no load to full load. Both the engine and alternator fitted on a common fabricated steel base plate with antivibration mounting engine and alternator both connected to each other by flexible flange coupling and with floor/wall mounted control panel box comprising of voltmeter ammeter, selector switches, ACB / MCCB / MCB of adequate capacity, indicator lamps duly wired with HRC fuses. The alternator & control panel shall be connected with provided suitable capacity armoured cable and complete with Acoustic enclosure (canopy) made out of 16 SWG CRCA Sheet, sound absorbing material Rockwool of 64 density & 100 mm thick conforming to IS:8183 / PU Foam of 40 Density - at least 40 mm. The resin bonded rockwool covered from inside the canopy by perforated sheet with 3/4 mm holes, sound level not more than 75 dB at a distance of 1 mtr, as per PVCT norms.DG set should have in built fuel tank capacity of minimum 8 hrs of continous running capacity on full load . Erection, commissioning and satisfactory testing as per requirement with first filling of fuel (minimum up to the 80% of fuel tank capacity), oil, etc. with guarantee / Warrantee of complete system for Two years. & with obtaining all

A. GENERATOR AND ELECTRICAL ROOM	
Sr. No.	Description
	necessary certificate from Electrical Inspector. The Capacity and Ratings of DG sets are as below. (As per new CPCB4+ Emission norms Engine With - Turbo Charger, EGR (Exhaust Gas Recirculation), CRS (Common Rail Fuel System), DOC (Diesel Oxidation Catalyst), SCR (Selective Catalytic Reduction), Integrated wiring harness connected to ECU .) (O) Continuous rating of 160 KVA ,BHP not less than 197 BHP
57	Providing & erecting approved make AMF control panel suitable for following size of 3 phase, 415 V., 50 cycles, A.C. diesel generating set complete of scope as detailed below: 1) Power module: A pair of electromechanically interlocked contactors (for mains & generator) Overload relay for generator contactor Neutral contactor for mains and generator Power socket for connections. 2) Control and metering module: Line voltage monitor. Generator voltage monitor Ammeter 3 items attempt start facility. Air circuit breakers/MCB/MCCB of suitable rating for auto/manual operation. Auto/manual switch. Emergency stop push buttons. Manual start push button. frequency meter. Engine hour meter. Two earthing studs. 3) Protection module: The engine shutdown in the unlikely event of Low lube oil pressure High cylinder head temperature. V belt failure. 4) Indicators with alarm Load on generator. 5) Indicators Load on mains Engine fails to start . Emergency stop battery charger. The AMF Panel of following capacity (D) AMF Control Panel for 200 KVA/250 KVA 3 phase DG Set
The relevant specifications of above electric item description of respective components shall be followed.	
Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.	
Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit as per Standard Practice.	

B. TOILET BLOCK	
Sr. No.	Description
WORK UP TO PLINTH LEVEL	
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed. (A) Up to 1.5 Mt. Depth Footing & GB (B) 1.5 to 3.0 Mt. Depth Footing
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 02 of RTS Building & Ramp shall be followed.
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 03 of RTS Building & Ramp shall be followed.
4	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete

B. TOILET BLOCK	
Sr. No.	Description
	(without reinforcement)
	(A) COLUMNS
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS :
	CC work M-25 for Coping using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	Coping
	The relevant specifications of item description no. 18 of Weighbridge with Office Building shall be followed.
5	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
6	Brick Masonry work in Cement:Mortar 1:6
	The relevant specifications of item description no. 14 of RTS Building & Ramp shall be followed.
7	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	The relevant specifications of item description no. 09 of RTS Building & Ramp shall be followed.
8	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	The relevant specifications of item description no. 11 of RTS Building & Ramp shall be followed.
9	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	The relevant specifications of item description no. 18 of RTS Building & Ramp shall be followed.
10	Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.
	The relevant specifications of item description no. 10 of Weighbridge with Office Building shall be followed.
WORK ABOVE PLINTH LEVEL	
11	CC work M-25 for Column using aggregate of size 10-20 mm,centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMN
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS
	CC work M-25 for RCC Bottom Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(C) SLAB
	CC work M-25 for RCC Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(D) TERRACE SLAB
	CC work M-25 for Lintel using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(E) LINTEL

B. TOILET BLOCK	
Sr. No.	Description
	CC work M-25 for Chajja using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) (F) CHHAJJA
	The relevant specifications of item description no. 24 of Weighbridge with Office Building shall be followed.
12	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
13	Brick Masonry work in Cement:Mortar 1:6
	The relevant specifications of item description no. 14 of RTS Building & Ramp shall be followed.
14	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	The relevant specifications of item description no. 17 of RTS Building & Ramp shall be followed.
15	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	The relevant specifications of item description no. 18 of RTS Building & Ramp shall be followed.
16	Supply, Fixing & Polishing of Kota Stone work thickness 20-25 mm to be fixed in Lime:Mortar 1:2 and liquid Cement and as instructed
	The relevant specifications of item description no. 16 of Generator & Electrical Room shall be followed.
17	Supply & Fixing of Glazed tiles (1st Quality) of required size in Cement Roga and joints to be filled with white cement after 12mm rough plaster in proportion of 1:3 flooring, treads of steps & landings
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of sq.m.</p>
18	Supply & Fixing of Glazed tiles (1st Quality) of required size in Cement Roga and joints to be filled with white cement after 12mm rough plaster in proportion of 1:3
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of sq.m.</p>
19	Providing and fixing 35 mm thick shutters for Doors, windows and clear story windows including anodised alluminium butt hinges with necessary screws. (A) Indian Teak Wood(iii) Partly panelled and partly glazed. Fully paneled
	The relevant specifications of item description no. 33 of Weighbridge with Office Building shall be followed.
20	Providing and fixing glazed louvered glass windows and ventilators with teak wood frame 10cm. x

B. TOILET BLOCK	
Sr. No.	Description
	7cm. size including 3 coats of oil painting to wood work etc.complete.
	The relevant specifications of item description no. 37 of Weighbridge with Office Building shall be followed.
21	Plastic Imulsion Paint (Two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger etc. of approved type) (with Prime Coat)
	The relevant specifications of item description no. 19 of RTS Building & Ramp shall be followed.
22	Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.
	The relevant specifications of item description no. 10 of Weighbridge with Office Building shall be followed.
WATER SUPPLY AND SANITARY ITEMS	
23	Providing and fixing wash down water closet (European type,W.C. Pan) with integral P or S trap including jointing the trap with soil pipe in Cement Mortar 1:1 (1-Cement : 1-fine sand) (Seal and cover to be measured and paid for separately)(A) vitreous China Pattern :(i) in white colour
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
24	Providing and fixing plastic seat and cover for wash down water closer with C.P. brass hinges and rubber buffers. (B) Black plastic seal and cover.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
25	Providing and fixing washbasin with single hole for pillar tap with C.I. or M.S. brackets painted white including sutting holes and making good the same but excluding fittings.(A) Vitreous China:(ii) Flat Back washbasin 550 mm x v 400mm size. (i) In white colour.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
26	Providing and fixing C.P. brass waste for washbasin or sink. (A) 32mmdia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of</p>

B. TOILET BLOCK	
Sr. No.	Description
	the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.
27	Providing and fixing pillar tap, capstan head, screw down high pressure with screws, shanks and back nuts. (i) 15mm dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
28	Providing and fixing brass screw down stop tap.(A) 15mm dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
29	Providing and fixing chromium plated, bottle trap with necessary couplings of approved quality for wash basin.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
30	Providing and fixing Urinal or approved quality including connecting the Urinal with waste pipe , tap etc. complete.(A) White earthenware flat back or corner type size 430mm x 260mm x 350mm.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
31	Providing and fixing 600mm x 450mm bevelled edge mirror of superior glass mounted on 6mm thick A.C. sheet or plywood sheet and fixing to wooden pluge with C.P. brass screws and washers.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
32	Providing and fixing PVC SWR Nahni trap IS 14735 for drain - 100 mm diameter with jali of the following nominal diameter of self cleansing design with C.I sread down or

B. TOILET BLOCK	
Sr. No.	Description
	hinged grating including the cost of cutting and making good the walls.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
33	<p>Providing and fixing to wall ceiling and floor 10.0 Kg./Cm² working pressure polythene pipes of the following outside Dia. Low density, complete with special flange compression type fittings, wall clipsetc. including making good the wall ceiling and floor.(F) 75mm</p> <p>(A) 75 mm Dia</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per RMT.</p> <p>Providing and fixing to wall ceiling and floor 10.0 Kg./Cm² working pressure polythene pipes of the following outside Dia. Low density, complete with special flange compression type fittings, wall clipsetc. including making good the wall ceiling and floor.(F) 110mm</p> <p>(B) 110 mm Dia</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per RMT.</p>
34	<p>Providing and fixing S.W. gully trap with C.I. grating brick masonry chamber and water tight C.I. cover with frame of 300mm x 300mm size (inside) with standard weight.(i) Square mouth traps.(B) 150mm x 100mm size P or R type</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
35	<p>Constructing brick masonry chamber for underground C.I. inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm² in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm internal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slab with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete</p>

B. TOILET BLOCK	
Sr. No.	Description
	etc. complete.(i) Inside dimensions 455mmx610mm and 450mm deep for single pipe line.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
36	<p>Providing laying (to level or slopes) and jointing reinforced concrete Light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete.(B) 150mm</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per RMT.</p>
37	<p>Providing and laying in trenches galvanised mild steel tubes (Medium grade) of the following nominal bore, and tube fitting (Earthwork in trenches to be measured and paid for separately) (C) 25mm</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per RMT.</p>
38	<p>Providing laying and jointing in true line and level 15mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre 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.</p>
	<p>(A) 15 mm.dia.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per RMT.</p> <p>Providing laying and jointing in true line and level 25mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre 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.</p>

B. TOILET BLOCK	
Sr. No.	Description
	(B) 25 mm.dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per RMT.</p>
39	Providing and fixing screw down bib taps of following size.(A) Brass screw down bib tap polished bright. (i) 15mm dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
40	Providing and fixing M.I. fisher union for washbasin or sink. (A) 32mm dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
41	Providing and fixing Gun metal check or non-return fullway wheel valve.(A) 15mm dia.
	(A) 15 mm Dia.
	Providing and fixing Gun metal check or non-return fullway wheel valve.(A) 25mm dia.
	(B) 25 mm Dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
42	Providing and fixing chromium plated brass half trun flush cock of approved quality including fixing in pipe line etc.complete. (ii) 25mm dia.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
43	Providing and fixing ball cock of approved. quality as directed.(B) Abonite (i) 25mm dia.
	Workmanship:

B. TOILET BLOCK	
Sr. No.	Description
	<p>The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
44	<p>Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35Kg.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of No.</p>
45	<p>Providing erecting and fixing double coated ISI water tank of required capacity each with all necessary fittings and connection etc. complete on terrace</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Liter.</p>
ELECTRICAL WORKS	
46	<p>Supplying & erecting approved make self-priming domestic monoblock water pump with 1 H.P motor, suitable for operation on 230 volts, 50c/s. AC supply with metallic flange, and M.S. impeller delivery and following discharge (a) 40 LPM at 24 mtrs. head suitable for 25mm dia. Delivery Cat III</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of each.</p>
47	<p>Providing and erecting ISI marked PVC insulated PVC Sheathed Flat flexible Submersible copper cable approved make of following Size. (A) 3 Core x 1.5 Sq. mm.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of meter.</p>
48	<p>Supplying and erecting Direct - On - Line Starter with 18 A. rating contactor and with 3.5 Amp. 18A range directly operated in totally insulated elegant enclosure for single phase operation up to 3 HP as per IS 13947 complete erected on P.W. Block with necessary connection. Cat III</p>

B. TOILET BLOCK	
Sr. No.	Description
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of each.</p>
49	Supplying of following size of STANDARD UPVC column pipe with coupler and wire lock [A] 25 mm dia
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of each.</p>
47	<p>Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed.NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete Cat III</p>
	The relevant specifications of item description no. 66 of RTS Building & Ramp shall be followed.
48	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
	The relevant specifications of item description no. 67 of RTS Building & Ramp shall be followed.
49	<p>Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed</p> <p>(a) 20 mm</p> <p>(b) 25 mm</p>
	The relevant specifications of item description no. 69 of RTS Building & Ramp shall be followed.
50	<p>Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size</p> <p>(A) With medium class Rigid PVC pipe and accessories</p> <p>(b) 2 wire 2.5 sq. mm</p>

B. TOILET BLOCK	
Sr. No.	Description
	The relevant specifications of item description no. 70 of RTS Building & Ramp shall be followed.
51	Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand / Solid Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (A) 4 core 4 Sq. mm
	The relevant specifications of item description no. 82 of RTS Building & Ramp shall be followed.
52	Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables. (A) 2 to 4 core 2.5 / 4 Sq. mm
	The relevant specifications of item description no. 87 of RTS Building & Ramp shall be followed.
53	Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (A) 1.5/ 2.5/4/6 Sq.mm
	The relevant specifications of item description no. 89 of RTS Building & Ramp shall be followed.
54	Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable (A)50 mm outer dia
	The relevant specifications of item description no. 85 of RTS Building & Ramp shall be followed.
55	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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy > 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Tube Light with integral driver (iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III
	The relevant specifications of item description no. 73 of RTS Building & Ramp shall be followed.
56	Supplying and erecting led lamps with following wattage capacity of 220 to 240 voltage, minimum 15000 burning hours life, 500 V in built-surge protection,Polycarbonate diffuser, mounting suitable for E14 / E27 / B22 lamp holders, pf >= 0.5(A) LED Lamps integral type, with PC diffuser suitable LAMP holder (iii) 10 to 15 watts Cat-III
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each.</p>
57	Providing & erecting 415V MCB Four Pole Switch for Lighting Load (B curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (a) 6 to 32 Amp. Cat III
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p>

B. TOILET BLOCK	
Sr. No.	Description
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each.
58	Providing & erecting 240 V MCB double pole switch for lighting Load (B Curve) having 10 KA breaking capacity & conforms to IS : 8828 in existing box having following capacity (a) 6 to 32 Amp. Cat III
	The relevant specifications of item description no. 57 of Weighbridge with Office Building shall be followed.
59	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs. (The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv) 12 way
	The relevant specifications of item description no. 75 of RTS Building & Ramp shall be followed.
60	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
	The relevant specifications of item description no. 80 of RTS Building & Ramp shall be followed.
61	Supplying & erecting earth pit of minimum bore dia. 150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I. Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A) (approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- < 2% (C) Back fill Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b) For Electrical installation up to 11 KV in normal soil. Length of Pipe : 2.00 mtrs Back filling Compound : 1 no. Bag of 25 Kg.
	The relevant specifications of item description no. 81 of RTS Building & Ramp shall be followed.

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
UPTO PLINTH LEVEL	
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	(A) Up to 1.5 Mt. Depth
	Footing & GB
	(B) 1.5 to 3.0 Mt. Depth
	Footing
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 02 of RTS Building & Ramp shall be followed.
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 03 of RTS Building & Ramp shall be followed.
4	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMNS
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS :
	The relevant specifications of item description no. 04 of RTS Building & Ramp shall be followed.
5	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
6	Brick Masonry work in Cement:Mortar 1:6
	The relevant specifications of item description no. 14 of RTS Building & Ramp shall be followed.
7	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	The relevant specifications of item description no. 09 of RTS Building & Ramp shall be followed.
8	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete.
	The relevant specifications of item description no. 11 of RTS Building & Ramp shall be followed.
9	Water Proof Cement Paint Work two coat (Snowcem, Deorocem or other similar brands approved) after primer Coat
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of square meter.
ABOVE PLINTH LEVEL	
10	CC work M-25 for Column using aggregate of size 10-20 mm,centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMN
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS
	CC work M-25 for RCC Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(C) SLAB AT PL
	CC work M-25 for Lintel using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	(E) LINTEL
	CC work M-25 for Chajja using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(F) CHHAJJA
	The relevant specifications of item description no. 24 of Weighbridge with Office Building shall be followed.
11	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
12	Brick Masonry work in Cement:Mortar 1:6
	The relevant specifications of item description no. 14 of RTS Building & Ramp shall be followed.
13	Half brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4 (1- Cement : 4 - coarse sand) in foundation and plinth (B) Conventional
	The relevant specifications of item description no. 15 of RTS Building & Ramp shall be followed.
14	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	(A) For wall
	(B) For ceiling and soffits of stair & Chhajja
	The relevant specifications of item description no. 17 of RTS Building & Ramp shall be followed.
15	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster in the proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carrying out Plaster work on RCC, required tipping work should be carried out as instructed)
	The relevant specifications of item description no. 18 of RTS Building & Ramp shall be followed.
16	Providing throating or plaster drip and moulding to R.C.C. Chhajja.
	The relevant specifications of item description no. 29 of Weighbridge with Office Building shall be followed.
17	Decorative Groove Work in Cement Plaster
	The relevant specifications of item description no. 30 of Weighbridge with Office Building shall be followed.
18	Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-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. (A) 25mm thick
	The relevant specifications of item description no. 31 of Weighbridge with Office Building shall be followed.
19	Constructing a platform 60 cm width and 70 cm high resting on B.B.Masonry walls 23 cm.thick in C.M.(1:6) with (ii) Fixing black kadappa stone 30mm thick laid on precast R.C.C. (1:2:4) slab with plastering on exposed faces of wall in C.M. (1:4) etc complete. (i) cooking platform
	The relevant specifications of item description no. 34 of Weighbridge with Office Building shall be followed.
20	Supply & Fixing of Glazed tiles (1st Quality) of required size in Cement Roga and joints to be filled with white cement after 12mm rough plaster in proportion of 1:3
	The relevant specifications of item description no. 17 of Toilet Block shall be followed.
21	Providing and fixing 35 mm thick shutters for Doors, windows and clearstory windows including blackenamelled M.S. butt hinges with necessary screws. (A) Indian teak wood. (i) Fully Panelled.
	The relevant specifications of item description no. 33 of Weighbridge with Office Building shall be followed.

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	followed.
22	aluminium section window work (with 3 track mosquito net) (jindal)(with necessary all fittings)
	The relevant specifications of item description no. 36 of Weighbridge with Office Building shall be followed.
23	Providing and fixing glazed louvered glass windows and ventilators with teak wood frame 10cm. x 7cm. size including 3 coats of oil painting to wood work etc.complete.
	The relevant specifications of item description no. 37 of Weighbridge with Office Building shall be followed.
24	Distempering with dry distemper of approved brand and manufacture (two coats) and of required shade on wall surfaces of given an even shade, over and including a priming coat of whiting after thoroughly brooming the surface free from mortar dropping and other foreign matter
	(A) For wall
	(B) For Ceilings and soffits of stairs
	The relevant specifications of item description no. 38 of Weighbridge with Office Building shall be followed.
25	Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.
	(A) For wall
	The relevant specifications of item description no. 10 of Weighbridge with Office Building shall be followed.
26	Water Proofing Treatment on Terrace and Wall sides with smooth finishing including material-labour etc. complete
	The relevant specifications of item description no. 20 of RTS Building & Ramp shall be followed.
27	Providing and fixing to wall ceiling and floor 10.0 Kg. F/Cm2 working pressure polythene pipes of the following outside Dia. Low density, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor.(F) 75mm
	The relevant specifications of item description no. 41 of Weighbridge with Office Building shall be followed.
28	Providing and fixing to wall, ceiling and floor galvanised Mild steel tubes (Medium grade) of the following nominal bore, tube fitting and clamps including making good the wall ceiling and floor.(A) 15mm
	The relevant specifications of item description no. 42 of Weighbridge with Office Building shall be followed.
29	Providing erecting and fixing double coated ISI water tank of required capacity each with all necessary fittings and connection etc. complete on terrace
	The relevant specifications of item description no. 43 of Weighbridge with Office Building shall be followed.
30	Grill work for doors - windows etc. as per design on site with fitting & fixing.
	The relevant specifications of item description no. 44 of Weighbridge with Office Building shall be followed.
WATER SUPPLY AND SANITARY ITEMS	
31	Providing and fixing wsh down water closet (European type, W.C. Pan) with integral P or S trap including jointing the trap with soil pipe in Cement Mortar 1:1 (1-Cement : 1-fine sand) (Seal and cover to be measured and paid for separately)(A) vitreous China Pattern :(i) in white colour

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	The relevant specifications of item description no. 23 of Toilet Block shall be followed.
32	Providing and fixing plastic seat and cover for wash down water closer with C.P. brass hinges and rubber buffers. (B) Black plastic seal and cover.
	The relevant specifications of item description no. 24 of Toilet Block shall be followed.
33	Providing and fixing washbasin with single hole for pillar tap with C.I. or M.S. brackets painted white including cutting holes and making good the same but excluding fittings.(A) Vitreous China:(ii) Flat Back washbasin 550 mm x v 400mm size. (i) In white colour.
	The relevant specifications of item description no. 25 of Toilet Block shall be followed.
34	Providing and fixing C.P. brass waste for washbasin or sink. (A) 32mmdia.
	The relevant specifications of item description no. 26 of Toilet Block shall be followed.
35	Providing and fixing pillar tap, capstan head, screw down high pressure with screws, shanks and back nuts. (i) 15mm dia.
	The relevant specifications of item description no. 27 of Toilet Block shall be followed.
36	Providing and fixing brass screw down stop tap.(A) 15mm dia.
	The relevant specifications of item description no. 28 of Toilet Block shall be followed.
37	Providing and fixing chromium plated, bottle trap with necessary couplings of approved quality for wash basin
	The relevant specifications of item description no. 29 of Toilet Block shall be followed.
38	Providing and fixing 600mm x 450mm bevelled edge mirror of superior glass mounted on 6mm thick A.C. sheet or plywood sheet and fixing to wooden pluge with C.P. brass screws and washers.
	The relevant specifications of item description no. 31 of Toilet Block shall be followed.
39	Providing and fixing PVC SWR Nahni trap IS 14735 for drain - 100 mm diameter with jali of the following nominal diameter of self cleansing design with C.I. screed down or hinged grating including the cost of cutting and making good the walls.
	The relevant specifications of item description no. 32 of Toilet Block shall be followed.
40	Providing and fixing to wall ceiling and floor 10.0 Kg.F/Cm2 working pressure polythene pipes of the following outside Dia. Low density, complete with special falnge compression type fittings, wall clipsetc. including making good the wall ceiling and floor.
	(A) 75 mm Dia
	(B) 110 mm Dia
	The relevant specifications of item description no. 41 of Weighbridge with Office Building shall be followed.
41	Providing and fixing S.W. gully trap with C.I. grating brick masonry chamber and water tight C.I. cover with frame of 300mm x 300mm size (inside) with standard weight.(i) Square mouth traps. (A) 100mm x 100mm size P type.
	The relevant specifications of item description no. 34 of Toilet Block shall be followed.
42	Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm2 in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm intenal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slabe with 1:2:4 mix (1-cement :2-coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(ii) Inside dimensions 500mm x 700 mm and 450mm deep for pipe line with one or two inlets.
	The relevant specifications of item description no. 63 of RTS Building & Ramp shall be followed.
43	Providing laying (to level or slopes) and jointing reinforced concrete Light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	including testing of joints complete.(B) 150mm
	The relevant specifications of item description no. 18 of Truck Wash & Maintenance Area shall be followed.
44	Providing and laying in trenches galvanised mild steel tubes (Medium grade) of the following nominal bore, and tube fitting (Earthwork in trenches to be measured and paid for separately) (C) 25mm
	The relevant specifications of item description no. 37 of Toilet Block shall be followed.
45	Providing laying and jointing in true line and level 15mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre 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.
	Providing laying and jointing in true line and level 25mm dia. U.P.V.C. Pipe (SCH- 40) for cold water including fittings as approved by Engineer In Charge. Pipe shall be fixed on the wall with the help of clamp at every two metre 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.
	The relevant specifications of item description no. 38 of Toilet Block shall be followed.
46	Providing and fixing screw down bib taps of following size. (A) Brass screw down bib tap polished bright. (i) 15mm dia.
	The relevant specifications of item description no. 39 of Toilet Block shall be followed.
47	Providing and fixing M.I. fisher union for washbasin or sink. (A) 32mm dia.
	The relevant specifications of item description no. 40 of Toilet Block shall be followed.
48	Providing and fixing Gun metal check or non-return fullway wheel valve.(A) 15mm dia.
	Providing and fixing Gun metal check or non-return fullway wheel valve.(C) 25mm dia.
	The relevant specifications of item description no. 41 of Toilet Block shall be followed.
49	Providing and fixing chromium plated brass half trun flush cock of approved quality including fixing in pipe line etc. complete.(ii) 25mm dia
	The relevant specifications of item description no. 42 of Toilet Block shall be followed.
50	Providing and fixing ball cock of approved. quality as directed.(B) Abonite (i) 25mm dia.
	The relevant specifications of item description no. 43 of Toilet Block shall be followed.
51	Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35Kg.
	The relevant specifications of item description no. 44 of Toilet Block shall be followed.
52	Providing erecting and fixing double coated ISI water tank of required capacity each with all necessary fittings and connection etc. complete on terrace
	The relevant specifications of item description no. 45 of Toilet Block shall be followed.
53	Supplying & erecting approved make self-priming domestic monoblock water pump with 1 H.P motor, suitable for operation on 230 volts, 50c/s. AC supply with metallic flange, and M.S. impeller delivery and following discharge (a) 40 LPM at 24 mtrs. head suitable for 25mm dia. Delivery Cat III
	The relevant specifications of item description no. 46 of Toilet Block shall be followed.
UNDER GROUND WATER TANK	
54	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	(A) Up to 1.5 Mt. Depth
	Soft Rock not required blasting
	(B) 1.5 to 3.0 Mt. Depth

