



REQUEST FOR PROPOSAL

For

**CONSTRUCTION OF ROADS, CIVIC INFRASTRUCTURE, LANDSCAPING AND HIGH
MAST WORKS AT FATEHPUR CHANDELA VILLAGE WITH DEFECT LIABILITY
PERIOD OF TWO YEARS AND OPERATION & MAINTENANCE OF 5 YEARS.**

IN FARIDABAD CITY

Under

SMART CITY MISSION (SCM)

in

FARIDABAD CITY

(HARYANA, INDIA)

Ref No: FSCL/2018/68

Issued on 01/03/2018

DNIT Amount: Rs. 5.49 Crores.

Employer: Faridabad Smart City Limited
Nain Sadan, 3rd Floor, Plot No. 35
Sector 20A, Behind EF3 Mall
Near Old Faridabad Metro Station
Faridabad - 121001
(Haryana)
Email : faridabadsmartcitylimited@gmail.com

DISCLAIMER

The information contained in this Request for Proposal document ("RFP") or subsequently provided to bidders, verbally or in documentary or any other form by or on behalf of the Faridabad Smart City Limited (here forth referred to as FSCL in this document) or any of its employees or advisers, is provided to bidders on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is not an invitation by the Employer to the prospective Consultants or any other person. The purpose of this RFP is to provide interested bidders with information that may be useful to them in the formulation of their Proposals pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by the Employer in relation to the Consultancy. Such assumptions, assessments and statements do not purport to contain all the information that each bidder may require. This RFP may not be appropriate for all persons, and it is not possible for the Employer, its employees or advisers to consider the objectives, technical expertise and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in this RFP, may not be complete, accurate, adequate or correct. Each bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments and information contained in this RFP and obtain independent advice from appropriate sources.

Information provided in this RFP to the bidder (consultant/contractor/developer/Manufacturer/Supplier etc) is on a wide range of matters, some of which depends upon interpretation of law. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Employer accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on the law expressed herein.

The FSCL and its employees and advisers make no representation or warranty and shall have no liability to any person including any bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, adequacy, correctness, reliability or completeness of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way in this Selection Process.

The FSCL also accepts no liability of any nature whether resulting from negligence or otherwise however caused arising from reliance of any bidder upon the statements contained in this RFP.

The FSCL may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumption contained in this RFP.

The issue of this RFP does not imply that the Employer is bound to select a bidder or to appoint the selected bidder, as the case may be, for the Consultancy and the FSCL reserves the right to reject all or any of the Proposals without assigning any reasons whatsoever.

The bidder shall bear all its costs associated with or relating to the preparation and submission of its Proposal including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the FSCL or any other costs incurred in connection with or relating to its Proposal. All such costs and expenses will remain with the bidder and the FSCL shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a bidder in preparation or submission of the Proposal, regardless of the conduct or outcome of the Selection Process.

Sd/
Chief Executive Officer
Faridabad Smart City Limited

TENDER DOCUMENT FOR THE WORK OF

Name of the Work: Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years

INSTRUCTIONS TO BIDDERS AND QUALIFICATION INFORMATION

“FORM-B”

NIT No: Dated 01.03.2018

OFFICE OF THE FARIDABAD SMART CITY LIMITED

No.FSCL/2018/68

DATED: 01/03/2018

E-TENDER NOTICE

Faridabad Smart City Limited (FSCL) invites online tenders for the work mentioned below:-

Sr No	T No	Name of Work	Estimated Cost of Works in INR	EMD to be deposited by bidder (Rs.)	Tender Document Fee Plus Service Fee in INR	Bid Release time and Date	Last date for online Submission of bids	Tender Open Date
1	75146	Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years	5.49 Crores	10.98 Lakhs	1000+1000	01/03/2018 @17:30 hrs	03/04/2018 @17:30 hrs	06/04/2018 @11:00hrs

1. Tender will be opened on 06/04/2018 @ 11:00 Hrs
2. The detail tender notice and Tender Document can be seen on website: <https://haryanaeprocurement.gov.in> and downloaded online from the Portal: <https://haryanaeprocurement.gov.in> by the Firms / Individual registered on the Portal.
3. Possession of Digital Signature Certificate (DSC) and registration of the contractors on the portal i.e. <http://haryanaeprocurement.gov.in> is a prerequisite for e-tendering.
4. For any other queries, please contact Deputy General Manager, Faridabad Smart City Limited, Faridabad phone no. 91-129-2410086. For further details and e-tendering schedule, visit website <https://haryanaeprocurement.gov.in/>
5. As the Bids are to be submitted online and are required to be encrypted and digitally signed, the Bidders are advised to obtain Digital Signature Certificate (DSC) at the earliest. For obtaining Digital Certificate, the Bidders should follow Section 1. Letter of Invitation-“General Terms and Conditions for e tendering ”.

Deputy General Manager
Faridabad Smart City Limited
Faridabad

**Chief Executive Officer
Faridabad Smart City Limited
Faridabad [HR]**

Name of the work	: Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years.
Probable Amt. of Contract	: 5.49 Crores
Amount of earnest money	: Rs. 10.98 Lakhs (EMD to be submitted Online payment using Net Banking/RTGS/NEFT/. The receipt shall be submitted along with the Technical Proposal (Envelope A) as per the time and location specified in the Data Sheet.
Application Processing Fee (Payable to FSCL online)	: 1,000 + 1000 (Non Refundable). Document can be downloaded from the web site https://haryanaeprocurement.gov.in
Time allowed for completion of work	: 06 (Six) Months including rainy season.
Date of Tender Release (Online)	: From 5:30 PM on 01.03.2018,
Last Date of ONLINE Bid Submission	: Up to 05:30 PM on 03.04.2018
Last date of Physical Document Submission (Envelope 'A' & 'B')	: UP TO 4:00 PM ON Date: 05.04.2018
Date of opening of Envelope 'A' & 'B' of tender document	: Date:06.04.2018 @ 11.00 AM onwards at Office of The Chief Executive
Online Financial Bid (Envelope C) opening.	: To be intimated later.
Type of Bidder	: The bidder / all partner of JV/consortium must be eligible bidders as per eligibility criteria laid down in RFP.
Type of Tender	: Open
Vender Class	: Other
Type of contract	: Unit Rate Contract
Engineer-in charge	: Any Officer Not below the rank of Deputy General Manager Appointed by CEO, Faridabad Smart City Limited.
Bid Validity Period	: 180 days

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SECTION 1: INVITATION FOR TENDERS [IFT]

Faridabad Smart City Limited (FSCL) invites **Unit Rate tenders in “Form B”** from eligible bidders. **The bidder / all partner of JV/consortium must meet the eligibility criteria laid down in RFP.** The tender documents can be downloaded from <https://haryanaeprocurement.gov.in> from 01.03.2018, 5.30PM onwards. The last date of tender online submission is on 03.04.2018 up to 5: 30 PM.

A. Work Details:

Sr. No.	Name of Construction Work	Completion period	Amount of EMD	Cost of tender document (Transaction Fee)
1.	Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years	06 Months including rainy season	<input type="checkbox"/> 10.98 Lakhs	<input type="checkbox"/> 1,000/- + <input type="checkbox"/> 1000/- as online bid submission fee

B. Key Dates:

S. No.	Stages	Start Date and Time
1	Online Tender Release	01.03.2018 @5:30 PM
2	Pre Bid Meeting at FSCL Office	14.03.2018 @ 02:30 PM
3	Last Date of Receipt of Queries	17.03.2018 @ 5.30 PM
4	Last Date of Online Bid Submission	03.04.2018 @5:30 PM
5	Last Date of Physical document submission at FSCL office	05.04.2018 @4:00 PM
6	Date & time of Opening of Envelope A & B at FSCL office	06.04.2018 @11:00 AM
7	Online financial bid opening	To be intimated later

- The proposal is available online on <https://haryanaeprocurement.gov.in> from **01/03/2018 (17:30 hrs onward) to 03/04/2018 (up to 17:30 hrs)** for a non-refundable fee as indicated in the Data Sheet as scheduled in General Terms and Condition for E-tendering. Bidders will be required to register on the website, which is free of cost. The bidders would be responsible for ensuring that any addenda available on the website is also downloaded and incorporated.
- For submission of the bid, the bidder is required to have Digital Signature Certificate (DSC). Possession of Digital Signature Certificate (DSC) and registration of the contractors on the portal i.e. <https://haryanaeprocurement.gov.in> is a prerequisite for e-tendering.
- Proposal must be submitted online on <https://haryanaeprocurement.gov.in> on or before **17.30 hours on 03/04/2018** and the “Technical proposal” will be **opened online on the 06/04/2018 at 11:00 AM**. The “Financial proposal” shall remain unopened in the e-procurement system until the second public Bid opening for the financial proposal. Any proposal or modifications to proposal received outside e-procurement system will not be considered. If the office happens to be closed on the date of opening of the Proposal as specified, the Proposal will be opened on the next working day at the same time. The electronic bidding system would not allow any late submission of Proposal.
- The bidder shall also submit the Technical proposal in hard bound.
- For any other queries, please contact Deputy General Manager, Faridabad Smart City Limited, Faridabad on phone No.0129 2410086
- For further details and e-tendering schedule, visit website <https://haryanaeprocurement.gov.in>.

Yours sincerely,

Address: Faridabad Smart City Limited,
Nain Sadan, 3rd Floor, Plot No. 35
Sector 20A, Behind EF3 Mall
Near Old Faridabad Metro Station
Faridabad – 121001 (Haryana)
Ph No. 0129 2410086
Email: faridabadsmartcitylimited@gmail.com

Eligibility Criteria:

I General Instructions to the Bidder

1. No Bidder shall submit more than one Bid for the Project. A Bidder bidding individually or as a member of a JV/Consortium shall not be entitled to submit another BID either individually or as a member of any JV/Consortium, as the case may be.
2. A Bidder bidding individually or as a member of a Consortium shall ensure that Power of Attorney is legalized / apostille by appropriate authority notarized in the jurisdiction where the Power of Attorney is being issued and requirement of Indian Stamp Act is duly fulfilled.
3. The Bidder should submit a Power of Attorney as per the format provided in Annexure - I, authorizing the signatory of the Bid to commit the Bidder.
4. In case the Bidder is a JV/Consortium, the Members thereof should furnish a Power of Attorney in favor of any Member, which Member shall thereafter be identified as the Lead Member, in the format at Annexure - K. In case the Bidder is a JV/Consortium, the Bidder shall submit Joint Bidding Agreement in the format at Annexure - J.
5. The Bid should include a brief description of the roles and responsibilities of individual members, particularly with reference to financial, technical and O&M obligations;
6. Unless otherwise indicated, the bidder means single entity or the consortium formed by the firms.

II Pre-qualification Criteria:

a. All Contractors/ Bidders shall provide the requisite information accurately and with sufficient details as required in **Section-3: Qualification information**. The bid is open to all Bidders who fulfill the criteria laid down in the NIT.

b. **Joint venture or consortium of Bidders is permitted but should be limited to maximum 3 numbers.** The Main Objective of the JV/consortium is to allow firms to technically collaborate for executing the various types of works defined in this tender.

c. **One of the members of JV shall be nominated as Lead member.**

d. To become eligible , each bidder must satisfy the following:

Criteria : The financial criteria and the value for similar works are based on the construction cost of work □ 5.21 Crores after excluding the Operation & Maintenance cost □ 0.28 Crores

i. Achieved during the last Three (3) financial years (2016-17, 2015-16, 2014-15), an average annual financial turnover of at least □ 1.695 Crores. In case of JV only the **Financial reports/information of the lead member will be considered for evaluation. The JV Firm's financial information will NOT be considered for evaluation.**

ii. Satisfactorily completed similar works during last 5 years as per criteria mentioned below:

a. Satisfactorily completed at least one similar work of value not less than □ 4.168 Crores as on date of submission of financial offer, **OR**

b. Satisfactorily completed at least two similar works each of a value not less than □ 2.605 Crores as on date of submission of financial offer, **OR**

c. Satisfactorily completed at least three similar works each of a value not less than □ 2.084 Crores Lakhs as on date of submission of financial offer.

iii. **Similar works means** experience in all of the below listed works in the **Category A**.

Category	Similar Works	One Similar Work	Two Similar Work	Three Similar Work
A	Construction experience of Horticulture Works/ Landscaping / Civil Works	4.168 Crores	2.605 Crores	2.084 Crores
	Total	4.168 Crores	2.605 Crores	2.084 Crores

Necessary supporting documents duly signed under seal, by a Chartered Accountant/ or officer not below rank of Executive Engineer in original shall be enclosed while submitting the bid.

e. Note:

- i. The turnover shall be indexed at the compounded rate of 10 % (Ten percent) for each earlier year.
- ii. The value of completed work shall be updated to the value of current financial year @ compounded rate of 10 % (Ten percent).
- iii. Proof of having successfully completed similar works must be submitted in the form of a completion certificate issued by an officer not below the rank of an executive engineer. This certificate must be in the format appearing in Annexure 4. The completion certificate should clearly indicate the amount of above similar work as a part of completed projects
- iv. The indexing factors for updating the value of works completed in previous years to the current financial year are mentioned as below:

Financial Year	Indexing Factor
FY 2016-2017	1.0
FY 2015-2016	1.1
FY 2014-2015	1.21
FY 2013-2014	1.33
FY 2012-2013	1.46
FY 2011-2012	1.61

In addition to the pre-qualification criteria mentioned above the following criteria shall also be satisfied for eligibility of the Bidder:

1. The bidder / Lead member in case of JV/consortium should have a bank solvency of **1.042 Crores** issued by any scheduled Bank. The solvency certificate should not be more than twelve months old. The solvency certificate shall be on Banks Letter Head and duly signed by the Banks Designated Authority in Original. The solvency Certificate shall be as per the prescribed format provided in the Annexure 2
2. It is necessary that the bidder should have executed the above work as either main Bidder or JV partner firm.
3. The bidder should not have incurred any loss in more than three years during the last five consecutive financial years. **A certificate to this effect from a Chartered Accountant shall be provided with Technical bid**
4. Bidders should submit all requisite and necessary details/documents with respect to the eligibility criteria. The said details to be submitted in prescribed forms appended with this tender document. The details of the requisite forms are as under:
 - i. Qualification Information (For all firms) Annexure- 1
 - ii. Banker's Certificate (Solvency Certificate of the Lead Member only) Annexure-2
 - iii. Details of Similar Works executed (For all firms) Annexure-3
 - iv. Details of All works executed during last 5 (Five) years (For all firms) Annexure-4
 - v. Existing commitments and on-going works (For all firms) Annexure-5
 - vi. Information regarding current claims, arbitration & litigation, if any(For all firms) Annexure-6
 - vii. Affidavit of having provided all correct information (For all firms) Annexure-7

Note: All aforesaid Annexure must bear the seal and signature of the Bidder or a duly authorized person.

1. Bidder must ensure providing complete information in Annexures mentioned above along with their signatures [under seal] wherever required, before submission of tender.
2. Each Bidder must enclose

- a) Certified Copies of Income Tax Returns for the last 5 (Five) years duly audited by Chartered Accountant including his audit report. CA shall certify the true copy in original.
 - b) Turnover certificate of Last 5 Years certified by Chartered Accountant in Original.
 - c) An affidavit that all the information furnished with the pre-qualification document is correct in all respects (Draft format of Affidavit is provided in the tender document).
3. The Lead Member who meets the minimum qualification criteria will be qualified only if their available bid capacity for construction work is equal to or more than the probable amount of contract. The available bid capacity will be calculated as under:

$$\text{Assessed Available Bid capacity} = (A * N * M - B)$$

Where,

A = Maximum value of all works executed in “ any one financial year” during the last Five years [updated to the price level at the current financial year at the compounded rate of 10% (Ten per cent) a year taking into account the completed as well as work in progress]. This has to be certified by a Chartered Accountant.

N = Number of years prescribed for completion of the works for which tender is invited (period up to 6 months to be taken as half-year and more than 6 months as one year). Any period beyond 12 months, the period actually mentioned in the NIT shall be considered.

$$M = 2.5$$

B = Value of existing commitments and on-going works to be completed during the period of completion of the work for which tender is invited.

4. The Bidder should have valid GST/VAT / Sales Tax Registration. Copies of latest GST/VAT / Sales Tax returns filed with GST/VAT/ Sales Tax Dept. along with a certificate of the Bidder that these returns have been filed with the GST/VAT/ Sales Tax Dept. If not applicable submit affidavit in Rupees 100/- Non-judicial stamp paper
5. The bidder should have valid ESIC registration Certificate. A certified copy must be submitted. If not applicable, submit a self certified affidavit on company’s letter head in original .
6. The bidder should be registered with the Commissioner, Provident Fund and should submit copy of the registration along with the Technical bid. In case the bidder has less than 20 persons in his employment, he shall submit an affidavit to this effect in lieu of such registration.
7. Submit the Pre Integrity Pact on Rs. 100 Stamp paper as indicated in Section 9.
8. Even though the Bidder meets the above qualifying criteria, he is subject to be disqualified if he has;
 - a) Made a misleading or false representation[s] in the Forms, Statements and Attachments submitted in Proof of the Qualification Requirements.

And/ Or

- b) A record of poor performance such as Abandoning a work, Poor quality of work, Claim, Litigation History, or Financial failures etc. in any State Govt. organization/services/corporations/local body etc. (by whatever names these are called).