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	Soft Rock not required blasting
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
55	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 02 of RTS Building & Ramp shall be followed.
56	CC work M20 for RCC Bottom slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) Base Slab
	CC work M-20 for Partition, Parsdment, railing etc. using aggregate of size 10-20 mm, centring, curing, finishing etc. Complete (without reinforcement)
	(B) Wall
	CC work M-20 for RCC slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(C) Top Slab
	The relevant specifications of item description no. 53 of RTS Building & Ramp shall be followed.
57	Providing and laying cement concrete flooring 1:2:4 (1- cement : 2-coarse sand : 4-graded stone aggregate 20mm nominal size) laid in one layer and finished with a floating coat of neat cement. (B) 50mm thick.
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Sq. m.
58	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
59	Water Proof Cement Plaster 20 mm thick using Water Proofing Compound and in the ratio of 1:3 with necessary finishing
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Sq. M.
60	RCC precast cover with supply, fitting, fixing with complete as per specification 10ton size 700/550/60-90mm.
	The relevant specifications of item description no. 57 of RTS Building & Ramp shall be followed.
61	RCC precast frame with supply, fitting, fixing with complete as per specification 10ton size 700/550/60-90mm
	The relevant specifications of item description no. 57 of RTS Building & Ramp shall be followed.
ELECTRICAL WORK	
62	Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	<p>following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete</p>
	The relevant specifications of item description no. 66 of RTS Building & Ramp shall be followed.
63	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2.</p> <p>[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete</p>
	The relevant specifications of item description no. 67 of RTS Building & Ramp shall be followed.
64	<p>Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.</p> <p>[I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III.</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
	The relevant specifications of item description no. 68 of RTS Building & Ramp shall be followed.
64	<p>Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected with 6A Modular type switch and hum free EME step type electronic fan regulator mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D.Connector as directed.</p> <p>(a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III</p> <p>NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.</p>
	The relevant specifications of item description no. 49 of Weighbridge with Office Building shall be followed.
65	<p>Providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat. III</p>
	The relevant specifications of item description no. 50 of Weighbridge with Office Building shall be followed.
66	Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed (a) 20 mm (b) 25 mm
	The relevant specifications of item description no. 69 of RTS Building & Ramp shall be followed.
67	Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) With medium class Rigid PVC pipe and accessories (a) 2 wire 1.5 sq. mm (b) 2 wire 2.5 sq. mm
	The relevant specifications of item description no. 70 of RTS Building & Ramp shall be followed.
68	providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size(A) with medium class Rigid PVC pipe and accessories(a) 2 wire 4 sq. mm
	The relevant specifications of item description no. 71 of RTS Building & Ramp shall be followed.
69	Providing & erecting Approved make Ceiling Fan with double ball bearing ISI mark with Condenser 230 volt A.C.50 Hz 1200 mm sweep complete having 3 blades aluminium body and blade sets having ornamental design shanks , canopy erected with earthing. [Make shall be approved by Engineer in Charge]
	The relevant specifications of item description no. 54 of Weighbridge with Office Building shall be followed.
70	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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy> 85 lumens/watt ,LED LED driver efficiency > 85 %(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Tube Light with integral driver (iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat. III
	The relevant specifications of item description no. 73 of RTS Building & Ramp shall be followed.
71	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed. (ii) 40Amps. FP CAT-III
	The relevant specifications of item description no. 78 of RTS Building & Ramp shall be followed.
72	Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity (ii) 6 to 32Amps. Cat III
	The relevant specifications of item description no. 57 of Weighbridge & Office Building shall be followed.
73	Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (b)40 Amp. Cat III

C. ADMIN OFFICE BUILDING	
Sr. No.	Description
	The relevant specifications of item description no. 77 of RTS Building & Ramp shall be followed.
74	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel and double door (IP-43) (iv)12 way
	The relevant specifications of item description no. 75 of RTS Building & Ramp shall be followed.
75	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
	The relevant specifications of item description no. 80 of RTS Building & Ramp shall be followed.
76	Providing and erecting required size HOT deep Galvanised iron strip for earthing of H.T. , OCB/ ACB/ Transformer LT panel board, Motors etc. using proper clamp.
	The relevant specifications of item description no. 61 of Weighbridge and Office Building shall be followed.
77	Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- <2%(C) Back fill Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b)For Electrical installation up to 11 KV in normal soil. Length of Pipe : 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.
	The relevant specifications of item description no. 81 of RTS Building & Ramp shall be followed.

D. CONTAINER STORAGE PLATFORM	
Sr. No.	Description
UPTO PLINTH LEVEL	
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed. (A) Up to 1.5 Mt. Depth Platform
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
2	Rubble Stone filling with 33% Murrum in specified thickness with watering, compaction etc. complete
	The relevant specifications of item description no. 05 of RTS Building & Ramp shall be followed.
3	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)

D. CONTAINER STORAGE PLATFORM	
Sr. No.	Description
	The relevant specifications of item description no. 02 of RTS Building & Ramp shall be followed.
4	CC work M-25 for RCC Bottom Slab using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) (C) SLAB AT PL
	The relevant specifications of item description no. 07 of RTS Building & Ramp shall be followed.
5	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
6	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster in teh proportion of 1:2 using Cement: Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	The relevant specifications of item description no. 18 of RTS Building & Ramp shall be followed.

E. UNDER GROUND WATER TANK	
Sr. No.	Description
1	<p>Item No. 2</p> <p>Preparing structural design of RCC Under Ground / Partially under ground / above high ground level Reservoir of required capacity as per relevant I.S. Standards and constructing the same, including excavation in all types of soil strata (including rock) including shoring strutting if required, for loose soil / to protect from collapse, casting 100 mm thick P.C.C. leveling course in M-15, Refilling the pit with proper soil and disposing of the surplus stuff at all lead including cement plaster in CM 1:2 with approved water proofing compound to all over inside container (i.e walls, base, top slab/dome bottom etc. all). Including all types of labour and material charges of lowering, laying, erecting / hosting and jointing of pipe assembly to inlet, outlet, overflow, washout and bye pass arrangement as per hydraulic design.</p> <p>Providing and fixing accessories, CI Manhole frame and cover, water level indicator, adequate cowl type ventilators or lantern type ventilator with stainless steel jail.</p> <p>RCC chambers for valves. Providing and applying three coats of cement paint / snowcem to the out side face of structure. It also includes satisfactory water tightness test as per relevant I.S. code and painting name of scheme and capacity on the tank as per direction of engineer in charge.</p> <p>List of Indian Standards for Design of GSR / SUMP:-</p> <p>The structural design of GSR shall be in accordance with provisions relevant I.S Standards.</p> <p>(1) I.S. 3370 part I & II 2009 or latest revision</p> <p>(1.1) I.S 3370 Part III & IV 1965 or its latest revision</p> <p>(2) IS 456-2000 or its latest revision</p> <p>(3) IS 1893-2002 part I to V or its latest revision</p> <p>(4) IS 875 part I to III, 1987 or its latest revision</p> <p>General Specifications:-</p> <p>(1) Water depth in container shall be adopted as per data of tender. Capacity shall be calculated excluding free board of the reservoir. If water depth is not specified the suitable water depth / acceptable to field engineer in accordance with hydraulic requirement shall be adopted for capacity.</p> <p>(2) Shape of container (in plan) specified by in data shall be adopted in absence circular shape shall be adopted.</p> <p>(3) Size shall be fixed as per availability of space (land area) at site / acceptable engineer in</p>

E. UNDER GROUND WATER TANK	
Sr. No.	Description
	charge.
	(4) Effect of overlapping of pressure bulbs on soil due near by structure and proposed sump should be considered.
	(5) Care shall be taken that no damage should occur to nearby existing structure. Compensation shall be paid for the same by agency.
	(6) The minimum concrete grade for RCC shall be M-30
	(7) HYSD Fe 415 / 500 grade reinforcing bars confirming to I.S. 1786 / 1139 shall be considered in design. CRS / TMT bars shall be provided. In saline atmosphere corrosion resistance stainless steel / HCR rebar shall be provided. Any other steel can be used with approval of C.E./ in situation of non availability in market without extra cost.
	(8) Minimum size (or thickness) of various components shall be provided as per tender criteria / specifications in absence as per I.S./ Std. practice of G.W.S.S.B. Minimum dimensions specified for various components in tender data / specifications shall be provided without fail.
	(9) The safe bearing capacity (SBC) shall be referred from SBC test report. In absence of report it shall be referred from data sheet. If poor soil is found / water table is met with during excavation SBC shall be scientifically ascertained and design shall be revise. No extra shall be paid for increase in quantity.
	(10) DI pipes and special shall only be used if type is not specified in tender.
	(11) The rate shall include cost of dewatering during excavation making all arrangement when water table meets within depth.
	(12) The structure shall be designed properly to resist uplift due to ground water table specified in data or actual ground water table meets with during excavation. If GWT / Uplift is mentioned in tender and during excavation it dose not meet 7.5% rate shall be reduced.
	(13) SS pipes railing shall be provided when sump is more than or equal to 1.5 meter above ground level.
	(14a) RCC staircase / RCC steps should be provided from GL to sump top slab based on the height of GSR above or below the ground .
	(14b) RCC staircase with SS railing to be provided inside reservoir container BB masonry stair cabin with MS safety door having locking arrangements to be provided for GSR, sump, and HGLR of capacity more than 7.5 lac lit. with top slab. If dome is considered as top slab then provide minimum opening of 900 mm X 2000 mm with curbing and SS railing around.
	(15) Appearance of structure should be aesthetically good looking acceptable to authority.
	(16) Any change in size, shape, depth below GL, height above GL, water depth, F.B., size of member etc can be permitted in exceptional case due to site condition or hydraulic design requirement by C.E. No extra shall be paid for change.
	(17) Any change in data, dimensions, shape, water depth, reduction in size if permitted by competent authority and if it reduces quantity then payment shall be reduced prorata.
	(18) When capacity of GSR / Sump is > 20 lakh liters two or suitable compartments acceptable to executive engineer shall be designed and provided.
	(19) Agency shall engage qualified (at least graduate) consulting engineer for designing the structure and he / she shall visit the site for guidance of work.
	(20) 75% part rate shall be payable for concrete, reinforcement and plastering items of container until satisfactory hydraulic testing for water tightness is performed as per tender condition. Till the work shall be treated as incomplete.
	Above conditions / general specifications Sr. No. 1 to 20 are part and parcel of tender (contact) and prevail over other provisions in tender.
	As above rectangular sump with water table (Sub Soil water above foundation level)
	(3)Cost of 100000 Liter

E. UNDER GROUND WATER TANK	
Sr. No.	Description
	(3a) Add for Capacity above 100000 up to 200000 litre
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Nos.</p>
ELECTRICAL WORKS	
2	<p>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 III</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each.</p>
3	<p>Providing & erecting open well horizontal mono block pump set with cast iron body, complete for three phase submersible motor having [C] For 3 HP 3 phase open well horizontal mono block pump set suitable for 85 LPM to 270 LPM @ 11 mtr to 33 mtr head suitable for 50/65 mm dia delivery pipe cat III</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each.</p>
4	<p>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.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Nos.</p>
5	<p>Providing and erecting ISI marked PVC insulated PVC Sheathed Flat flexible Submersible copper</p>

E. UNDER GROUND WATER TANK	
Sr. No.	Description
	cable approved make of following Size. (B) 3 Core x 2.5 Sq. mm.
	The relevant specifications of item description no. 47 of Toilet Block shall be followed.
6	Supplying of following size of STANDARD UPVC column pipe with coupler and wire lock [D] 50 mm dia
	The relevant specifications of item description no. 49 of Toilet Block shall be followed.

F. Land Development	
Sr. No.	Description
1	Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete A. 0 to 0.2 mt depth
	The relevant specifications of item description no. 11 of RTS Building & Ramp shall be followed.
2	Rubble Stone filling with 33% Murrum in specified thickness with watering, compaction etc. complete
	The relevant specifications of item description no. 05 of RTS Building & Ramp shall be followed.
3	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 06 of RTS Building & Ramp shall be followed.
4	Providing and Casting Controlled cement concrete M 250 proportions of ingredients as per mix design by weigh batching for pavement wearing coat 75 mm thick including floor finishing with a floating of neat cement complete. TREMIX VD SYSTEM including providing and fixing channels as per required levels and slope, leveling poured concrete between channels with Double Beam screed vibrators removing excess water using VD Pump finishing the surface with power trowel and power floater including cutting the groove of size 5mm x 10mm at required distance and providing and filling the same with bitumen as per practices etc. complete at all levels Excluding steel reinforcement.
	The relevant specifications of item description no. 24 of RTS Building & Ramp shall be followed.

G. COMPOUND DEVELOPMENT - GREEN BELT	
Sr. No.	Description
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed. (A) up to 1.50 m depth Green Space
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
2	Grassing with selection No.1 grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn, free from weeds and fit for mowing including supplying good earth, if needed In rows 5 cm apart in both directions.
	Material and Workmanship: Soil Spreading: Finished surfaces will be smooth, free of lumps, humps and hollows and left ready for planting works. Garden Beds; Spread native blend garden bed mix to a maximum depth of 200mm, when settled. Back filling shall be tampered progressively to avoid later subsidence. Mound all garden beds to centre. Allow for depth of mulch to finished levels when installing soil mix.

G. COMPOUND DEVELOPMENT - GREEN BELT	
Sr. No.	Description
	<p>Mulch: Mulch shall be free of soil, weed growth or any other foreign matter. Spread mulch evenly to a depth of 75mm over all garden beds. Rake over mulch surface to create an even finish. Mulch selection to be supplied / approved by client.</p> <p>Supply of good quality garden soil free from debris and roots with normal pH range as per requirement for development of garden/Lawns. While developing the area it should be ensured that the thickness of the soil spreading should not be less than 300 mm from the existing surface of the ground. Engineer In-charge's inspection report should be obtained towards spreading of garden soil before laying the Grass.</p> <p>GRASSING WITH SELECT GRASS NO. 1 The area from where the grass roots are to be obtained shall be specified by the Engineer-in- Charge at the time of execution of the work and no royalty shall be charged on this account from the contractor. Grass is to be arranged by contractor.</p> <p>The soil shall be suitably moistened and then the operation of planting grass shall be commenced. The grass shall be dibbled at 10 cm, 7.5 cm, 5 cm apart in any direction or other spacing as described in the item. Dead grass and weeded shall not be planted. The contractor shall be responsible for watering and maintenance of levels and the lawn for 30 days or till the grass forms a thick lawn free from weeded and fit for moving whichever is later. Generally planting in other direction at 15 cm, 10 cm, spacing is done in the case of large open spaces, at 7.5 cm spacing in residential lawn and at 5cm spacing for Tennis Court and sports ground lawn. Rates are including cost of labour and material and grass.</p> <p>During the maintenance period, any irregularities arising in ground levels due to watering or due to trampling by labour, or due to cattle straying thereon, shall be constantly made up to the proper levels with earth as available or brought from outside as necessary, Constant watch shall be maintained to ensure that dead patches are replanted and weeds are removed.</p> <p>Measurements Length, breadth of the lawn grassed shall be measured correct to 0.1 meter and the area shall be calculated in sqm. Correct to two places of decimal. Rate The rate shall be for a unit of one square meter. The rate shall include of all the labour and material involved in all the operations described above, and grass so needed for properly maintaining the levels of the lawns.</p>
3	<p>Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. Complete</p> <p>Green Space</p> <p>The relevant specifications of item description no. 09 of RTS Building & Ramp shall be followed.</p>
4	<p>Supply and stacking of Peltophorum species plant of height 150-165 cm. in big poly bags of size 25 cm</p> <p>In Green Belt</p> <p>Materials:-</p> <ol style="list-style-type: none"> 1. The plants should be full of fresh and healthy foliage. 2. The plants should be free from insect, pest and diseases. 3. Plant should be well developed and healthy. 4. The height of the plants will be measured from top of the pots/poly bags.

G. COMPOUND DEVELOPMENT - GREEN BELT	
Sr. No.	Description
	<p>5. The plants should be well settled and should not be newly shifted/Transplanted.</p> <p>6. The plants should be true to the variety and Variety name should be tagged.</p> <p>7. Moss stick used should be made on plastic pipe.</p> <p>8. Moss stick should be straight and properly fixed in the pot/polybags.</p> <p>9. The rejected plants materials should be removed from the site immediately.</p> <p>10. Moss stick should be covered with the plants in case of plants supplied with moss stick.</p> <p>11. The Plant should be well stabilized and should have good foliage.</p> <p>12. Good earth and manure used for filling the pot/poly bag should be free from any inert material and mixed to proper ratio.</p> <p>13. Pot/ Poly bag used for filling the plants should be of proper size.</p> <p>14. There should be proper drainage in pots for plants.</p> <p>15. The flowering plants should also have proper flowering and should be true to the variety.</p> <p>16. All plant should have the tendency of growth and should not be stunted or de shaped.</p> <p>17. There should be no stagnation of water in the pots.</p> <p>18. Plant should not have any physiological disorder.</p> <p>19. Tips of the Plants should have intact, there should not be any damages etc.</p> <p>20. In case of flowering pots flower should be on bud stage/semi bloom stage.</p> <p>21. In case of potted plant pots should have uniformity/same size and quality.</p> <p>22. Plants of bigger height should be properly supported /stacked by bamboo stick.</p> <p>23. Pots/Poly bags soil should not be infectious and plant should have free from all kind of diseases.</p> <p>24. Bulbs, seeds, seedling, suckers should properly treat with fungicides before sup.</p>
5	<p>Digging holes in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%): Holes 60 cm dia, and 60 cm deep, Plantation of Trees, Shrubs, and Hedge at site i/c watering and removal of unserveiceable material's as per direction of officer in charge (excluding cast of plant & water)</p>
	In Green Belt
	<p>DIGGING HOLES FOR PLANTING TREES</p> <p>In ordinary soil, including refilling earth after mixing with oil cake/ manure and watering. Holes of circular shape in ordinary soil shall be excavated to the dimensions described in the items and excavate soil broken to clods of size not exceeding 75 mm in any direction, shall be stacked outside the hole, stones, brick bats, unsuitable earth and other rubbish, all roots and other undesirable growth met with during excavation shall be separated out and unserviceable material removed from the size as directed. Useful material, if any, shall be stacked properly and separately. Good earth in quantities as required to replace such discarded stuff shall be brought and stacked at site by the contractor which shall be paid for separately.</p> <p>The tree holes shall be manured with powdered Neam/castor oil cake at the specified rate along with farm yard manure over sludge shall be uniformly mixed with the excavated soil after the manure has been broken down to powder, (size of particle not be exceeded 6 mm in any direction) in the specified proportion, the mixture shall be filled in to the hole up to the level of adjoining ground and then profusely watered and enable the soil to subside the refilled soil shall then be dressed evenly with its surface about 50 to 75 mm below the adjoining ground level or as directed by the Engineer-in-charge.</p> <p>SUPPLY AND STACKING OF SLUDGE</p> <p>It shall be transported to the site in lorries with efficient arrangement to prevent spilling enroute. It</p>

G. COMPOUND DEVELOPMENT - GREEN BELT	
Sr. No.	Description
	<p>shall be stacked at site. Each stack shall not be less than 50 cm height and volume not less than 3 cum.</p> <p>Measurements Length, breadth and depth of stacks shall be measured correct to a cm. The volume of the stack shall be reduced by 8% for looseness in stacking and to arrive at the net quantity.</p> <p>Rate The rate shall include the cost of labour and material involved in all operations described above, including carriage.</p> <p>FILLING MIXTURE OF EARTH & SLUDGE OVER MANURE</p> <p>The separately specified earth and sludge shall be broken down to particles of size not exceeding 6 mm in any directions before mixing. Good earth shall be thoroughly mixed with sludge over manure in specified proportions as directed by Officer-in-Charge. During the process of preparing the mixture as above, trenches shall be flooded with water and levelled.</p> <p>Rate:</p> <p>The rate shall be for a unit of Each Digging Hole.</p> <p>The rate shall include the cost of all the labour, material involved in all the operations described above items, including the cost of supply and stacking the requisite quantity of manure/sludge and oil cake. The rate shall also include royalty if payable</p>

H. COMPOUND WALL	
Sr. No.	Description
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	(A) up to 1.50 m depth
	Footing & GB
	(B) 1.50 m to 3.0 m depth
	Footing
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 02 of RTS Building & Ramp shall be followed.
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 03 of RTS Building & Ramp shall be followed.
4	CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(A) COLUMNS
	CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(B) BEAMS
	CC work M-25 for Coping using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)
	(3) Coping
	The relevant specifications of item description no. 04 of RTS Building & Ramp shall be followed.
5	Brick Masonry work in Cement:Mortar 1:6
	The relevant specifications of item description no. 14 of RTS Building & Ramp shall be followed.

H. COMPOUND WALL	
Sr. No.	Description
6	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 13 of RTS Building & Ramp shall be followed.
	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	The relevant specifications of item description no. 09 of RTS Building & Ramp shall be followed.
7	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster inteh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	The relevant specifications of item description no. 18 of RTS Building & Ramp shall be followed.
8	Finishing wall with water proofing cement paint of on wall surfaces (Threecoats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials.
	The relevant specifications of item description no. 10 of Weighbridge with Office Building shall be followed.
9	Supply and fixing 610mm dia. concertina coil fencing etc. complete.
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of kg.
10	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 conneted to common rafters and the like The relevant specifications of item description no. 23 of RTS Building & Ramp shall be followed.

I. Main Gate	
Sr. No.	Description
1	Excavation of foundation in soft rock up to required depth including dewatering with lifting and laying in RMC limit as instructed.
	(A) up to 1.50 m depth
	Footing
	(B) 1.50 m to 3.0 m depth
	Footing
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
2	CC work 1:3:6 using aggregate of size 10-20 mm, curing, finishing etc. complete (without reinforcement)
	The relevant specifications of item description no. 02 of RTS Building & Ramp shall be followed.
3	CC work M-25 for RCC footing using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement)

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Sr. No.	Description
	Footing CC work M-25 for Column using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) Column CC work M-25 for Beam using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) Ground Beam and Tie Beam CC work M-25 for Stair Case using aggregate of size 10-20 mm, centring, curing, finishing etc. complete (without reinforcement) SLAB FOR CABIN
	The relevant specifications of item description no. 09 of Truck Wash & Maintenance Area shall be followed.
4	Supplying, Cutting, Bending, Binding and Hooking and binding with wire for RCC work Tor steel TMT round bar including all cost
	The relevant specifications of item description no. 08 of RTS Building & Ramp shall be followed.
5	Filling of Plinth with using excavated usefull material partly and remaining murrum to be brought from out side in layer of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete
	The relevant specifications of item description no. 09 of RTS Building & Ramp shall be followed.
6	Providing and fixing 35 mm thick shutters for Doors, windows and clear story windows including anodised alluminium butt hinges with necessary screws.(A) Indian Teak Wood (1) Fully Panelled Fully Paneled D Providing and fixing 35 mm thick shutters for Doors, windows and clear story windows including anodised alluminium butt hinges with necessary screws. (A) Indian Teak Wood (ii) Fully Glazed. Fully Glazed W
	The relevant specifications of item description no. 17 of Generator & Electrical Room shall be followed.
7	Brick Masonry work in Cement:Mortar 1:6
	The relevant specifications of item description no. 14 of RTS Building & Ramp shall be followed.
8	20mm thick Sand Face Cement Plaster Work in which 1 paster in proportion of 1:3 and 2nd plaster in teh proportion of 1:2 using Cement:Mortar with spong finishing etc. complete (Note: Before carringout Plaster work on RCC, required tipping work should be carried out as instructed)
	The relevant specifications of item description no. 18 of RTS Building & Ramp shall be followed.
9	Cement Plaster 12 mm thick using Cement:Mortar in proportion 1:3 with Niru Finishing curing, etc. complete
	The relevant specifications of item description no. 17 of RTS Building & Ramp shall be followed.
10	Providing, fixing and Lettering Stainless steel Font " RAJKOT MUNICIPAL CORPORATION - REFUSED TRANSFER STATION, MOTA MUVA" (height 12") on FRONT TOP beam as per drawing. at elevation portion as directed by Engineer in charge.
	Stainless Steel: The Stainless-Steel font shall be specified size and quality. The S.S. font shall conform to steel of grade designation 312 conforming to IS 13983 or as instructed by engineer in charge. The S.S. font shall be of 30 cm height and of 16-gauge (1.62 mm) thickness with S.S. plate of 2.00 mm thickness of steel grade The S.S. rod and flat shall be of steel grade AISI 312. 312.