Chief Executive Officer
Faridabad Smart City Limited
Faridabad HR

General Terms and Conditions for E-tendering:

1. The detail tender notice and Tender Document can be seen on website: <https://haryanaeprocurement.gov.in> and downloaded online from the Portal: <https://haryanaeprocurement.gov.in> by the Firms / Individual registered on the Portal.
2. As the proposals are to be submitted online and are required to be encrypted and digitally signed, the Bidders are advised to obtain Digital Signature Certificate (DSC) at the earliest.
3. The payment for Tender Document Fee and e-service Fee shall be made by eligible bidders online directly through Debit Cards & Internet Banking Accounts and the payment for EMD can be made online directly through RTGS/NEFT or OTC Please refer to „Online Payment Guideline“ available at the Single e-Procurement portal of GoH (Govt. of Haryana) and also mentioned under the Tender Document.
4. Intending bidders will be mandatorily required to online sign-up (create user account) on the website <https://haryanaeprocurement.gov.in> to be eligible to participate in the e-Tender. He/ She will be required to make online payment towards EMD fee in due course of time i.e. **between 01/03/2018 (from 18:00 Hours) to 02/04/2018 (up to 16:00 Hours)**. The intended bidder fails to pay EMD fee under the stipulated time frame shall not be allow to submit his / her Proposal for the respective event / tenders.
5. The interested bidders must remit the funds at least T+1 working day (Transaction + One working Day) in advance i.e. on or before 02/04/2018 (up to 16:00 Hours); and make payment via RTGS /NEFT or OTC to the beneficiary account number specified under the online generated challan. The intended bidder / Agency thereafter will be able to successfully verify their payment online, and submit their Proposal on or before the expiry date & time of the respective events/Tenders at <https://haryanaeprocurement.gov.in>.
6. The undersigned reserves the right to reject any or all the tenders without assigning any reason what so ever and no conditional and postal tenders will be accepted.
7. If the date on which the tenders are to be received is declared a public holiday, the tender will be received on the next working day.
8. The offer will remain valid up to 180 days from the due date of submission of tenders.
9. Any amendment to a tender after opening of tender made by the tenderer according to his own will is liable to be ignored altogether and such tenderer will be debarred from tendering for a period of six months

Check List for online submission of Documents

Envelop A (Mandatory documents) :

1. Letter of EMD
2. Online deposit receipt of EMD
3. Scanned Copy of Pre Contract Integrity Pact duly Signed (On Rs 100 Non judicial stamp Paper, duly Notarized)

Envelop B:

4. Letter of Technical Bid
5. Power of Attorney on Rs 100 Stamp Paper authorizing for signing the bid documents
6. Qualification Information (Annexure 1)
7. Copy of ESIC Certificate/ otherwise if not applicable submit a self certified affidavit on company's letter head in original.
8. Copies of latest GST/ VAT / Sales Tax Returns.
9. Copy of registration with Commissioner PF.
10. Affidavit of having provided all correct information (Annexure-7)
11. Information regarding current claims, arbitration & litigation, if any (Annexure-6)
12. Existing commitments and on-going works (Annexure-5)
13. Details of all works executed during last 5 (Five) years (Annexure-4)
14. Details of similar works executed (Annexure-3)
15. Income Tax returns for last 5(Five) Years
16. Bankers Certificate in original on Banks Letter head (Solvency Certificate) (Annexure-2)
17. List of Plant & Equipment to be deployed (Annexure -8)
18. List of Technical person to be deployed (Annexure -9)
19. Duly signed RFP including all corrigendum's and Pre bid responses (if any)

Section 1a:

Letter of EMD – Envelop –‘A’

To,

**Chief Executive Officer,
Faridabad Smart City Limited
BK Chowk, NIT Faridabad,
Haryana - 121001.**

Sub: Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years.

Dear Sir,

Enclosed please find online deposit receipt favour of **Faridabad Smart City Limited** against Earnest Money Deposit for the work mentioned.

Thanking You

Yours Faithfully

For and on behalf

(Seal and Signature of the Authorized Signatory)

Enclosure: r e c e i p t

Letter of Technical Bid Envelop –‘B’

To,

**Chief Executive Officer,
Faridabad Smart City Limited
BK Chowk, NIT Faridabad,
Haryana – 121001**

For Bid Invitation No.: _____

Date:

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instruction to Bidders (ITB);
- (b) We offer to execute in conformity with the bidding Documents the following Work/s: **Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years**
- (c) Our bid shall be valid for a period of **180 days** from the bid submission due date in accordance with the bidding documents, and it shall remain binding up on us and may be accepted at any time before the expiration of that period;
- (d) **If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;**
- (e) We, including any sub-Bidders or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITT;
- (f) We are not participating, as a Bidder in more than one bid in this bidding process in accordance with the ITT,
- (g) Our firm, its affiliates or subsidiaries including any Sub-Bidders or suppliers for any part of the contract, has not been declared ineligible by Government of Haryana (GoH)/ Government of India (GoI) or any of its undertakings/Other Departments any State Government, any public sector unit or any Local Body.
- (h) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal Contract is prepared and executed.
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (j) We are not a Government owned entity / we are a Government owned entity, meeting all the requirements of the ITT.

Seal and Signature:

Name.....

Signed in the capacity of.....

Duly authorized to sign the Bid for and on behalf of..... Date:

SECTION 2: INSTRUCTIONS TO BIDDERS/Tenderers (ITB/ITT)

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A. Introduction:

With a view to improve urban centers of India and make them citizen friendly and sustainable, the Government of India through the Union Ministry of Urban Development (MoUD) has initiated the Smart Cities Mission. The program is oriented around urban renewal and retrofitting of 100 cities in India in collaboration with the State Governments and the respective City Authorities.

The method of selection of the cities is through competition wherein the following two stages are already complete:

Stage I: Shortlisting of cities by States,

Stage II: The Challenge round for selection

After completion of Stage II, 20 selected Smart Cities were declared in Round 1. Subsequently, 13 cities were selected in Fast Track Round, which included the City of Faridabad.

The Ministry of Urban Development, Government of India vide its memo no. K-15016/157/2015-SC-1 (vol.II) dated 26th May, 2016 directed Government of Haryana to constitute Special Purpose Vehicle (SPV) for Faridabad Smart City Limited. The Special Purpose Vehicle will implement the smart City Proposals prepared by Municipal Corporation, Faridabad and duly approved by MoUD under the smart City Mission of Government of India. Faridabad Smart City Limited was incorporated on Twentieth day of September Two Thousand sixteen under the Companies Act, 2013 and the company is limited by shares.

The Special Purpose Vehicle is constituted for Faridabad Smart City Limited under:

Constitution of Board of Directors:

The Board of Directors of Faridabad Smart City Limited shall comprise of the following members

1	Principal Secretary to Govt. of Haryana, Urban Local Bodies Department	Chairman
2	Mission Director, Urban Local Bodies Department	Director
3	Chief Administrator, HUDA	Director
4	Representative of Govt of India	Director
5	Chief Executive Officer of SPV	Commissioner, Municipal Corporation, Faridabad
6	Independent Directors (3 Nos.)	Director

After selection of Faridabad in the Fast Track Round, the process of implementation has been initiated with the setting up of the SPV – Faridabad Smart City Limited (FSCL). FSCL has appointed (PMC) to Design, Develop, Manage and Implement the Smart City Project under the Smart City Mission.

In order to achieve the vision set out in the Smart City Proposal, the city has identified projects under the two categories of Area Based Development and Pan City Solutions as follows:

Area Based Development: 3 Modules, 8 Sub Modules consisting of 59 sub-projects with an estimated cost of Rs. 1916 crores.

Pan City Solution: 1 Module and 09 Sub-projects with an estimated cost of Rs. 425 crores.

FSCL is interested in taking up the construction of smart road years on priority basis. As per the Smart City Proposal, the funding for this project is being sourced from Smart City Mission of Government of India.

Although FSCL is envisaging constructing many more roads at various places within ABD, it is interested in taking up works at selected location on pilot basis. The location of the Smart Road is enclosed at the end of this document.

FSCL is now inviting eligible bidders for the works “**Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years.**

The Defect Liability Period (DLP) shall be for a period of two years from the date of actual completion of the work. The completion of work shall be reckoned from the date of issue of completion certificate by the FSCL. The Bidder shall not claim the cost of works/items covered under the DLP.

FSCL reserves the right to add/ reduce or delete items at its discretion without providing any reasons. All the additional items shall be paid as per prevailing HSR rate. (In case the rates are not available in the HSR then rates shall be taken either from other states SOR rates or as decided by Engineer-In-Charge.

In case, different works are to undertaken simultaneously, the bidders shall coordinate the works with other contractor who will be working simultaneously on same site.

General

1.0 Broad Scope of Tender

The Faridabad Smart City Limited (abbreviated as ‘FSCL’ and Referred to as the ‘Employer’ in these documents) invites Unit Rate Tenders from eligible Bidders for the Works as defined as “**Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years** ” in this document and referred to as "the Works").

The detailed Scope of Works and the Drawings can be referred at Section 7 and Annexure F of this document.

2. Eligible Bidders: shall be as defined in Section 1.

3. Qualification of the Bidder: shall be as defined in Section 1.

4. One Tender per Bidder: Each Bidder shall submit only one Tender for the Project. A Bidder who submits or participates in more than one Tender (other than as a Sub Bidder or in cases of alternatives that have been permitted or requested) will cause all the Proposals with the Bidder’s Participation to be disqualified.

5. Cost of Tendering: The Bidder shall bear all Costs associated with the Preparation and Submission of his Tender and the Employer will in no case be Responsible and Liable for those Costs.

6. Site Visit: The Bidder, at his own Responsibility and Risk, is encouraged to visit and examine the Site of Works and its surroundings and obtain all Information that may be necessary for preparing the Tender and entering into a Contract for construction and execution of the Works. The cost of visiting the site shall be at the Bidder’s own expense.

C. Tender Documents

7. Content of Tender Documents

The Set of Tender Documents shall have all the Sections given in 'Contents' of this document.

8. Clarification of Tender Documents

A prospective Bidder requiring any clarification of the Tender Documents may present himself with his queries in the pre-bid meeting as detailed in the N.I.T. or send the same at the address/email indicated in the bid document so that these may reach the Authority before the date and time mentioned under KEY DATES.

9. Amendment of Tender Document

9.1 Before the Deadline for Submission of Tenders, the Employer may modify the Tender Document by issuing Addenda.

9.2 Any Addendum thus issued shall be part of the Tender Documents and shall be updated on the website and **NOT** communicated in writing to any purchaser of the Tender Document. To give Prospective Bidders reasonable time in which to take an Addendum into account in preparing their Tenders, the Employer may extend, as necessary, the Deadline for **Submission of Tenders, in accordance with S. No. 16 below.**

D. Preparation of Tenders

10. Documents Comprising the Tender

Only Technical Proposal shall be submitted both physically (hard Copy) as well as online. **FINANCIAL PROPOSAL SHALL BE SUBMITTED ONLINE ONLY.** The hard Copy of the Tender shall be submitted by the Bidder with Two sealed envelope and shall contain the Documents as follows.

Envelope A:

Original **Earnest Money Deposit: 10.98 Lakhs** (EMD through Online payment using Debit Card/Net Banking/RTGS/NEFT favour of Chief Executive Officer, Faridabad Smart City Limited and payable at Faridabad (HR) in a separate, sealed envelope).

Letter of EMD (Envelope A)

Pre Contract Integrity Pact duly Signed (On Rs 100 Non judicial stamp Paper, duly Notarized)

Envelope B:

Letter of Technical Bid (Envelop B- as per format given in Page 14.)

Pre-Qualification Information as per Formats given in Section-1: Pre-qualification document.

Any other information required for completing and submitting the tender by Bidders in accordance with these Instructions.

The Documents Listed under Sections - 1 shall be filled and submitted in without exception.

11. Tender Prices

11.1 The Contract shall be for the Whole Works as described in General Scope of Works clause 1.0 and its Sub Clause 1.1.

11.2 The Unit Rate Price shall be inclusive of all taxes including Goods and Service Tax (GST) as applicable by the law The Unit rates quoted by the bidders shall include Goods and Service tax. The quoted rate shall therefore be including the Goods and Service tax and other taxes & Duties, such as Labour Cess, Royalties, etc. imposed by the Government (State or Central)] and other Levies payable by the Bidder under the contract or for any other cause. FSCL will not be responsible for changes in any of the tax rates.

11.3 The Lump sum Price quoted by the Bidder shall be subject to adjustment during the Performance of the Contract in Accordance with the Provisions of the General Conditions of Contract.

12. Tender Validity

12.1 Tenders shall remain valid for a period not **less than 180 days** after the Deadline Date for Tender Submission specified in Clause - 16. A Tender valid for a Shorter Period shall be rejected by the Employer as Non Responsive. In Exceptional Circumstances, prior to expiry of the Original Time Limit, the Employer may request that the Bidders may extend the Period of Validity for a specified additional period. The request and the Bidders' responses shall be made in writing. A Bidder may refuse the request without forfeiting his Earnest Money Deposit. A Bidder agreeing to the request will not be required or permitted to modify his Tender, but will be required to extend the Validity of his Earnest Money Deposit for a period of the extension, and in compliance with Clause - 13 in all respects.

13. Earnest Money Deposit

13.1 The Bidder shall make the Earnest Money **Deposit 10.98 Lakhs** (EMD through Online payment using Debit Card/Net Banking/RTGS/NEFT in favour of Chief Executive Officer, Faridabad Smart City Limited and payable at Faridabad (HR) in a separate, sealed envelope).

13.2 Any Tender not accompanied by an acceptable Earnest Money Deposit as indicated in Sub Clause 13.1 above shall be rejected by the Employer as Non Responsive.

13.3 The Earnest Money Deposit of unsuccessful Bidders shall be returned within 30 days of the end of the Tender Validity Period specified in Sub Clause 12.1

13.4 The Earnest Money Deposit made by a Bidder may be forfeited:

(a) If the Bidder withdraws the Tender after Tender Opening or during the Period of Tender Validity;

(b) If the Bidder does not accept the Correction of the Tender Price, pursuant to Clause 23; or

(c) In the case of a successful Bidder, if the Bidder fails within the specified time limit to execute the Agreement with the FSCL for works under this bid.

14. Format and signing of Tender:

14.1 The tendering system for the work comprises three stages (i) EMD (ii) Technical Bid [Eligibility qualification] and (iii) online Financial Bid.

The Bidders are required to submit the online tender and submit hard copy with all required documents in Three Sealed Envelopes – A & B, as detailed above, manually within specified time and date at the address given below.

Chief Executive Officer,

Faridabad Smart City Limited

Nain Sadan, 3rd Floor, Plot No. 35

Sector 20A, Behind EF3 Mall

Near Old Faridabad Metro Station

Faridabad – 121001 (Haryana)

14.2 In Stage II [Technical Bid] the Bidder shall prepare the Documents comprising the Tender as described in Clause - 10 of these Instructions to Bidders. Bidders shall attach all Copies of Certificates pertaining to their Eligibility Criteria, Qualification Information Documents and Credit lines / Letter of Credit / Certificates from Scheduled Banks, failing which the Bid shall not be considered.

14.3 Stage III - **SUBMISSION OF ONLINE FINANCIAL BID. (DO NOT SUBMIT FINANCIAL PROPOSAL PHYSICALLY).**

14.4 The Tender shall contain no Alterations or Additions, except those to comply with instructions issued by the Employer.

E. Submission of Tenders

15. Procurement of Tenders

Tender Documents may be downloaded from the e procurement portal <https://haryanaeprocurement.gov.in> as indicated in the NIT

Bidders shall submit signed, complete Proposal comprising the documents and forms in accordance with Clause 10 (Documents Comprising Proposal). The submission shall be physically (hard Copy) as well as online.

Only the authorized representative of the Bidder shall sign the original submission letters in the required format for the Qualification Documents, Technical Proposal and the Financial Proposal and shall initial all pages as required. The authorization shall be in the form of a written power of attorney attached to the Qualification Documents Proposal.

Any modifications, revisions, interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Proposal.

The signed Proposal shall be marked "Original". The scanned Copy shall be made from the signed original and submitted online. If there are discrepancies between the original and the scanned copies submitted online, the tender committee at FSCL shall decide the one prevails.

If the envelopes and packages with the Proposal are not sealed and marked as required, the Client will assume no responsibility for the misplacement, loss, or premature opening of the Proposal.

16. Deadline for Submission of the Tenders

16.1 As per KEY DATES given in tender notice.

16.2 The Employer may extend the Deadline for Submission of Tenders by issuing an Amendment in accordance with Clause - 9, in which case all Rights and Obligations of the Employer and the Bidders previously subject to the original deadline will then be subject to the new deadline.

17. Late Tenders

17.1 Envelopes 'A & B' received by the Employer after the Deadline prescribed As per **KEY DATES** given in tender notice will **not** be accepted.

F. Tender Opening and Evaluation

18. Opening of Envelope 'A' [EMD] and Envelope 'B' of all Tenders and Evaluation to determine Qualified Bidders:-

18.1The Employer shall open Envelope 'A' of all the Tenders received (except those received late), in the presence of the Bidders or their representatives who choose to attend such opening of Envelope 'A' of the Tender at 11.00 HOURS ON

06.04.2018

at the office of the Chief Executive Officer, Faridabad Smart City Limited. In the event of the Specified Date of Tender Opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.

18.2 The Bidders' Names, the Presence or Absence of Earnest Money Deposit (Amount, Format and Validity), will be announced by the Employer at the opening. Late Submission of EMD will be rejected, unopened (wherever Applicable).

18.3 Envelope 'B' [Qualification Information] only of those Bidders who have submitted all the documents prescribed in Envelope A and are found in order in all respects shall be opened for technical evaluation.

18.4 The Employer shall prepare Minutes of the Tender Opening, including the information disclosed to those present in accordance with Sub Clause - 18.3 (Wherever Applicable).

18.5 Online tender of other bidders shall be kept unopened.

18.6 The Employer will evaluate and determine whether each Tender (a) meets the Eligibility Criteria defined in ITT Clause - 2; (b) is accompanied by the Required Earnest Money Deposit as per stipulations in ITT Clause 10 and (c) meets the Minimum Qualification Criteria stipulated in ITT Clause – 3 (Section1). The Employer will draw out a List of Qualified Bidders and will intimate these Qualified Bidders.

19. Opening of online tender of Qualified Bidders and Evaluation.

19.1 The Employer will inform all the qualified Bidders the Time, Date and Venue fixed for the opening of online tender containing the Unit Rate financial offer. The Employer will open the online tender of Qualified Bidders at the Appointed Time and Date in the presence of the Bidders or their Representatives who choose to attend. In the event of the Specified Date of online Tender opening being declared a holiday for the Employer, Online Tender shall be opened at the appointed Time and Location on the next working day.

19.2 The Bidders names, the Tender Prices, any discounts, and such other details as the Employer may consider appropriate, will be announced by the Employer at the time of opening.

19.3 The Employer shall prepare Minutes of the Online Tender Opening, including the Information disclosed to those present in accordance with Sub Clause - 19.2.

20. Process to be Confidential

20.1 Information relating to the Examination, Clarification, Evaluation, and Comparison of Tenders and recommendations for the Award of a Contract will not be disclosed to Bidders or any other persons not officially concerned with such process until the Award to the successful Bidder has been announced. Any effort by a Bidder to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

21. Clarification of Tenders

21.1 To assist in the Examination, Evaluation and Comparison of Tenders, the Employer may, at his discretion, ask any Bidder for clarification of his Tender. The request for clarification and the response shall be in writing, but no change in the price or substance of the Tender shall be sought, offered or permitted except as required to confirm the Correction of Arithmetic Errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause - 24.

21.2 Subject to Sub Clause 21.1, no Bidder shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the Contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, he should do so in writing.

21.3 Any effort by the Bidder to influence the Employer in the employer's Tender Evaluation, Tender Comparison or contract award decisions may result in the rejection of the Bidders' Tender.

22. Examination of Tenders and Determination of Responsiveness

22.1 Prior to the Detailed Evaluation of Tenders, the Employer will determine whether each Tender; (a) has been properly signed; and (b) is substantially responsive to the requirements of the Tender Documents.

22.2 A Substantially responsive Tender is one which

- Confirms to all the conditions or criteria set in the pre-qualification criteria
- submission of all supporting documents indicated in Section 1,
- EMD, Transaction (Document Fee), Processing Fee, Pre Contract Integrity Pact (in prescribed format) are enclosed,
- All forms and annexures are enclosed.
- Bid Capacity is achieved.
- Terms Conditions and Specifications of the Tender Documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the Scope, Quality or Performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender Documents, the Employer's Rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Tenders.

22.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

23. Correction of Errors

23.1 Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors.

23.2 The amount stated in the Tender will be adjusted by the Employer for the correction of errors and with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, the Tender will be rejected, and the earnest money deposit may be forfeited in accordance with Sub-Clause 13.4 (b).

24. Evaluation and Comparison of Tenders

24.1 The Employer will evaluate and compare only the Tenders determined to be Substantially Responsive in accordance with Clause - 22.

24.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

(a) Making any Correction for Errors pursuant to Clause - 23.

24.3 The Employer reserves the right to accept or reject any variation, deviation or alternative offer. Variations, deviations and alternative offers and other factors, which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer, shall not be taken into account in Tender Evaluation.

After Evaluation of the Price Analysis, the Employer may require that the amount of the Performance Security be increased at the expense of the Successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the contract.

G. Award of Contract

25. Award Criteria

25.1 Subject to Clause-26, the Employer will award the Contract to the Bidder whose Tender has been determined to be substantially responsive to the Tender Documents and who has offered the Lowest Evaluated Lump sum Tender Price, provided that such Bidder has been determined to be (a) Eligible in accordance with the Provisions of Clause - 2, and (b) Qualified in accordance with the Provisions of Clause - 3.

26. Employer's Right to accept any Tender and to reject any or All Tenders

26.1 Notwithstanding Clause - 25, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the Award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

27. Notification of Award and Signing of Agreement

27.1 The Bidder whose Tender has been accepted will be notified in writing of the award by the Chief Executive Officer prior to expiration of the Tender validity period. This written communication from the employer to the successful Bidder shall be termed as the "Letter of Acceptance". This Letter (hereinafter called the "Letter of Acceptance") will state the sum that the Chief Executive Officer will pay the Bidder in consideration of the execution and completion of the Works by the Bidder as prescribed by the Contract (herein after and in the Contract called the "Contract Price").

27.2 The Notification of award will constitute the formation of the Contract.

27.3 The Agreement will incorporate all Agreements between the Chief Executive Officer from FSCL and the successful Bidder. It will be kept ready for signature of the successful Bidder in the office of the Chief Executive Officer within 21 days following the notification of award along with the Letter of Acceptance. Within 7 days of Receipt, the successful Bidder will sign the Agreement and deliver it to the Chief Executive Officer, FSCL. The duration of the project will be considered from the date of issue of work order or date stipulated in the work order.

SECTION 3: QUALIFICATION INFORMATION

- 1.1. The Bidder shall meet the Pre-qualification Criteria indicated in Section 1.
- 1.2. The Bidder performance for each work completed in the last 3 years and those in hand should be certified by an officer not below the rank of Engineer-In-Charge or equivalent. Details should be furnished in **Annexure-4**.
- 1.3. The Bidder should furnish a legal document in the form of an Affidavit in the Performa appearing in **Annexure-7** guaranteeing the truth and accuracy of all statements and information furnished by the bidder as part of this Tender. The Affidavit shall also authorize FSCL to approach any authority/person to verify the accuracy of the information furnished or enquire about the Bidder competence and his Reputation in general.
- 1.4. Tender submitted by a Bidder, who has been debarred from undertaking any work or has been black-listed by any organization/agency in India as on the date of submission of this tender, shall be summarily rejected.
- 1.5. Bidder should have its own in-house electrical wing fulfilling all the terms & conditions given in the electrical sub heads or can associate any electrical contractor who fulfils the requisite criteria given in the electrical sub heads in the tender document.

Note: The Bidder is required to furnish all information in all the FORMS and their appurtenant formats included herein, (duly signed with seal) failing which the tender is liable to be rejected.

2. Agreement shall be drawn with the successful Bidder on approved Form 'B'. Bidder shall quote his rates as per various terms and conditions given in the General Condition of the Contract mentioned in the bid document, including the general specification and drawing.
3. The time allowed for carrying out the work is 6 (**Six**) **months**, including Rainy Season, to be reckoned from the date of written orders to commence the work.
4. Time is Essence of this contract.

FORM B - TENDER FOR UNIT RATE CONTRACT
(TO BE SUBMITTED ONLINE WITH DIGITAL SIGNATURE)

I/we hereby tender to execute the whole of the works as described in the scope of services indicated in called works:

- a) **Name of the Work:** “Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years And Operation & Maintenance Of 5 Years”
- b) **Location Plan and Specifications:** The location plan and specifications as detailed in Section 7: Designs and Specifications and appearing in Annexure F.
- c) **Scope as defined in ITT clause 1 under “General”**

S. No.	Description of the Item	Total Rate (Rs.) (in figure)	Total Rate (Rs.) (In words)
1	Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works at Fatehpur Chandela Village In Faridabad With Defect Liability Period Of Two Years as per the total detailed BOQ S.No.1-174 which is mentioned below. Total “A” (Value of A from table)		
2	Operation & Maintenance for 5 years as per detailed BOQ S.No. 175-179 (Total of 1st year to 5th Year), Total “ B ”		
3	Grand Total “C” = (A+B) (Inclusive of GST and other Taxes)		

Note: No escalation of Price shall be considered during the contract period.

The bids will be evaluated on the basis of amount quoted against “C “: **Grand Total (C) in INR**

(Lump sum Inclusive of all taxes including Goods and Service Tax (GST)

Total sum of (In Figures as in “C”) □..... (In Words) Rupees
.....
.....

And should this tender be accepted, I/we do here by agree and bind myself/ ourselves to abide by and fulfil all the conditions of this Tender Document, in default thereof to forfeit and pay to the **Chief Executive Officer, Faridabad Smart City Limited** the penalties of sums of money mentioned in the said condition.

Dated:

Bidder’s Signature

Address Seal

Witness:

Address:

The above tender is hereby accepted by me on behalf of the Faridabad Smart City Limited.

(Designation)

SIGNATURE OF AUTHORITY BY WHOM the TENDER IS ACCEPTED

BILL OF QUANTITIES

Preamble

1. The Bill of quantities shall be read in conjunction with the instructions to Bidders, Conditions of contract, Technical Specifications and Drawings. Wherever applicable, the interpretation of Items mentioned in the BOQ shall be as per HSR.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and process tendered in the priced Bill of Quantities, where applicable, and otherwise at such rates as the Engineer may fix within the terms of the Contract.
3. The rates and prices tendered in the Bill of Quantities shall, except in so far as it is otherwise provided under the Contract, include all constructional plant, labour, supervision, materials, erection, maintenance, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out of implied in the Contract.
4. The rates and prices shall be quoted entirely in Indian Currency.
5. A rate or price shall be entered against each item in the Bill of Quantities, whether quantities are stated or not. The cost of Item against which the contractor has failed to enter a rate or price of price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
6. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the Bill of Quantities, and where no Items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Item of work.
7. General directions and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates of prices against each item in the Bill of Quantities.
8. The method of measurement of completed work for payment shall be in accordance with the HSR or as specified in the BOQ.

Errors will be corrected by the Employer for any arithmetic errors

Note: Wherever applicable, the interpretation of Items mentioned in the BOQ shall be as per HSR.

S.No	Ref.	No.	Description of Item	Unit	QTY	Rate (Rs)	In Words	Amount (Rs)
			Concrete Road					
1	Non SOR		Design mix cement concrete of grade M-30 with minimum cement contents 420 Kg./cum in foundation and plinth.- Construction Concrete Road Including cleaning of existing surface and spreading of cement slurry(admixed with suitable approved bonding agent for bonding old & new concrete at the prescribed rate) before laying of concrete as per Drawing and the direction of Engineer in Charge.	Cum	1965.00			
2	HSR	24.34	Making and filling expansion joints, with bituminous filler (bitumen 40 percent, asbestos 5 percent and sand 55 percent), 12 mm wide	meter/cm depth	2666.67			
3	HSR	24.35	Providing and fixing premoulded bituminous joint filler, for expansion joints, including the cost of sealing compound and primer coat-12mm wide	meter/cm depth	3666.67			
4	HSR	18.21	Mild steel reinforcement for R.C.C. works where not included in the complete rate of R.C.C., including bending binding and placing in position complete. Dowels Bar-25 mm dia,500 mm long @300mm c/c with cardles.	Quintal	112.67			
5	HSR	9.5	Centring and shuttering for faces of walls, partitions, retaining walls,well steining and the like (vertical or battering)including attached pilasters etc.	sqm	1774.17			
6	Non SOR		Supplying , stacking ,Sprading and compection of Good earth at site for any work. .	Cum	80.00			
7	HSR	6.2 b(k)	Extra for Humus- Humus is decayed vegetable and animal mould (growth caused by dampness) that will contain sewage, flows like molasses, and will not support a man's weight. The rate shall be paid only after obtaining approval of the Superintending Engineer. -For Cleaning of Existing Drain	Cum	240.00			
8	HSR	8.6(d)	Dismantling Concrete -cement concrete plain 1:2: 4 mi	Cum	1200.00			
			DRAIN					

9	HSR	6.6 b	Earth work in excavation in foundations, trenches, etc.in all kinds of soils, not exceeding 2 metres depth including dressing of bottom and sides of trenches, stacking the excavated soil, clear from the edge of excavation and subsequent filling around masonry, in 15 cm layers with compaction, including disposal of all surplus soil, as directed within a lead of 30 metres	Cum	639.38			
10	HSR	10.63	Design mix cement concrete of grade M-10 with minimum cement contents 220 Kg./cum in foundation and plinth.	Cum	244.69			
11	HSR	10.66	Design mix cement concrete of grade M-25 with minimum cement contents 410 Kg./cum in foundation and plinth. -For Drain work	Cum	542.81			
12	Non SOR		Design mix cement concrete of grade M-25 with minimum cement contents 410 Kg./cum in foundation and plinth. -For Precast perforated slab with 50mm dia hole @ 200 mm center to center, making hole of require dia for house connection in Drain.	Cum	210.94			
13	HSR	18.22	Fe- 500 EQR TMT Steel bars RCC, works, where not including in the complete rate of RCC including bending, binding and placing in position complete.	Quintal	376.88			
14	HSR	9.5	Centring and shuttering for faces of walls, partitions, retaining walls, well steining and the like (vertical or battering)including attached pilasters etc.	sqm	4425.00			
15	Non SOR		Providing and fixing factory made precast RCC perforated drain covers, having concrete of strength not less than M-25, of size 750 x 450x50 mm, reinforced with 8 mm dia four nos longitudinal & 9 nos cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations @ 100 to 125 mm c/c, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer- in-charge.	Each	135.00			

16			Providing and fixing factory made precast RCC perforated drain covers, having concrete of strength not less than M-25, of size 1000 x 450x50 mm, reinforced with 8 mm dia four nos longitudinal & 9 nos cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations @ 100 to 125 mm c/c, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer- in-charge.	Each	400.00			
			Repairing of existing manholes					
17	HSR	29.94	Providing and fixing SFRC MANHOLE COVERS AND FRAMES MARKED WITH IS:12592 including setting the same to correct lines and levels in 1:2 cement sand mortar over manhole including Carriage loading, unloading stacking handling rehandling etc. Complete in all respects to the satisfaction of Engineer-In-charge.- Type: Extra heavy Duty Set (EHD-35) 560 MM Clear opening	each	50.00			
18	HSR	8.6 D	Dismantling of concrete-cement concrete plain 1:2: 4 mi	cum	1200.00			
			Renovation of existing Park					
19	HSR	6.25 (a)	Surface dressing of the ground including removing vegetation and inequalities not exceeding 15 cm deep -soft/loose soil	Sqm	1900.00			
20	HSR	(D) 8.5(b)	Dismantling Brick Work, Tile Masonry or Tile Lining and Tile Terracing - in cement	Cum	10.00			
21	HSR	8.32(a)	scraping white wash and colour wash	sqm	2132.30			
22	HSR	8.32(c)	scraping-cement plaster	Sqm	1931.28			
23	HSR	11.3	First class brick laid in cement sand mortar 1:5 in foundation and plinth.	cum	4.60			
24	HSR	11.8	First class brickwork laid in cement sand mortar 1:5 in first storey upto 4 meters above plinth level.		11.50			
25	HSR	15.15	20 mm thick cement plaster 1:4 in 2 coats work.	sqm	1932.30			
26	HSR	16.54	Distempering with dry distemper (of approved manufacture) two coats over one priming coat on new work.	sqm	1932.30			

27	Non SOR		Taking out existing CC interlocking paver blocks from footpath/ central verge, including removal of rubbish etc., disposal of unserviceable material to the dumping ground, for which payment shall be made separately and stacking of serviceable material within 50 metre lead as per direction of Engineer-in-Charge.	Sqm	300.00			
28	HSR	10.15 8	Providing and laying 60mm thick interlocking paver blocks of all shapes and colours in design mix cement M-35 over a bed of 25mm thick fine sand complete in all respect.		802.92			
Horticulture								
1. EARTH WORK								
29	HSR	33.7	Fine dressing the ground	Sqm	1000.00			
2. GRASS								
30	HSR	33.9	Mixing earth and sludge or farm yard manure in proportion specified or as directed.	Cu m	200.00			
31	HSR	33.8	Spreading of sludge, farm-yard manure or/and good earth in required thickness (Cost of sludge, farmyard manure or /and good earth to be paid for separately) (MIN 200 MM LAYER)	Cu m	200.00			
32	Non SOR		Providing & laying Selection no. 1 grass turf with earth 50mm to 60mm thickness on existing ground prepared with proper level and ramming with required tools wooden and than rolling the surface with light roller make the surface smoothen and light watering the same, as per direction of Officer-in-charge.	Sqm	1000.00			
3.0 TREES/PALMS /SHRUBS/CLIMBERS								
33	HSR	33.9	Mixing earth and sludge or farm yard manure in proportion specified or as directed.	Cum	194.15			
34	HSR	33.21 (i)	Digging holes in all kinds of soil, and refilling the same, with the excavated earth, mixed with well decayed farm-yard manure (cost of well decayed farm yard manure to be paid separately) in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any with all leads and liftsHoles 1.2 m dia and 1.2 m deep.	Nos.	68.00			

35	HSR	33.21 (ii)	Digging holes in all kinds of soil, and refilling the same, with the excavated earth, mixed with well decayed farm-yard manure (cost of well decayed farm yard manure to be paid separately) in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any with all leads and liftsHoles 60 cm dia, and 60 cm deep.	Nos.	600.00			
			TREES/ PALMS					
36	Non SOR		Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting-ERYTHRINA INDICA,Minimum 2.0/2.5m overall height,Multibranching at 2.5m from collar	Nos.	7.00			
37	Non SOR		Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting-PHEONIX PALM,DATE PALM,Minimum 2.5m overall height,Minimum 100mm caliper,min. 8 fronds	Nos.	20.00			
38	Non SOR		Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting-WASHINGTONIA PALM,Minimum 1.5m overall height,Minimum 100mm caliper,5 fronds.	Nos.	20.00			

39	Non SOR	Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting-BAUHINIA VAREIGATA,Minimum 1.5m overall height,Minimum 100mm caliper,5 fronds.	Nos.	7			
40	Non SOR	Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting-CASSIA FISTULA,Minimum 1.5m overall height,Minimum 100mm caliper,5 fronds.	Nos.	20.00			
41	Non SOR	Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- Yucca plant ,Minimum .6 m overall height,Minimum 100mm caliper,10-12 fronds.	Nos.	20.00			
42	Non SOR	Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- COCHLOSPERMUM RELIGIOSUM ,Minimum .6 m overall height,Minimum 100mm caliper,10-12 fronds.	Nos.	7.00			