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	<p>S.S. Plate: Stainless Steel plate of 04 mm thickness of steel grade AISI 316/312.</p> <p>Fixing of font: 16 mm S.S. rod of required size as per instruction of engineer in charge or drawing shall be fixed on the side of beam/wall by welded or stainless-steel nuts and bolts on S.S. plate of size 100 mm x 100 mm x 4 mm size grouted in wall side or above surface with minimum 50 mm depth in rich cement mortar or slurry. Curing shall be done minimum seven days where cement is used in work. Cutting and welding shall be making as per engineer in charge or drawing. Grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless-steel nuts and bolts complete, including fixing the font with necessary accessories & stainless-steel dash fasteners, stainless steel bolts etc., of required size.</p> <p>Finish Font may be supplied with a bright or dull finish, as desired by the engineer in charge.</p> <p>Marking Each S.S. material for font shall be clearly and permanently marked with the following information in such a way that it can be easily seen after installation: a) The manufacturer's name or identification mark, b) Year of manufacture.</p> <p>Workmanship: Steel grade shall be of 312 as specified and erection/fixing shall be done by as per standard practice and as per instruction of engineer in charge with good workmanship.</p> <p>16 mm S.S. rod of required size as per instruction of engineer in charge or drawing shall be fixed on the side of beam/wall by welded or stainless-steel nuts and bolts on S.S. plate of size 100 mm x 100 mm x 4 mm size grouted in wall side or above surface with minimum 50 mm depth in rich cement mortar or slurry. Curing shall be done minimum seven days where cement is used in work.</p> <p>Cutting and welding shall be making as per engineer in charge or drawing. Grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless-steel nuts and bolts complete, including fixing the font with necessary accessories & stainless-steel dash fasteners, stainless steel bolts etc., of required size.</p> <p>The height S.S. font shall be 30cms.</p> <p>Mode of measurements and payment: The rate includes cost of all labour, materials, tools and plant and other equipment required for satisfactory completion of this item as described in workmanship. The rate shall be for a unit of one number</p>
11	Providing & fixing steel work welded in built up structural M.S. Sections, Plates etc. for Platform, MS ladder, inserts including fabrication as shown in the drg. all steel work to have primer coat of red oxide zink chromate paint to relevant IS followed by final coat as per specification / 2 coats of approved enamel paint as directed by engineer in charge etc with all material & labour, complete.
	Materials

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	<p>The structural steel work shall conform to M-22. Red lead paint primer shall conform to I.S. 102-1962</p> <p>Workmanship:</p> <p>Riveted Section</p> <p>The steel section as specified or required shall be cut square and to correct length as per drawings and design. The cut ends exposed to view shall be finished smooth. No two pieces shall be welded otherwise jointed to make up the required length of member, except as indicated in 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.</p> <p>Steel riveted or bolted or welded in built up sections frame work.</p> <p>The steel structure as shown in the drawings or as per direction of the Engineer-in-charge shall be laid out of level platform to full scale and to full size or in parts. A steel tape shall be used for measurements to ensure maximum accuracy.</p> <p>Wooden templates 12 mm to 19 mm thick or metal sheet template 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 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.</p> <p>All stiffeners shall be formed by pressure and where practicable, the metal shall not be cut and welded in making the set. In major works or where so specified. Shop drawings giving complete details and information for the fabrication of component parts of the structure, including location type size length and details of rivets, bolts or weld shall be prepared in advance of the actual fabrication and as approved. The drawings shall indicate the shop and field rivets and bolts. The steel members shall be distinctly marked or stencilled with paint with the identification mark as given in the shop drawings.</p> <p>The bars shall be thickened at the ends, so as to provide for screwed threads and gradually tapered off to meet their normal section.</p> <p>Great accuracy shall be observed in fabrication of various member, 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, bends, buckles or open joints. Before making holes individual members for fabrication, the steel work intended to be riveted or bolted together shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping 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 dressed true and straight and fitted close together. Web splice plates and fillers under stiffeners shall be cut to fit with 3 mm or flange Angles web plates of Girders shall have not cover plates, shall have their ends flush with the top of angles forming the flanges unless otherwise required. The web plates when specified shall have clearance of more than 6 mm.</p> <p>The erection, clearance for cleared ends of members connecting steel to steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be</p>

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	<p>more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably, designed seating shall be provided.</p> <p>Pins and rollars shall be accurately turned to gauge. These shall be straight and smooth and free from flows. The roller bearing shall be provided with adequate arrangement 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 to gather shall be accurately mechanized so fabricated and place in position with greater accuracy so that they are not unduly reduced in thickness by machining.</p> <p>The ends of 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 required size. The holes for rivets and bolts shall be lager by 0.4 to 6 mm than the nominal diameter of rivets or black bolts depending upon the diameter of rivets.</p> <p>Holes shall have their axis perpendicular to the surface bored through. The drilling or reamering shall be free from butts and the holes should be clean an accurate. Holes for counter shunk bolts shall be made in such a manner that their heads fit flush of rivets turned and fitted bolts and black bolts.</p> <ul style="list-style-type: none"> (i) Rivets and 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 sparing where a force is carried through a connection without impact, vibration or reversal of stresses. <p>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 rigid held together while</p> <p>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 s to fill the hole thoroughly and from the required head after riveting.</p> <p>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 replace. The heads of rivets shall be central to shanks and shall grip the assembled members firmly. In cutting out rivets, care shall be taken so as not be injuring the assembled, members caulking or recuppying shall not be permitted.</p> <p>For testing rivets, 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.</p> <p>All rivet heads shall be painted with red lead paint within a week of their fixing.</p> <p>Bolting all bolt heads and nuts shall be hexagonal and of equal size unless specified otherwise. The</p>

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	<p>screwed heads shall conform to I.S. 1363-1960 and the threaded surface shall not be tapered.</p> <p>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 they 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 bolts 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 vibrators 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.</p> <p>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 specifications of painting.</p> <p>Welding shall generally be done by electric process. Gas welding shall be resorted to using oxyacetylene flame with specific approval. Gas welding shall not be permitted for structural steel work.</p> <p>The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded shop and site welds as well as type of electrodes to be used. Symbol for welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must be done after improper welding that is likely to be done due to heights and difficult position on scaffoldings etc.</p> <p>The welding work shall conform to I.S. 816-1969.</p> <p>Preparation of surfaces: Surface 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. Assembly of welding: Before welding is commenced, the plates shall first be brought together and firmly clamped or spot welded at specified distance. The temporary connection has to be strong enough to hold the plates accurately in place without displacement.</p> <p>Precautions: All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968.</p> <p>The following points shall be borne in mind during the process of welding</p> <p>(a) Welds shall be made in flat position wherever practicable.</p> <p>(b) Arc length, voltage and amperage shall be suited to the thickness of material, type of groove and other circumstances of the work.</p> <p>(c) The segments of welding shall be such be considered harmful to the strength shall cut out and rewelded.</p> <p>The defective welds which shall be considered harmful to the strength shall cut out and rewelded.</p>

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	<p>Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all stage has been removed welds and adjacent parts shall be painted after the same are approved. All the members shall be thoroughly cleaned of rust scales, dust etc. and given a priming coat of red lead paint before fixing them in position.</p> <p>Mode of measurements & payments</p> <p>The steel work shall be measured in general as under.</p> <ol style="list-style-type: none"> All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise. The weight of steel sections, steel strips in finished work shall be calculated from standard weight on the same basis on which steel is supplied to the Contractor by department or those given in relevant I.S. if steel is arranged by the contractor. The weight of steel plates and strips shall be taken from relevant I.S. based on 7.85 Kg/Sq. meter for every millimeter sheet thickness if steel is supplied by the contractor; otherwise the weight shall be calculated on the basis on which steel is supplied to the contractor by department. Unless otherwise specified weight of clearets, brackets, packing pieces, bolts, nuts, washers, distance pieces, separators diaphragm gusset (taking over all square dimensions fish plates etc. shall be added to the weight of respective Descriptions. In riveted work allowances to be made of weight of rivet hands. No deductions shall be made for rivet or bolt holes excluding holes for anchore or holding down bolts. For forged steel and steel costing, weight shall be calculated on the basis of 7850 kg.cum. Unless otherwise specified an addition of 2.5 percent of the weight of structure shall be made for shop and site rivet heads in rivetted steel structure. Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure. Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001m. Mill tolerance shall be ignored when weight is determined by calculation. <p>The rate includes cost of all material, labour, erection, hoisting, scaffolding, and protective measure, required for proper completion of the Description of work. This shall also included conveyance and delivery loading, unloading and storing etc. Required for completing the Description described above including necessary wastage involved.</p> <p>The rate shall be for a unit of Kg</p> <p>Welded Section:</p> <p>Materials & Workmanship</p> <p>The relevant specification of Description of riveted section shall be followed except that the steel work shall be done by welding.</p> <p>Welding shall generally be done by electric process. Gas welding shall be resorted to using oxyacetylene flame with specific approval. Gas welding shall not be permitted for structural steel work.</p> <p>The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded shop and site welds as well as type of electrodes to be used. Symbol for</p>

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	<p>welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must be done after improper welding that is likely to be done due to heights and difficult position on scaffoldings etc.</p> <p>The welding work shall conform to I.S. 816-1969.</p> <p>Preparation of surfaces: Surface 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.</p> <p>Assembly of welding: Before welding is commenced, the plates shall first be brought together and firmly clamped or spot welded at specified distance. The temporary connection has to be strong enough to hold the plates accurately in place without displacement.</p> <p>Precautions: All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968.</p> <p>The following points shall be borne in mind during the process of welding</p> <p>(A) welds shall be made in flat position wherever practicable.</p> <p>(b) Arc length, voltage and amperage shall be suited to the thickness of material, type of groove and other circumstances of the work.</p> <p>(c) The segments of welding shall be such be considered harmful to the strength shall cut out and rewelded.</p> <p>The defective welds which shall be considered harmful to the strength shall cut out and rewelded.</p> <p>Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all stage has been removed welds and adjacent parts shall be painted after the same are approved. All the members shall be thoroughly cleaned of rust scales, dust etc. and given a priming coat of red lead paint before fixing them in position.</p> <p>Mode of measurements & payments The rate shall be for a unit of quintal</p>
12	<p>Alucomat Ti - Zink aluminium composite Panel 4 mm thick cladding as per drawing, approved color, specification and as directed by engineer in charge</p> <p>Item shall be executed as per manufacturer's specification and instruction of engineer in charge.</p> <p>Rate shall be for a unit of one square meter.</p>
13	<p>Finishing wall with water proofing cement paint of on wall surfaces (Three coats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials.</p> <p>The relevant specifications of item description no. 10 of Weighbridge with Office Building shall be followed.</p>
14	<p>Providing and erecting approved make LED compound wall light 200 mm dia, 300 mm high, aluminium base, white color, LED E27 8 W bulb, luminous flux 750 lm, luminous efficiency ≥ 90 lm/w with fixtures and lamp etc. complete and as directed by engineer in charge</p> <p>Item shall be executed as per item description, drawing and instruction of engineer in charge.</p> <p>Rate shall be for a unit of one number.</p>
ELECTRICAL WORK	
15	<p>Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below</p>

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	type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete
	The relevant specifications of item description no. 66 of RTS Building & Ramp shall be followed.
16	Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected with 6A Modular type switch and hum free EME step type electronic fan regulator mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D.Connector as directed. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete cat III NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-5 & 1-5-1 & 1-5-2.
	The relevant specifications of item description no. 49 of Weighbridge with Office Building shall be followed.
17	Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories. NOTE:1. For use of ZHFR/HRFR Copper wires in place of FRLS PVC wires add 5% in Item of Point wiring Item No 1-1-1 to 1-2-6 & 1-5-1 & 1-5-2. [II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board. (a) with medium class Rigid PVC pipe and accessories erected flushed on wall/ceiling complete
	The relevant specifications of item description no. 67 of RTS Building & Ramp shall be followed.
18	Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed (a) 20 mm (b) 25 mm
	The relevant specifications of item description no. 69 of RTS Building & Ramp shall be followed.
19	Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size (A) With medium class Rigid PVC pipe and accessories (b) 2 wire 2.5 sq. mm
	The relevant specifications of item description no. 70 of RTS Building & Ramp shall be followed.
20	Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand / Solid Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (A) 4 core 4 Sq. mm
	The relevant specifications of item description no. 82 of RTS Building & Ramp shall be followed.
21	Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated

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	armoured cable complete with out going tails, insulating tape etc for following size of cables. (A) 2 to 4 core 2.5 / 4 Sq. mm
	The relevant specifications of item description no. 87 of RTS Building & Ramp shall be followed.
22	Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (A) 1.5/ 2.5/4/6 Sq.mm
	The relevant specifications of item description no. 89 of RTS Building & Ramp shall be followed.
23	Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable A)50mm Outer dia
	The relevant specifications of item description no. 85 of RTS Building & Ramp shall be followed.
24	Providing & erecting Approved make Ceiling Fan with double ball bearing ISI mark with Condenser 230 volt A.C.50 Hz 1200 mm sweep complete having 3 blades aluminium body and blade sets having ornamental design shanks , canopy erected with earthing. [Make shall be approved by Engineer in Charge]
	The relevant specifications of item description no. 54 of Weighbridge with Office Building shall be followed.
25	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/ aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 160V to 270V, Power Factor more than 0.95, THD < 15%, CCT 3000 K to 6500K, Luminaire efficacy> 85 lumens/watt ,LED LED driver efficiency > 85 % (fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Tube Light with integral driver (iv) 22-24 Watts, Surge - 2KV,IP-20, conventional 4 feet Cat -III
	The relevant specifications of item description no. 73 of RTS Building & Ramp shall be followed.

J. FIRE FIGHTING, DETENTION & PA SYSTEM WORKS	
Sr. No.	Description
A.	FIRE FIGHTING SYSTEM :
1	Supply, Installation, Testing & Commissioning of MS Pipes (above ground level)(Hydrant System) confirming to IS 1239 medium duty malleable specials such as Reducers, Tees, elbows, flanges. Including cutting, Welding with all associated works & accessories (a) 100 mm (b) 80 mm
2	Supply, Installation, Testing & Commissioning of Hydrant valve oblique pattern single head SS 80mm inflow dia and 63 mm outflow dia with black cap, chain nut-bolt rubber gasket complete (ISI Marked)
3	Supply, Installation, Testing & Commissioning of First Aid Swinging Hose Reel Drum along with Isolation Valve & necessary pipe fittings complete. (30 metre Length)
4	Supply, Installation, Testing & Commissioning of Hose Box cabinet made of MS sheet to accommodate 2 nos fire hose and 1 branch pipe
5	Supply, Installation, Testing & Commissioning of 63mm RRL Hose of 15 mtr length & Male Female Instantaneous coupling (SS)
6	Supply, Installation, Testing & Commissioning of Branch Pipe 16 mm dia outlet with 63 mm (SS)
7	Supply, Installation, Testing & Commissioning of Two Way Fire Brigade Inlet with 63mm instantaneous coupling.
8	Supply, Installation, Testing & Commissioning of Cast Iron Sluice Valve of 100mm.
9	Supply, Installation, Testing & Commissioning of Isolation Valve of 100mm S S Plate of PN 1.6 including nuts, bolts, gasket.
10	Supply, Installation, Testing & Commissioning of Single Plate Non Return valve 100 mm including nuts, bolts.
11	Supply, Installation, Testing & Commissioning of Ball Valve -25 mm dia
12	ISI Marked Fire Extinguisher, ABC (Powder) Type, Capacity – 04.0 Kgs
13	ISI Marked Fire Extinguisher, BC (Co2) Type, Capacity – 04.5 Kgs
14	ISI Marked Fire Extinguisher, ABC (Powder) Type, Capacity – 01.0 Kgs
15	Supply of 10.8 Cum./hr. electrically driven horizontal centrifugal, end suction type Common Jockey pump set for wet riser Sprinkler system at 7.0 Bar & 2,900 rpm with all necessary accessories like bronze impeller, stainless steel shaft and mechanical seal along with anti-vibration mounting pad and flexible connections at discharge end of the pipes etc., and shall be automatic in operation. Pump shall have electrical motor of adequate KW/HP suitable for electric supply, material, piping, fittings, installation, minor civil works, etc. complete.
16	Auto / Manual Panel for the Pump
17	Pressure Gauge
18	Pressure Switch
19	Installation & Fittings Charges
20	Various Symbols as per BOQ

NOTE:

ITEM NO. 1 TO 20 SHALL BE EXECUTED AS PER DETAILED SPECIFICATION LAID DOWN IN THIS TENDER DOCUMENT AND ELECTRICAL PART OF TRANSFER STATION BUILDING.

K. STORM NETWORK	
S r. N o.	Description
1	Excavation of trench for Pipes in Soft Murrum / Clay / Sand with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
2	Excavation of trench for Pipes in Hard Murrum with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 01 of Truck Wash & Maintenance Area shall be followed.
3	Excavation of trench for Pipes in Soft Rock with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
4	Excavation of trench for Pipes in Hard Rock using Breaker / blasting / Chiezale / Hammer with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
5	Excavation of trench for Pipes in Soft Murrum / Clay / Sand with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
6	Excavation of trench for Pipes in Hard Murrum with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
7	Excavation of trench for Pipes in Soft Rock with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
8	Excavation of trench for Pipes in Hard Rock using Breaker / blasting / Chiezale / Hammer with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 01 of RTS Building & Ramp shall be followed.
9	Providing bhogavo sand bedding including raming , watering, consolidating etc. complete
	The relevant specifications of item description no. 60 of RTS Building & Ramp shall be followed.
10	R.C.C. Spun pipe IS. N.P.-3 class pipe, should of the standard design and also have corresponding standard diameter as per length including spigot and socket with rubberized, all taxes, insurance, transportation, loading along with unloading and reaching the store or site and carrying out necessary inspections along with providing supply work and required hemp, wata (from CM. 1:1) and also line level And complete including laying, jointing, curing with required hemp in grades. for pipe of NP - 3 class of 350 m.m. dia. only supply work.
	<p>Workmanship:</p> <p>Materials:</p> <p>The reinforced concrete non pressure pipes of specified diameter shall be confirmed to relevant is: 458. Material shall be of the 1st quality of the approved make or equivalent as approved by the Consultants.</p> <p>Carting and Handling</p> <p>The pipes and other materials required shall be transported from the factory to the work sites at places along the alignment of pipeline as directed by the engineer-in-charge. The contractor shall be responsible for the safety of pipes and fittings/specials in transit, loading / unloading. Every care shall be exercised in handling pipes to avoid damage. While unloading, the pipes and fittings/specials shall not be thrown down from the truck on the hard surfaces. They shall be unloaded on timber skids with</p>

K. STORM NETWORK	
S r. N o .	Description
	<p>steadying ropes or by any approve means. Padding shall be provided between coated pies, fittings/specials and timber skids to avoid damage to the coating. Suitable gaps between pipes should be left at intervals in order to permit access from one side to the other. In case of spigot socket pipes, care should be taken regarding orientation of pipes while unloading. As far as possible pipes shall be unloaded on one side of the trench only. The pipes shall be checked for any visible damage while unloading and shall be sorted out. Any pipe which shows sufficient damage to preclude it from being used shall be discarded. Dragging of pipes and fittings/specials along concrete and similar pavement with hard surfaces shall be prohibited.</p> <p>New pipes can be brought to site only after the mandatory tests (i.e cube tests, three edge bearing tests, hydrostatic tests, dimension test water absorption test etc.) are completed.</p> <p>Storage:</p> <p>Each stack of pipe shall contain only pipes of same class and size, with consignment or batch number marked on it with particulars of suppliers wherever possible. Storage shall be done on firm level and clean ground and wedges shall be provided at the bottom layer to keep the stack stable. The stack shall be in pyramid shape or the pipes laid lengthwise and crosswise in alternate layers. The pyramid stack shall be made for smaller diameter pipes for conserving space in storing them. The height of the stock shall not exceed 1.5 m.</p> <p>Laying:</p> <p>The pipes shall be lowered into the trenches carefully; Mechanical appliances may be used. Where necessary pipe shall be laid in straight lines or with easy curves and true to line and gradient as specified. The laying of pipe shall precede upgrade of a slope. In the pipe with loose collar, the collars shall be slipped on before the next pipe is laid.</p> <p>In case where the foundation conditions are unusual such as the proximity of trees or holes, under existing or proposed around in 150 mm thick cement concrete 1:5:10 (1 cement: 5 fine sands: 10 graded stone aggregate 40mmnominalsize) or compacted sand or gravel.</p> <p>Incasewherethenaturalfoundationisinadequatethepipeshallbelaideitherinconcretetecradle, supported on proper foundation or on any other suitably designed structure. If concretebeddingissued,the depthofconcretebelowbottomofthepipeshallbeatleast$\frac{1}{4}$th ofthe internal diameter of the pipe subject to a minimum of 100 mm and maximum 300 mm. The concrete shall be extended up to the sides of the pipe at least a distance of $\frac{1}{4}$th of the out sided diameter for pipes 300mm and over in diameter.</p> <p>The pipes shall be laid in the concrete bedding before the concrete has set. Pipes laid in trenches in earth shall be bedded evenly and firmly as far as up to the haunches of the pipe as to safely transit the load expected from the backfill through the pipe to the end. This shall be done either by excavating the bottom of the trenches to fit the curve of the pipe or by compacting the earth under round curve of the pipe to form an even bed. Necessary provision shall be made for joints wherever required.</p> <p>Jointing:</p> <p>The joints shall be done by slipping the collar over and clear of the end of the pipe. The recess of the end of the pipe shall be filled with jute threading dipped in hot bitumen. The new pipe shall then be brought forwarded until bitumen ring in recess of first pipe is set into the recess of the second pipe.</p>

K. STORM NETWORK	
S r. N o .	Description
	<p>This process shall be repeated for two or three pipes which shall then be jacked up so as to thoroughly compress the bitumen. The quantity of jute and bitumen shall be just enough to fill the recess when pressed hard by jacking care being taken that no off set of the jute braiding shall be visible either enough to fill the recess when pressed hard by jacking care being taken that no offset of the jute braiding shall be visible either outside or inside of pipe. The collar shall then be set up over the joints covering equally both the pipe and leaving an even caulking space all around cement and sand mortar 1:1 ½ shall then be well punched or pressed home with a caulking tool within the caulking space. Care shall be taken that the underside of the joints is properly filled with mortar.</p> <p>Curing: Every joint shall be kept wet for about 10 days for maturing, the section of the pipe line laid and jointed shall be covered immediately to protect from weather effects, Minimum bore of 100 mm is considered adequate.</p> <p>The joints shall be left exposed for observation. Testing of joint: The pipeline shall be tested as directed. If any leakage is visible, the defective part of the work shall be made good at no extra cost. A slight amount of sweating which is uniform may be overlooked, but excessive scattting forma particular pipe or joints shall be watched for and taken as indicating a defect to be made good.</p> <p>Mode of measurements and payment: The rate shall be for a unit of one running meter (Including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (As per IS-458 latest version) Pounding or bottoming of the net without any allowance for cutting and waste. The length of bends, junctions and other connections shall be included in the total length of the drainpipes. Nothing extra shall be paid for the same.</p> <p>The rate shall be for a unit of one running meter.</p>
1 1	R.C.C. Spun pipe IS. N.P.-3 class pipe, should of the standard design and also have corresponding standard diameter as per length including spigot and socket with rubberized, all taxes, insurance, transportation, loading along with unloading and reaching the store or site and carrying out necessary inspections along with providing supply work and required hemp, wata (from CM. 1:1) and also line level And complete including laying, jointing, curing with required hemp in grades. for pipe of NP - 3 class of 350 m.m. dia. only fixing work
	The relevant specifications of item description no. 11 of Storm Network shall be followed.
1 2	Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick mansony 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or suply of frame cover) Type ---A--- : Round : Up to 1.50 m depth * inside dia. 1200 mm (for drainage lines from 150 mm to 500 mm dia.) (Menhole type - A up to 1.00 meter depth)
1 3	Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick mansony 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or suply of frame cover) Type ---A--- : Round : Up to 1.50 m depth * inside dia. 1200 mm (for drainage lines from 150 mm to 500 mm dia.) (Additional depth up to 1.01 to 1.50 meter)

K. STORM NETWORK	
S r. N o .	Description
1 4	Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick masonry 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or supply of frame cover) Type --- B --- : Round : for 1.50 to 4.00 m. depth and inside dia. 1500 mm (for drainage lines from 150 mm to 600 mm dia.) (up to 1.50 meter depth)
1 5	Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick masonry 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or supply of frame cover) Type --- B --- : Round : for 1.50 to 4.00 m. depth and inside dia. 1500 mm (for drainage lines from 150 mm to 600 mm dia.) (Additional depth up to 1.51 to 4.00 meter)
1 6	Precast R.C.C circular manhole frame supply complete with fixing 600 mm diameter with 20 tone of capacity
	<p>• R.C.C.PRECASTM.H.F.C. Manufacture, supply delivery at Contractor's store at site of work and fixing on top of manhole precast RCCM. 20 Frame & cover suitable to drainage M.H. and as per type design including cost of reinforcement M.S. Angles or Flat, curing, mold work etc.</p> <p>• General Specification R.C.C. Precast manhole frame & covers shall be manufactured as per standard type design. Frames shall confirm to IS: 12592 part-II-1991. Covers shall confirm to IS: 12592 part-I-1988.</p> <p>• Inspection Inspection of materials will be carried out at work site by the Engineer. Who shall carry out inspection as soon as material is brought on work site. Inspection will be carried out normally within one week time. The supplier has to take care of the following points.</p> <ol style="list-style-type: none"> 1. The manufacturer has to go in for on line stenciling for identifying size and class for proper separation. 2. The unloaded material has to be stacked in manageable batches with adequate inspection space like spreading the pieces etc. to permit proper inspection. <p>• Transit Risk The contractor shall bring goods at his own risk or it should be covered against the transit risk at its own cost.</p> <p>• TEST CERTIFICATE The contractor shall always provide manufacturer's test certificate in accordance with every batch/lot of goods so manufactured and supplied.</p> <p>The supplier shall also produce in addition to manufacturer's test certificate as mentioned in above, the inspection certificate issued by Engineer for the same purpose.</p> <p>• Mode of measurements & payment: The depth of manhole shall be distance between the top of the manhole cover and the invert level of the main drain. The rate includes all labours-</p>

K. STORM NETWORK	
Sr. No.	Description
	,materials,toolsandplantetc.requiredforsatisfactorycompletionofthisitemasdirectedabove. The rate shall be paid for a unit of one no of constructed and extra depth shall be paid per nos.
17	Precast R.C.C circular manhole cover supply complete with fixing 600 mm diameter with 20 tone of capacity
	The relevant specifications of item description no. 16 of Storm Network shall be followed.
18	Rigid P.V.C. Pipe ISI Marked of 6 kg/sq.cm. Pressure, required with coupler, only supplies work.for pipe of 160 m.m.outer dia.
19	Rigid PVC Pipe 4 to 6 kg/sq.cm pressure. With the necessary fittings of it. The required solvent to be joined with cement. (Only labour work).for pipe of 160 m.m. outer dia.
20	Constructing Brick masonry road gully chamber 500mm x 450mm x 600mm including 500mm x 450mm C.I. horizontal grating wih frame complete.
21	Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) RCC work
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.
22	Demolition brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) in Cement mortar
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of cubic meter.
23	Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) Cement Concrete work
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Rmt.