43	Non SOR	Supply & Install Trees/ Palms inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- PLUMERIA ALBA ,Minimum .6 m overall height,Minimum 100mm caliper,10-12 fronds.	Nos.	7.00			
		CLIMBERS					
44	Non SOR	Supply & Install Climbers inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- ADENOCALEMA SPP. ,Minimum 1500mm height @1000mmc/c,Minimum 3 runners per plant	Nos.	27.00			
45	Non SOR	Supply & Install Climbers inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- IPOMEA CURELEA ,Minimum 1500mm height @1000mmc/c,Minimum 3 runners per plant	Nos.	27.00			
46	Non SOR	Supply & Install Climbers inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- IPOMEA PALMATA ,Minimum 1500mm height @1000mmc/c,Minimum 3 runners per plant	Nos.	27.00			

47	Non SOR		Supply & Install Climbers inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- PETRA VOLUBLIS Minimum 1500mm height @1000mmc/c,Minimum 3 runners per plant	Nos.	27.00			
48	Non SOR		Supply & Install Climbers inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- QUISQUALIS INDICA ,Minimum 1500mm height @1000mmc/c,Minimum 3 runners per plant	Nos.	27.00			
49	Non SOR		Supply & Install Climbers inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% concentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting- THUNBERGIA ALATA Minimum 1500mm height @1000mmc/c,Minimum 3 runners per plant	Nos.	27.00			
			GROUND COVERS					
50	HSR	33.9	Mixing earth and sludge or farm yard manure in proportion specified or as directed.	Cu m	125.00			

51	Non SOR	Supply & Install ground covers/ Shade plants inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.- ALTERNENTHERA RED,Minimum 150mm height @200mmc/c,Bushy	Sq m	125.00			
52	Non SOR	Supply &Install ground covers/ Shade plants inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-IPOMEA GOLDEANA,Minimum 300mm height @200mmc/c,Minimum 3 runners per plant	Sq m	125.00			
53	Non SOR	Supply &Install ground covers/ Shade plants inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-WEDELIA TRILOBATA,Minimum 3 runners per plant,Minimum 150mm height @200mmc/c	Sq m	125.00			
54	Non SOR	Supply &Install ground covers/ Shade plants inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-ZEBRINA PENDULA,Minimum 300mm height @250mmc/c,Minimum 3 runners per plant	Sq m	125.00			

55	Non SOR	Supply & Install ground covers/ Shade plants inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-SYNGONIUM BUTTERFLY,Minimum 200mm height @200mmc/c,Minimum 3 runners per plant	Sq m	125			
		HEDGES/SHRUBS					
56	Non SOR	Supply & Install plants to form hedge , inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.- MURRAYA EXOTICA ,Minimum 300mm height @300mmc/c,Bushy. MINIMUM WIDTH 600MM	RMT	85.00			
57	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.- FICUS PANDA Minimum 300 mm height @200mmc/c,Bushy . MINIMUM WIDTH 600MM	RMT	85.00			
58	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.- FICUS BENJAMINA Minimum 600 mm height @200mmc/c,Bushy. MINIMUM WIDTH 1200MM dimension 1.2x1	Nos.	85.00			

59	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-CASSIA BIFLORA Minimum 600 mm height @200mmc/c,Bushy	Nos.	85.00			
60	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-HAMELIA PATENS DWARF Minimum 300 mm height @200mmc/c,Bushy. MINIMUM WIDTH 1200MM	RMT	85.00			
61	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-TMC VARIEGATED Minimum 300 mm height @200mmc/c,Bushy. MINIMUM WIDTH 600MM	Nos.	85.00			
62	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-ACALYPHA WILKENSIANA TRICOLORMinimum 300 mm height @200mmc/c,Bushy. MINIMUM WIDTH 600MM	RMT	85			

63	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.- CALLIANDRA EMARGINATA Minimum 600 mm height @200mmc/c,Bushy. MINIMUM WIDTH 1200MM dimension 1.2x1	Nos.	85.00			
64	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.-HIBISCUS SNOWFLAKE Minimum 600 mm height @200mmc/c,Bushy. MINIMUM WIDTH 1200MM dimension 1.2x1	RMT	85.00			
65	Non SOR	Supply & Install plants to form hedge, inclusive of: i).Removal of rubbish/ all construction debris /site trash, and surplus earth inclusive with all leads and lift. ii). Treat the pit with Chloropyriphos solution of 0.5% oncentration(5 ml/liter water) as required iv). Flooding the pit with water after making kiaries where required vi). Fertilise the pit by adding DAP 50gm, MOP 25 gm, 50gm neem oil cake and 50 gm stearammeal per pit at the time of planting.- CAESALPINIA PULCHERRIMA. Minimum 600 mm height @200mmc/c,Bushy. MINIMUM WIDTH 1200MM dimension 1.2x1	Nos.	85			
ELECTRICAL WORKS							
LUMINARIES							

66	Non SOR	Supply, installation, testing and commissioning of POST TOP IP66 Luminaire: Outdoor type, Integral LED lamp, Decorative, Direct lighting type, Non corrosive Aluminium housing, Housing Colour: Black/Grey ,Suitable for mounting on pole. Luminaire integrated and prewired from terminal connector for incoming supply with LED lamp . Low power loss LED driver for 36 W LED,Operated on 240V, 50Hz AC supply,	Nos.	35.00			
67	Non SOR	Supply, installation, testing and commissioning of LIGHT POLES:(i) Steel tubular poles with base plate of size 300x300x6mm welded at bottom, necessary hole for cable entry and earthing stud welded at standard height including painting . Fabricated pole shall be made form Galvanized Iron (GI) pipes or mild steel (MS) pipes The pole shall be complete with cap and base plate, Light pole suitable to accommodate Post top luminaire.Hollow pole of thickness not less than 2.3 mm . Earthing terminals for earth connection. Cable will be terminate at luminaire through hollow pole. Pole is black/grey in colour having corrosion resistance coating on it. Suitable for outdoor application. Height : 3.5-4 mtr,Top dia: 76 mm, Bottom dia: 140 mm	Nos.	35.00			
68	Non SOR	Supply, installation, testing and commissioning and interconnection of wiring of wall mounted double door distribution board (16 modules) having plain door, IP 43 protected, as per IS 8623 including blanking plates, insulated busbar and earth bar, circuit identification label i) Incomer: 1 no. 63A 40kA TPN MCCB as per IEC 60947 with adjustable overload, fixed short ckt. ii) Outgoing: 4 nos. each of 16A 10kA SPN MCB as per IS/IEC 60898 and 1 no. 25A 10kA D curve TPN MCB as per IS/IEC 60898	Nos.	2.00			
PLAY EQUIPMENT							
69	Non SOR	Providing and fixing Standard See-saw, Product Area : 2.5m X 0.3m, Safe Play Area :3.5m X1.3m, Ideal For :4-10 Years, Friends at a time : 2 no.on suitable location at smart park	each	2			

70	Non SOR		Providing and fixing Double Post Swing, Area : 3.5m x 1.0m, • Safe Play Area : 4.5m X 2.0m • Ideal For : 4-14 Years, Friends at a time : 2 on suitable location at smart park,	each	3			
71	NON SOR		Providing and fixing in play equipment , including excavation of 0.45 x 0.45 x 0.45 m size pit and fixing the each supporting leg / anchoring arm of playing instrument in 1:1 1/2:3 grade concrete block of 0.45 x 0.45 x 0.45 m size including curing etc. complete Straight Slide chute is made is made up of LLDPE (Linear Low Density Polyethylene) material of Grade-36RA045, UV-8 (Food Grade Plastic). The structure is made up of 20 NB and 25 NB powder coated GI pipes. The slide is supported on 80 NB powder coated GI pipes. The ladder cum railing is made 20 NB and 25 NB GI pipes respectively. The platform of the slide is made up of 14 SWG GI sheet with anti-skid for firm foot grip. There are triangular steps 16 SWG GI sheet. The slide chute has its end such as it causes safe landing of the child.	Nos	3.00			
			TOTAL					
			HIGH MAST LIGHT					
72	Non SOR		Supply, installation, testing, commissioning and interconnection of wiring of 12 m LED Flood Light High mast including 6 nos. 100-150W LED Flood light. LED flood Light luminaires and pole complete with all accessories viz. foundation bolts, trailing cable, SS rope, winch & motor, aviation light etc as per specification	No.	8			
73	Non SOR		Supply of switching & advanced monitoring type lighting controls embedded streetlighting feeder box with required foundation Including Programing & commissioning of Lighting controls & Management Panels & necessary software	No.	8.00			
			Part :PUMP					
74	NON SOR		Drilling of 250 mm dia by method of tractor Driver direct rotary machine drilling as amended (up to date) but modified to the extent of the specifications attended with the scheduled of rates item in all kinds of soils, except rocky, strata including cost of all consumable stores. Fuels, oil, soil, establishing material & transportation of rig and other accessories to the site of proposed bore & back complete in all respect, to the Engineer – in – charge.	Mtrs	242.00			

75	NON SOR		Supply of 8" dia. PVC pipe 6 kg sqm tested ISI mark complete in all respect.	Mtrs	200.00			
76	NON SOR		Lowering of 8" dia PVC pipe 6 kg/cm ² tested ISI mark filter including binding of rope and plastic jail complete in all respect.	Mtrs	42.00			
77	NON SOR		P/F steel screws, 20x4 nos. = 80 nos.	Each	160.00			
78	NON SOR		Supply of cement solvent for fixing of PVC pipe.	kg	4.00			
79	NON SOR		200 mm M. S clamp as per IS 226-1975 as amended up to date for servicing he housing pipe supported on two girders embedded in suitable foundation as approved by the Engineer – in – charge.- 1x1 = 1 nos.	Each	2.00			
80	NON SOR		Digging of pit use for collection water for boring.	Each	2.00			
81	NON SOR		Supply of 5 HP 10 stage submergible motor pump, CRI make with all charges loading / unloading, transportation complete in all respect	Each	2.00			
82	NON SOR		Supply and Jointing of 4mm ² submersible cable (copper) CRI make (FINDEX) POLYCAB, ECAO & BUNTON) complete in all respect as per HSR 31.59.	Per mtr	320.00			
83	NON SOR		Supply 2"x10' long GI pipe make Jindal – B both side threading & fixing MS flenge and welding complete in all respect. As per HSR 28.52.	Each	60.00			
84	NON SOR		Lowering of submersible motor pump complete in all respect	Each	2.00			
85	NON SOR		Labour charges for making tee connection with existing line complete in all respect.	Each	2.00			
			Material required Mechanical & Electrical works for pump					
86	NON SOR		(a) 2" Pump Nipple new making with flenge	Each	2.00			
87	NON SOR		(b) 2" MS clamp HD	Each	2.00			
88	NON SOR		(c) Pannel box Hut (MS)	Each	2.00			
89	NON SOR		(d) 7.5 HP control panel CS make complete in all respect	Each	2.00			
90	NON SOR		(e) 4" Tee C.I (4"x4"x4")	Each	2.00			
91	NON SOR		(f) 4" Duck foot bend	Each	2.00			
92	NON SOR		(g) 4" CI bend	Each	4.00			
93	NON SOR		(h) 4" Vertical pipe with Flenge	Each	2.00			

94	NON SOR		(i) 4" Horizontal pipe with Flenge	Each	2.00			
95	NON SOR		(j) Rubber sheet	kg	20.00			
96	NON SOR		P/F cast iron double flanged saluce valve PN- 1.6 marked with I.S : 14846 including nuts and bolts marked with I.S 1363 etc. carriage loading, unloading stacking, handling, Re-handling etc. complete in all respect to the satisfaction of Engineer—in-charge (Makes AARKO, VENUS, LEADER, BIR, PANJA, UPADHAY) as per HSR 28.10 (A) 100mm internal diameter of valve	Each	4.00			
97	NON SOR		P/F cast iron double flanged Swing check type reflux (Non return) valves PN- 1.6 marked with I.S : 5312 including nuts and bolts carriage loading, unloading stacking, handling, Re-handling etc. complete in all respect to the satisfaction of Engineer –in-charge (Makes AARKO, VENUS, LEADER, BIR, PANJA, UPADHAY) as per HSR 28.10 (A) 100mm internal diameter of valve.	Each	2.00			
98	NON SOR		Supply of MS Bolts of required site with nuts and warshals complete as per HSR no. 18.15 (G)	Per kg	50.00			
Repairing of existing bore wells								
99	NON SOR		Taking out pipes of existing tube well including strainer etc. complete for portion of length:-) 150 mm dia. metre	mete r	500.00			
100	NON SOR		Taking out pipes of existing tube well including strainer etc. complete for portion of length:-) 200 mm dia. metre	mete r	500.00			
101	NON SOR		Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.150 mm nominal size dia	Rmt	500.00			
102	NON SOR		Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.200 mm nominal size dia	Rmt	500.00			
103	NON SOR		Repairing chocked up tube well by cleaning and washing with chemical including pumping with powerful pump.-100 mm to 200 mm dia. tube well upto 100 metre deep	Set	5.00			

104	NON SOR		Supplying, assembling and fixing of Switch button for Bore well Pump in steel framed boxes at difference location	Set	10.00			
			LED Steet Light					
105	Non SOR		Supply Installation Testing and commissioning of Energy efficient LED street light of 25W with IP 66 luminaires fixed on existing concrete pole	Nos.	100.00			
106			Supplying and fixing of 32 mm dia X 2.00 meter long G.I. pipe (medium class) bracket for mounting of fluorescent / HPMV / HPSV / LED street light fitting on pole including bending the pipe to the required shape, 2 Nos. 40 mm X 3 mm flat iron clamps with nuts, bolts and washer, painting the flat iron with primer and finish paint etc. as required.	Each	100.00			
	DSR	12.34						
107			Supplying, fixing and commissioning of following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) 8 way, Double door	Each	8.00			
	DSR	2.3.2						
108			Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required. Triple pole and neutral 32A	Each	8.00			
	DSR	2.10.5						
109			Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required. Single pole 16 A	Each	16.00			
	DSR	2.10.1						
110			Supplying, installation, testing and commissioning of Astronomical time switch of following configuration to be mounted in feeder pillars / Lighting DBs for automatic switching On & OFF of street lights at sun set & sun rise or twilight (Auto ON, Auto OFF, Auto modes) with manual override facility with 12/24 hour display format with suitable battery and indication for relay status i/c programming at site complete as required. 1 output per phase and suitable for single phase supply	Each	16.00			
	DSR	15.4.1						

111	DSR	15.4.3	Supplying, installation, testing and commissioning of Astronomical time switch of following configuration to be mounted in feeder pillars / Lighting DBs for automatic switching On & OFF of street lights at sun set & sun rise or twilight (Auto ON, Auto OFF, Auto modes) with manual override facility with 12/24 hour display format with suitable battery and indication for relay status i/c programming at site complete as required. 3 output (1 output per phase) and suitable for three phase supply	Each	8.00			
			LT Electrical Cable					
112	DHBVN	Gurgaon rate 20	Supply of LT XLPE Armoured Cable 4/C, 25 MM sq	Mtr.	500.00			
113	DHBVN	33.2	Supply of Unarmoured copper control cable 2C X 6 sqmm	Km	0.05			
114	DSR	9.1.34	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 kV grade as required.-4C X 25 sq. mm (28mm)	Each	50.00			
115	DSR	9.1.1	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 kV grade as required.-2 X 6 sq. mm (19mm)	Each	15.00			
116	DHBVN	F 8 ii	Making of LT joints	Each	200.00			
117	DSR	14.16.1	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc..direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required. 63 mm dia (OD-63 mm & ID-51 mm nominal)	Mtr.	500.00			
118	DSR	7.5.1	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 kV grade of following size in the existing RCC/ HUME/ METAL pipe as required. Upto 35 sq. mm	Mtr.	500.00			
			Earthing Work					
119	NON SOR	Non SOR	Supplying and erection of maintenance free Earthing with all allied materials	Nos.	25.00			
120	HSR	31.22. (ix)	Supplying and laying 25mm X 6mm G.I. strip at 0.5 metre below ground as strip earth electrode including soldering etc. as required.	Meter	1250.0			

121	HSR	31.22. (xi)	Pdg. and fixing 25 mm x 5 mm G.I. Strip in 40 mm dia G.I. pipe from earth electrode as required.	Meter	125.0			
122	DHBVN	A 9	Earth boaring	Feet	250.0			
123	DHBVN	K 5.3	Erection of GI strip 25 X 6 mm, 9 mtr. For earthing	No.	50.0			
			Dismantaling					
124	DSR	12.42	Dismantling of pole/ street light standard/ strut embedded in cement concrete foundation etc. as required.	Each	40.00			
125	PWD	30.7	Dismantling the all sizes outdoor lighting luminaries from wall/ roof with accessories including shifting of dismantled material to department store.	Each	100.00			
126			Vertical Graphics Ambient Signs Single sided duly fixed on RCC foundation approximately 3cum. The Single sided Vertical Graphics Ambient board shall be made out of internal structure by using SHS duly powder coated and cladded with 4mm Aluminium Composite Panel. The top portion of circle of the Ambient sign logo shall be thermoformed from PET-G Sheet & rest of the front facilities shall be made out of plain Acrylic sheet/PET-G Sheet/Poly carbonate. The messages will be on digital printed on Type – XI Retro Reflective Sheeting which will be dimond grade and special translucent sheet and the same shall be pasted on front & back of the sign (printing standard should be ultra chrome GS-3 ink for outdoor application). Outdoor durability of ink should be minimum five years certified by OEM on reflective material.	Nos.	1.00			
127	NON SOR		Desilting and cleaning of existing 0.6 X 0.6 mtr storm water duct/ sewer line with high pressure jetting & high volume suction machine, opening of blocked sewer line, manholes, disposal of retained silt to hazard free dumping ground including mobilization of equipments, cost of sundries, T & P, Safety devices, dewatering, cleaning and required plugging of manholes with cartage, loading & unloading of silt/ sludge , insurance of employee & laboured etc. complete in all respect	Rmt	500.00			
			SEWERAGE SYSTEM					

128	Non SOR		Providing, laying and jointing following P.V.C. - U pipes with solvent cement joint for Non-pressure gravity drain and sewer applications including testing of joints, cost of jointing materials etc. comConform to IS 15328 & IS 14182]. SN-8complete in all respect. 110 mm dia. uPVC. pipe	meter	5940.0			
129	HSR	30.11 4 (c)	PROVIDING AND FIXING IN POSITION GULLY TRAPS FIXED IN CEMENT CONCRETE 1:4:8 complete WITH H.C.I. GRATING 150 MM X 150 MM CAST IRON COVER WEIGHING APPROXIMATELY 7.26 K.G. AND FRAME CLEAR OPENING 300 MM x 300 MM and outside size 330 MM x 330 MM AND CHAMEBR INCLUDING cost of all brick work in CEMENT MORTAR 1:5 CEMENT CONCRETE 1:8:16 IN FOUNDATIONS, AND CEMENT CONCRETE 1:2:4 IN COPING around C.I. cover and frame etc. WITH THREE COATS of black bitumastic superior PAINT of approved manufacture on all C.I. work AS PER STANDARD DESIGN, minimum depth of water should be 150mm with a minimum seal 50mm. 100 mm internal diameter S.W. gully trap	each	1200.0			
130	Non SOR		Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete : 150 mm dia. R.C.C. pipe	metre	250.0			
131	Non SOR		Providing, laying and jointing following P.V.C. - U pipes with solvent cement joint for Non-pressure gravity drain and sewer applications including testing of joints, cost of jointing materials etc. comConform to IS 15328 & IS 14182]. SN-8plete in all respect. 200 mm dia. uPVC. pipe	metre	2100.0			

132	Non SOR		Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete : 250 mm dia. R.C.C. pipe	metre	100.0			
133	Non SOR		Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete : 300 mm dia. R.C.C. pipe	metre	1350			
134	Non SOR		Providing and laying non-pressure NP3 class (medium duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete : 450 mm dia. R.C.C. pipe	metre	100.0			
135			Providing and laying Non Pressure NP-3 class (Medium duty) R.C.C.pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete 600mm Dia R.C.C. pipe	metre	100.0			
136	Non SOR		Providing and laying Non Pressure NP-3 class (Medium duty) R.C.C.pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete 900mm Dia R.C.C. pipe	Metre	100			
137	HSR	10.4	Cement concrete 1:3:6 with stone aggregate 20mm nominal size in foundation and plinth	Cum	297.0			

138	Non SOR	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete : For pipes 100 to 250 mm diameter	each	1200.0			
139	Non SOR	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete : For pipes 250 to 300 mm diameter	each	60.0			
140	Non SOR	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete : For pipes 350 to 450 mm diameter	each	50.0			

141	Non SOR	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete : For pipes 900mm diameter	each	20.0			
142	Non SOR	Constructing brick masonry circular type manhole 0.91 m deep with S.F.R.C. cover and frame (heavy duty, HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg., fixed in cement concrete 1:2:4 (1cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete.(Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately) :- With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	each	87.0			
143	Non SOR	Extra depth for circular type manhole 0.91 m internal dia (at bottom) beyond 0.91 m to 1.67 m -With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	metre	50.0			

144	Non SOR	<p>Constructing brick masonry circular manhole 1.22 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement : 4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement :3 coarse sand) finished with a floating coat of neat cement foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design : -1.68 m deep with SFRC Cover and frame (heavy duty HD- 20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not With common burnt clay F.P.S. (non modular) bricks of class designation 7.5</p>	each	18			
145	Non SOR	<p>Extra depth for circular type manhole 1.22 m internal dia (at bottom) beyond 1.68 m to 2.29 m : With common burnt clay F.P.S. (non modular) bricks of class designation 7.5</p>	metre	30			

146	Non SOR		Constructing brick masonry circular manhole 1.52 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement : 4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1cement : 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :2.30 m deep with SFRC Cover and frame (heavy duty HD- 20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg. fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete.(Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately) : With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	each	21.00			
147	Non SOR		Extra depth for circular type manhole 1.52 m internal dia (at bottom) beyond 2.30 m : With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	metre	20			
148	HSR	15.76	12 mm thick cement plaster damp proof course 1:3 with 2 coats of bitumen at 1.65 kg per sqm laid hot and sanded.	Sqm	835.3			

149	Non SOR		<p>Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910, on 12 mm dia steel bar conforming to IS: 1786, having minimum cross section as 23 mmx25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.</p>	each	405.0			
150	HSR	6.9/(b))/(i)	<p>EXCAVATION FOR PIPELINES RUNNING UNDER PRESSURE IN TRENCHES AND PITS, IN STREETS & LANES including trimming and dressing sides, leveling of beds of trenches to correct grade, cutting joint holes, cutting trees and bushes, etc., refilling consolidation and watering of refill, in 15 cm layers AND RESTORATION OF UNMETALLED OR UNPAVED SURFACE TO ITS ORIGINAL OR UNPAVED the cost of dewatering of rain water, diversion of traffic, night signals, fixing caution boards, crossing over trenches for access to the houses, watching, fencing, etc., AND DISPOSAL OF SURPLUS SOIL OUTSIDE AND INSIDE THE TOWN, INVOLVING LEAD UPTO ONE KM IN ORDINARY SOIL with timbering and shoring , upto 1.5 metress depth</p>	Cum	2805.0			

151	HSR	6.9/(b)/(i)	EXCAVATION FOR PIPELINES RUNNING UNDER PRESSURE IN TRENCHES AND PITS, IN STREETS & LANES including trimming and dressing sides, leveling of beds of trenches to correct grade, cutting joint holes, cutting trees and bushes, etc., refilling consolidation and watering of refill, in 15 cm layers AND RESTORATION OF UNMETALLED OR UNPAVED SURFACE TO ITS ORIGINAL OR UNPAVED the cost of dewatering of rain water, diversion of traffic, night signals, fixing caution boards, crossing over trenches for access to the houses, watching, fencing, etc., AND DISPOSAL OF SURPLUS SOIL OUTSIDE AND INSIDE THE TOWN, INVOLVING LEAD UPTO ONE KM IN ORDINARY SOIL, with timbering and shoring, exceeding 1.5 metress depth, but upto 2.25 metress depth	Cum	1,445.38			
152	HSR	6.9/(b)/(iii)	EXCAVATION FOR PIPELINES RUNNING UNDER PRESSURE IN TRENCHES AND PITS, IN STREETS & LANES including trimming and dressing sides, leveling of beds of trenches to correct grade, cutting joint holes, cutting trees and bushes, etc., refilling consolidation and watering of refill, in 15 cm layers AND RESTORATION OF UNMETALLED OR UNPAVED SURFACE TO ITS ORIGINAL, condition, including the cost of dewatering of rain water, diversion of traffic, night signals, fixing caution boards, crossing over trenches for access to the houses, watching, fencing, etc., AND DISPOSAL OF SURPLUS SOIL OUTSIDE AND INSIDE THE TOWN, INVOLVING LEAD UPTO ONE KM IN ORDINARY SOIL with timbering and shoring exceeding 2.5 metress depth, but upto 3.00 metress depth	Cum	750.0			

153	HSR	29.84	CONSTRUCTION BRICK MASONRY INSPECTION CHAMBER SIZES AS GIVEN BELOW UPTO 0.60 METRE AVERAGE DEPTH in cement mortar 1:5 LIME CONCRETE with 40 percent lime mortar 2:3 in foundation cement concrete 1:2:4 BENCHING 12mm THICK CEMENT PLASTER 1:2 with a floating coat of 1mm thick of neat cement R.C.C.1:2:4 SLAB 100mm THICK /C.C.TOPPING 50 mm THICK WITH 455 MMx455MM/455MMx610MM INSIDE LIGHT DUTY C.I.INSPECTION CHAMBER COVER AND FRAME weight as per I.S.I. specification painted WITH 3 COATS OF black bitumastic superior paint complete as per standard design.(b) Size 450 mm X 600 mm inside (with 455 mm x 610 mm cover and frame single seal pattern I weighing 38 kg with C.C. topping)	each	600			
			Water Supply					
154	Non SOR		Providing and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS : 8329 : -100 mm dia Ductile Iron Class K-7 pipes	Mtr.	3498.00			
155	Non SOR		Providing and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS : 8329 : 150 mm dia Ductile Iron Class K-7 pipes	Mtr.	894.00			
156	Non SOR		Providing and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS : 8329 : 200 mm dia Ductile Iron Class K-7 pipes	Mtr.	335.00			
157	Non SOR		Providing and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS : 8329 : 250 mm dia Ductile Iron Class K-7 pipes	Mtr.	268.00			
158	Non SOR		Providing and laying S&S Centrifugally Cast (Spun) / Ductile Iron Pipes conforming to IS : 8329 : 300 mm dia Ductile Iron Class K-7 pipes	Mtr.	1000.00			
159	Non SOR		Providing push-on-joints to Centrifugally (Spun) Ductile Iron Pipes including testing of joints and the cost of rubber gasket :- 100 mm dia pipes	Joint	875			
160	Non SOR		Providing push-on-joints to Centrifugally (Spun) Ductile Iron Pipes including testing of joints and the cost of rubber gasket :- 150 mm dia pipes	Joint	224			

161	Non SOR		Providing push-on-joints to Centrifugally (Spun) Ductile Iron Pipes including testing of joints and the cost of rubber gasket :- 200 mm dia pipes	Joint	84			
162	Non SOR		Providing push-on-joints to Centrifugally (Spun) Ductile Iron Pipes including testing of joints and the cost of rubber gasket :- 250 mm dia pipes	Joint	67			
163	Non SOR		Providing push-on-joints to Centrifugally (Spun) Ductile Iron Pipes including testing of joints and the cost of rubber gasket :- 300 mm dia pipes	Joint	250			
164	Non SOR		Providing and fixing C.I. sluice valves (with cap) complete with bolts, nuts, rubber insertions etc. (the tail pieces if required will be paid separately) : 100 mm diameter Class II	each	4.00			
165	Non SOR		Providing and fixing C.I. sluice valves (with cap) complete with bolts, nuts, rubber insertions etc. (the tail pieces if required will be paid separately) : 150 mm diameter Class II	each	2.00			
166	Non SOR		Providing and fixing C.I. sluice valves (with cap) complete with bolts, nuts, rubber insertions etc. (the tail pieces if required will be paid separately) :200 mm diameter Class II	each	2.00			
167	Non SOR		Providing and fixing C.I. sluice valves (with cap) complete with bolts, nuts, rubber insertions etc. (the tail pieces if required will be paid separately) : 250 mm diameter Class II	each	2.00			
168	Non SOR		Providing and fixing C.I. sluice valves (with cap) complete with bolts, nuts, rubber insertions etc. (the tail pieces if required will be paid separately) : 300 mm diameter Class II	each	2.00			

169	Non SOR		Constructing masonry Chamber 60x60x75 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) , i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design : 18.33.1 With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	each	12.00			
170	HSR	6.9 b i	EXCAVATION FOR PIPELINES RUNNING UNDER PRESSURE IN TRENCHES AND PITS, IN STREETS & LANES including trimming and dressing sides, leveling of beds of trenches to correct grade, cutting joint holes, cutting trees and bushes, etc., refilling consolidation and watering of refill, in 15 cm layers AND RESTORATION OF UNMETALLED OR UNPAVED SURFACE TO ITS ORIGINAL OR UNPAVED the cost of dewatering of rain water, diversion of traffic, night signals, fixing caution boards, crossing over trenches for access to the houses, watching, fencing, etc., AND DISPOSAL OF SURPLUS SOIL OUTSIDE AND INSIDE THE TOWN, INVOLVING LEAD UPTO ONE KM IN ORDINARY SOILwith timbering and shoring upto 1.5 metres depth	cum	5367.24			
171	Non SOR		Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main : 15 mm Dia	each	1000			
172	Non SOR		Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main : 20 mm Dia	each	50			

173	Non SOR		Providing and fixing G.I. pipes complete with G.I. fittings and clamps, i/c cutting and making good the walls etc. : Internal work – Exposed on wall. -15 mm dia. nominal bore	Mtr.	2250.00			
174	Non SOR		Providing and fixing G.I. pipes complete with G.I. fittings and clamps, i/c cutting and making good the walls etc. : Internal work – Exposed on wall. -20 mm dia. nominal bore	Mtr.	100.00			
			TOTAL (A)					
			MAINTENANCE OF ROAD, DRAIN, PARKS AND LIGHT WORKS					
175	NON SOR		Providing O& M service as indicated in the scope of work , maintance of the entire features & maintenance of other infrastructure related works (Cost of Good Earth, Manure, Fertilizer, Insecticide,Pesticide , lawn mover and brush cutter with fuel will be calculated as per actuals & other T & P material/articles shall be provided by the contractor.) Undertaking routine maintenance including prompt repairs of potholes, cracks, joints, cleaning and maintenance of side drains, park lighting, wall painting, play equipments repair & maintenance street light and High Mast lights and accessories as directed by office-in-charge;- for 1st Year	Year	1			
176	NON SOR		O & M Scope of Fatehpur infraproject as mentioned in S.no.175 -for 2 nd year	year	1			
177	NON SOR		O & M Scope of Fatehpur infraproject as mentioned in S.no.175-for 3rd year	year	1			
178	NON SOR		O & M Scope of Fatehpur infraproject as mentioned in S.no175 -for 4th year	year	1			
179	NON SOR		O & M Scope of Fatehpur infraproject as mentioned in S.no.175 -for 5 th year	year	1			

TOTAL (B)

PROVISIONAL ITEMS					
1	Non-SOR		Supply & Installation of Décorative Street Art painting on vertical Wall.	LS	35,00,000
2	Non-SOR		Provision of State of art entry gates using designed MS/SS steel & stone and concrete structures with intricate design works including decorative lights etc.	LS	15,00,000

NOTE:

1. **THE AMOUNT ALLOCATED IN THE ABOVE INDICATED PROVISIONAL ITEMS IS NOT PART OF THE BID PRICE.**
2. **THE BIDDER HAS TO IMPLEMENT THE PROVISIONAL ITEMS FOR WHICH THE ADMINISTRATIVE SANCTION IS APPROVED. THE PROVISIONAL ITEMS SHALL BE TAKEN AS PER THE QUOTED RATES OR HSR RATES. FOR NON-SOR RATES, THE CONTRACTOR SHALL SUBMIT THE RATE ANALYSIS AND HAVE IT APPROVED BY FSCL PRIOR EXECUTING THE ITEMS.**

SECTION 5: GENERAL CONDITIONS OF CONTRACT (GCC).

The GCC applies for entire duration of the contract period (Construction, Operation and Maintenance Period)

1. **Security Deposit:** The person whose tender may be accepted (hereinafter called the Bidders which expression shall unless excluded by or repugnant to the context include his heirs executors, administrators representatives and assigns) shall permit FSCL at the time of making any payments to him for the value of work done under the contract to deduct the security deposit as under.

The **Security Deposit** to be taken for the due performance of the contract under the terms & conditions printed on the tender form will be a deduction of 5% (Five Percent) from the payment made in the running bills up to the maximum of 5 % of the contract value. Further, upon completion of works and subsequent to issue of completion certificate as detailed in the special conditions of contract an amount equal to 50% of the total security deposit deducted from the running payments may be refunded to the contractor, provided that all the recoveries/out standings against the contractor have been realized. Balance 50 % of the amount shall be refunded after Four months of successful Operation period.

Performance Security:

I) The successful bidder shall deposit BG against Performance Security computed @ 5 % of the contract value at the time of signing of the contract. **This performance security shall be in the form of the BG in favour of Chief Executive Officer, Faridabad Smart City Limited payable at Faridabad. EMD deposited at the time of bid shall be refunded on production of Performance Security and signing of Agreement.**

II) a) An amount equal to 50 % value of the Performance security deposit in the form of Bank Guarantee as above shall be released on successful completion of One calendar year of the Defects Liability Period.

b) Balance amount equal to 50 % value of the Performance security deposit in the form of Bank Guarantee as above shall be released on successful completion of Two Calendar Years of the Defects Liability Period and providing another additional Performance Security in the form of BG of 10% of value of the balance Operation and Maintenance cost.

The release of BG in lieu of the Performance Security as above shall be subject to the contractor furnishing a fresh BG for an amount equal to the amount to be retained by the FSCL. The BG submitted in lieu of O & M shall be released upon issue of certificate for successful completion of O& M period.

2. Additional Performance Security:

If the rate quoted by the lowest Bidder (L1) considered to be unbalanced in relation to the Authority's estimated of cost of work to be performed under the contract, the Chief Executive Officer then may require giving the Bidder notice to submit detailed price/ rate analysis of major items of the work. The bidder shall submit the rate analysis within 7 days of such notice so as to demonstrate the internal consistency of these price(s)/rate(s) with his quoted price(s)/rate(s). After revaluation by tender sanctioning authority, Chief Executive Officer may require the Bidder to submit 5 % additional Security over the performance security in the form of B.G., which shall be refunded along with the Second instalment of the normal Security Deposit (After four months of completion of successful operation period of works). In the event, contractor fails to complete the work to the satisfaction of the authority or abandoned the work incomplete, the authority may forfeit this 5 % additional Performance Security Deposit along with performance security and Security deposit & the agreement shall be terminated and action shall be taken accordingly. In case if the lowest Bidder, whose rates quoted, is considered to be unbalanced, does not agree to deposit additional 5 % Security Deposit then his bid may be rejected by the sanctioning authority and earnest money shall be forfeited

3. The Bidders is /are to provide everything of every sort and kind (with the exception noted in the schedule attached) which may be necessary and requisite for the due and proper execution of the several works included in the contract according to the true intent and meaning of the drawings and specifications taken together, which are to be signed by the Engineer in Charge designated by the FSCL (herein after called the Engineer-In-Charge) and the Bidder whether the same may not be particularly described in the specifications or shown on the drawings, provided that the same are reasonably and obviously to be inferred there from and in case of any discrepancy between the drawings and the specifications

the Engineer-In-Charge which shall prevail.