L. WATER SUPPLY NETWORK	
Sr. No.	Description
1	Providing, supplying, Lowering, laying, fixing and jointing PVC/uPVC/cPVC pipes and specials of following class and diameter including cost of conveyance from stores to site of works including

L. WATER SUPPLY NETWORK	
Sr. No.	Description
	cost of labour, material, cement solvent, giving satisfactory hydraulic testing as per ISI code.
	15 mm Dia
	25 mm Dia
	40 mm Dia
	15 mm Dia Tee
	25 mm Dia Tee
	40 mm Dia Tee
	15 mm Dia Elbow
	25 mm Dia Elbow
	40 mm Dia Elbow
	15 mm Dia Coupling
	25 mm Dia Coupling
	40 mm Dia Coupling
	25 mm to 15 mm Dia Reducer
	40 mm to 25 mm Dia Reducer
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of meter.</p>
2	Laying of PVC / UPVC Pipe line - 15 to 75 mm dia without special as per site condition with required jointing solution including hydraulic testing as directed by engineer-in-charge
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Running meter.</p>
3	Excavation of trench for Pipes in Soft Murrum / Clay / Sand with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 01 of Storm Network shall be followed.
4	Excavation of trench for Pipes in Hard Murrum with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 02 of Storm Network shall be followed.
5	Excavation of trench for Pipes in Hard Rock using Breaker / blasting / Chiezale / Hammer with all safety Provisions (with re-filling of trench) for depth from 1.0 to 1.5 mtr
	The relevant specifications of item description no. 04 of Storm Network shall be followed.
6	Excavation of trench for Pipes in Hard Rock using Breaker / blasting / Chiezale / Hammer with all safety Provisions (with re-filling of trench) for depth from 1.0 to 1.5 mtr
	The relevant specifications of item description no. 04 of Storm Network shall be followed.
7	Providing and supplying ISI standard R.C.C pipes (of sulphate resisting cement) in standard length 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.

L. WATER SUPPLY NETWORK	
Sr. No.	Description
	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 rate below.
	A RCC pipe is set to be placed across the road to allow for utility transmission in future development plans.
	Class NP3 Test Pressure 0.7 kg/sq.cm
	150 mm dia for Encasing under road
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Running meter.
8	Lowering, laying and jointing R.C.C pipes in C.M. 1:1 1/2 of following diameter 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
	150 mm dia for Encasing under road
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Running meter.
9	Water Storage Tank of HDPE material cylindrical Vertical Black with closed Top 'SINTEX' Brand. (500 Liter Capacity).
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per No.
10	Providing erecting and fixing double coated ISI water tank of required capacity each with all necessary fittings and connection etc. complete on terrace
	The relevant specifications of item description no. 43 of Weighbridge with Office Building shall be followed.

M. SEWER NETWORK	
Sr. No.	Description
1	Excavation of trench for Pipes in Soft Murrum / Clay / Sand with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr

M. SEWER NETWORK	
S r. N o .	Description
	The relevant specifications of item description no. 01 of Storm Network shall be followed.
2	Excavation of trench for Pipes in Hard Murrum with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 02 of Storm Network shall be followed.
3	Excavation of trench for Pipes in Soft Rock with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 03 of Storm Network shall be followed.
4	Excavation of trench for Pipes in Hard Rock using Breaker / blasting / Chiezale / Hammer with all safety Provisions (with re-filling of trench) for depth from 0.0 to 1.5 mtr
	The relevant specifications of item description no. 04 of Storm Network shall be followed.
5	Excavation of trench for Pipes in Soft Murrum / Clay / Sand with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 05 of Storm Network shall be followed.
6	Excavation of trench for Pipes in Hard Murrum with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 06 of Storm Network shall be followed.
7	Excavation of trench for Pipes in Soft Rock with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 07 of Storm Network shall be followed.
8	Excavation of trench for Pipes in Hard Rock using Breaker / blasting / Chiezale / Hammer with all safety Provisions (with re-filling of trench) for depth from 1.51 to 3.0 mtr
	The relevant specifications of item description no. 08 of Storm Network shall be followed.
9	providing bhogavo sand bedding including raming, watering, consolidating etc. complete
	The relevant specifications of item description no. 09 of Storm Network shall be followed.
10	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 departmental stores, stacking etc. complete. 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. Class NP3 Test Pressure 0.7 Kg./sq.cm
	200 mm dia pipe ID
	<p>Workmanship:</p> <p>Materials:</p> <p>The reinforced concrete non pressure pipes of specified diameter shall be confirmed to relevant is: 458. Material shall be of the 1st quality of the approved make or equivalent as approved by the Consultants.</p> <p>Carting and Handling</p> <p>The pipes and other materials required shall be transported from the factory to the work sites at places along the alignment of pipeline as directed by the engineer-in-charge. The contractor shall be responsible for the safety of pipes and fittings/specials in transit, loading / unloading. Every care shall be exercised in handling pipes to avoid damage. While unloading, the pipes and fittings/specials shall not be thrown down from the truck on the hard surfaces. They shall be unloaded on timber skids with steadying ropes or by any approve means. Padding shall be provided between coated pies,</p>

M. SEWER NETWORK	
S r. N o .	Description
	<p>fittings/specials and timber skids to avoid damage to the coating. Suitable gaps between pipes should be left at intervals in order to permit access from one side to the other. In case of spigot socket pipes, care should be taken regarding orientation of pipes while unloading. As far as possible pipes shall be unloaded on one side of the trench only. The pipes shall be checked for any visible damage while unloading and shall be sorted out. Any pipe which shows sufficient damage to preclude it from being used shall be discarded. Dragging of pipes and fittings/specials along concrete and similar pavement with hard surfaces shall be prohibited.</p> <p>New pipes can be brought to site only after the mandatory tests (i.e cube tests, three edge bearing tests, hydrostatic tests, dimension test water absorption test etc.) are completed.</p> <p>Storage:</p> <p>Each stack of pipe shall contain only pipes of same class and size, with consignment or batch number marked on it with particulars of suppliers wherever possible. Storage shall be done on firm level and clean ground and wedges shall be provided at the bottom layer to keep the stack stable. The stack shall be in pyramid shape or the pipes laid lengthwise and crosswise in alternate layers. The pyramid stack shall be made for smaller diameter pipes for conserving space in storing them. The height of the stock shall not exceed 1.5 m.</p> <p>Laying:</p> <p>The pipes shall be lowered into the trenches carefully; Mechanical appliances may be used. Where necessary pipe shall be laid in straight lines or with easy curves and true to line and gradient as specified. The laying of pipe shall precede upgrade of a slope. In the pipe with loose collar, the collars shall be slipped on before the next pipe is laid.</p> <p>In case where the foundation conditions are unusual such as the proximity of trees or holes, under existing or proposed around in 150 mm thick cement concrete 1:5:10 (1 cement: 5 fine sands: 10 graded stone aggregate 40mm nominal size) or compacted sand or gravel.</p> <p>In case where the natural foundation is inadequate the pipes shall be laid either in concrete cradle, supported on proper foundation or on any other suitably designed structure. If concrete bedding is used, the depth of concrete below bottom of the pipes shall be at least $\frac{1}{4}$th of the internal diameter of the pipe subject to a minimum of 100 mm and maximum 300 mm. The concrete shall be extended up to the sides of the pipe at least a distance of $\frac{1}{4}$th of the outside diameter for pipes 300mm and over in diameter.</p> <p>The pipes shall be laid in the concrete bedding before the concrete has set. Pipes laid in trenches in earth shall be bedded evenly and firmly as far as up to the haunches of the pipe as to safely transit the load expected from the backfill through the pipe to the end. This shall be done either by excavating the bottom of the trenches to fit the curve of the pipe or by compacting the earth under round curve of the pipe to form an even bed. Necessary provision shall be made for joints wherever required.</p> <p>Jointing:</p> <p>The joints shall be done by slipping the collar over and clear of the end of the pipe. The recess of the end of the pipe shall be filled with jute threading dipped in hot bitumen. The new pipe shall then be brought forward until bitumen ring in recess of first pipe is set into the recess of the second pipe. This process shall be repeated for two or three pipes which shall then be jacked up so as to thoroughly</p>

M. SEWER NETWORK	
S r. N o .	Description
	<p>compress the bitumen. The quantity of jute and bitumen shall be just enough to fill the recess when pressed hard by jacking care being taken that no off set of the jute braiding shall be visible either enough to fill the recess when pressed hard by jacking care being taken that no offset of the jute braiding shall be visible either outside or inside of pipe. The collar shall then be set up over the joints covering equally both the pipe and leaving an even caulking space all around cement and sand mortar 1:1 ½ shall then be well punched or pressed home with a caulking tool within the caulking space. Care shall be taken that the underside of the joints is properly filled with mortar.</p> <p>Curing: Every joint shall be kept wet for about 10 days for maturing, the section of the pipe line laid and jointed shall be covered immediately to protect from weather effects, Minimum bore of 100 mm is considered adequate.</p> <p>The joints shall be left exposed for observation. Testing of joint: The pipeline shall be tested as directed. If any leakage is visible, the defective part of the work shall be made good at no extra cost. A slight amount of sweating which is uniform may be overlooked, but excessive scattting forma particular pipe or joints shall be watched for and taken as indicating a defect to be made good.</p> <p>Mode of measurements and payment: The rate shall be for a unit of one running meter (Including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (As per IS-458 latest version) Pounding or bottoming of the net without any allowance for cutting and waste. The length of bends, junctions and other connections shall be included in the total length of the drainpipes. Nothing extra shall be paid for the same.</p> <p>The rate shall be for a unit of one running meter</p>
1 1	<p>Lowering, laying and jointing R. C. C. 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.</p> <p>200 mm dia pipe ID</p>
	<p>Workmanship: The relevant specifications of item description no. 10 of Sewer Network shall be followed.</p> <p>Mode of Measurement and Payment: The relevant specifications of item description no. 10 of Sewer Network shall be followed. Rate shall be for a unit of one running meter.</p>
1 2	<p>Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick mansony 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or suply of frame cover) Type ---A--- : Round : Up to 1.50 m depth * inside dia. 1200 mm (for drainage lines from 150 mm to 500 mm dia.) (Menhole type - A up to 1.00 meter depth)</p>
	The relevant specifications of item description no. 12 of Storm Network shall be followed.
1 3	<p>Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick mansony 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4</p>

M. SEWER NETWORK	
S r. N o. .	Description
	should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or supply of frame cover) Type ---A--- : Round: Up to 1.50 m depth * inside dia. 1200 mm (for drainage lines from 150 mm to 500 mm dia.) (Additional depth up to 1.01 to 1.50 meter)
	The relevant specifications of item description no. 13 of Storm Network shall be followed.
1 4	Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick masonry 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or supply of frame cover) Type --- B --- : Round : for 1.50 to 4.00 m. depth and inside dia. 1500 mm (for drainage lines from 150 mm to 600 mm dia.) (up to 1.50 meter depth)
	The relevant specifications of item description no. 14 of Storm Network shall be followed.
1 5	Drainage manhole should be done according to design given with ratio are at the bottom it should be C C 1:3:6 with brick masonry 1:4 cum plaster 1:3 cm coping 1:1:2 and also benching around it with 1:2:4 should be done with finishing, curing, manhole frame cover and also with PVC step. (excluding excavation or supply of frame cover) Type --- B --- : Round : for 1.50 to 4.00 m. depth and inside dia. 1500 mm (for drainage lines from 150 mm to 600 mm dia.) (Additional depth up to 1.51 to 4.00 meter)
	The relevant specifications of item description no. 15 of Storm Network shall be followed.
1 6	Precast R.C.C circular manhole cover supply complete with fixing 600 mm diameter with 10 tone of capacity
	The relevant specifications of item description no. 17 of Storm Network shall be followed.
1 7	Precast R.C.C circular manhole frame supply complete with fixing 600 mm diameter with 10 tone of capacity
	The relevant specifications of item description no. 16 of Storm Network shall be followed.
1 8	RCC precast MH frame & cover manufacture, supply & delivery at store or at site of work precast RCC M200 frame & cover suitable to drainage MH and as per type design & drawing including cost of reinforcement MS angle or flat, curing mold work etc. House connection chamber light duty
	Frame
	Cover
	<ul style="list-style-type: none"> • R.C.C.PRECASTM.H.F.C. Manufacture, supply delivery at Contractor's store at site of work and fixing on top of manhole precast RCCM. 20 Frame & cover suitable to drainage M.H. and as per type design including cost of reinforcement M.S. Angles or Flat, curing, mold work etc. • General Specification R.C.C. Precast manhole frame & cover shall be manufactured as per standard type design. Frames shall conform to IS: 12592 part-II-1991. Covers shall conform to IS: 12592 part-I-1988. • Inspection Inspection of materials will be carried out at work site by the Engineer. Who shall carry out inspection as soon as material is brought on work site. Inspection will be carried out normally within one week time. The supplier has to take care of the following points. 3. The manufacturer has to go in for on line stencil ing for identifying size and class for proper separation.

M. SEWER NETWORK	
S r. N o .	Description
	<p>4. The unloaded material has to be stacked in manageable batches with adequate inspection space like spreading the pieces etc. to permit proper inspection.</p> <ul style="list-style-type: none"> • Transit Risk The contractor shall bring goods at his own risk or it should be covered against the transit risk at its own cost. • TEST CERTIFICATE The contractor shall always provide manufacturer's test certificate in accordance with every batch/lot of goods so manufactured and supplied. The suppliers shall also produce in addition to manufacturer's test certificate as mentioned in above, the inspection certificate issued by Engineer for the same purpose. • Mode of measurements & payment: The depth of manhole shall be distance between the top of the manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item as directed above. The rate shall be paid for a unit of one no of constructed and extra depth shall be paid per nos.
19	Rigid P.V.C. Pipe ISI Marked of 6 kg/sq.cm. Pressure, required with coupler, only supplies work for pipe of 160 m.m. outer dia.
	The relevant specifications of item description no. 18 of Storm Network shall be followed.
20	PVC Fittings 6 kg/sq.cm pressure pipes. Only supply work. 160 m.m. outer dia. Of also of the PVC pipe
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Nos.</p>
21	PVC Fittings 6 kg/sq.cm pressure pipes. Only supply work. 160 m.m. outer dia. Of tee of the PVC pipe
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Nos.</p>
22	Rigid PVC Pipe 4 to 6 kg/sq.cm pressure. With the necessary fittings of it. The required solvent to be joined with cement. (Only labour work). for pipe of 160 m.m. outer dia.
	The relevant specifications of item description no. 19 of Storm Network shall be followed.
23	Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) RCC work

M. SEWER NETWORK	
Sr. No.	Description
	The relevant specifications of item description no. 21 of Storm Network shall be followed.
24	Demolition brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) in Cement mortar
	The relevant specifications of item description no. 22 of Storm Network shall be followed.
25	Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) Cement Concrete work
	The relevant specifications of item description no. 23 of Storm Network shall be followed.
26	Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35Kg/Cm ² in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm intenal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slabe with 1:2:4 mix (1-cement: 2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(i) Inside dimensions 455mmx 610mm and 450mm deep for single pipe line.
	The relevant specifications of item description no. 17 of Truck Wash & Maintenance Area shall be followed.
27	Extra over items 24.44 for every additional depth of 0.1M. of part thereof beyond 450mm depth for Brick masonry chamber.(i) for 455mm x 610mm size.
	The relevant specifications of item description no. 64 of RTS Building & Ramp shall be followed.

N. TUBE WELL	
Sr. No.	Description
1	Drilling of tube well by direct / reverse rotary rig in alluvial strata Drilling of pilot bore hole in alluvial strata by directrotary rig / reverse rotary rig. 300mm
	<p>Workmanship: Drilling 300 mm dia bore at village specified in Schedule – B up to desired specified depth in Schedule – B in all type of strata by using best quality of sodium-based bentonite powder.</p> <p>The drilling should be done by mud flush direct circulation rotary rig with Hydraulic movements fitted with heavy duty Reciprocating mud pump / Reverse rotary Rig.</p> <p>All tools and equipment required for drilling operation should be brought to site of work by contractor at his own cost. Arrangement of fresh potable (i.e. not higher than 2,000 PPM) water for drilling operation should be done by contractor at his own cost. In unavoidable circumstances drilling water of salinity higher than 2000 PPM may be considered after obtaining the permission of Engineer in charge of work for particular Tube well.</p> <p>If fresh water (i.e. 2000 PPM) is not available in surrounding 2 kilometres of the drilling site, the necessary arrangement of departmental water tanker will be arranged by Contractor and required charges for the same will be recovered from the bill of the contractor as per departmental norms.</p> <p>The drilling agency has to collect and furnish following information: Samples of drilled cuttings from different strata shall be collected at suitable intervals preferably at</p>

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Sr. No.	Description
	<p>every 2 meters depth drilled and across intervals if a change in the strata is met with the opinion of the Geohydrologist shall be binding to the contractor. The samples should be stored preferably in sufficient quantity and should be washed properly as the drilling is in progress. An accurate drilling time log shall be kept indicating the time taken for drilling every two meters. This log will enable interpretation regarding the nature of formation (hard, soft, unconsolidated etc.) which has bearing on the water yielding capacity of the formation.</p> <p>Electro logging Test Constructor's logger as per standard practice conducts this test till. The contractor should inform well in advance to Engineer in charge for the above test after completion of 250 mm dia. pilot bore hole. In no case – logging test in pilot bore hole exceeding 300 mm dia. size shall be carried out. The logging electrodes must reach at specified depth of borehole as started in the schedule Otherwise logger operator can ask or cleaning the borehole again and second time logging test should be carried out . The charge for second time logging should be recovered from the contractor, as the full depth of bore hole could not be logged due to not having smooth and clean bore hole as certified by in charge logger operator (Hydrologist / Jr. geologist).</p> <p>In case of drilling area having sticky / plastic clay strata where contractor has drilled pilot bore of 300 mm dia. R.R. Bit for successful logging operation. Even if the logging is not possible in 300 mm dia. because of expanding nature of clay, the agency is not required to pay the re-logging charges.</p> <p>Reaming of 250 mm dia. Bore hole. Reaming 250 mm dia bore hole to 400 / 450 / 550 / 600 mm. dia. bore hole up to desired depth is specified in Schedule – B in all alluvial strata including soft and hard rock by using best quality if bentonite powder. The drilling shall be done by mud flush direct Rotary Rig. including lowering, jointing of ERW / MS pipes / Strainer pipes etc. during welding alignment of pipe should be checked with spirit level. Carting of pipes from store to site including welding, jointing etc. complete as directed by engineer in charge for specified depth and as per pipe assembly given is to be done by the contractor.</p> <p>If further drilling cannot be done up to specified depth due to encountering the hard formation, blue sticky clay or shale, the drilling will be stopped as per instructions of Hydrologist and payment will be made for the work carried out by the contractor.</p> <p>In case, Cement sealing is proposed below the total depth of housing, then the upper reaming shall be continued up to the upper limit of cement sealing. The lowering, of pipe assembly at required depth of 3 meters more reaming should be carried out beyond the full depth of pipe assembly to ensure the safe lowering against any cutting remaining in the bore hole. No payment will be made for these 3 meters extra drilling.</p> <p>The pipe assembly (as per the size of tube well) suggested by hydrologist should be lowered as per instruction of Engineer in charge and pipe lowering work shall be started by mutual understanding with in charge Engineer, Hydrologist, contractor and representative of RMC it should be ensured that each joint of pipe assembly perfectly welded.</p> <p>The required suggested size of casing, strainer pipes etc. shall be brought by contractor at his own cost as per pipe assembly. The pipes should be lowered in a vertical position necessary steel – bedded plates should be brought by contractor. No extra cost for welding rods should be given. During welding of each joint, it should be ascertained that there should not be air gap left so that</p>

N. TUBE WELL	
Sr. No.	Description
	<p>there is no chance of water leakage from outside of pipe assembly throughout welding joints. In housing length of pipe assembly. Welding of each joint has to be done initially by 8 SWG welding rod followed by removal of extra slag / flux there after second line of welding shall be carried out to ensure perfect welding joint, welding rod shall be of reputed make.</p> <p>If the bore is required to be drilled more than specified depth the contractor shall be bound to carry out such additional works including drilling jointing and lowering casing and strainer pipes etc. as may be necessary. The relevant specifications regarding drilling, lowering, jointing, welding of pipes and strata samples etc. shall also be completed. In case of such additional works would be paid as per tender approved rates of department with less / more percentage of quoted by the contractor.</p> <p>The gravel packing around housing, casing and strainer pipes shall have to be carried out by the contractor at his own cost.</p> <p>Before gravel packing is started. it should be ensured that the thickness of mud plaster is reduced to minimum and perfect back washing should be carried out.</p> <p>The tube well should be gravel packed with at least minimum calculated quantity. The gravel packing operation shall be continued till filter is constructed around the slotted pipe or screen. So as to ensure that no sand flows in the tube well under normal operational condition of the tube well. After gravel packing no mud slurry should remain at bottom and it should be cleaned by fresh water.</p> <p>Record of quantity of gravel packed in the bore should be kept by contractor and should be supplied along with strata chart.</p> <p>Extra quantity of gravel should be used if required during development of the bore, Clay packing (if required) should be done by the contractor by providing sticky clay balls only as desired by Engineer – in –charge during or after developing the bore with Air Compressor etc.</p> <p>Vertically Test: (In case of education line and airline could not be lowered during compressor test)</p> <p>All the pipes shall be installed in shell fashion. So that pipe assembly has minimum possible deviation from vertical plumb.</p> <p>The vertically test will be performed as under :- (As per I.S.: 2800 (Part II) – 1979).</p> <ol style="list-style-type: none"> 1. The deviation up to 10 CMS per 30 meters will be permitted in one plane and one direction only and no deduction in payment will be made. 2. If the deviation is beyond 10 CMS the bore will be accepted with 10 % deduction from the payment of drilling charges provided a submersible pump suitable to above size only in case of availability of power in particular site or turbine pump suitable to bore size and of required capacity should be lowered at required depth and run satisfactorily. 3. If above submersible pump (in case of availability of power in particular. site) or turbine pump of required capacity and size could not be lowered and do not run satisfactorily, the tube well will be rejected and no payment will be made. The arrangement for providing, lowering and running of suitable pumping machinery including electric power for condition at (2) and (3) above have to be made by the contractor at his cost. The vertically test will be carried out as per standard practice as per I.S. and as directed by Engineer in charge. In case of artesian tube well the artesian condition can be removed by fitting piece of pipe (2 meters of more as required) above the tube well and eccentricity should be measured. Otherwise, full payment should be made without insisting of measurement of eccentricity. <p>The rate shall be for unit of one running meter.</p>

N. TUBE WELL	
Sr. No.	Description
2	Reaming of 250/300 mm dia. pilot bore hole including assembling, lowering housing casing ,strainer pipes, gravel packing, clay packing etc.400mm
	The relevant specifications of item description no. 1 of Tube well shall be followed.
3	Supply of clay ball of size ranging from 25 mm to 50 mm made from sticky clay at site of work as certified by Hydrologist.
	Material & Workmanship: Clay balls of required quantity should be supply at site work by the contractor before the pipe lowering work is started. The clay balls should be prepared from sticky clay only. The size of clay balls should be of 15 mm. to 25 mm clay balls should be packed as suggested in the assembly given by the Hydrologist. The rate shall be for unit of one cubic meter.
4	Supply of best quality well sorted Sevaliya gravel of size ranging from 4 mm to 6mm.
	Material & Workmanship: Providing of gravel of selected size 4 mm to 6 mm hard, well rounded uniform particles, free from dust, clay, foreign particles etc. and should be of River. The rate shall be for unit of one cubic meter.
5	Supply of ordinary portland cement of grade 53
	Material & Workmanship: Ordinary ISI mark port lands cement of min 53 grade. The cement should be fresh and free from moisture and foreign particles. It should be well packed be well packed in bag dully stitched. The rate shall be for unit of one metric tonne.
6	Cement grouting / sealing without cost of cement by means of mud pump.
	(a) Cement Sealing
	(b) Bottom Cement Sealing (Grouting)
	Material & Workmanship: (A) Cement Sealing Cement sealing should be carried out by the help of mud pump and air line at specified depth given in the pipe assembly suggested by the Hydrologist. The work should be carried out as per the instruction of Engineer in charge and Geologist / Hydrologist. (B) Bottom Cement Sealing Bottom sealing should be carried out by contractor at desired depth as suggested in pipe assembly in single operation with the help of mud pump and bottom cement sealing of suitable size in the presence of Geologist / Hydrologist and in charge Engineer. The rate shall be for unit of one number.
7	Charges for attending existing bore well and taking necessary measurement & giving opinion for depth and filling materials and cleaning of bore well with necessary tools and tackels. (without lifting & lowering of pump).
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of

N. TUBE WELL	
Sr. No.	Description
	the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Rmt.
8	Compressor test of tube well by air compressor of 600 CFM / 150 PSI capacity in all districts.
	<p>Material & Workmanship: Initial development should be carried out by means of compressed Air within one week after completion of gravel packing / cement sealing. Air compressor to be used should be of minimum capacity as stated in Schedule – B and education / drop line should be used for development of zones of the bore.</p> <ol style="list-style-type: none"> Compressor test shall be carried out as per following procedure. Contractor has to cart all the required materials machinery and accessories like education / drop line, airline, required capacity compressor and accessories required to lower airline, education line / drop line etc. at site of work at his own risk and cost. No carting charges shall be paid for handling such machinery materials and accessories. Contractor has to carryout compressor test in each zone by lowering airline into drop line lowered in each zone by keeping lower end of education / drop line in each zone till sand free discharge is obtained. Thus after cleaning of the first zone the contractor has to carryout compressor test of this zone till sand free discharge is obtained. By this way the contractor has to carryout cleaning and development of each separate zone sequentially. The entire work is to be carried out under strict supervision of concerned geologist / Hydrologist and after completion of work the contractor has to obtain the necessary certificate for satisfactory completion of work from him. To carry out the work show in Paragraph – (2) the contractor has to pull out the air line first and then lower the drop line for each zone. By this way the contractor has to clean all the water bearing zones, sequentially, cleaning and development of one bore, carried out by this way shall be treated as one full job and payment shall be made for such completed full job. <p>The test will be carried out as under:-</p> <ol style="list-style-type: none"> Up to the depth of 40 Mts. 600 CFM / 150 PSI capacity of compressor may be used without drop line if required by the department, drop line shall have to be used. The compressor shall be used for minimum 6 hours or till sand free discharge is obtained whichever is later. For the depth above 40 Mts, 900 CFM/200 PSI capacity of compressor should be used with drop line for minimum 6 hours or till sand free discharge is obtained whichever is later.
9	Manufacture, supply & delivery of ISI marked UPVC Casing pipe (IS 12818 with latest amendment. (Rates are exclusive of GST) (B)200.00 mm nominal dia. " CM " Type
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Rmt.</p>
10	Manufacture, supply and delivery of following ISI marked HDPE pipes (IS:4984/1985 with latest amendment) having material Grade PE-80 in approximate 100-meter coil length or as per GWSSB requirement with SS316 nipple at both ends having 11 TPI threads as per specifications, press fitted and bolted having nominal diameter as under as per detailed technical specifications. (Rates are exclusive of GST) iv) DN 63 PN-10

N. TUBE WELL					
Sr. No.	Description				
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per unit of Rmt.</p>				
11	<p>Bail plug of length 0.45 meter made from MS medium class pipe as per IS suitable for b) 200 mm dia. pipe.</p> <p>Bore plug from medium class M.S. pipes and M.S. plate should be fabricated as per IS suitable for 250 mm dia. pipe. Length of M.S. bail plug should be minimum 0.45 mt. Before applying the plug it should be got approved by engineer in charge. Payment shall be made per no. bases. Rate shall be for a unit of one number.</p>				
12	<p>Clamps made from MS plate with 3 holes on either side with nuts & bolts of standard make and suitable size. (g)750 mm X 75 mm X 16 mm flat to 200 mm dia. pipe.</p> <p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per pair.</p>				
13	3	Phase	Borewell	Submersible	Pump Sets
	<p>Electric motor driven borewell submersible pump set confirming to IS 8034 and motor confirming to IS 9283 working at 3 phase 400 / 440 volt 50 Hz AC supply & 2900 RPM. 7.5 HP Head = 150 LPM 90</p> <p>Head 150 mt, HP 7.5</p> <p>The submersible pump set shall be of approved and IS standard from vendor list with GWSSB. The pump set shall have maximum head of 150 mt. with discharge capacity of 600 LPM. Minimum H.P. for pump set shall be 7.5 H.P. rate shall be paid per no. of submersible pump set provided and erected on site. Payment shall be released only after erection and satisfactory testing for a period of seven days. Lowering of submersible motor pump set complete with required nos. and size of casing pipes erected by means of proper chain pulley block and pipe wrenches after checking of threads of G.I. nipple coupled with HDPE pipe with coupling to take the load of the pump set and pipe assembly filled up with water. The rate shall be paid per no. base</p> <p>(A) Panel board up to 10 HP SD type</p> <p>Panel board of approved make 3 phase motor control cubical panel (Star – Dalta) made from 16 G. CRCA sheet duly painted with epoxy power painted inside and outside with hinged doors and locking arrangement, consisting of suitable size of ON –OFF isoaiator (AC – 3 / 23 duty) main fuses, single phasing preventor cum water level. Guard (Complete unit), Toggles switch to bypass single phase preventer cum WLG, indicating lamps for R - Y- B phases, over load reply. Automatic water level controller, Ammeter & Voltmeter each with two way selector switch incoming wires duly socket crimped panel to be erected on angle iron frame grouted on wall as directed. Star Dalta& main contractor, coverload relay, thermal / Electronic Star dalta cut off timer, start – stop push buttons. The isolator overload relay & contactor of L & T, Siemens or Cuttler Hamer make only. Panel to be erected on angle iron frame ground on wall. Panel board should be provided and</p>				

N. TUBE WELL	
Sr. No.	Description
	<p>erected of approved make and quality as per specification and instruction of engineer in charge. Rate shall be paid per no. bases.</p> <p>(B) Cable 2.5 Sq. m 3 core. The cable shall be suitable for running submersible pump set, and approved make XLPE (IS: 7098) (I) ISI marked unarroundAlluminium cable1.1 kV grade. Scope: -The Scope of work shall cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling. All Cables shall be as per relevant Indian Standard with ISI Mark. Materials: - All cables shall be 1100-volt grade PVC insulated, PVC sheathed aluminum or copper conductor with or without armouring as specified and with an outer PVC protective sheath heavy duty. Cables shall have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standard. Type designation and core identification of cables shall be as per relevant Indian Standard. All cables shall be new without any kind of visible damage. The manufacturers name, insulating materials, conductor size, voltage class and IS mark shall be marked on the surface of the cable at every 600MM length. General: -The cable shall be supplied in single length i.e. without any intermediate joint. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice. Installation: - Cable shall be laid in the routes as directed by in charge Electrical Engineer.Cable running indoors shall be laid on walls or ceiling as per the site situation. Cables shall be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500 MM. interval with chrome plated screws. In case of cables buried directly in ground, cables shall be laid in an excavated trench not less than 900 MM from G.L., over a sand or soft earth cushion to provide protection against abrasion. In case cables entering the building or one room to another it would be done through porcelain/PVC pipes. After erection the pipes shall be sealed with M-seal. The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.</p> <p>(C) Materials required for piping and connection to pump like clamp nipple union, valve bend, elbow etc. comp as per bill. Materials required for piping and connection to pump like G.I. Nipple Union, bend, elbow etc. as per standard and approved made and "C" category as approved by engineer in charge. The payment shall be made as per only the quantity provided and erected on site as per purchases bill of contractor.</p> <p>The rate shall be paid per Number of so installed and tested commissioned.</p>
14	<p>DOL / Star Delta starter suitable for local & remote pump control application consisting of MPCB, overload relay and contactors as per Type II coordination including digital voltmeter, analogue ammeter with selector switch, run hour meter, required protective relays & control accessories. (c)D. O. L. up to 7.5 HP</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p>

N. TUBE WELL	
Sr. No.	Description
	<p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Nos.</p>
15	<p>PVC insulated flat submersible cable as per detailed technical specifications of R/C of GWSSB Ele - mech conforming to IS 694, IEC 60227 / 60228. (b)1 R x 3 C x 2.5 mm2</p>
	<p>Material & Workmanship: The cable shall be suitable for running submersible pump set, and approved make XLPE (IS: 7098) (I) ISI marked unarroundAlluminium cable1.1 kV grade.</p> <p>Scope: - The Scope of work shall cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling.</p> <p>All Cables shall be as per relevant Indian Standard with ISI Mark. Materials: - All cables shall be 1100-volt grade PVC insulated, PVC sheathed aluminum or copper conductor with or without armouring as specified and with an outer PVC protective sheath heavy duty. Cables shall have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standard. Type designation and core identification of cables shall be as per relevant Indian Standard.</p> <p>All cables shall be new without any kind of visible damage. The manufacturers name, insulating materials, conductor size, voltage class and IS mark shall be marked on the surface of the cable at every 600MM length.</p> <p>General: The cable shall be supplied in single length i.e. without any intermediate joint. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.</p> <p>Installation: - Cable shall be laid in the routes as directed by in charge Electrical Engineer. Cable running indoors shall be laid on walls or ceiling as per the site situation. Cables shall be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500 MM. interval with chrome plated screws. In case of cables buried directly in ground, cables shall be laid in an excavated trench not less than 900 MM from G.L., over a sand or soft earth cushion to provide protection against abrasion. In case cables entering the building or one room to another it would be done through porcelain/PVC pipes. After erection the pipes shall be sealed with M-seal. The general and technical specification given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.</p> <p>The Rate shall be paid in one running meter.</p>
16	<p>Material required for piping and connection to pump like clamp nipple union, valve bend, elbow etc. comp as per bill.</p>
	<p>The relevant specifications of item description no. 13 of Tube well shall be followed.</p>

STREETLIGHTPOLE

General Specification of streetlight pole:

(i) Steel Tubular Pole (Swaged), 7.5 Mtr Long

Steel tubular pole (Swaged) made of steel tubes of following dimensions swaged together

When hot, complete painted with one coat of Red oxide and two coats of aluminum paint. Erected with metallic base plate of 300mm x 300mm x 4mm thick

Overall length 7.5 mtr. With approximate weight of pole 67kg.

Effective length of sections:

_ Bottom 4.5 mtr. Having outside dia. 114.3mm and wall thickness 4.50mm.

_ Middle 2 mtr. Having outside dia. 88.9mm and wall thickness 3.65mm.

_ Top 2 mtr. Having outside dia. 76.9mm and wall thickness 3.25mm.

The general and technical specifications given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(ii) Cable clamp

Cable clamp shall be 25 mm X 3 mm M.S. flat suitable for fixing 2 Nos. of armored cable with nuts and bolts.

(iii) C.C. Foundation for Poles

The Cement concrete foundation shall be prepared in accordance with current specifications and as per instruction of in-charge electrical engineer. The depth of pit shall vary with planting depth of pole (length below ground) as per IS: 2713-1964. The planting depth shall be 1.25M for 7.5 M pole, 1.50M for 8.0M to 9.0M Pole, 1.8M for 9.5M to 11.0M pole and 2.00M for 12.00M pole. The cross-section of pit shall be 450MM x 450MM. The C.C. foundation shall be started from the base plate of the pole and shall be filled up to depth of 100MM. below the ground level. Cement concrete mixture shall be prepared in the ratio of 1 part cement: 2 parts coarse sand: 4 parts gravel of 19MM size. The cement concrete foundation shall be made in presence of representative of in-charge electrical engineer. The C.C. shall be protected from premature drying by curing for at least 7 days after pouring it with regular interval of time as instructed.

The pole shall be covered above the ground level by plinth of 30cm. x 30cm. x 30cm. of brick shall be prepared as specified. The plinth shall be prepared with cement mortar containing 1 part cement: 3 parts of fine cement. The smooth plaster shall be prepared with minimum thickness of 150MM. to outer side and top surface. Necessary white washing shall be made after proper curing of plinth.

(iv) Sintex Box for Cutout

The sintex box shall be approved make RMC press or painted molded composite FRP (Plastic) loop in loop out box approx 2.07 MM. thick complete with bakelite connector strip 4 way and hinged doors having locking arrangements with mounting clamp with nuts bolts and washers suitable for erection on pole with cable clamps and earth bolt of required size of box.

The box shall be erected on pole/wall with suitable M.S. clamp duly painted as described above and as per the instruction of Engineer-in-charge.

The general and technical specification given in the tender booklet shall be considered as a part of a agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(v) MCB

The MCB shall be with ISI mark of Indian standard specification No. IS:8828/1996.

MCB shall be with overload and short circuit tripping elements. The breaking capacity of fault current of MCB shall not be less than 10000 Amp at electric pressure of 230 volt.

Miniature circuit breaker single pole, double pole or four pole should be suitable to operate on 230/415 V A.C. system and having overload and short circuit tripping elements and breaking capacity 10KA to be erected in existing M.S. box. Confirming to IS 8828/1996 with ISI Mark.

MCB / ELCB distribution board should be thermo plastic "SHOKARE" / L & T - Hager or equivalent having modular double doors with DIN rails, epoxy powder coated finish metal frame & door assembly with S.S. door spring & hinged pins complete with required PVC sleeved 63A copper bus strips without MCB / ELCBs. The general and technical specification given in the tender booklet shall be considered as a part of a agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(vi) Bracket for Pole

The arm bracket shall be prepared from specified class of galvanized iron pipe of suitable diameter as specified in the Description. The bracket shall be complete with M.S. / G.I. sleeve tubing of required size and length suitable for pole to fitted with necessary fasteners to fix the bracket. The rise and angle shall be according to site condition and as per instruction of in-charge electrical engineer. The length of spread shall be as specified in the Description with suitable welded stiffener. Bracket shall have 1 coat of anti-corrosion primer red-oxide coating before dispatching to site and 2 coats of approved make and shade of aluminum paint after erection on pole. The general specification given in tender booklet, specification as per schedule-B, drawing attached with tenders shall also be considered as a part of a agreement.

The arm bracket shall be single or double or triple as specified in the Description itself. The bracket shall be erected on the top of the pole with necessary bold fasts etc. with special reducer at the end to accommodate type of street light fitting to be fixed.

The general and technical specification given in the tender booklet shall be considered as a part of a agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(vii) G.I. Pipe

The galvanized iron pipe shall be of 'B' Class and 38/40 MM. diameter having smooth finished bore of the pipe on both ends erected on the face of the wall with wall clamps nuts and bolts and clamps for laying of cable along the pole / wall shaping the pipe as per site requirement to ease cable entry.

The general and technical specification given in the tender booklet shall be considered as a part of a agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(viii) Sodium Vapour Lamp, 70w to 400w

The sodium vapour lamp shall be high-pressure type with SON-E Elliptical lamps or SON-T tubular lamps as specified. The wattage of the lamps shall be specified. The lamp shall have a minimum approximate rated and guaranteed life of 15000 hours. The H.P.S.V. lamps shall confirm IS-9974(Part 1&2):1981. The Bi-pin cap of lamp for 70W shall be E-40 and shall have colour temperature of 2000 K. The lamps shall be rated for operating on 230 V/250 V as directed by in-charge electrical engineer. The voltage, current, nominal luminous flux and dimensions of lamp shall be as per Indian Standard.

The lamps shall be fixed in the fixtures hung on the pole/wall at a height not less than 3.0 meters for P.T. Land and for 5.00 meters for street lighting purpose from ground level. The lamps fused before/during the final testing of installations shall be replaced by the contractor at his own cost and no extra payment shall be made for such replacement. Lamps for permanent installations shall not be placed in the fixtures until so directed by in-charge electrical engineer.

The general and technical specification given in the tender booklet shall be considered as a part of a agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(ix) HPSV Lamp, 200v to 240v

HPSV public lighting luminaries should be as per Keselec 'Z' range comprising an injection molded aluminum body with a single piece deep drawn reflector in high purity polished & anodized aluminum, with polystyrene acrylonitrile protective cover & a clear acrylic protector. The control gear mounted in the body on to removable mounting plate. Suitable for mounting on double or four-arm bracket as per above with prismatic or reinforced glass protector.

The street light luminaries suitable for HPSV lamp shall confirm IS: 10322 and part 5 section 1 & 3): 1987 for luminaries for road and street lighting. The luminaries shall be dust, vermin and weatherproof. The luminaries shall be of single die cast aluminum made out of LM6 canopy, anodized high purity aluminum reflector with reflection factor of not less than 80%. A single piece clear, UV treated protective acrylic cover shall be hinged to one end and stainless steel toggle shall be provided for claiming. Neoprene synthetic rubber felt gasket should be provided between acrylic cover and fixture. Control gear compartment shall have heavy-duty low loss copper wound ballast, porcelain lamp holder (E.40) power factor improvement capacitor igniter. All accessories are pre wired up to terminal block. Two Nos. M.S.U. clamps shall be provided for mounting on suitable sized pipe. A hole with a grommet shall be provided for cable entry. The luminaries shall be painted with stove enamel of gray/black outside and white inside as approved by in-charge electrical engineer.

The general and technical specification given in the tender booklet shall be considered as a part of a agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

(x) PVC Insulated Cable 2, 3, 3½ & 4 core

Scope:- The Scope of work shall cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling.

All Cables shall be as per relevant Indian Standard with ISI Mark.

Materials: - All cables shall be 1100-volt grade PVC insulated, PVC sheathed **aluminum or copper conductor** with or without armouring as specified and with an outer PVC protective sheath heavy duty. Cables shall have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standard. Type designation and core identification of cables shall be as per relevant Indian Standard.

All cables shall be new without any kind of visible damage. The manufacturer's name, insulating materials, conductor size, voltage class and IS mark shall be marked on the surface of the cable at every 600MM length.

General:-

The cables shall be supplied in single length i.e. without any intermediate joint. The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.

Installation:- Cables shall be laid in the routes as directed by in-charge Electrical Engineer.

Cables running indoors shall be laid on walls or ceiling as per the site situation. Cables shall be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500MM interval with chrome plated screws.

In case of cables buried directly in ground, cables shall be laid in an excavated trench not less than 900MM from G.L., over a sand or soft earth cushion to provide protection against abrasion.

In case cables enter the building or one room to another it would be done through porcelain / PVC pipes. After erection the pipes shall be sealed with M-seal.

The general and technical specifications given in the tender booklet shall be considered as a part of agreement. The material shall be approved as per relevant IS specification and shall be approved by the Electrical Engineer in charge before executing the work.

Metal Hail Lamp

The wall light fitting should be decorative type pole mounted luminaries suitable for 150 W halogen tube. It should have die cast aluminum housing anodized aluminum reflector. It should have flame hardened Pyrex glass diffuser and silicon gasket.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge/Architect before executing the work.

(i) MCB and MCB Distribution Boards

The MCB should be with ISI mark of Indian standards specification No. IS:8828/1996.

MCB should be with overload and short circuit tripping elements. The breaking capacity of fault current of MCB should not be less than 10000 Amp. at an electric pressure of 230 volt.

Miniature circuit breaker single pole, double pole or four pole should be suitable to operate on 230/415 V A.C. system and having overload and short circuit tripping elements and breaking capacity 10KA to be erected in existing M.S. box conforming to IS 8828/1996 with ISI Mark.

MCB / ELCB distribution board should be metal clad having modular double doors with DIN rails, epoxy powder coated finish metal frame & door assembly with S.S. door spring & hinged pins complete with required PVC sleeved 63A copper Bus strips without MCB / ELCBs. The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

(ii) ELCB

The ELCB should be of approved make & should be conforming to IS: 12640/1988 & BS: 4293/1983 having sensitivity of 30 MA & breaking capacity of 10 KA & suitable for 240/415 V 40 Amp rating. ELCB should have characteristics of quick acting & tripping with all advanced features & do not incorporate any electronic component. The wiring for connection should be used of PVC copper wires of adequate capacity with proper size of lugs.

The ELCBs should be erected on polished wooden board as per direction of Engineer in charge. The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Description No: 122

Power Distribution Board

General Specification:

All the Main Co Panel's, PCC's / PDB's / MCC's shall be metal clad, totally enclosed, rigid, floor / wall mounted, air - insulation, cubical type suitable for operation on three phase / single phase, 415 / 230 volts, 50 Hz. neutral effectively / Non effectively grounded at transformer and short circuit level not less than 30 MVA at 415 volts.

The Main Co Panel's, PCC's / MCC's shall be designed to withstand the heaviest condition at site, with minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.

Standard and Codes

The Main Changeover Panel, PCCs & MCCs shall comply with the latest edition of relevant Indian standards and Indian Electricity rules and regulations. The following Indian Standards shall be complied with:

IS: 4237: General requirements for switch gear and control gear for voltage not exceeding 1000v.

IS: 375: Switch gear bus-bars, main connection and auxiliary wiring, marking and arrangement.

IS: 2147: Degree of protection provided by enclosures for low voltage switch gear and control gear.

IS: 8197: Terminal marking for electrical measuring instrument and their accessories

.IS: 2557: Danger notice plates.

IS: 2516: Specification for AC circuit breaker.

IS: 1818: Specification for AC isolator and earthing switch.

IS: 3072: Code of practice for installation and maintenance of switch gear.

IS : 8623: Specification for factory built as symbolize of switch gear and control gear for voltage upto and including 1000v.A.C.&1200v.D.C.

IS: 8828: Miniature Circuit Breaker.

IS: 2516: Air circuit breaker.

IS: 4064: Fuse switch and switch fuse unit

.IS: 9224: HRC fuse unit.

IS: 2705: Current transformer

IS: 3155: Voltage transformer.

IS: 3231: Electrical relay for

protection. IS: 1248: Indicating instrument.

IS: 722 : Integrating instrument.

IS: 6875: Control switches & push

buttons. IS: 2959: Auxiliary contactor.

IS: 1822: AC motor starters of voltage not exceeding 1000V.

Indian Electricity Act and rules. (as amended upto eight) & approval of FIA. of India.

The Main Changeover Panel, PCCs / MCCs / PDBs also require approval of the purchaser or his representative at various stage of their manufacture such as design, selection, construction, testing, shipping etc.

Shop Drawing

Prior to fabrication of the MAIN CHANGE OVER PANEL, PCCs/MCCs/PDBs, the supplier/contractor shall submit for consultant's approval the shop/vender drawing, and design calculations, indicating type, size, short circuiting rating of all the electrical components used, busbar size, internal wiring size, MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs dimension, colour, mounting detail etc. The contractor shall submit manufacture's catalogues of the electrical components installed in the MAIN CHANGE OVER PANEL, PCCs & MCCs.

Inspection

At all reasonable times during production and prior to transport of all the MAIN CHANGE OVER PANEL, PCCs & MCCs to site, the supplier / contractor shall arrange and provide all the facilities at their plant for inspection.

Test Certification

Testing of MAIN CHANGE OVER PANEL, PCCs & MCCs shall be carried out at factory or at site as specified in Indian Standards in the presence of Client. The test results shall be recorded on prescribed forms. The test certificates for the test carried out at factory or at site shall be submitted in duplicate for approval.

Construction

Cubical Type MAIN CHANGE OVER PANEL, PCCs, MCCs, PDBs.

STRUCTURE

The MAIN CHANGE OVER PANEL, PCCs, MCCs & PDBs shall be metal clad enclosed and be fabricated out of high quality CRCA sheet, suitable for indoor installation having dead front operated and floor mounting type.

All CRCA sheet steel used in the construction of MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs shall be 1.6mm thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet shall be seam welded, all welding slag grounded off and welding pits wiped smooth with plumber metal.

The MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs shall be totally enclosed, completely dust and vermin proof and degree of protection being no less than IP-51 to IS 2147. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be fully gasketed with foam rubber and / or rubber strips and shall be lockable.

All panels and covers shall be properly fitted and secured with the frame, and holes in the panel correctly positioned. Fixing screw shall enter into holes tapped into an adequate thickness of metal or provided with bolts and nuts. Self threading screws shall not be used in the construction of MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs.

A base channel of 75mm x 75mm x 5mm thick shall be provided at the bottom.

MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs shall arrange in multi-tier formation. The size of the MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs shall be designed in such a way that the internal space is sufficient for hot air movement, and the electrical component does not attain temperature more than 40 degree Celsius. If necessary openings shall be provided for natural ventilation, but they said openings shall be screened with fine weld mesh.

Knockout holes of appropriate size and number shall be provided in the MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs in conformity with number, and size of incoming and outgoing conduits

/cables.

Alternatively the MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs shall be provided with removable sheet plates at top to drill holes for cable / conduit entry at site.

The MAIN CHANGE OVER PANEL, PCCs / MCCs / PDBs shall be designed to facilitate easy inspection, maintenance and repair.

The MAIN CHANGE OVER PANEL, PCCs/MCCs/PDBs shall be sufficiently rugged in design and shall support the equipment without distortion under normal and short circuit condition; they shall be suitably braced for short circuit duty.

Protection Class

All the indoor MAIN CHANGE OVER PANEL, PCCs/MCCs/PDBs shall have protection class of TP-51.

Painting

All sheet steel work shall undergo a process of decreasing pickling in acid, cold rinsing, phosphate and passivating and then sprayed with a high corrosion resistant primer. The finishing treatment shall be by application. Two coats of synthetic enamel paint of approved colour shall be applied by spray.