4. The Bidder (s) is/are to set out the whole of the works in conjunction with an officer to be deputed by the Engineer-in-charge and during the progress of the works, to amend on the requisition of the Engineer-in-charge any errors that may arise therein and provide all the necessary labours, and materials for so doing. The Bidder(s) is/are to provide all plant, labour and materials (with the exceptions noted in the schedule attached) which may be necessary and requisite for the works. All the materials and workmanship are to be the best of their respective kinds. The Bidder(s) is/are to leave the works in all aspects clean and perfect at the completion thereof.
5. The Bidder must extensively coordinate with FSCL and its Technical Consultant during all stage of the contract. The successful bidder shall obtain written approvals from FSCL at all stages, before commencing work on any particular stage of work. During the construction phase, after completion of any particular stage/phase of works and before commencing work on the next stage/phase of work, the successful bidder shall obtain written approval on the completed works/phase from FSCL, before commencing work on the next stage/phase of works
6. **CONTRACTOR TO SUPPLY PLANT, LADDERS, SCAFFOLDING, ETC.:** The contractor shall supply at his own cost materials (except such special materials if any, as may in accordance with the contractor be supplied from the Engineer – in – charge’s Stores) plants, tool, appliances, implements, ladders, cordage, tackle, Scaffolding and temporary work requisite for the proper execution the work whether original, or altered or substituted, and whether included in the specification or other documents forming part of the contract referred to in these condition or not or which may be necessary for the purpose of satisfying or complying with the requirement of the Engineer – in – charge as to any matter as to which under 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 requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing & assisting in the measurement or examination at any time and from time to time of the work, or materials. Failing his so doing the same may be provided by the Engineer -in charge at the expenses of the contractor and the expenses may be deducted from any money due to the contractor under the contract, or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof.
7. During the entire contract period (Construction and Operation and Maintenance); the Contractor is liable for damages arising from non-provision of lights fencing etc. The contractor shall also provide at his own cost except when the contract specifically provides otherwise and except for payments due under clause all necessary fencing and lights required to protect the public from accident and shall be bound to bear the expenses of defense of every suit, action or proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions & to pay any damage 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 to compromise any claim by any such person.
8. The location of the existing features is provided for bidding purpose only. It is the responsibility of the bidder to gather relevant approved drawings and approvals from the concerned department and agencies, prior taking up the works defined in the scope of services of this tender.
9. If the contractor finds that the data provided to him is not accurate or require more information, in such cases the contractor shall conduct all relevant survey’s, studies, investigations at his own cost.
10. Prior bidding the project, the contractors shall visit the site and have his own assessment of the accuracy of the information provided in this document.
11. The contractor should submit the construction plan and have it approved by FSCL before starting of work including shifting of utilities.
12. The Contractor shall have approvals including design mix concrete from FSCL prior to the commencement of the tasks/activities. Alternatively, the contractor shall take prior approval from FSCL for concreting through mixer machine.
13. **Drawings:** All the Drawings received from FSCL for construction work has to be returned to FSCL after completion of work.
14. All machine and equipment foundation design shall be as per the Manufacture. Prior commencing the works, the Manufacturer’s design details shall be submitted to FSCL for approval.
15. All works indicated in the scope of Services of this tender (Backfilling, Concreting, steel work, civil works, landscaping, etc) Quality, Testing, Sampling, shall be done in accordance with BIS and specifications at the contractor’s cost.
16. The contractor has to liaison with the various departments for seeking approvals including applying for new connection or for increase (change in the power load). The Administration cost shall be borne by the FSCL.

17. Utilities: The cost of shifting of the utilities like OFC and Gas shall borne by the relevant service provider or FSCL.
18. Dismantling:
- a. Prior to commencing dismantling work, the contractor shall discuss the dismantling plan and have it approved.
 - b. The dismantling plan shall clearly indicate the materials that would be reused or disposed.
 - c. The reusable materials shall be returned to the FSCL in such a way that it can be used again or sold.
 - d. The reusable material shall be segregated and stacked at designated location as indicated by the Engineer-In-Charge.
 - e. In case the reusable material is damaged, the contractor will repay the cost of reusable material to FSCL. The decision of the E in C shall be final in assessing the damaged material.
19. All disposable (waste) material shall be dispose at place identified by the Engineer –In-Charge (E in C) or Construction & Debris (C & D) Plant in case of such notification issued by the relevant agencies.
20. The contractor shall also ensure that the streets (beyond the site premises) on which his equipment traverses/ply are not damaged. If they are damaged or spread with construction material, the contractor shall restore it to the satisfaction of the E in C at his own cost.
21. From the Commencement of the work to the completion of the contract, the site and the works thereupon are to be under the Bidder(s) charge. The Bidder (s) is/are to be held responsible for and to make good all injuries, damages and repairs occasioned or rendered necessary to the same by fire or other causes and they are to hold the FSCL harmless from any claims for injuries to persons or for structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the Bidder(s) or of any one in his/their employment during the execution of the works.
22. The Bidder shall execute the work as per detailed specifications as incorporated in the tender document and in accordance with the approved drawings and special conditions incorporated in the tender documents or BIS.
23. **Transport of materials is Bidder responsibility:** The Bidder shall make his own arrangement for transport of all materials. FSCL is not bound to arrange for priorities for getting wagons or any other materials though all possible assistance by way of recommendation will be given, if it is found necessary in the opinion of the Engineer–in–Charge. If the efforts of the Engineer-in charge prove in effective, the Bidder shall have no claim for any compensation on this account.
24. Contractor should submit the procurement plan prior procuring the material and same should be approved by FSCL before procurement. If any materials whose make is not specified in the approved make list, then before procurement of same it is to be approved by FSCL.
25. Contractor shall submit the monthly progress report and expedite the Project as per the instruction provided by the FSCL.
26. Debris cleaning in the park area /site has to be done by contractor at their own cost. The debris needs to be disposed at the designated compost pit indicated in the drawing.
27. FSCL shall **NOT** provide any space or place for storage of construction materials or Equipment(s). The bidder shall arrange the same at their own cost.
28. The contractor has to stack the excavated materials, debris including strom water debris and vegetation material at a location designated by the Engineer In Charge (E in C- FSCL official) at his own cost.
29. The works shall be undertaken in a phased manner so that on going operation of village should not get affected and at no point the public shall be put in inconvenience.
30. The Bidder is to set out the whole of the works in conjunction with an officer to be deputed by the Engineer-in-charge and during the progress of the works, to amend on the requisition of the Engineer-in-charge any errors which may arise therein and provide all the necessary labours, and materials for so doing. The Bidder(s) is/are to provide all plant, labour and materials (with the exceptions noted in the schedule attached) which may be necessary and requisite for the works. All the materials and workmanship are to be the best of their respective kinds. The Bidder(s) is/are to leave the works in all aspects clean and perfect at the completion thereof.
31. **COMPLETION TIME :**
- a) The works are to be commenced immediately upon receipt of order of commencement given in writing by the Engineer-in-charge. The whole work, including all such addition and variations as aforesaid (but excluding such, if any, as may have been postponed by an order from the Engineer-in charge) shall be completed in every respect within 6(Six) months including rainy season from the reckoned date. The work shall throughout the stipulated period of contract be proceeded with all due diligence, keeping in view that time is the essence of the contract.

32. CHANGE IN SCOPE :

- (i) As a part of the approval process, the bidder shall, when the Authority [The FSCL] demands changes, the bidder shall obtain the written approval before commencing the work for such changes. All such revisions shall be to the complete satisfaction of FSCL and on which mandatory written approvals obtained from the FSCL before commencing work related to the requested approval. No work under the scope of works under this bid/contract shall be commenced before obtaining the said written approval from the Authority.
- (ii) If at any time before or after the commencement of the work, Engineer-in-charge shall for any reason whatsoever: -
 - (a) Cause alterations, omissions or variations in the drawings and specifications involving any curtailment of works as originally contemplated; or
 - (b) Not requiring the whole of the work as specified in the tender to be carried out, The Bidder(s) shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he/they might have derived from the execution of the work in full as specified in the tender but which he/they did not derive in consequence of the curtailment of the works by reasons of alterations, omissions or variations or in consequence of the full amount of the work not having been carried out. But the Bidder(s) shall be entitled to compensation for any loss sustained by him/their by reason of his/their having purchased or procured any materials or entered in to any engagements or made any advance to labour or taken any other preliminary or incidental measures on account of or with a view to the execution of the works or the performance of the contract.
 - (iii) In case any item/work is not executed as per the drawings, designs, estimates and /or specifications (as per the agreement executed) the same shall be deducted and recovered from the Bidder at (prevailing market rates or at par with FSCL/ HSR whichever is more at the time of execution in force Plus 15 % of total value as extra. No compensation shall be paid for any change in quantities occurring due to site and / or requirements of design.
- (iv) **Addition Alterations In Specifications & Designs:** The Chief Executive Officer shall have power to make any alteration in, omissions, from additions to, or substitutions for, the original specifications, drawings & instructions that may appear to him to be necessary or advisable during the progress of the works, and the contractor shall bound to carry out the work in accordance with any instructions which may be given to him to writing signed by the Engineer in Charge such alternations omissions additions or substitutions shall not invalidate the contract and any altered, additional of substituted work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out contractor on the same conditions in all respects on which he agree to do the main work & at the same rates as are specified in the tender for the main work, provided total value of such increased or altered or substituted work does not exceed 25% of the amount put on tender inclusive of contractor's percentage. If such value exceeds 25%, it shall be open to the contractor either to determine the contract or apply for extension.

33. BILL OF QUANTITIES

- (i) The Bill of Quantities shall contain items for the construction, installation, testing, and commissioning works to be done by the Contractor.
- (ii) The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rates in the Bill of Quantities for each item

34. CHANGE IN QUANTITIES

- (i) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 per cent provided the change exceeds 1% of initial Contract Price, the Engineer shall adjust the rate to allow for the change, duly considering
 - (a) justification for rate adjustment as furnished by the contractor,
 - (b) economies resulting from increase in quantities by way of reduced plant, equipment and overhead costs,
 - (c) entitlement of the contractor to compensation events where such events are caused by any additional work

The Engineer shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 per cent, except with the Prior approval of the Employer. If requested by the Engineer, the Contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of Quantities

35. PAYMENT FOR CHANGE IN QUANTITIES

- (i) The Contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the Variation is ordered.
- (ii) If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the

opinion of the Engineer, the quantity of work is above the limit stated in Sub Clause 35 (i) or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.

- (iii) If the Contractor's quotation is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs
- (iv) If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
- (v) The Contractor shall not be entitled to additional payment for costs which could have been avoided by giving early warning

36. DAMAGES TO THE EXISTING INFRASTRUCTURE:

- a) During the contract period (Construction and Operation and Maintenance), the bidder shall be responsible for any damage caused to existing infrastructure like residential/ Commercial buildings, Temples, Ramps, Gates, Compound wall, Telephone line trenches, sewerage line, water pipelines, telephone lines, Electrical cables, OFC cables, Gas lines or any utility lines etc. Upon request from FSCL or by himself, the bidder shall restore the damaged works immediately at his own cost to the satisfaction of the FSCL.
- b) During the Construction and O& M period, in case the bidder fails to repair the damages caused to existing infrastructure indicated in the above clause, the E in C shall have the damages repaired by other contractor or its staff or by any other means and deduct the actual amount incurred as per market rate plus 15 % extra for undertaking such works from the contractors bills. The delays caused due to inaction of the bidder on the above damages will be considered for penalty equivalent to the sum indicated in the "Penalty clause" in the GCC of this document.
- c) The contractor will inform in writing if any Heritage Structure/Tree is found in the work area. After receipt of written confirmation or instruction from FSCL the contractor will take suitable action.
- d) In case of shifting of existing infrastructure, prior permission has to obtain in writing from FSCL and all other relevant authorities.
- e) If any utilities lines which are affecting the "**Construction of Roads, Civic Infrastructure, Landscaping and High Mast Works**" herein after referred as "Proposed / Said Work" then contractor shall inform in writing to FSCL. As per the instructions of E in C the contractor will shift the lines accordingly at their own cost.

37. OBLIGATION OF EMPLOYER :

- (i) Upon request from the contractor, whatever relevant data available with the FSCL will be shared with the contractor.
- (ii) All the approved construction drawings shall be provided by FSCL. No work shall be started without approved construction drawings.
- (iii) Acquisition of land or removal of encroachment in the work area shall be the responsibility of FSCL. The bidder/contractor shall mobilize their team only after getting the clearance from FSCL.

38. EXECUTION OF WORK ACCORDING TO TIME SCHEDULE:

The work shall be done by the Bidder according to the time schedule (working hours, weekdays etc) fixed by the Engineer-In-Charge, FSCL. At no point of time, works during night shall not take place. Works shall not cause any inconvenience to the residents. In case of any complaints, the contractor shall inform the FSCL and as per instruction shall cease the works until further instructions from FSCL.

39. DESIGN AND CONSTRUCTION :

- (i) The Bidder (s) cannot vary or deviate from the drawings or specifications or execute any extra work of any kind whatsoever unless upon the authority of Engineer-in-charge to be sufficiently shown by any order in writing by any plan or drawings expressly given and signed by him as extra or variation or by any subsequent written approval signed by him.
- (ii) In cases of daily labor all vouchers for the same are to be delivered to the Engineer-in-charge or the officers-in-charge at least during the week following that in which the workmen have been engaged and only such day work is to be allowed for as such as may have been authorized by the Engineer-in-charge to be so done unless the work cannot from its character be properly measured and valued.
- (iii) **Applicable Specifications :** As indicated in the Tender document, I.S.I. codes for buildings or special specifications

whenever enclosed separately shall apply in the case of any variance the following order of precedence shall prevail.

- a) Specifications as per NIT.
 - b) Specifications as per S.O.R.
 - c) Mode of measurements of work shall be as provided in the S.O.R. applicable to the contract. Where such mode of measurement is not specified in the S.O.R. it shall be done as per I.S.I. Code of building measurement. However if any mode of measurement is specifically mentioned in the N.I.T. (Tender-document) the same will get precedence over all the above.
- (iv) **WORK TO BE EXECUTED IN ACCORDANCE WITH SPECIFICATION, DRAWING, ORDER, ETC.:**
The contractor shall execute the whole and every part of work in the most substantial and workman like manner, and both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Engineer – in – charge and lodged in his office and to which the contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours and the contractor shall if he so requires be entitled at his own expense to take or cause to be made copies of the specifications, and of all such designs, drawings and instructions as aforesaid.
- (v) In the case of any class of work for which there is no specification as is mentioned in Rule such work shall be carried out in accordance with the specification approved by CEO, FSCL for application to work.
- (vi) The Engineer-in-charge has full power to require the removal from the premises of all materials which, in his opinion, are not in accordance with the specification and in case of default, the Engineer-in-charge is to be at liberty to employ other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-charge is also to have full power to substitute other improper materials to be substituted and in case of default, the Engineer-in-charge may cause the same to be supplied and all costs which may arise due to such removal and substitution are to be borne by the Bidder (s).

40. QUALITY ASSURANCE, MONITORING AND SUPERVISION :

- (i) The Engineer-in-charge is to have at all times access to the works which are to be entirely under his control. He may require the Bidder(s) to dismiss any person in the Bidder (s) employ upon the works that may be incompetent or misconduct him and the Bidder (s) is/are forthwith to comply with such requirements.
- (ii) Cubes shall be casted and tested for all concrete pour as per the relevant IS Standards.
- (iii) Contractor shall submit mock samples and product literature of all materials (Material used in “Said Works”) & it have to be approved by FSCL before procuring the materials and Equipments.
- (iv) All the materials have to be tested & necessary reports/ test certificated has to be submitted to FSCL before start of work.
- (v) The cost of conducting all the tests which is required during the execution of contract or as instructed by E in C shall be borne by the contractor. All the required test has to be carried as per relevant IS Standard.
- (vi) The Contractor has to strictly adhere to the instructions provided by the FSCL officials from time to time. The contractor shall rectify bad workmanship works within the stipulated time provided by the E in C. The E in C has the right to dismantle the works which according to him is not complying with the drawings and standards. The Contractor upon receiving such instruction shall either rectify the defect or dismantle the structure at his own cost.
- (vii) The bidder has to arrange accredited 3rd party testing agency to meet the quality standard at his own cost. The frequency of Testing shall be as per the BIS or as indicated by the E in C.
- (viii) The E in C has the right to reject the concrete or all other works that according to him is not complying the standards and specifications. The contractor upon receiving such instruction with no time shall stop concreting and discard the concrete at his own cost.
- (ix) At any point of the contract period, In case the contractor does not obey the instructions of the E in C, the E In C has the authority to get the work/dismantled/ rectified by other contractors/workers. The cost of such work on actual amount incurred as per market rate plus 15 % extra amount will be deducted from the contractor’s bill.
- (x) **Inspection and Technical audit by the Authority :** The FSCL shall have the right to cause Audit and Technical Examination of the work and the final bills of the Bidder including all supporting voucher, abstract, etc. to be made as per payment of the final bill and if as a result of such Audit and Technical Examination the sum is found to have been overpaid in respect of any work done by the Bidder under contract or not to have been executed, the Bidder

shall be liable for refund of the amount of over payment and it shall be lawful for the FSCL to recover the same from the security deposit of the Bidder or from any other dues payable to the Bidder. If it is found that the Bidder was paid lesser than what was due to him under the contract the amount of such under payment shall be duly paid by the FSCL, to the Bidder.