Circuit Compartment

Each circuit breaker and switch fuse units shall be housed in separate compartments and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly interlocked with the breaker/switch fuse units in ON and OFF position. Safety interlocks shall be from being drawn out when the breaker is in ON position.

The door shall not form an integral part of the draw out position of the circuit breaker. All instruments and indicating lamp shall be mounted on the compartment door. Sheet steel barriers shall be provided between the trolleys in a vertical section.

Instrument Compartment

Separate and adequate compartment shall be provided for accommodating instruments, indicating lamp, control contactors, relays and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, switch fuse units, busbars and connections.

Busbars

The busbar shall be air insulated and made of high quality, high conductivity, high strength aluminum and as per relevant IS code. The busbar shall be of three phases and neutral system with separate neutral and earth bar. The busbar and interconnection between busbar and various components shall be of high conductivity, hard drawn, aluminum. The busbar shall be of rectangular cross section designed to withstand full load current for phase busbar and half rated current for neutral busbar and shall be extensible type on either side. The busbar shall be rated for the frame size of the main incoming breaker but in any case not less than 125 amp capacities. The busbar shall have a uniform cross section throughout the length.

The busbar and interconnections shall be insulated with heat shrinkable PVC sleeves and be colour coded in red, Yellow, Blue and Black to identify the three phases and neutral of the system. The busbar shall be supported on unbreakable, non hygroscopic DMC insulated supports at sufficiently close interval to prevent busbars sag and shall effectively withstand electromagnetic stresses in the event of short circuit capacity of 50 KA RMS symmetrical for one second and a peak short circuit withstand of 105 KA minimum.

The busbar shall be housed in a separate compartment. The busbar shall be isolated with 3 mm thick Bakelite sheet to avoid any accidental contact. The busbar shall be arranged such that minimum clearance between the busbars remain maintained as per below.

Between phases : 27
mm min. Between phases and neutral :
25 mm min.

Between phases and earth : 25 mm min.

Between neutral and earth : 23 mm min.

All bus bar connection shall be done by drilling holes in bus bars and connecting by chromium plated brass bolt and nuts. Additional cross section of bus bar shall be provided in all MAIN CHANGE OVER PANEL, PCCs/MCCs/PDBs to cover up the holes drilled in the busbars. Spring and flat washers shall be used for tightening the bolts.

All connection between bus bar and circuit breaker / switches and between circuit breaker/switches and cable terminals shall be through solid aluminum strips of proper size to carry full rated current. These strips shall be insulated with insulating strips.

Electrical Power & Control Wiring Connection

Terminal for both incoming and outgoing cables shall be suitable for 1100 volts grade, aluminum/copper conductor PVC insulated and sheathed, armoured cable and shall be suitable for connections of solder less sockets for the cable size as indicated on the appended drawing for the MAIN CHANGE OVER PANEL, PCCs, MCCs, and PDBs.

Both control and power wirings shall be brought out in cable alley for ease of external connections, operation and maintenance.

Both control and power terminals shall properly be shrouded.

10% spare terminals shall be provided on each terminal block. Sufficient terminals shall be provided on each terminal block so that not more than one outgoing wire connected per terminal.

Terminal strip for power and control shall preferably be separated from each other by suitable barriers of enclosures.

Wiring inside the module for power, control protection and instrument etc. shall be done with use of 660/1100 confirming to IS 694 and IS 8130. Power wiring inside the starter modules shall be rated for full current rating of contactor, but not less than 4 sq mm cross section area. For current transformer circuits, 2.5 sq mm copper conductor wires shall be used. Other control wirings shall be done with 1.5 sq mm copper conductor wires. Wires for connections to the door shall be flexible. All conductors shall be crimped with solderless sockets at the ends before connections are made at other terminals.

Control power for the motor starter modules shall be taken from the respective modules switch gear outgoing from R phase and Neutral. Control wirings shall have control fuse (HRC type).

Particular care shall be taken to ensure that the layout of wiring neat and orderly. Identification ferrules shall be fitted to all the wire termination for ease of identification and to facilitate and testing.

"CUPAL" washers shall be used for all copper and aluminum connections.

Final wiring diagram of the PCC, MCC, PDB power and control circuit with ferrule numbers shall be submitted along with the PCC/MCC/PDB as one of the documents.

Terminals

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformer for instrument metering shall be mounted on the disconnecting type terminal blocks. No direct connection of incoming and outgoing cables to internal components connection of the distribution board is permitted; only one conductor may be connected in one terminal.

Wireways

A horizontal PVC wireway with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

Cable Compartment

Cable compartment of adequate size shall be provided in the MAIN CHANGE OVER PANEL, PCCs, MCCs, PDBs for easy termination of all incoming and outgoing cables entering from bottom to top. Adequate support shall be provided in the cable compartment shall be brought out to terminal blocks in the cable compartment.

Earthing

Aluminum earth bus bar of 25 mm x 3 mm shall be provided in the MAIN CHANGE OVER PANEL, PCCs, MCCs, PDBs for the entire length of panel. The frame work of the MAIN CHANGE OVER PANEL, PCCs, MCCs, and PDBs shall be connected to this earth bus bar. Provisions shall be made for connection from earth bus bar to the main earthing bar coming from the earth pit on both sides of the MAIN CHANGE OVER PANEL, PCCs, MCCs, and PDBs.

The earth continuity conductor of each incoming and outgoing feeder shall be connected to this earth bar. The armour shall be properly connected with earthing clamp and the clamp shall be ultimately bounded with the earth bar.

Labels

Engraved PVC labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangement of circuit inside the distribution board shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet.

Name Plate

A name plate with panel designation in bold letter shall be fixed at top of the central in panel. A separate name plate giving feeder details shall be provided for each feeder module door. Inside the feeder compartment, the electrical component, equipments, accessories like switch gear, contactor, lamp, relay etc. shall suitably be identified by providing stickers.

Engraved name plates shall preferably be of 3 ply, (red-white-red or black-white-black) laminated cold sheet. However black engraved perlex sheet name plates shall also be applicable. Engravings shall be done with square groove cutters.

Name plates shall be fastened by countersunk screws and not by adhesives.

Danger Notice Plate

The danger plates shall be affixed in a permanent manner on operating side of the panel.

The danger notice plates shall indicate danger notice both in Hindi and English and with a sign of skull and bones.

The danger notice plate in general shall meet the requirements of local inspecting authorities.

Overall dimension of the danger notice plate shall be 200 mm wide and 150 mm high. The danger notice plates shall be made from minimum 1.6 mm thick mild steel sheet and after due pretreatment to the plate, the same shall be painted white with vitreous enamel paint on both front and rear surface of the plate.

The letter, the figure, the conventional skull and bones shall etc. shall be positioned on the plate as per recommendation of IS:2551-1982.

The said letter, the figure and the sign of skull and bones be painted in single red colour as per IS:5-1978.

The danger plates shall have rounded corners. Location of fixing holes for the plates shall be decided to suit design of the panel.

The danger notice plate, if possible, be of ISI certification mark.

Internal Components

The PCC / MCC / PDB shall be equipped complete with all type of required number of air circuit breakers, switch fuse unit, contactor, relays, fuses, meters, instruments, indicating lamps, push buttons, equipment, fittings, busbar, etc. and all the necessary internal connections / wiring as required and as indicated on relevant drawings. Components necessary for proper complete functioning of the PCC / MCC / PDB but not indicated on the drawings shall be supplied and installed on the PCC/MCC/PDB.

All part of the PCC/MCC/PDB carrying current including the components, connections, joints and instrument shall be capable of carrying their specified rated current continuously, without temperature rise exceeding the acceptable values of the relevant specifications at any part of the PCC/MCC/PDB.

All unit of the same rating and specification shall be fully interchangeable.

Inspections

Each equipment should inspect and witness by client.

The PCC / MCC / PDB shall be inspected and checked as per inspection manual of the PCC / MCC / PDB manufacturer.

Various electrical components and accessories of the PCC/MCC/PDB shall be checked as per drawing for their respective PCC/MCC/PDB.

The PCC/MCC/PDB shall be checked for rigid mounting, earthing connections, proper rating and size of components, internal wiring, etc.

All mechanical fasteners and electrical connections shall be checked and tightened before installation.

Routine test certificates for all ACB for similar ratings shall be submitted.

Test

Prior to dispatch of the PCC/MCC/PDB following tests shall be carried out.

Mechanical endurance tests shall be carried out by closing and opening of all the ACB's, MCB's switches etc.

High voltage and insulation resistance tests shall be carried out between phases and between phase to earth bus, keeping the isolating switch in ON position. Similar test shall be carried out keeping the isolating switch in closed position.

All the interlocks, controls and tripping mechanism of the switch gears shall be tested for their proper functioning.

Components General

The type, size, and rating of the components shall be as indicated on the relevant drawings.

While selection of the capacity of the components resulting from the prevailing conditions like room temperature shall be allowed for the Thermal and magnetic tripping shall be compensated for ambient temperature.

The rating indicated on the drawings are rating anticipated at prevailing site condition.

Fuse Switch Units

The fuse switch unit shall be 3-pole double break type suitable for load break duty (AC23), quick make and break action. Separate neutral link shall be provided with hinged doors duly interlocked with operating mechanism so as to prevent opening of the door when the switch is in "ON" position and also prevent closing of the switch when the door is not properly secured. All contacts shall be silver plated and all live parts shall be shrouded. The incoming and outgoing terminals of switches shall be adequately sized to receive proper size of the cables. High Rupturing capacity (HRC) fuse links shall be provided with switch fuse units and shall be in accordance with IS : 2208-1962 and having rupturing capacity of not less than 35 MVA at 415 volts. HRC fuse link shall be provided with visible indicators to show that they have operated. The switch fuse unit shall be manufactured in accordance with IS: 4047-1967 as amended to date.

Miniature Circuit Breaker

Miniature circuit breakers shall be quick make and break and break type conform with British standard BS : 3871 (Part-I) 1965 and IS : 8825. The housing of MCBs shall be heat resistant and having a high impact strength. The fault current of MCBs shall not be less than 9000 amps, 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.

The circuit breaker shall be of trip free pattern to prevent closing the breaker on a fault current.

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 3 as for over current and short circuit protection. The over load or short circuit devices shall have a common trip bar in the case of DP and TPN miniature circuit breakers. All the MCB's shall be tested and certified as per Indian Standard, prior to installation.

Fuse

Fuses shall be of high rupturing capacity (HRC) fuse links and shall be in accordance with IS: 2000-1962 and having rupturing capacity of not less than 35 MVA at 415 Volts. The backup fuse rating for each motor / equipment. HRC fuses shall be of English Electric make or approved equal.

Moulded Case Circuit Breaker

The MCCB shall be air break type and having quick make quick break with trip free operating mechanism.

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 breakers shall be of high conducting non deteriorating silver alloy contacts.

The MCCB shall be provided with thermal/magnetic type BI-metal overload 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 appended drawings shall provide an earth fault relay.

The MCCB shall provide two set 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 appended drawings.

Contactors

The contactor shall meet with the requirements of IS: 2959 and BS: 775.

The contactors shall have minimum making and breaking capacity in accordance with utilization category AC3 and shall be suitable for minimum class II intermittent duty.

If the contactor forms part of a distribution board then a separate enclosure is not required, but the installation of the contactor shall be such that it is not possible to make an accidental contact with live parts.

Voltmeter

Voltmeter shall comply with BS-90. The dial of the meter shall be square in shape of 96 x 96 mm size. The voltmeters shall be moving iron type, flush pattern with dust and moisture proof enclosure.

The voltmeter selector switch shall be arranged to provide line to line voltage reading.

Ammeter

Ammeter shall comply with BS: 89. The dial of the ammeter shall be square in 96 x 96 mm in size. The ammeters shall be moving iron type, flush pattern with dust and moisture proof enclosure. The range of the ammeter shall be in accordance with 1 to 1.5 times the feeder full load current. Separate current transformers shall be provided for all Ammeters.

Current Transformer

Where an ammeter is called for, CT's shall provide for current measuring. Each phase shall be provided with separate CT of class I accuracy and suitable VA burden for operation of associated metering and controls. Current transformer shall be in accordance with IS: 2705 - 1964 as amended up to date.

Push Button

The push button unit shall comprise of the contact element, a fixing holder, and push button actuator. The push button shall be momentary contact type. The contact shall be of silver alloy and rated at 10 Amps. Continuous current rating. The actuator shall be of stranded type and colour as per its usage for ON, OFF and Trip.

Indicating Lamp

Indicating Lamp shall be LED type.

Colour shade for the indicating lamp shall be as below:

ON Indicating lamp	:	Red
OFF Indicating lamp	:	Green
TRIP Indicating lamp	:	Amber
ASE Indicating lamp	:	Red, Yellow, Blue.

PVC Insulated Cable 2, 3, 3½ & 4 core

Scope:- The Scope of work should cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling.

All Cables should be as per relevant Indian Standard with ISI Mark.

Materials:- All cables should be 1100 volt grade PVC insulated, PVC sheathed aluminum or copper conductor with or without armoring as specified and with an outer PVC protective sheath heavy duty. Cables should have high conductivity stranded aluminum or copper conductors and cores colour coded to the Indian Standard. Type designation and core identification of cables should be as per relevant Indian Standard.

All cables should be new without any kind of visible damage. The manufacturers name, insulating materials, conductor size, voltage class and ISI mark should be marked on the surface of the cable at every 600MM length.

General:- The cable should be supplied in single length i.e. without any intermediate joint. The cable ends should be suitably sealed against entry of moisture, dust, water etc. with cable compounds as per standard practice.

Installation:- Cables should be laid in the routes as directed by in-charge Electrical Engineer.

Cable running indoors should be laid on walls or ceiling as per the site situation. Cables should be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500MM interval with chrome plated screws.

In case of cables buried directly in ground, cables should be laid in an excavated trench not less than 900MM from G.L., over a sand or soft earth cushion to provide protection against abrasion.

In case cables enter the building or one room to another it would be done through porcelain/PVC pipes. After erection the pipes should be sealed with M-seal.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Cable Laying

Scope:- The Scope of work should cover supply, laying, connecting, testing and commissioning of low and medium voltage power cabling.

All Cables should be as per relevant Indian Standard with ISI Mark.

Materials: - All cables should be 1100 volt grade PVC insulated, PVC sheathed aluminum or copper conductor with or without armoring as specified and with an outer PVC protective sheath heavy duty. Cables should have high conductivity stranded aluminum or copper conductors and cores color coded to the Indian Standard. Type designation and core identification of cables should be as per relevant Indian Standard.

All cables should be new without any kind of visible damage. The manufacturer's name, insulating materials, conductor size, voltage class and ISI mark should be marked on the surface of the cable at every 600MM length.

General: -The cable should be supplied in single length i.e. without any intermediate joint. The cable ends should be suitably sealed against entry of moisture, dust, water etc. with cable compounds as per standard practice.

Installation:- Cables should be laid in the routes as directed by in-charge Electrical Engineer.

Cable running indoors should be laid on walls or ceiling as per the site situation. Cables should be fixed directly to wall or ceiling and supported with G.I. saddles / clamps at not more than 500MM interval with chrome plated screws.

In case of cables buried directly in ground, cables should be laid in an excavated trench not less than 900MM from G.L., over a sand or soft earth cushion to provide protection against abrasion.

In case cables enter the building or one room to another it would be done through porcelain/PVC pipes. After erection the pipes should be sealed with M-seal.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Brass Cable Gland & Lug

The cable gland should be of polished brass, double compression type and ends should be shrouded. The inner size of gland should be suitable to receive suitable size of cables. The cable glands should be heavy duty and should be fixed with switch fuse unit with suitable brass washers with rubbering/gasket.

Rigid PVC Pipes

The Rigid PVC Pipe should conform IS: 2509 or ISI marked. A specified Rigid PVC Pipe should be 1.5MM to 1.6 MM thick manufactured from high grade virgin PVC. The diameter of PVC pipe

should be as specified. Fittings for Rigid PVC Pipe such as bends, elbows, nipples, couplings, reducers, plugs etc. should be specifically designed and manufactured for their particular applications. All fittings should conform to IS: 3415.

The Rigid PVC Pipe should be erected on wall / ceiling with properly screwed heavy duty Rigid PVC Saddles at the intervals not more than 500 MM. and pipes to pipes and pipes to fittings should be fixed with adhesive solution. 16 SWG G.I. fish wire should be erected with erection of pipe as a draw wire. The installation of pipes should be as per IS: 4648, IS: 732 and IS: 1646.

The general and technical specifications given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Earthing

The Earthing of an installation should conform to I.E. Electricity Rules, IS-3043, latest edition and

I.E.E. The copper earth plates should be tinned before installation. The earth plates of **Cast iron, having size of 0.45 x 0.45 x 0.35 cm. in separate pit.** It should be specially prepared 2.5 mtr deep with necessary to reach moist earth surface. The earth pit should be provided with 38 MM dia GI Pipe 2mtr long. Alternatively layers of salt and coke should be provided surrounding the plate.

The pits should be filled when the plates are in position and in presence of Engineer in Charge. The earthing resistance of each earth plate should be measured by resistance meggar in the presence of Engineer in Charge. Three days after the completion of earthing work the values should conform to regulations.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

Copper Earth Wire

The copper wire of 8 to 16 SWG should be used for earthing of switchgear. The wire should be Annealed bare Copper Wire. The copper wire should be erected as per the requirement and instruction of Engineer in charge.

The general and technical specification given in the tender booklet should be considered as a part of agreement. The material should be approved as per relevant IS specification and should be approved by the Electrical Engineer in charge before executing the work.

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
1	Supplying and erecting approved make Octagonal pole made from HR sheet steel. The pole should be made as per IS. and shall be coated with hot dip galvanizing as per IS 2629/2633/4759, suitable to sustain local wind speed with integral Junction box consist of terminal plate of min 6mm Hylam sheet, standard profile 35mmX7.5mm Din-Rail for MCB Mounting, stud type terminal and arrangement for cable termination to be erected on foundation as per details given by manufacturer considering site requirement. (E) 7 Mtr. Long 70 mm Top X 135 mm bottom dia, 3 mm thickness with 225mmX225mmX16mm base plate, 4-M20 Bolts and 600mm long with necessary G.I. J Bolts .Approx Pole weight 67 kg
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each.
2	Providing and erecting street light pole bracket comprising main B Class GI pipe of 4.2 cm/require outside dia. complete with suitable B Class G.I sleeve tubing of approx. 45cms.length and suitable for 76.5 mm / 80mm. / require size pole top having sufficient fasteners for fixing the brackets and having spread of 1 mtr. length with suitable rise as per site condition & suitable welded stiffener reducer and nipple with check nut complete painted with one coat of Red oxide / PU base primer and two coats of Aluminium / PU paint. paint with following nos of arms. [A] Single Arm bracket 1.5 Mtr [B] Double Arm Bracket 1.5 Mtr
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each.
3	Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V,Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K,Uniformity ratio >0.45, Luminaire efficacy> 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Street Light (IP-65), Surge protection -4KV integral and ,Light must have 440VAC line supply with over-voltage protection. (iv) above 90 to 120 watts Cat-III
4	Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground. Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per Meter.
5	Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable (A)50 mm inner dia The relevant specifications of item description no. 85 of RTS Building & Ramp shall be followed.
6	Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand / Solid Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
	(B) 4 core 6 Sq. mm
	The relevant specifications of item description no. 82 of RTS Building & Ramp shall be followed.
7	Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (A) 4 core 16 Sq. mm
	The relevant specifications of item description no. 82 of RTS Building & Ramp shall be followed.
8	Supplying and erecting Flexible PVC insulated multi strand multi core 1.1 kv grade ISI marked copper wires of following size to be erected as directed. e) 1.50 Sq.mm 3 core round PVC sheathed
	The relevant specifications of item description no. 72 of RTS Building & Ramp shall be followed.
9	Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables. (B) 2 to 4 core 6 Sq. mm (D) 2 to 4 core 16 Sq. mm
	The relevant specifications of item description no. 87 of RTS Building & Ramp shall be followed.
10	Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (A) 1.5/ 2.5/4/6 Sq.mm (C) 16/25 Sq.mm.
	The relevant specifications of item description no. 89 of RTS Building & Ramp shall be followed.
11	providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat.III
	The relevant specifications of item description no. 76 of RTS Building & Ramp shall be followed.
12	Providing and erecting Pipe type earthing with 40 mm dia 2.5 mtr long 'B' grade G.I. pipe with necessary coupling buch buried in specially prepared earth pit & G.I. earth wire of 8 SWG erected & connected as directed (For panel)
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each nos.
13	For using salt and charcoal / coke as required for pipe type earthing.
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.
	Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each nos.
14	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed. (ii) 40 Amps.FP Cat. III

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
	The relevant specifications of item description no. 79 of RTS Building & Ramp shall be followed.
15	Providing & erecting 415V MCB Four Pole Switch for Lighting Load (B curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity (a) 6 to 32 Amp.
	The relevant specifications of item description no. 57 of Toilet Block shall be followed.
16	Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv)12 way
	The relevant specifications of item description no. 75 of RTS Building & Ramp shall be followed.
17	Providing and erecting Pipe type earthing with 40 mm dia 2.5 mtr long 'B' grade G.I. pipe with necessary coupling buch buried in specially prepared earth pit & G.I. earth wire of 8 SWG erected & connected as directed (For panel)
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each nos.</p>
18	Supplying & erecting approved make IP 55 grade Company fabricated Timer Panel of following capacity for switch On-Off street lights on time scheduling basis made from 16G CRCA sheet duly epoxy power painted inside and outside with hinged doors and locking arrangement consisting of suitable size of 4 Pole MCB and 4 pole contactor (cat-III)with analog time switch, auto manual switch of same make and suitable input and output Bakelite terminals and with door earthing approved by Engineer in charge. (B) 40 Amp
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each nos.</p>
19	Supplying, erecting, testing, commissioning approved make M.S. Polygonal High Mast Pole having following general Specification. (a) Polygonal Section fabricated from M.S. Plate confirms BSEN 10025 & Hot deep galvanized minimum 65/86 micron (as per IS 2629 /1985) Lantern carriage with ring and rubber lines for erection of luminaries of suitable site. (b) Maximum telescopic section not more than four (c) Double drum gear pipe motorized winch with 6mm dia S.S. Rod (For 16 mtr and above size) (d) Approved make L.E.D. aviation light = 1 No. Lightning arrestor = 1 No. with necessary wiring of 2.5 sq.mm 5 core ISI copper cable Unarmoured. (e) Bottom most section suitable for mounting reversible motor and switchgears having door not more than 1400mm x 300mm with waterproof gasket & hinges & locking arrangement. (f) Pole structure comprises suitable size of reversible motor, cable and necessary switchgears with

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
	control panel. (g) bottom section shall have suitable size of thickness supports ribs foundation bolts nuts etc. (h) Item not comprises the cost of lanterns. (i) Necessary Cement Concrete foundation as per IS including testing & commissioning of the entire structure for following size of High Mast poles [7] High Mast 20 Mtr. TOP A/F 150 Mm, BOTTOM A/F 400 Mm, No. of Sec. No. - 2, Bottom Thickness - 4 mm, Top Sec. - 3 mm, Size Base Plate -dia.580 mm x 20 mm thick, Foundation Bolt Size M27 x 850mm , Qty - 10 Nos., Suitable for mounting Fitting of Light - 12 Nos.
	Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC. Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each nos.
20	Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V,Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K,Uniformity ratio >0.45, Luminaire efficacy> 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings.The Engineer incharge may select any wattage capacity between the ranges shown.) (B) Flood Light (IP-65), Surge protection -4KV integral and ,Light must have 440VAC line supply with over-voltage protection. (vii)Above 200 to 250 watts Cat III The relevant specifications of item description no. 74 of RTS Building & Ramp shall be followed.
21	Supplying and erecting Flexible PVC insulated multi strand multi core 1.1 kv grade ISI marked copper wires of following size to be erected as directed. (k) 4.00Sq.mm 4 core round PVC sheathed The relevant specifications of item description no. 72 of RTS Building & Ramp shall be followed.
22	Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables. 4 Core x 10 Sq.m.m The relevant specifications of item description no. 83 of RTS Building & Ramp shall be followed.
23	Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables 3 1/2 core 25 Sq. mm (16 Sq. mm 1/2 core) The relevant specifications of item description no. 84 of RTS Building & Ramp shall be followed.
23	Providing & fitting heavy duty brass cable glands (nickel-plated) with washers & rubber ring conforming to IS, suitable for 3, 3½ & 4 core cables of following type & sizes: Double Compression Brass Cable Glands 2 to 4 core10 Sq.m.m 2 to 4 core25 Sq.m.m
	Workmanship:

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
	<p>The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per meter.</p>
24	<p>Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner.</p> <p>10 Sq.m.m</p> <p>16/25 Sq.mm.</p>
	The relevant specifications of item description no. 89 of RTS Building & Ramp shall be followed.
25	<p>Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth for laying of cable. below ground / road surface for enclosing cable</p> <p>(A)50 mm inner dia</p>
	The relevant specifications of item description no. 85 of RTS Building & Ramp shall be followed.
26	<p>Providing and erecting Pipe type earthing having 150 cms.long and 2.5 cms. dia. galvanised iron pipe with coupling and buch buried in specially prepared earth pit complete with necessary 8 SWG earth wire.</p>
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each nos.</p>
27	For using salt and charcoal / coke as required for pipe type earthing.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per meter.</p>
28	<p>Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be suitable for</p> <p>(b) sheet steel double door (IP-43)</p> <p>(H) Single phase 12-way SS Double door</p>
	The relevant specifications of item description no. 75 of RTS Building & Ramp shall be followed.
29	<p>providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat.III</p>
	The relevant specifications of item description no. 76 of RTS Building & Ramp shall be followed.
30	<p>Providing & erecting 415V MCB Four Pole Switch for Lighting Load (B curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity</p>

O. STREET LIGHT & HIGH MAST	
Sr. No.	Item of Work
	(a) 6 to 32 Amp. Cat.III
	The relevant specifications of item description no. 57 of Toilet Block shall be followed.
31	Providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on 3 phase and neutral 415V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component for following Max. rating erected as directed.(ii) 40Amps. FP Cat.III
	The relevant specifications of item description no. 78 of RTS Building & Ramp shall be followed.
32	Providing and erecting HOT deep Galvanised iron strip wire 8 to 16 SWG.
	The relevant specifications of item description no. 80 of RTS Building & Ramp shall be followed.
33	Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load & dry form, Sulphur content:- <2%(C) Back fill
	Compound: - Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency. (b)For Electrical installation up to 11 KV in normal soil. Length of Pipe: 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.
	The relevant specifications of item description no. 81 of Toilet Block shall be followed.