In the case of any audit examination and recovery consequent on the same, the Bidder shall be given an opportunity to explain his case and the decision of the Chief Executive Officer- FSCL shall be final.

In the case of Technical Audit, consequent on which there is a recovery from the Bidder no recovery should be made without orders of the Chief Executive Officer- FSCL whose decision shall be final. All action(s) under this clause should be initiated and intimated to the Bidder within a period of Twelve months from the date of completion of work.

- (xi) **Work to be open for inspection-contractor or responsible agent to be present:** All work under or in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the Engineer-in-Charge and his subordinates and the contractor shall at all time 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 instruction or have a responsible agent duly accredited in writing present for that purpose. Orders given to the contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.
- (xii) Further, the Contractor shall ensure of having a knowledgeable Technical Engineer at site all times. The Engineer will be responsible for coordinating with the FSCL officials and his firm. The Contractor shall replace the Technical Staff if he/she is found to incompetent by the FSCL officials.
- (xiii) All works to be executed under the contract shall be executed under the direction and subject to the approval in all respect of the CEO, FSCL for the time being who shall be entitled to direct at what point or points and in what manner they are to commenced and from time to time carried on.
- (xiv) Contractor should provide a Quality Assurance Plan (QAP) and have it approved by the FSCL .The cost of all material inspection within and outside the site shall be borne by the contractor. This includes cost of travel and accommodation of FSCL officials/Consultants for inspection outside the Site Premises.
- (xv) FSCL reserve the rights to reject any materials which contractor shall procure without prior approval from FSCL. The cost of such rejected materials shall be bourn by Contractor

41. INSURANCE :

- (i) **Insurance:** The bidder shall have a suitable insurance to cover all the risks that are likely to occur from the scope of services indicated in this project. The insurance shall cover FSCL, FSCL's Project Management Consultant staff, Users etc. Risks may include but are not limited to a) accidents b)Mal function of equipment/or machines c) casualties d) Safety e) Theft etc.
- (ii) If the Contractor shall fail to effect and keep in force any of the insurances referred to in Clause 84 hereof, or any other insurance which he may be required to effect under the terms of the Contract, the Employer may in any such case effect and keep in force any such insurance and pay such premium as may be necessary for that purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any monies due or which may become due to the Contractor, or recover the same as a debt due from the Contractor

42. DEFECTS LIABILITY PERIOD: The contractor shall be responsible for all the defects except usual wear and tear of this project for the period of two years from the date of issue of Completion certificate.

43. COST OF REMEDYING DEFECTS :

- (i) At any point of the contract period, If in the opinion of the Engineer-in-charge any of the works, are executed with improper/Inferior materials or defective workmanship, the Bidder(s) is/are, when required by the Engineer-in-charge to re-execute the same forthwith and to substitute proper materials and workmanship, and in case of default of the Bidder(s) in doing so within a week, the Engineer-in-charge shall have full powers to employ other persons/agency to re-execute the work and the cost there of the actual amount incurred as per market rate plus 15 % extra amount shall be borne by the Bidder(s).
- (ii) Any Defects, dying of plants/vegetation/grass/shrinkage or other faults which may appear within the contract period including O & M period arising out of defective or improper materials or workmanship or due to any other reason are, upon the direction of the Engineer-in-charge, to be amended and made good by the Bidder at his / their own cost unless the Engineer-in charge decides that he/they ought to be paid for the same and in case of default the Engineer-

in-charge may recover from the Bidder (s) the cost of making good the works as per prevailing norms and specifications.

- (iii) During the entire contract period including O & M period, the contractor shall maintain the grass, green, Storm water system & lighting and coverage all the times. If it is found that the grass greenery is not maintained and it is found dry then cost grass plus 15 % extra shall be recovered from contractor

44. PENALTY CLAUSE FOR DELAY IN COMPLETION :

The Engineer-In-Charge have full power to recover penalty for Delay Period during both construction and operation and maintenance. The Penalty will be calculated @ 0.5% Per Week or Part thereof of value of works not completed. Total Penalty shall be limited to maximum to 5% of Agreement Amount for construction period and 5 % of amount of the operation and maintenance for the O & M period. Engineer-In-Charge will be fully responsible for recovery of Penalty. The timeline for completion and delays of maintenance shall be determined by the E In C.

45. TERMINATION :

- (i) The Engineer-in-charge may terminate the contract if the Bidder causes a fundamental breach of the contract.. The fundamental breach of contract shall include, but not be limited to, the following: -
- a) The Bidder stops work for four weeks, when no stoppage of work is shown on the current programme or the stoppage has not been authorized as by the Engineer-in-charge.
- b) If serious rectification of bad / poor quality work is not done by the Bidder within 15 days from 1st notice issued to him by Engineer-in-charge might attract termination of the agreement and whole performance guarantee will be forfeited.
- c) If the Bidder fails to appoint the technical staff and if appointed do not function properly for 4 weeks even after due written notice by the Engineer-in charge.
- d) If he violates labour laws.
- e) Any other deficiency which goes to the root of the contract Performance
- (ii) If the contract is terminated, the Bidder shall stop work immediately, make the site safe and secure and leave the site as soon as reasonably possible.
- (iii) The Engineer - in - charge shall cause recording and checking of measurements of all items of work done (taking in to account quality and quantity of items actually executed) and prepare the final bill after adjusting all pervious outstanding dues. Such recording of measurements shall be done after due notice regarding time and date of recording measurement and directing the Bidder to either remain present himself or his authorized representative so as to satisfy himself that the recording of measurement is just and proper. Failure on his parts either to attend and or refusing to acknowledge the measurement so recorded in the department measurement book, shall be at his sole risk and responsibility.
- (iv) **Payment upon Termination :**
- (a) If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received upto the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the cost of the work not completed plus 15% of actual cost incurred. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer. The Employer shall also be free to recover the amount from any other due payments to the contractor against this contract.
- (b) If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance material brought by the Contractor and available at site, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law

46. SUBMISSION OF BILL :

- (i) **Bill To Be Submitted Monthly:** "A bill shall be submitted by the contractor by 3rd day of each month for all works executed by him till the end of previous month less the gross amount received by him till the last previous month. This bill must be supported by records of detail measurement of quantities of all executed item of work along with true copies of record and result of all test conducted in the previous month (date wise). The C.E.O shall take or cause

to be taken the requisite measurement for purpose of having the same verified/checked by the his authorized Engineer/Representative concern (if any) for quantity, quality and specification and examining all the "test results" and record the same in the Departmental measurement book. Based on above record measurement bill shall be corrected /prepared afresh. The contractor shall sign the measurement and the bill.

If the contractor fails to submit, the bill on or before the day prescribed, the Engineer in Charge after waiting for another 15 days shall depute a subordinate to measure the said work in the presence of contractor and or his authorized Engineer/Representative, whose counter signature to the measurement recorded with quantity and quality remark will be sufficient proof for acceptance of the same and shall be binding on the contractor.

All such running bill payments arc by way of "Advances" and shall be subject to final adjustment.

Bills to be submitted for Maintenance: The Bidder shall submit the maintenance running bill every three months (quarter). The bill amount would be the amount quoted by the bidder for that year and interpolated for the quarter.

Payment for the O & M shall be made upon issue of satisfactory completion certificate for that period by the E in C.

- (ii) **Bill To Be On Printed Forms:** The contractor shall submit all bills on printed forms to FSCL account, and the charges 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. The deduction or addition as the case may be of the percentage will be calculated on the amount of the bill for the work done, after deducting the cost of materials supplied departmentally at rates specified in the agreement.

47. PAYMENT :

- (i) The Bidder(s) shall be paid as per the payment schedule.
- (ii) A certificate of the Engineer - in - charge or Authorised person by FSCL as the case may be, showing the final balance due or payable for the Bidder(s) is to be conclusive evidence of the works / having been duly completed and that the Bidder(s) is/are entitled to receive payment of the final balance but without prejudice to the liability of the Bidder(s) under provisions of clause.
- (iii) **Mobilization Advance :** No Mobilization advance shall be paid to the bidder.
- (iv) **Bank Commission Charges:** Bank commission charges in all payments by demand drafts shall be borne by Bidder.
- (v) **Payment Of Intermediate Certificate To Be Regarded As Advances:** Intermediate payment during the course of execution of works if considered desirable in the interest of work, can be made on monthly basis, on the recommendation of Engineer In charge, in such a way that in his opinion, it reflects the amounts due to the Contractor in accordance with the contract, after deduction of any sums which may have become due and payable by the contractor to the employer. In cases where there is a difference of opinion as to the value of any item, the Engineer's view shall prevail. Within the 14th day of the receipt of the monthly bill, the Engineer shall determine the amounts due to the contractor and shall deliver to the Employer and the contractor an Interim Payment Certificate, certifying the amounts due to the contractor.
- (vi) But all such intermediate payments shall be regarded as payments by way of advance against the final payment for works actually done and completed and shall not preclude the requiring of bad unsound and imperfect or unskillful work to be removed and taken away and reconstructed or erected or be considered as admission of the due performance of the contract or any such part thereof, in any respect, or the accruing of any claim, nor shall it conclude determine, or affect in any way the powers of the employer under these conditions or any of them 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 completion of the work, otherwise the Engineer-in charge's certificate of the measurement and of the total amount payable for work accordingly shall be final and binding on all parties.
- (vii) Receipts for payments made on account of a work when executed by a firm must also be signed by the several partners, except where the contractors are described in their tender as a firm/ proprietor in which case the receipt must 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.

48. ARBITRATION CLAUSE:

Except as otherwise provided in this contract all question and dispute relating to the meaning of the specification, designs, drawings and instruction herein before mentioned as to thing whatsoever in any way arising out of or relating to

the contract designs, drawings, specification, estimate, concerning the works, or the execution or failure to execute the same, whether arising during the progress of the work, or a after the abandonment there of shall be referred to the TA - FSCL for his/her decision, within a period of 30 (thirty) days of such an occurrence (s). There upon the TA-FSCL shall give his written instructions and/or decisions, after hearing the contractor and Engineer in Charge within a period of 15 (fifteen) days of such request. This period can be extended by mutual consent of parties. Upon receipt of written instructions or decisions, of TA -FSCL the parties shall promptly proceed without delay to comply such instructions or decisions. If the TA-FSCL fails to give his instruction or decisions in writing within a period of 15 (fifteen) days or mutually agreed time after being requested and/or, if the party (es) is/are aggrieved against the decision of TA-FSCL, the aggrieved party may within 30 days prefer an appeal to the Chief Executive Officer -FSCL, who shall afford an opportunity to the parties of being heard and to offer evidence in support of his appeal. The, Chief Executive Officer, will give his decision within 30 (thirty) days, or such, mutually agreed period. If any party is not satisfied with the decision of the Chief Executive Officer, he can file a petition for resolving the dispute through arbitration in the arbitration tribunal. A reference to Arbitration Tribunal shall be no ground for not continuing the work on the part of the Contractor. Payment as per original terms and condition of the agreement shall be continued by the Engineer in Charge.

- 49. DEATH OR PERMANENT INVALIDITY OF BIDDER:** - if the Bidder is an individual or a proprietary concern or a partnership concern, dies during the currency of the contract or becomes permanently incapacitated, and where the surviving partners are only minors, the contract shall be closed without levying any damages/ compensation as provided in the contract agreement. However, if competent authority is satisfied about the competence of the surviving Partner[s], then the competent authority Engineer - in - charge shall enter into a fresh agreement for the remaining work strictly on the same terms and condition under which the contract was awarded.
- 50.** FSCL reserves the right to accept or reject any Tenders or all tender at any time prior to the Award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the FSCL action.

51. SUBLETTING OF WORKS:

The contract may be rescinded & security deposit forfeited, for subletting, bribing or if contractor become insolvent.

The contract shall not be assigned or sublet without the written approval of the Engineer in Charge, & if the contractor shall assigns or sublet his contract, or attempt, so to do, or become insolvent commence any insolvency proceeding for make any composition with his creditors, or attempt so to do or if any bribe, gratuity, gift, loan, perquisite, regard of advantage pecuniary or otherwise shall either directly or indirectly be given, promised or offered by the contractor, or any of his servants, or agents to any public office or person in the employ of Authority 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 shall contract, the Engineer in Charge may there up by notice in writing record the contract, & the S.D. of the contractor shall be there upon stand forfeited & be absolutely at the disposal of Authority, & the same consequence shall ensure as if the contract had been rescinded under clause 6 hereof, & in addition the contract shall not be entitled to recovered or be paid for any work there to fore actually per firmed under the contract.

If the contractor gets item/items of work accepted on a task rate basis with or without materials, this shall not amount to sub-letting of the contract.

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

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

52. TAXES, ROYALTY, ETC.:

[a] Taxes: The rate quoted by the Bidder shall include **Goods and Service Tax component**. The quoted rate shall therefore be including the **Goods and Service Tax** and other taxes such as sales and other levies, duties, royalties, cess, toll, taxes of Central and State Governments, local bodies and authorities that the Bidder will have to pay for the performance of this Contract. The FSCL will perform such duties in regard to the deduction of such taxes at source as per applicable law. Any payment claimed by the Bidder due to any change[s] in the existing tax structure shall not be entertained by the FSCL Deposit/remittance of Goods and Service Tax in government treasury within stipulated time shall be sole responsibility of the contractor and failing to which FSCL may recover the due amount from any other payable dues with FSCL. The decision of competent authority shall be final and binding on the contractor in this regard.

[b] Royalty on Minor Minerals: The Bidder shall pay all quarries, Royalty charges etc. If the Bidder fails to

produce the royalty clearance certificate from concerned department then the Executive Engineer shall deduct the royalty charges from his bills and keep in deposit head, which shall be refunded to the Bidder on production of royalty clearance certificate from the concerned department. If he fails to produce the royalty clearance certificate within 30 days of submission of final bill, then royalty charges which were kept under deposit head by the Executive Engineer shall be deposited to the concerned department and his final bill payment shall be released.

In all cases where change[s] in the royalty rates of minor minerals are notified by the state government after the date of submission of financial offer by the bidder/ Bidder the same shall be not reimbursed.

[c] Income tax at the rate of 2% or such other percentage as may be fixed by income tax department from time to time from any sum payable to the Bidder shall, at the time of credit of such sum or at the time of payment to the Bidder by cash, cheque or draft or any other mode, shall be deducted at the source from the running, final or any type of payment for this contract as per section 194 of income tax Act. 1961.

[d] Labour Welfare Cess at the rate of 1% or such other percentage as may be fixed by Labour department Government of Haryana from time to time from any sum payable to the Bidder shall, at the time of credit of such sum or at the time of payment to the Bidder by cash / cheque or draft or any other mode, shall be deducted at the source from the running, final or any type of payment for this contract as per Labour Act.

[e] It is open to the Bidder, as the case may be; to make an application to the Income Tax officer concerned and obtain from him a certificate authorizing the payer to deduct tax at such lower rate or deduct no tax as may be appropriate to his case. Such certificate will be valid for the period specified therein unless it is cancelled by the income Tax Officer earlier.

53. MODEL RULES FOR WATER SUPPLY, SANITATION IN LABOUR CAMPS:

The Bidder will be bound to follow the Haryana model rules relating to layout of water supply and sanitation in labour camps (Vide Annexure-A).

54. FAIR WAGES TO LABOURERS:

The Bidder shall pay not less than minimum wages as described in the Labour Acts & Laws to labourers engaged by him on the work. (Copy of rules enclosed vide Annexure-B).

55. RIGHT TO TAKE UP WORK DEPARTMENTALLY OR TO AWARD ON CONTRACT: The Chief Executive Officer, FSCL reserves the right to take up departmental work or to award works on contract in the vicinity without prejudice to the terms of contract.

56. ISSUE OF MATERIALS BY THE DEPARTMENT:

No Materials shall be supplied by the FSCL. So far as supply of cement and steel (TMT Bars) and other materials is concerned these has to be arranged by the Bidder himself at his own cost and the conditions given in the Annexure-E shall prevail.

57. REMOVAL OF UNSUITABLE OR UNDESIRABLE EMPLOYEES OF BIDDER:

The Bidder shall, on receipt or the requisition form the Engineer-in-charge at once remove any person employed by him on the work who in the opinion of Engineer-in-charge is unsuitable or undesirable.

58. RECOVERY OF AMOUNT BY FSCL FROM BIDDER:

Any amount due to FSCL from the Bidder on any account, concerning work may be recovered from him as arrear of land revenue and/or from payment due to him in any of the Govt. / Semi Government Department.

59. MISCELLANEOUS :

- (i) FSCL shall provide the source of water. The contractor has to make his own arrangement for distribution of water Like hosing, pipe laying, concret for the Said works at their own cost. The charges for the water shall be borne by the Contractor. In case of failure of supply of water at source, contractor shall make alternate arrangement through tanker at their own cost. The O & M cost which will be paid to the contractor shall be inclusive of all such costs.
- (ii) The Electric charges for running the construction equipment(s) during the contract including O & M period shall be borne by the Contractor. FSCL shall provide only the source of Power. The contractor shall make all necessary arrangements at his own cost. However, the electricity charges for the lighting shall be borne by the FSCL.
- (iii) The bidder shall arrange at his own cost tools and plants required for proper execution of work during the Contract period which includes construction and operation and Maintenance period.
- (iv) The contractor should submit the Site Layout plan indicating the location of the Labour Camp, Store House, Site

Laboratory if any etc and have it approved by FSCL.