P. CCTV Surveillance System	
Sr. No.	Description
1	Supply, Providing, Installation and erecting of CCTV Surveillance system including item such as mentioned below NVR 32 Ch/04 Hdd Slots = 1 Nos. IP Bullet/4MP/IR = 18 Nos. IP 5" PTZ Camera = 2 Nos. Connectors and DC Pins = 100 Nos. Network Cable /Meters = 3000 Rmt. Ropway Wire for Wire laying = 3000 Rmt. Camera Installation/pc = 36 Nos. Camera Installation/PTZ = 4 Nos. Cable Laying charges = 3000 Rmt. HDD - 06TB = 2 Nos. POE switch 08 Port 10/100mbps = 8 Nos. UPS For power protection-DVR- 1KVA = 1 Nos. Extra Accessories/shedal/tie/gbox/Other = 1 Nos. Junction Box = 16 Nos.

P. CCTV Surveillance System	
Sr. No.	Description
	Wire Electric = 1200 Rmt. 6U Rack = 1 Nos.
	<p>Workmanship: The specifications for this item shall be carried out in accordance with the directions of the Engineer-in-Charge, RMC.</p> <p>Mode of Measurement and Payment: Measurement and payment for this item shall be governed by the specifications and directions of the Engineer-in-Charge, RMC. The rate shall be applicable per each unit.</p>

21 SPECIFICATION FOR FIRE FIGHTING SYSTEM

21.1 TECHNICAL SPECIFICATIONS FOR FIRE SAFETY WORKS

1. DESIGN PHILOSOPHY

1.1. Hazard Classification:

1.2. Types of Systems Proposed:

Following are the various Fire Protection systems proposed

- Building wise Fire Water Tank and Fire Pump
- Wet Riser system
- Yard Hydrant with external ring main
- Fire Extinguishers

1.3. Fire Water Storage Tank:

Water Tank at Ground Floor level near Fire pump

1.4. Fire Water Pumps:

Electrically Driven Main Pump for Hydrant system

1.5. Fire Hydrant System:

- Ring Main at ground floor level with isolation valve
- Wet Riser cum down comers
- Landing Hydrants on Floor

1.6. Wet Riser come down comer System:

- Wet riser cum down comer for every 1000 sq. mts floor area
- Landing Hydrants on all floors with single- headed hydrant valve, Alternately Hose reel and Rubber hose at each Floor.

1.7. Yard Hydrant:

- Yard Hydrants at most prominent locations maintaining maximum distance of 30 m. between two hydrants of periphery of the constructed building with single headed Hydrant valve, fire hoses with nozzle

1.8. Fire Extinguishers:

- Dry Chemical Powder Fire Extinguishers confirming to IS 2171 are provided at all the prominent location to extinguish the B & C class Fire
- Carbon Dioxide type Fire Extinguishers confirming to IS 2878 are provided at all the prominent location to extinguish the B & C Class fire in conjunction with DCP fire Extinguishers
- Water Expelled Carbon-dioxide type fire extinguisher confirming to IS 940 are provided to all the prominent location to extinguish the A class fire
- ABC Type fire extinguishers are provided in the individual offices confirming IS:13849

2. APPLICABLE CODES AND STANDARDS

Unless specifically mentioned otherwise, the installation shall conform in all respect to the following broad list of standards in general and in particular the materials used shall bear prevailing ISI marking:

a).	NBC	National Building Code of India Part 4, Fire & Life Safety
b).	IS:1239	Specification for M.S Pipe
c).	API 600 / BS 5163	Specifications for Gun Metal Gate, Globe and Check valves for Water Supply
d).	IS:800	Specifications for Structural steel
e).	IS:814	Specifications for covered electrodes for metal arc welding of structural steel
f).	BS:5155	Specifications for C.I butterfly valve
g).	IS:4927	Specifications for Canvas Hose Pipes for Fire Fighting purpose
h).	IS:636	Synthetic Jacketed hose pipes
i).	IS:903	Specifications for ranch Pipes Fire Hose coupling and auxiliary equipments
j).	IS:5290	Specifications for Hydrant Landing Valves
k).	IS:4853	Recommended practice for radiography inspection of fusion welded butt joints in steel pipes
l).	IS:2198	Control Panel
m).	IS:5	Specifications for Painting
n).	IS:9137	Specifications for horizontal end suction centrifugal pump
o).	BS:1965 Part I	Specifications for butt welded pipe fittings
p).	IS:8423	Controlled percolating hose for fire fighting
q).	IS:2871	Branch Pipe, Universal for fire fighting purpose
r).	IS:884	First aid Hose reel for Fire fighting
s).	IS:5132	Hose reel tubing for fire protection system
t).	IS:2190	Code of practice for selection, installation and maintenance of portable first aid fire extinguishers
u).	IS:937	Specifications for Washers for water fittings for fire fighting system
v).	IS:2171	Dry Chemical Powder Fire Extinguishers
w).	IS:940	Water type Carbon-dioxide Fire extinguisher
x).	IS:2878	Carbon-Dioxide type Fire Extinguishers
y).	IS:13849	ABC Type Fire Extinguishers

3. SCOPE OF WORK FOR JOB EXECUTION

Description of Work will be as follows which have to be supplied, erected, commissioned and validated. The system to conform requirements as per IS and National Building Code of India – 2005.

- Fire Hydrant System consisting of M.S piping with fittings, valves, Fire Hoses, Hose Cabinets, Fire Nozzles, Hose reels, Anti Corrosion treatment, Painting and Accessories.
- Fire Extinguishers system consisting of Carbon Dioxide, Dry Chemical Powder, Water-CO₂ and ABC type Fire Extinguishers.

3.1. Drawings:

The drawings enclosed herewith are for the general guidance to the tenderers. The Contractor shall upon the award of the work, furnish detailed drawing necessary to carry out the work at site within 15 days. These shall be submitted for approval to the Architect/Consultants/Fire Department. The work shall be commenced only after the approval of drawing by the Architects/ Consultants/ Fire Department

3.2. Drawing/Information Required from Successful Tenderer Within 15 Days After Award of Work:

- a) Bar chart showing engineering, manufacturing and dispatch of each equipment and erection services.
- b) Drawing, literature and technical particulars of all bought out items.
- c) Schedule for valves and piping material.
- d) Pump GA & Cross sectional drawings.
- e) Performance curve for the pumps.
- f) Control logic diagram for pump to start.

3.3. Inspection and Approval:

The contractor shall arrange all necessary inspection by the local Authority He shall also arrange for the entire test, obtain and deliver to the Owner any approval required as per the standards It is the sole responsibility of the contractor to prepare & submit the drawings.

3.4. Painting:

All piping, furnished under this specification shall be properly painted with one coat of zinc chromate primer and two coats of synthetic enamel paint after installation and shall meet the requirements as outlined in Fire Protection Manual. Paint used for this work will be lead free quality.

3.5. Guarantee:

The contractor shall guarantee the material and workmanship of the entire system is of first class quality and shall correspond to standard Engineering Practice. All the equipments/apparatus shall be guaranteed to yield the specified rating and design capacities, speeds. Any defective equipment / material / workmanship found short of the specified quality shall be rejected contractor shall make good the rejected items at his own cost. Guarantee certificate of equipment from suppliers/manufacturers shall be handed over to the Owner.

3.6. Defects & Liability:

- All the equipment/ material and the system shall be guaranteed against defective material and workmanship for a period of 12 months from the date of commissioning and handing over the Owners along with all relevant documentation. The contractor shall repair/ rectify or replace all the defective materials, components free of cost. In addition, normal maintenance shall be carried out periodically during the defect liability period including replacement of spares, as required.

3.7. Instruction Manual/Completion Drawings/Training:

The contractor shall furnish detailed instruction and operation manual in quadruplicate. The contractor shall also furnish detailed completion drawings as soft copy and hard copy on tracing sheet drawn to an approved scale. The drawings shall be inclusive of control schematic, if any. The contractor shall train the Employer's personnel in the operation and maintenance of the system for one month.

3.8. Testing:

- The contractor shall arrange to test the entire system as per the procedure enumerated under particular specifications, after the erection is completed as per standards, The tests shall be carried out to the satisfaction of Project Managers/Owners. The results of the tests shall be submitted to the Project Managers / Owner in triplicate. If the results of the tests are not found to be satisfactory by the Project Managers/Engineer-in-charge, necessary rectifications.
- shall be done until the test results are found to be satisfactory. The installation shall be deemed to be completed only after the successful completion of the tests.

3.9. Technical Data:

The tenderers shall furnish data of their equipments as per the perform under 'Technical Data'. The tenders without technical data are liable to be rejected.

4. TECHNICAL SPECIFICATIONS FOR FIRE HYDRANT SYSTEM

4.1. Without restricting to the generality of the foregoing, the fire hydrant system shall include the following:

- a) Pumps, suction / delivery pipes, Valves, control panel and Instrumentation and pump set shall be in auto operation.
- b) Mild steel (M.S.) Class "C" (heavy grade) ring mains / riser main within the building and as well outside the building.
- c) Landing valves, external hydrant valves, hose reels, fire duct shutters. Hose cabinets, fire brigade connections and connections to pumps and appliances.
- d) All materials shall be of the best quality and brand new, conforming to these specifications / standards and subject to the approval of the Client / consultant.
- e) Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.,
- f) Pipes and fittings shall be fixed to walls and ceilings by suitable clamps at intervals specified. Only approved types of anchor fasteners shall be used for RCC ceilings and walls.
- g) Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat manner.
- h) The pipes shall be supported by structural steel fabricated (like, channel / angle / flat / plate etc) supports with suitable anchor fasteners / suspended thread rods not less than M16 in size.
- i) Valves and other appurtenances shall be as located that they are easily accessible for operation, repairs and maintenance. Valves / other equipments fitted above the false ceiling shall be provided with trap / access doors.
- j) Pipes for wet risers within the Building shall be M.S. tubes conforming to IS 1239 (heavy duty 'C' class) with flanged/welded joints.
- k) Fittings for steel pipes shall be malleable iron or forged iron fittings with screwed / welded joints.
- l) Inter connection between sprinkler and hydrant pumps shall be carried out at discharge side with Check valve and isolation valves.
- m) All equipment should be confirmed with Technical data sheets as enclosed along with this tender.
- n) In case Technical data sheet for any of ht equipment is not enclosed Bidder shall consider reputed make of equipment, manufactured under good engineering practice for the same details to be furnished along with bid.

4.2. Piping

All pipes inside the building and where specified, outside the building shall be M.S. tubes conforming to IS: 1239 - heavy duty. Fittings for pipes shall be as per IS: 1239, Part II (heavy grade) up to 150mm dia., 200 mm dia. and above shall be M.S. pipes as per IS: 3589 with minimum 6 mm wall thick & fittings shall be fabricated from pipes confirming to IS 3589. Pipes shall be carefully laid to the alignment, levels and gradients shown on the plan and sections and great care shall be taken to prevent any sand, earth or other matter from entering the pipes during laying. Pipes shall be kept thoroughly clean during the course of laying. The ends of pipes shall be blocked with wooden plugs wedged home, at the end of each days work to prevent dirt and rodents, insects etc., entering the pipe. Pipes up to 50mm dia, tapered screwed / Socket welded / Butt welded type jointing shall be adopted, while for pipes above 50mm dia welded or flanged connections shall be used. Flanged joints shall be made with 3 mm thick insertion rubber washer / Gaskets. All boltholes in flanges shall be drilled & making hole by using gas cutting is not acceptable. The drilling of each flange shall be in accordance with relevant Bureau of Indian Standards.

Flanged joints shall be used for connections to vessel equipment, flanged valves and also on suitable straight lengths of pipeline at strategic points to facilitate erection and subsequent maintenance work. **The Bolts /Nuts / Washers used in the system shall be Galvanized as per IS 1367 and suitable length & not more than 15mm beyond the Nut.**

4.2.1. Pipe protection

- **Above Ground Pipes**

All pipes above ground and in exposed locations shall be painted with two coat of Zinc rich type primer and two or more coats (minimum film thickness of 75 microns) of synthetic enamel paint of approved shade. The pipes should be initially brushed to remove all foreign matter before applying paint / primer.

- **Under Ground Pipes**

The pipes (buried) should be initially brushed to remove all foreign matter and apply the primer over the pipe. Primer is allowed to dry until the solvent evaporates and surface becomes tacky. The tape 2mm / 4mm thick and 150/250mm wide shall then be wound in a spiral fashion and bonded completely to pipe by thermo fusion process. The overlap is to be maintained at 15mm. 4 mm. Wrapping & Coating should be done to all the underground piping to protect it from moisture and other impurities.

Excavation Of Trenches

4.2.2.1 Excavation for pipelines shall be in open trenches to line and grade or as required at site including disposal outside of site at approved dumping yard with the prior approval of concerned authorities. Pipelines shall be buried to a minimum depth of 1M (top of the pipe) from the finished ground level.

4.2.2.2 The contractor shall support all trenches or adjoining structures with adequate timber supports wherever required.

4.2.2.3 On completion of testing and painting of the pipelines, trenches shall be refilled with excavated fine earth in 20cms. Layers and consolidated by ramming and watering.

Thrust Blocks

Contractor shall provide suitable PCC blocks of suitable dimensions at Change – in – direction and regular intervals of 6 meters to support the pipes. Minimum Size of Blocks shall be 600mmx600mmx450mm.

Pipe Supports

Supports for above ground pipes of 65 mm dia and above shall be fabricated by structural steel of suitable sections with suitable fasteners. The spacing of supports shall be 3mts minimum and painted two coats of enamel paint of approved color over a coat of primer.

Suitable type hangers shall support pipes below 50 mm dia with clamps, anchor fasteners and suspended rods etc. In any case fasteners shall not be less than 12 mm in size.

4.3 Valves

4.3.1 Butterfly Valves

Butterfly valves shall be as per BS 5155 & provided for pipes 50mm dia and above on downstream (delivery side) of the pumps. The valves shall be CI construction, seat shall be black nitrile rubber within situ moulding. The valves shall be PN 16 rating.

4.3.2 Gate Valves

Gate valves shall be as per IS: 14846 / 780, with C.I. body and bronze / brass internal parts and shall be used on suction side of the pumps. Valve shall be flanged end type, PN 10 with Non-rising Spindle type with C.I hand wheel etc.

4.3.3 Non – Return Valves

Non – return valves shall be reflux swinging disc type with C.I. body and bronze / brass internals with PN 16 rating and as per IS: 5312.

4.4 External Hydrants

External (yard) hydrant valves shall be single headed as per IS: 5290 (Type A). The valves should be complete with hand wheels, quick coupling connections, springs and blank caps. The hydrants shall be fixed to stand posts of 80mm dia for single headed hydrants at 1.0M from ground level. External hydrant valves shall be consisting with 2 nos. fire Hoses of 15m long 63 mm dia, One No. Gun metal Branch pipe with Nozzle housed in the M.S cabinet and cabinet shall be mounted (next to stand post) on free standing support fabricated by suitable structural steel / pipe of not less than 80 mm dia. Please refer the tender drawings for the details.

4.5 Hose Reel

Hose reel shall be swinging type for 180 deg with mounting base plate. Hose reel shall consist with 19mm dia high-pressure rubber braided hose of 36 mts length with gunmetal nozzles. Hose reel water shall be tapped off from the wet riser with Ball valve. The hose reel shall be installed in fire hose duct inside the building.

4.6 Landing Hydrant Valve

The landing valve (internal) shall be gunmetal double-headed type conforming to IS: 5290 complete with hand wheel, quick coupling, spring and blank cap. 2 Nos. of RRL type hose pipe of 63mm dia and 15 mts. length as per IS: 636 with 63mm dia instantaneous type Gun metal heavy duty couplings & Gun metal Branch pipe and nozzle to be provided. Fire hoses and branch pipes shall be mounted inside the fire shaft with suitable supports.

The Fire shaft shall be sealed at all floors with fire retardant material as shown in the Drawings, Refer Typical standard details furnished along with Tender.

4.7 Fire Hose

Fire hoses shall be Reinforced Rubber Lined (RRL) type - A, as per IS: 636 & 63 mm dia and 15 mts long. Hoses shall be bounded by G.I wire to heavy-duty instantaneous gunmetal couplings as per IS 903.

4.8 Branch Pipe With Nozzle

Branch pipe shall be gunmetal, 63 mm dia with Nozzle of 19 mm dia made as per IS: 903 and suitable fitted with hoses as specified else where in this specifications.

4.9 Hose Cabinet

Hose cabinet shall be Made from MS sheet duly powder coating, fronted with double hinged door and lock. It shall be spray painted to post office red color with word fire. The hose cabinet shall be of suitable size.

4.10 Air Release Valves

Air release valve is 25mm screwed inlet GM single acting type and shall be fixed on all high points in the system (wet riser) with Ball valves or as shown on drawings.

4.11 Drain Valves

Gun metal Gate / Ball valve of 15 / 25 / 40 / 50mm dia as per IS; 778 with fittings as required for instruments / draining any water in the system / Risers in low points.

4.12 Valve Chambers

Contractor shall provide suitable brick masonry chambers in cement mortar 1:5 (1 cement: 5 Coarse sand) on cement concrete foundations 150mm thick 1:5:10 mix (1 cement: 5 fine sand: 10 graded stone aggregate 20mm nominal size) 15mm thick cement plaster inside and outside finished with a floating coat of neat cement inside with cast iron surface box (OR top cover fabricated by M.S. chequered plate of 6 mm thick with frame / stiffeners etc) approved by local fire brigade including excavation, back filling and additional Iron rungs for entering in to valve chamber etc, complete.

Valve chambers shall be 1200mm x 1200mm x 1500mm depth.

4.13 Tests At Site

4.13.1 Piping

All piping in the system shall be tested to hydrostatic pressure of 1.5 times of the working pressure without drop in pressure for at least 120 minutes. The test should be made in the presence of and to the satisfaction of the Employers / consultants representatives. Any defects / leakage should be repaired or if necessary defective works / equipment should be replaced with new work / equipment. Tests should be repeated until work is done to the satisfaction of concern representatives.

After testing all pipes shall be flushed with portable water to remove foreign materials.

Under ground Pipes after lowered in to trenches shall be Holiday tested for damages of the anticorrosion treatment and damages should be rectified, bring it to the notice of the engineer – in –charge of site before closing the trenches.

Also the under ground pipes joints shall be tested for Radiographic for 10 % of the total under ground joints. The test results and films shall be submitted for approval and any defects found in the welding process shall be rectified the contractor with out any extra cost to the clients.

4.14 Painting:

All exposed surface of pipes, specials valves, Steel doors and windows, etc, shall have two coats of synthetic enamel paint of approved shade over a coat of red oxide primer etc all complete as approved and direction of the Engineer–in-charge.

4.15 Trial Run:

The trial run shall consist of a period of three months for total complete jobs of this water supply scheme. The contractor shall provide the skilled plant operator/pump operators, supervisors along with other service staffs for this duration of trial run after completion of the total work on Turnkey job basis. The contractor staffs shall train the staffs/persons nominated by the Engineer in charge during this period. The contractor shall run the plant round the clock during this period and shall maintain a logbook to ascertain the quality and quantity of treated water, consumption of power and chemicals. Any shortcomings in quality and quantity of water shall be corrected by the contractor adopting proper correction measures and as per direction of Engineer in charge.

4.16 Pumps and Accessories:

The pumps shall be exclusively used for fire fighting purposes and shall be BIS approved as mentioned in the BOQ. One set main pump for each hydrant & sprinkler system with electrical motor driven direct couple centrifugal pump of adequate discharge & head and in addition common standby Diesel engine driven direct coupled centrifugal pump of adequate discharge and head shall be provided. Also there shall be a Booster pumps on the Terrace of each office block. The pumping capacity of main and stand by hydrant / Sprinkler system pumps shall be as mentioned in the specimen BOQ. The suction / delivery pipes, valves, instrumentation and control panel shall be consider accordingly.

4. 16.1 General Requirement:

The pumps shall be horizontal centrifugal back pull out type, pump designed for continuous operation and shall have a continuously dropping head characteristic without any zone of instability. The power capacity

characteristic shall be non-over loading type. The head vs. capacity, input power vs. capacity characteristics, etc., shall match to ensure load sharing and trouble-free operation throughout the range. In case of accidental reverse flow through the pump the driver shall be capable of bringing the pump to its rated speed in the normal direction from the point of maximum possible reverse speed. The contractor under this specification shall assume full responsibility in the operation of the pump and the drive as one unit. The pump shall be capable to discharge 150 percent of rated capacity at a total head of not less than 65 percent of the total rated head. The total shut off head shall not exceed 120 percent of total rated head on the pump. An automatic air release valve shall be provided to vent air from the pump discharge and also to admit to the pump to dissipate the vacuum there, upon stopping of the pump. This valve shall be located at the highest point in the discharge line between the pump and the discharge check valve. Pump coupled with motor or engine on a common base plate shall perform smoothly without any excessive noise or vibration. Also pump shall be provided with re-circulation piping with valves.

4.16.2. Pump Casing:

The casing shall be cast iron to IS 210 and capable of withstanding to the maximum pressure developed by the pump at the pumping temperature.

4.16.3. Impeller:

The impeller shall be of standard bronze. The impeller shall be secured to the shaft with hydraulically balanced and shall be retained against circumferential movement by keying, pinning or lock rings. All screwed fasteners shall tighten in the direction of normal rotation.

4.16.4. Shaft:

Shaft size shall be selected on the basis of maximum combined shear stress. The shaft shall be of stainless steel AISI-410 ground and polished to final dimensions and shall be adequately sized to withstand all stresses from motor weight, hydraulic loads, vibrations and torque's coming in during operation. Pump Shaft-Motor Shaft Coupling shall be connected with adequately sized flexible couplings with spacer of suitable approved design. Necessary guards shall be provided for couplings. Pump shall be consisting with Gland plate for gland packing.

4.16.5. Base Plate:

A common base plate for mounting both the pump and drive shall be provided. The base plate shall be of rigid construction, shall be fabricated by M.S. channels. Base plate and pump supports shall be so constructed, the pumping unit shall be mounted so as to minimize misalignment caused by mechanical forces such as normal piping strain, hydraulic piping thrust etc.

4.16.6. Vibration And Balancing:

The rotating elements shall be so designed to ensure least vibration during start and throughout the operation of the equipment. All rotating components shall be statically and dynamically balanced at workshop. All the components of pumps of identical parameters supplied under these specifications shall be interchangeable.

4.16.7. Instruction Manual And Tools/Spares:

A comprehensive instruction manual shall be provided by the sub-contractor indicating detailed requirements for operation, dismantling and periodic operation and maintenance procedures. Recommended tools/spares shall be provided along with the Pump set.

5.0 Technical Specifications For Fire Extinguishers

Work under this section shall consist of furnishing all labour material appliances and equipment necessary and required to install fire extinguishing hand appliances. Without restricting to the generality of the foregoing, the work shall consist of the following.

General Requirements:

Fire Extinguishers shall conform to the following Indian Standard specifications as revised and amended up to date.

Dry Powder Type: IS:2171

Carbon Di-oxide: IS 2878

Water type: IS:940

ABC Type: IS: 13849

Fire extinguishers shall be installed as per Indian Standard Code of practice for Selection, installation and maintenance of portable first aid appliances IS: 2190 (latest amendment). The appliances shall be installed in readily accessible locations with the appliance's brackets fixed to wall by suitable anchor fasteners. Each appliance shall be provided with an inspection card indicating the date of illumination and caused all reset or silenced, the control panel trouble buzzer will sound until such time as the manual station or automatic initiating device is returned to normal and the control reset switch is operated. Generally, fire extinguishers should be placed as near as possible to exits or stair lands without hindering the escape routes. Wherever possible, advantage should be taken of normal routes of escape by placing these in positions where these shall readily be seen by persons following the natural impulse to get out of danger. Wall mounted fire extinguishers should be placed on the supporting wall or in wooden, metal or plastic cabinets in such a way that their 1000 mm bottom is above ground level.

When installed in the open, fire extinguishers should be placed on masonry platforms or in wooden/metal/plastic cabinets in such a way that their bottom is 1000 mm above ground level.

6.0 Cutting & Welding Procedures**6.1 Cutting:**

Pipe shall be cut mechanically (by saw or shear) or by oxy acetylene flame. No Electric metal arc cutting shall be allowed. All edges cut by oxy acetylene shall be cleaned of impurities prior to welding joints.

6.2 Cutting Tolerance Shall Be As Follows:

- a) For pipe connected at both ends to - 1mm
- b) Elsewhere to - 3mm

The edge preparation for welding of members more than 1/2" thick shall be done by flame cutting & grinding. Cut faces shall not have cracks or irregular, below 1/2" thick shall be done by Grinding Machine.

6.3 Preparation of Members for Welding:

Sharp edges, rust of cut edges, notches, irregularities fissure due to faulty cutting shall be chipped, grounded over the length, edge of the affected area.

Edge preparation for welding joints shall be carefully & accurately made so as to facilitate a good joint. Generally, no special edge preparation shall be required for members under 1/2" thick. Edge preparation bevelling denotes cutting & grinding of the same so as to result in 'V' or 'X' shapes as per IS:823.

The members to be assembled shall be clean and dry on the welding edges. Under no circumstances shall wet, greasy rust or dirt covered parts be assembled joints shall be kept free from any foreign matter, likely to get into the gaps between members to be welded.

6.4 Welding Procedure:

Welding shall be carried out only by fully qualified welders as tested & approved by the architects. Any test carried out either by the architects or their representative or the inspectors shall constitute a right by them for such tests & the cost involved there on shall be borne by the contractor himself. When welding is carried out on open air, steps shall be taken to protect the place of welding against wind or rain, the welding electrodes and parts being welded shall be dry.

Before beginning the welding operation, each jointing shall be checked to ensure the parts to be welded are clean and root gaps provided as IS: 823. For single butt welds (in V) and double butt welds (in double V or U etc.). The re-welding of the root is mandatory but only the metal deposits of the root has been cleaned by back gauging or chipping. The welding joints shall be left to cool slowly. The contractor shall not be allowed to cool the welds quickly by any other methods. For multilayer welding, before welding the following layer, the formerly welded layer shall be cleaned metal bright by light chipping & wire brushing. Packing strips shall not be allowed i.e. All slag shall be removed.

6.5 Welding Inspection:

The welding joints shall satisfy not to have any defects such as cracks, incomplete penetration and fusion, under-cuts, rough surfaces, burns, blow holes & porosity etc. beyond permissible limits.

7.0 List of Approved Makes

Sr. No.	Equipment	Makes
1	GI Pipes/Fittings	Jindal / Tata/Asian
2	GI Forged Fittings	VS/JK
3	Cast iron butterfly valves	BDK / Kalpana / Marck/Audco/IVC/IVI/Kirlosker/Fouress
4	Gun metal valves	BDK / Kalpana / Audco/IVC/IVI/Kirlosker/Fouress
5	Wrapping & Coating tape	IWL
6	Paint	Berger / Asian
7	Hydrant valves & accessories	Newage / Winco/Swati/Essle
8	Hose pipes	Newage / Winco/CRC
9	Hose Reel	Minimax / Tyco / Eversafe/Newage/Winco
10	Flow Switch	System Sensor
11	Pressure Gauge	Fiebig / Pricol / Bells Control
12	Anticorrosive Material	I W L / Rustech
13	Fire Pumps	Kirloskar Bors. / Flowmore / KSB/Lubi
14	Fire Extinguishers	Eversafe / Safex / winco / Minimax/Kenex

8.0 SAFETY NORMS

Contractor has to comply in line with all the Safety Guidelines as given below during execution of the job.

- 1) Contractor shall ensure that his/her workmen do not smoke or chew tobacco within working area.
- 2) Contractor shall ensure proper use of all the required PPEs while carrying out jobs.
- 3) Contractor shall ensure that adequate resources in terms of PPEs and tools-tackles should be available with his/her workmen.
- 4) Contractor shall ensure that his/her all Lifting Tools and Tackles are certified by Competent person (e.g. Chain Blocks, Slings, D- Shackle, Wire Rope, Crain etc)
- 5) Contractor shall ensure that all his/her Electrical Appliances like Welding m/c, grinder, Drill m/c, Breaker etc. be in good condition with proper industrial plug top with good cable. Contractor shall not bring any equipment with joint or damaged cable.
- 6) Contractor shall deploy one dedicated supervisor for the job undertaken by his/her agency to take care of Safety of his/her employees
- 7) Contractual supervisor will ensure that work is started only after issue of required work permit for the same on daily basis and work will be carried out only during the validity period of the permit.
- 8) Contractor shall be equally responsible for his/her workmen's and others safety as an acceptor of Work permit.
- 9) Contractor shall ensure that his/her all employees are covered under workmen compensation policy or ESI.

- 10) Contractor shall ensure that his/her workmen will start the job only after proper safety induction.
- 11) Contractor shall accept his/her responsibility to ensure that scrap generated from my activity will be disposed off at designated locations within the site only.
- 12) Contractor shall ensure full compliance with all the applicable legal requirements pertaining to his/her job as per 'Law of Land'
- 13) Contractor shall accept that his/her workmen / supervisor will ensure that no material is disposed off in the drains without permission of site management.
- 14) While handling with any hazardous waste like spent oil, grease, paint etc. Contractor shall ensure that disposal of the same is done as per the guidelines of site management.

Signature of the Contractor with seal

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

FIRE HYDRANT SYSTEM

Item no:-1

Supply, installation, testing and commissioning of 10.8 Cum./hr. electrically driven horizontal centrifugal pump of end suction type with Common Jockey pump set for wet riser & Sprinkler system at 7.0 Bar & 2,900 rpm with all necessary accessories like bronze impeller, stainless steel shaft and mechanical seal along with anti-vibration mounting pad and flexible connections at discharge end of the pipes etc., and shall be automatic in operation. Pump shall have electrical motor of adequate KW/HP suitable for electric supply, material, piping, fittings, installation, minor civil works, including SITC common control panel suitable for electric motor and jockey pump etc. complete.

Item no:-2

Providing and fixing 100 mm dia Cast iron body Sluice valve PN 1.0 non-rising stem type conforming to IS : 14846, with flanged ends Kirloskar Brand.

Item no:-3

Providing and fixing 80 mm dia Cast iron body non-return valve conforming to IS : 5312 with flanged ends, etc., complete.

Item no:-4

Providing and Fixing GI/MS Class-C Heavy Quality Yellow colour code 100mm dia pipe as per IS 1239 The pipes complete with necessary specials such as tees, bends, flanges, reducers, etc., including supply and installation of pipe supports, fasteners, etc. complete. Above ground piping with necessary flanges & fittings such as elbows, tees and painting, supports and orifice plates, if any necessary for the fire protection system complete as per the requirement of local fire service department.

Item no:-5

Providing, erecting bourdon type glycerine filled pressure gauge complete with syphon tube with isolating cock having range 0 - 20 kg/sq.cm. as per IS 8793. Pressure gauge 100 mm dia

Item no:-6

Providing & fixing pressure switch [0 - 15 Kgs./sq.cm. with required fittings and accessories.] Standard Type with isolation ball valve

Item no:-7

Supply and fabrication of structural steel supports with I - sections, C - channels and angle iron L-sections for supporting the pipes inside the Fire Pump Room and the FPS shafts as per the site requirement. The quoted price should include necessary painting as per the direction of the Site Engineer or supervisor.

Item no:-8

Supply, fixing and testing fire hydrant valve, single oblique outlet, S.S. body / female installation, oblique outlet 63 mm size with pull out type, lug made of stainless steel, Gr.-1, 75 mm NB flanged inlet, spindle made of SS and handwheel made of CI, complete with PVC blank cap, bearing commercial, flange dimension OD 200 mm PCD 160 mm etc. complete as per instruction of EC.

Item no:-9

Supply, installation, testing and commissioning Hose reel wall mounting type drum complete with wall mounting bracket complete with 20 mm bore, 15 m long, high pressure braided rubber hose as per IS 444 type 2, fitted with inlet valve generally conforming to IS 884 with hose box wall mounting type, made of 18 gauge mild steel with lock, key and a break glass recess for keys, two coat of oil painted etc. complete - single door fire hose box

Item no:-10

Supply, installation, testing and commissioning 2-way Fire Brigade Inlet 2 way body made of SGI, having 2 nos. SS 304 63 mm male instantaneous inlet confirming to IS 903 etc. complete as per the requirement of local fire service department.

Item no:-11

Supplying & erecting D.C.P. type fire extinguisher of for following capacity cartridge type with gun metal cap 150 gram CO2 gas cartridge, powder and brackets confirming to IS 2171 1985 and complete erected with necessary clamps made from 50 x 6 mm M S Flat with nuts and bolts grouted in wall complete. 5 Kg capacity

Item no:-12

Supplying & erecting ABC powder type 'Ceasefire' type Fire extinguisher as per IS 13849 or 2 Kg capacity with necessary clamp for erection on wall

Item no:-13

Supplying & erecting carbon dioxide (CO2) fire extinguisher user of 4.50 Kg capacity with necessary clamps made from 50 x 6 mm M.S. Flat with nut & bolts grouted in wall complete.

Item no:-14

Supply, installation, testing and commissioning 04 nos. of 9.00 liters capacity round bottom sand buckets along with bucket stand as per local fire officer's standard, etc. complete.

- a. Green or Red color safety signage in different sizes / graphics / colors / texts can be made according to the standards accepted by the Local Fire Service Department.
- b. Fire Hydrant - with symbol. Size 6" X 8".
- c. Fire Hydrant & Hose reel - with symbol. Size 6" X 8".
- d. Fire Extinguisher - with symbol. Size 4" X 4".
- e. Arrow downwards + Running man + Emergency exit - with symbol. Size 6" X 16".

NOTE:

ITEM NO. 01 TO 14 SHALL BE EXECUTED AS PER DETAILED RELEVANT SPECIFICATION LAID DOWN IN THIS TENDER DOCUMENT, AS PER FIRE SAFETY SPECIFICATION WITH FIRE SAFETY NORMS – GENERAL ENGINEERING PRACTICE AND AS PER INSTRUCTION OF ENGINEER IN CHARGE

22 VENDOR LIST

Approved / Expected Brands :-

Sr.No.	Item	Recommended/Suggested Brands
1.	Cement	Ambuja, Ultratech, Sanghi, Hathi, Siddhi, J.K. Laxmi, High bond - O.P.C. 53 grade
2	White Cement	J.K. White, Birla White, Nihon White
3.	Steel	TMT Bars Fe-500D conforming to IS-1786:1985 (reaffirmed 2004) TATA, SAIL, JSW, National, Electrotherm.
4	Structural Steel	SAIL, TISCO, IISCO, Vizag, Asian
5.	(A) Vitrified tiles for EWS-1 Soluble Salt Type (B) Vitrified tiles for EWS-2 Double charged Type	Somani, Kajaria, Nitco, Cera, Johnson, Asian, Euro
6	Ceramic tiles	Somani, Kajaria, Nitco, Cera, Johnson, Asian, Euro
7	100 % Vitrified Parking tiles	Nitco, NTC, Kajaria, Vyara, Johnson, Cera, Somani
8	Glazed tiles	H & R Johnson, Somani, Nitco, Cera, Bell, Kajaria, Asian
9	Wash basin	Hindware, Johnson, Cera
10.	(A) PVC water supply pipes (SCH-80) (B) PVC pipe (SCH-40) as rainwater spout	Astral, Supreme, Prince, Finolex, Dutron
11	M.S. Tubes	TATA, Zenith, Asian, Jindal, Dutron
12.	(A) PVC Drainage lines pipes (U-PVC pipe (SWR) confirming to IS no. 13592 (Type "B") (B) PVC Rainwater pipes (U-PVC pipe (SWR) confirming to IS no. 13592 (Type "A")	Astral, Supreme, Prince, Finolex, Dutron
13.	P.V.C. pipes (6 Kg f/cm ²)	Prince/Supreme/Astral / Dutron
14.	Aluminium sections	Hindal, Jindal, Banco, Hindalco
15	All Aluminium Hardware, Fittings	Everite, Garnish, Arches, Kausal, Nulite Alif, Shalimar (Bombay) Singla, Opel, Bolt, Arhish
16	Glass/Float	Saint Gobain, Modi, Hindustan, Tata, Asahi, Triveni, Shree Vallabh
17.	Kitchen sinks	Nirali, Diamond, Cobra, Jayna
18.	C.P brass screw down Bib tap / pillar cock / stop cock conform to I.S. 781-1977- (Wt. 400 gm.)	Crown, Prince, Jaguar-ESSCO, Cera, Hindware or equivalent as approved by EIC.
19.	Electric Items	
	(i) Wires	R.R. Kable, Finolex, Polycab, Havells
	(ii) Switches and	Anchor, Alex, L&T, NorthWest, Great White, GM, Haier

	<p>Accessories</p> <p>(iii) Cable</p> <p>(iv) ARMOURED CABLES</p> <p>(v) MCB/ELCB/RCCB/ Distribution Board/Change over switch/SFU/SDF/ Motor Starter</p> <p>(vi) Pump Set</p> <p>(vii) Luminaries</p> <p>(viii) RIGID pipes & Accessories-for concealed wiring</p> <p>(ix) Liquid Level Controller</p> <p>(x) Earthing /Lightning Arrestor</p> <p>(xi) LED Aviation Light</p>	<p>Anchor, Alex, L&T, NorthWest, Great White, GM, Haier CCI , Universal, Incab, Gloster</p> <p>Siemens/ L&T (Exora)/Hager/Havells/ABB/Legrand</p> <p>Kirlosker, Crompton,Lubi Philips, GE Finolex,Precision,Polycab</p> <p>GELCO, OCLEG, ELICO E-Link, Ashlok, Rip, Etp</p> <p>Alpha-Lite, AavidsTechnovators Pvt Ltd. or equivalent as approved by EIC</p>
20.	<p>Fire fighting equipments</p> <p>(i)GI Pipes/Fittings</p> <p>(ii) Cast iron butterfly valves</p> <p>(iii) Gun metal valves</p> <p>(iv) Hydrant valves & accessories</p> <p>(v) Hose Reel</p> <p>(vi) Pressure Guage</p> <p>(vii) Fire Pumps</p> <p>(viii) Fire Extinguishers</p> <p>(ix) Forged Fittings</p> <p>(x)Wrapping & Coating tape</p> <p>(xi) Epoxy Paint</p> <p>(xii) Hose pipes</p> <p>(xiii) Flow Switch</p> <p>(a) Anticorrosive Material</p>	<p>Jindal / Tata/Asian Audco/IVC/Kirloskar/Fouress</p> <p>Audco/IVC/Kirloskar/Fouress Newage/Aaag/Essel</p> <p>Newage / Minimax Fiebig / Pricol / Bells Control Kirloskar / Crompton / KSB/Lubi Safex / Minimax/Kenex</p> <p>VS/JK</p> <p>IWL</p> <p>Berger / Asian Newage /CRC System Sensor I W L / Rustech</p>
21.	Door shutters	As per approval of Engg-in-charge and shall be fitted after testing and approval.
22.	<p>(A)Flush Doors (confirming to I.S.1003 Part-I 1991)</p> <p>(B)PVC Doors(PVC material confirming to IS 10151-1982)</p>	<p>'Sitapur plywood', 'Mysoboard', Sudarshan W &P Industries, Bajwa, Baroda, Goyal, industrial corp, Wood craft, Jain wood industries, Alpro, Genda-Northen Doors, Greenply, Kitply, Bhutan or equivalent as approved by EIC</p> <p>Syntex</p>
23.	<p>Door Frames</p> <p>Teak Wood</p>	<p></p> <p>Bulsar/ C.P Teak (Second Class specified)</p>

	Sal Wood	Sal wood [Indian or Imported] First class
24.	Door Fittings / Hinges	As per approval of Engg-in-charge and shall be fitted after testing and approval.
25	Plywood Products Commercial Block Board Commercial Ply Teak Ply	Greenply, Kitply / Century, Anchor, Duro, Green Ply, Western India plywood(WIP), Mysore marine
26	Laminates / Decorative laminates	Decolam, GreenlamMerinolam Formica, National laminate, Decolite, Delta
27	Pre laminated board	Bhutan, Eco board, Bakelite HylemNepalboard, Green board
28	Impregnated Fibre Board	Shalitex by Shalimar Tar Product
29.	Exterior colour (weather shield max)	ICI/Dulux, Asian Paint Ultima
30	Synthetic Enamel Paints /Oil bound distemper satin finish	ICI/Dulux, Johnson & Nicholson, Asian Paint, Dulux
31	Putty	J.K. white, Birla white
32.	Paver Blocks	Regency, Gurjari, Vyara, PEEDEE, Jagruti – Rajkotor as approved by EIC/consultant
33.	D.G. Sets	Engine: Cummins, Greaves, Kirloskar, Caterpillar Alternator: Crompton, KEC, Stamphord
34.	AAC Block(confirming to IS : 2185, Part III)	Aerocon, Magicrete, Biltech, Litecone, Ecolite, Xtralite make [autoclaved aerated block] or as approved by EIC.
35	Chemical mortar/AAC block jointer	Iolite cube bond, Fairmate, Lion joint mortar, MAP block set and equivalent ISI brand
36.	Water Proofing Compound	'CICO' , Fosroc, GE silicon Pidilite, MC-Bauchmie, Sika,Roff, Perma, Dr. Fixit
37.	Polycarbonate Sheets	Lexan, GE or approve by Engineer – in -Charge
38.	Construction Chemicals	Fosroc, MC-Bauchmie, Sika, Pidilite, Roff,Perma
39.	Drainageline network	NP 3 class of SR Cement RCC Pipes or as approved by EIC
40.	Water supply network	D.I.Pipes
41	Anti-Termite Treatment	Thyodin by Hoechest, Lyntric by Bayer India, Durmet by Cynamid India, Nocil Pyramid
42	Polycarbonate Sheets	Lexan, GE or approve by Engineer – in -Charge
43	Polyester Fibre	Recron 3S or approve by Engineer – in -Charge.
44	Welding Rod	Advani, Philips, Sunarc, Eshab
45	Cast Iron Pipes and Fittings(LA Class)	TISCO / IISCO/ KESHO SPUN Co. - Calcutta E.L.C. Standard approved manufacturers of any other brand of fittings having ISI marking.
46	R.C.C. Pipes conform to I.S. 458-1971	Indian Hume Pipe Co., Alcock Cement Products, Patel Spun (Rajkot)
47	G.I. Pipes conform to I.S. 1239-1968	Jindal, Tata, Bharat SteelTube, Bombay, Zenith, G.S.T.Unik. ("C" Class)
48	G.I. Fittings	"R "Mark, Unik.
49	Gun Metal Valves	Leader Engineering Works, Jallandhar, Crown / prince – Rajkot Bombay

	(Heavy)	Metal Co Annapurna Metal Work, Calcutta'Sant'brand, Jalandhar, L&K, Bombay metal & Alloy man. co.Bombay, Premier, Aatco, Atlas, BR, BS, NN.
50	Brass fittings (Heavy)	Leader Engineering Works, Calcutta L & K Mathura, Crown / Prince - Rajkot Annapurna Metal Works, Calcutta, Perko, Kingstone Ark, Enclss Willians, Chilly, Aquva Plus, Nova, Kingstone, Driple, Ranutrol Hansa.
51	C.P. Fittings (Heavy)	Ego Metal Works, Ballabgarh, GEM, New Delhi; Soma Calcutta; Bilmet, Bombay 'ESSCO', Delhi. Rajka Metal Works, Delhi Eng. Co. Metal Works, Calcutta Everite, NU-Lite Navbhart Shalimar Crown, Prince
52	W.C. Pan / Washbasin / Urinals /Anglow Indian W.C. Pan	E.I.D. Parry, Hindware, Neycer, Johnson,Parshuram, Cera
53	Stainless Steel Sinks	Nirali, Diamond, Cobra
54	Mirrors	Atul Glass Works, Haryana Sheet Glass Vallabh Glass Works, Modi Float glass, Asahi, Saint Gobin
55	Plumbing /Sanitary Fixtures /Accessories	Jaquar continental, CERA, Hindustan Sanitaryware / Parryco India. Hindware, Lauvet, Kohlar, Rak, Jaquar
56	C.I. Sluice valve,Check valves	Kirloskar, IVC, Burn, William Jacks, Indian Valve(IVC)
57	UPVC Borewell Column pipe	Astral, Supreme, Prince, Ashirvad Pipes, Duke, kisan, Precision.
58	Fibre reinforced R.C.C. Manhole Cover	Pratibha, CIDCO, approved brand by RMC
59	C.I. Manhole cover with frame	ISI approved make
60	P.V.C. Pipes & Fittings	Astral, Supreme, Prince, Finolex
61	P.V.C. / H.D.P.E Water Tanks	Sintex
62	Ball Cock	GPA Brand by Govardhan Das Jullunder, L & K Brand by L. K.Industries Mathura, Sant Brand by Sant Press Metal Works Jullundhar
63	UPVC Pipes (Solvent Welded Joints)	Astral, Supreme, Prince, Jain
64	C.P.V.C. Pipes & Fittings	Astral, Supreme, Prince
65	Water meter	Kapstan Bombay, Voltas Kent, Calcutta or equivalent as approved by RMC
66	SWR pipe	Astral, Supreme, Prince, Finolex
67	Fire Hydrant Valve& Air Valve,Scour Valve	Newage / Minimax/Swati/Priyanka/Aaag
68	P.V.C. non-return full way wheel valve	Prince/Supreme/Jain/Astral
69	C.P.brass half turn flush cock	crown, prince,Jaguar,Plumber,Hindware or equivalent
70	Water cooler	Voltas, godrej, blue star, carrier, electrolux
71	HDPE pipe	Jain, Reliance, Duraline, Penvolt
72	Submersible pump	Kirloskar, KSB, Aqua, Grundfos
73	Sluice Valve	Kirloskar, IVC, Durga, Fouress
74	Weigh Bridge	Avery, Unique, Matler, Eagloe, Matrix, Apple
75	Exhaust fan	GEC / Crompton / Bajaj / Orient/ Khetan /Ortem
76	Ceiling Fan	GEC / Crompton / Bajaj / Orient/ Khetan / Ortem

77	Air Conditioner	Hitachi / Blue star / LG / Voltas / General / Carrier / Mitsubishi
78	Static Compactor with tipping cart mechanism, Hook loader & container	Kam-Avida Enviro Engineers Pvt. Ltd. - Thetford International, Hyva India Pvt. Ltd., TPS Infrastructure Ltd.
79	Truck Chassis	Tata, Ashok Leyland, Eicher, AMW.
80	Self supported roof	Proflex, Green Curve, Kailash roofing
81	Bailer Machine	Shree Ram Industries – SRI, HM hydraulic solution, AIM industries
82	PVC Dust Bin	Sintex, Nilkamal, Vishakha Industries
83	Weighing Scale	Zobra digital weighing scale, Tapi scale industries, Swastik system & services
84	Welding & welding rod	MIG welding & ESAB / ADOR / L&T

Notes:

The following guidelines are to be noted with regard to use of materials in the work:

- a)** The contractor shall produce samples of the materials for approval of the EIC. The materials of the makes, out of the above as approved by the EIC shall be used on the work.
- b)** In respect of materials for which approved makes are not specified above, the make/brand will be decided by the EIC.
- c)** Before bulk purchase of quantities of materials, it is the responsibility of the Contractor to get the samples of materials approved by the consultant and EIC.
- d)** All cost towards the testing shall be borne by the contractor.
- e)** For all the material of approved brands necessary testing as per IS standards shall be done by the agency and no extra payment shall be paid for that.

23 ADVANCE STAMP RECEIPT

Received with thanks the sum of Rs. (In Words
.....) only from the Rajkot Municipal RMC being the
Refund of Earnest Money Deposit placed by me/us vide RMC's Receipt No. dated.
..... along with the tender paper for the
.....

(Name of the work)

Date:- Revenue Stamp

Signature of the Tenderer

f.w.c. to the Accountant,

2. For remarks whether thedeposit amounting to

Rs. placed on by

Shri/M/s. in connection

with the work of

stands in full in the name of the aforesaid party (R.No. dated)

**Environment Engineer
Solid Waste Management Department
Rajkot Municipal Corporation**

F.W.Cs. to Ex. Engineer -Solid Waste management dept.

To deposit of Rs. placed on by

Shri/M/s. stands

in full in the name of the aforesaid party.

Accountant.

Submitted,

For favour of sanction of refund Rs.

being the amount of deposit placed on

..... vide Receipt No. by

Shri/M/s.....in connection with the work of

.....

as the tender of the above party has been accepted / had not been accepted and the concerned

contractor has paid security deposit of Rs. for the above referred work

on Dt. The party has also executed an agreement for the above work. The

above deposit stands in full in the name of the said party as certified by the Accountant on

..... The expenditure will be debited on

B.H.G. Tender Deposit Account

Assistant Engineer / Junior Engineer

Deputy Executive Engineer,

Sanctioned Accordingly

Environment Engineer

Solid Waste Management Department

Rajkot Municipal Corporation

24 TENDER DRAWING

List of drawing:

Sr.No.	Drawing name
01	Topographical Survey drawing
02	Layout Plan
03	Plan, Elevation & Section of RTS
04	Plan, Elevation & Section of MRF Station
05	Details of Weigh Bridge
06	Details of office building of weigh bridge
07	Details of Generator & Electrical room
08	Details of wash & Service area
09	Details of Toilet box
10	Details of UG Tank
11	Details of leachate tank
12	Details of Admin office building
13	Details of Main Gate
14	Typical details of compound wall