- (v) All work materials brought and left upon the ground by the Bidder(s) or his/their orders for the purpose of forming part of the works are to be considered to be the property of the FSCL and the same are not to be removed or taken away by the Bidder's or any other person without the special license and consent in writing of the Engineer-in-charge but the FSCL is not to be in any way answerable for any loss or damage which may happen to or in respect of any such work or materials either by the same being lost or stolen or injured by weather or otherwise.
 - (vi) From the Commencement of the work to the completion of the contract, the site there upon are to be under the Bidder(s) charge. The Bidder (s) is/are to be held responsible for and to make good all injuries, damages and repairs occasioned or rendered necessary to the same by fire or other causes and they are to hold the FSCL harmless from any claims for injuries to persons or for structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the Bidder(s) or of any one in his/their employment during the execution of the works.
 - (vii) The authority competent to accept a tender reserves the right of accepting the tender for the whole work or for distinct part of it or of distributing the work between one or more Bidders.
 - (viii) If the total duration of suspension of the work is more than the six months, then this suspension of the work will be considered as permanent stoppage of the work, and the contractor can determine the contract, if he so desires.
 - (ix) The contractor shall protect all the existing Infrastructure & buildings and will cordon the work area. They will take all proper safety protection and measures while working for the scope indicated in this tender.
 - (x) All soft and hard copies of the construction plans submitted by Bidders shall be property of FSCL & FSCL has all power to choose & adopt any construction plans submitted by all Bidders.
 - (xi) The bidder shall make the plan for activities of Construction, Operation and Maintenance in such a way that it should not stop the existing operations of Village (i.e. including but not limited to movement of Traffic / public within village) and should not cause any inconvenience to the public/commercial setup near by the proposed Works.
- 60. Increase or Decrease of work specified:** The competent authority reserves the right to increase or decrease any work specified within lump sum during the currency of the contract and Bidder will be bound to comply with the order of the competent authority.
- 61. Canvassing or support for acceptance of tender:** Canvassing or support in any form for the acceptance of any tender is strictly prohibited. Any Bidder doing so will render him liable to penalties which may include removal of his name from the register of approved Bidders.
- 62. List of persons employed by Bidder:** Bidder shall not be permitted to tender for works in the FSCL who's near relative is posted as Assistant Engineer or above capacity. A list showing the names of the persons who are working with the Bidder and are near relatives to any officer in the FSCL should also be appended to the tender. The Bidder should also intimate to the Engineer-In-Charge the names of subsequently employed persons who are near relatives of any officer in FSCL. Any breach of this condition by the Bidder would render him liable to be removed from the bidding process.
- 63. Validity of Offer:** Tenders shall remain open up to **180 days** from the prescribed date of opening of tenders. However, In the event of the Bidder withdrawing the offer before the aforesaid dates for any reason whatsoever, Earnest money deposited with the tender shall be forfeited.

In the event of Bidder withdrawing his/her offer before the expiry of the period of validity of offer or failing to execute the contract agreement he/she not be entitled to tender for this work in the case of recall of tenders in addition to forfeiture of his/her earnest money as may be applicable for the work. If the Bidder has committed a similar default on an earlier occasion as well, his/her registration in the department may be suspended temporarily for a period of 6 months from such date as may be ordered by the authority which had registered him/her.

- 64. FORCE MAJEURE:** Should failure in performance of any part of this contract arise from war, insurrection, restraint imposed by FSCL, act of Legislature or other authority, stoppage of hindrance in the supply of raw materials, or fuel, explosion, accident, strike, riot, lockout, or other disorganization, of labour or transport, breakdown of machine, flood, fire act of God, or any inevitable or unforeseen event beyond human control directly or indirectly interfering with the supply of stores or from any cause which may be a reasonable ground for an extension of time, the competent authority will allow such additional time as he considers to be justified in the circumstances of the case. No compensation will be payable to the Bidder for any loss incurred by him due to these reasons.
- 65.** Each Bidder shall supply the name, residence and place of business of the person or persons submitting the tender and shall be signed by the Bidder with his usual signature. When tender is submitted by partnerships the full names of all

partners shall be furnished. An attested copy of the constitution of the firm and the registration number of the firm shall be furnished. In such a case, the tender must be signed separately by each partner thereof or in the event of the absence of any partner it must be signed on his behalf by a person holding a power of attorney authorizing him to do so. Tenders by a company /corporation shall be signed with the legal name of the company/corporation followed by the name of the state of incorporation and by signature and by designation of the president, secretary or other persons authorized to bind it in the matter.

66. TECHNICAL KNOWLEDGE AND STAFF: The tender shall be submitted with an Information that the Bidder has successfully carried out similar works of this nature and has adequate organization, machinery and experienced personnel to handle jobs of this type and magnitude.

67. A brief description of similar works previously executed by Bidder: After the tender has been opened any Bidder may be required to submit detailed particulars of such works along with manner of their execution and any other information that will satisfy the officer receiving the tender that the Bidder has adequate organization, Including experienced personnel to execute vigorously the work to be carried out as per these specifications.

(a) The Bidder shall employ adequate Construction Managers, Graduate Engineers & Diploma Engineers as Technical Staff during the execution of the work.

(b) The Technical Staff should be available at site and take instructions from the Engineer-in-Charge or other supervisory staff including PMC.

(c) In case the Bidder fails to employ the technical staff as aforesaid, the Engineer-In-Charge shall have the right to take suitable remedial measures.

(d) The Bidder shall give the names and other details of the graduate engineer / diploma engineer to whom he intends to employ or who is under employment with him, at the time of agreement and also give his curriculum vita.

(e) The Bidder shall give a certificate to the effect that the graduate engineer / diploma engineer is exclusively in his employment.

(f) A Retired Assistant Engineer who is holding a diploma may be treated at par with a Graduate Engineer for the operation of the above clause.

Note: - Such Degree or Diploma engineer must always be available on works site on day to day basis and actively supervise, instruct and guide the Bidder's works force and also receive instruction from the Departmental Engineers / Sub engineers. In case the Bidder fails to employ the required technical staff or fails to employ technical staff / personnel as submitted by the Bidder in Prequalification documents and or the technical staff/personnel so employed are generally not available on work site and or do not receive or comply the instructions of the Departmental Engineers, the Engineer-In-Charge shall recover / deduct from his bills as directed by the Engineer – In charge.

68. The tender documents have to be completed and submitted with all the documents required in the tender notice. Following is the summary of the documents required to be submitted with the completed tender form.

[a] Name, residence and place of business etc.

[b] Details of contracts already held by the Bidder.

[c] Attested copy of the constitution of firm and power of attorney.

[d] A declaration that there has been no conviction imprisonment for an offence involving moral turpitude.

[e] Declaration and description.

69. Registration with Labor Department: As per rule 1976 rule-21 (Form-4) or applicable laws, the successful Bidder shall submit the Labor registration Certificate after issuing the work order and prior to the Commencement of work.

70. INDEMNIFY: The bidder shall indemnify the FSCL and its Project Management Consultant staff on all accounts from all aspects while performing the scope of services of this project.

71. EXTENSION OF TIME

(i) If the contractor shall desire an extensions of time for completions of work on the ground of his having been "UNAVOIDABLY" hindered or on compensation event(s) or on any other ground(s), he must apply giving all and complete details of such hindrances and/or compensation event(s) and/or other cause(s) in writing, to the Chief Executive Officer, through Engineer In charge positively within 15 (Fifteen) days of occurrence of such hindrance(s)/compensation

event(s)/other cause(s) and seek specific extension of time (period from..... to.....).

If in the opinion of Engineer in Charge, such reasonable grounds are shown, the Engineer-in-charge shall himself grant extension of time, if the extension of time sought by the contractor is for one month or 10% (ten percent) of the stipulated period of completion, whichever is more. If the extension of time sought is more than above period mentioned, then the Engineer in Charge shall refer the case to the CEO, FSCL with his recommendation and only after his decision in this regard, the Engineer in Charge shall sanction extension of such time as decided by the CEO, FSCL.

Once the Chief Executive Officer, FSCL has decided the case of extension of time with reference to the particular application of the contractor, it will not be competent for them to review/change such a decision later on. However, the Chief Executive Officer, FSCL shall give the contractor an opportunity to be heard (orally and or in writing), before taking any final decision either of granting extension of time or permitting the contractor to complete the work by the delayed date or before refusing both.

Provided further where the Engineer In charge has recommended grant of extension of particular time contract or has refused to recommend extension of time but has recommended permitting the contractor for delayed completion, the contractor shall continue with the work till the final decision by Chief Executive Officer, FSCL.

Failure on the part of the contractor for not applying extension of time even within 30 days of the cause of such an hindrance, it shall be deemed that the contractor does not desire extension of time and that he has "Waived" his right if any to claim extension of time for such cause of hindrance.

(ii) **EXTENSION OF TIME IN CONSEQUENCE OF ALTERATIONS:** The time for the completion of the work shall be extended in the proportion that the altered, additional or substituted work bear to the original contractor's work and certificate of the Engineer in Charge shall be conclusive as to such proportion.

(iii) **Compensation Events for consideration of extension of time without penalty:**

The following mutually agreed Compensation Events unless they are caused by the contractor would be applicable;

- a) The Chief Executive Officer FSCL does not give access to a part of the site.
- b) The Chief Executive Officer FSCL modifies the schedule of other contractor in a way, which affects the work of the contractor under the contract.
- c) The Chief Executive Officer FSCL orders a delay or does not issue drawings, specification or instructions / decisions/approval required for execution of works on time.
- d) The Chief Executive Officer, FSCL instructs the contractor to uncover or to carry out additional tests upon work, which is then found to have no defects.
- e) The Chief Executive Officer FSCL gives an instruction for additional work required for safety or other reasons.
- f) The advance payment and or payment of running bills (complete in all respect) are delayed.
- g) The Chief Executive Officer, FSCL unreasonably delays issuing a Certificate of Completion.
- h) Other compensation events mentioned- in contract if any.

72. FINAL CERTIFICATE:

On completion of the work the contractor shall be furnished with a certificate by the C.E.O, FSCL as per completion-report of the Engineer-in-charge, of such completion in the form appended at the end, but no such certificate shall be given, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the works shall be executed, all scaffolding surplus materials and rubbish, and cleaned off the dirt from all wood-work, doors windows walls, floors or other parts of any building in upon or about which the work is to be executed or of which he may have had possession for the purpose of the execution there of nor until the work; shall have been measured by the Engineer-in-charge whose measurement shall be binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to removal of scaffolding surplus materials and rubbish and cleaning of dirt on or before the date fixed for the completion of the work, the Engineer-in-charge may, at the 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, and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid, except for any sum actually realized by the sale thereof.

73. PRICE ESCALATION

No escalation (whatsoever) will be paid for entire contract period including extension period if provided.

74. RATES FOR WORKS NOT IN SCHEDULE OF RATES:

And if the altered, additional or substituted work includes any class of work, for which no rate is specified in this contract, then such classes of the work shall be carried out at the rates entered in the applicable schedule of rates which was in force on the date of tender provided that when the tender for the original work is a percentage below/above the schedule of rates, the altered, additional or substituted work required as aforesaid shall be chargeable at the said schedule of rate minus/plus the same percentage deduction, addition and such class of work is not entered in & arrange to carry in out in such manner as may be considered advisable provided always & if the contractor shall commence work or incur any expenditure in regard thereto before the rates shall have been determined as lastly herein before mentioned than & In such case he shall only be entitled to the paid in respect of the work carried to such rate or rates be fixed by the Chief Executive Officer in the event of a dispute the decision of the Chief Executive Officer, shall be final.

If the contractor commence non-schedule work or incur expenditure in regard there to before the rates shall have been determined by the Chief Executive Officer than he shall be entitled for payment for the work done as may be finally decided by the Chief Executive Officer. In the event of dispute, the decision of the Chief Executive Officer shall be final.

75. CLAIM OR COMPENSATION :

- (i) **Claims for compensation for delay in starting the work :** No compensation shall be allowed for any delay caused in the starting on the work on account of acquisition of land, or in the case of clearance work, on account of any delay in according sanction to estimates.
- (ii) 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.
- (iii) **No claim to any payment or compensation for alteration in or restriction of works:** 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.

If any such case, except as provided hereunder, the contractor shall have no claim to any payment or compensation what so ever 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 not having been carried out, or on account of any loss that he may be put to on account of materials purchased or for unemployment of labor recruited by him. He shall not also have any claim for compensation by reason of any alteration having been made in the original specifications, drawing, designs and instructions, which may involve any curtailment of the work as originally contemplated. Where, however, materials have already been purchased or agreed to be purchased by the contractor shall be paid for such materials at the rates determined by the Engineer-in-charge, provided they are not in excess of requirement and of approved quality and / or shall be compensated for the loss, if any that he may be put to, in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the CEO whose decision shall be final. If the contractor suffers any loss on account of his having to pay labor charges during the period during which the stoppage of work has been ordered under this clause, the contractor shall, on application be entitled to such compensation on account of labor charges as the CEO, whose decision shall be final, may consider reasonable provided that the contractor shall not be entitled to any compensation on account of labor charges, if in the opinion of the Engineer – in – charge, the labor 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.

76. ACTION AND COMPENSATION :

- (i) **Action and compensation payable in case of bad work :** If at any time before the security deposit is refunded to the contractor, it shall appear to the Engineer – in – charge or his subordinate in charge of the work, that any work has been executed with unsound, imperfect or unskillful workmanship or with material of inferior quality or that any materials or articles provided by him for the execution of the work are unsound, or of a quality inferior to that contracted for, or are otherwise not in accordance with the contract, it shall be lawful for the Engineer – in – charge to intimate this fact in writing to the contractor and then notwithstanding the work, materials or articles complained of may have been Inadvertently passed, certified and paid for 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 proper charge and cost, and in the event of his failing to do so with in 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 contract put to tender every day not exceeding ten percent, during which the failure so, continues and in the case of any such failure the Engineer – in – charge may rectify or remove and, re-execute the work or remove and replace the materials or articles complained of as the case may be at the risk and expense in all respects of the contractor. Should the Engineer-in-charge consider that any such inferior work or materials as described above may be accepted or made use of it shall be within his discretion to accept to the same at such reduced rates as he may fix therefore. This shall be exclusive of, and will be in addition to any action being taken under other clause of the contract.

- (ii) In any case in which under any clause or this contract the Bidder shall have renders himself liable to pay compensation amounting to the whole of the security deposit (whether paid in one sum or deducted by installments) or committed a breach of any terms in Fair Wages or in the case of delays beyond three months or in case of abandonment of the work owing to the serious illness or death of the Bidder or any other cause, Engineer-In-Charge on behalf of the FSCL shall have power to adopt anyone of the following courses, as he may deem best suited to the interest of the Board.
- (a) The rescind of contract, (of which recession notice in writing to the Bidder under the hand of the Engineer-In-Charge shall be conclusive evidence) and in which case the security deposit of the Bidder shall stand forfeited and be absolutely at the disposal of the Board.
 - (b) To employ labour paid by the FSCL or by employing FSCL machinery and to supply materials to carry out work, or any part of the work, debiting the Bidder with the cost of the labour or hire charge of FSCL machinery and the price of the materials (of the amount of which cost and price, a certificate of the Engineer-In-Charge shall be final and conclusive against the Bidder) and crediting him with the value of the work done, in all respects in the same manner and the same rates as it had been carried out by the Bidder under the terms of this contract or the cost of the labour and the price of the materials as certified by the Engineer-In-Charge whichever is less the certificate of the Engineer-In-Charge as to the value of the work done shall be final and conclusive against the Bidder. This does not qualify the Bidder to any refund if the work is carried out at lower rates than the rates quoted by the Bidder. Saving, if any, will go to the Board.
 - (c) To measure up the work of Bidder and to take such part thereof as shall be unexecuted out of his hands and to give it to another Bidder to complete in which case any expenses which may be incurred in excess of the sum which would have been paid to the original Bidder if the whole work had been executed by him (of the amount of which excess certificate in writing or the Engineer-In- Charge shall be final and conclusive) shall be borne and paid by the original Bidder and may be deducted from any money due to him by FSCL under the contract or otherwise or from his security deposit or the proceeds of sale thereof or a sufficient part thereof. The same provision of recovery of the difference amount will apply in case of failure in compliance on part of the Bidder to execute the work or part of the work as per work and time schedule. Engineer-In-Charge will have the right to decide as to which work or which part of work / item is to be put in fresh tender in case of failure in execution as the part of the Bidder.
 - (d) In the event of any of the above courses being adopted by the Engineer-In- Charge, the Bidder shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any agreement or made 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 rescind under the provisions aforesaid, the Bidder shall not be entitled to recover or to be paid any sum for any work thereof actually performed under this contract, unless and until the Engineer-In- Charge will have certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.
- (iii) **Notice to be given before work is covered up:** The contractor shall give not less than five day notice in writing to the Engineer–in–charge or his subordinate in charge of the work before covering tip or otherwise placing beyond the reach of measurement any work in order that the same may be measured, and correct dimensions thereof be taken before the same is so covered up or placed beyond the reach of measurement, any work without the consent in writing of the Engineer-in charge or his subordinate in charge of the work and if any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained, the same shall be uncovered at the contractors expenses, or in default thereof, no payment or allowance shall be made for such work or the materials with which the same was executed.

77. LIABILITY AND INDEMNITY :

- (i) **Contractor Liable For Damage Done And For Imperfections After Certificate Of Completion :** If the contractor or his work people or servants shall break, deface injure or destroy any part of infrastructure in which they may be working or any building, road, road curbs, fences, enclosures, water pipes, cables drains, electric or telephone posts or Wires trees grass or grassland or cultivated ground continuous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress, from any cause whatever, or any imperfections become

apparent ,the contractor shall make good the same at his own expense or in default, the CEO may cause the same to be made good by other workmen and deduct the expense of which certificate of the Engineer-in charge shall be final) from any sums that may be then or at any time thereafter, may become due to the contractor or from his security deposits, or the proceeds of sale thereof or of a sufficient portion thereof.

78. COMPENSATION UNDER SECTION 12 SUB-SECTION (1) OF THE WORKMAN'S COMPENSATION ACT 1923:

In every case in which by virtue of the provisions of section 12 sub-section (1) of the workman's compensation Act 1923 FSCL is obliged to pay compensation to a workman employed by the contractor in execution of the works, CEO, FSCL will recover from the contractor the amount of compensation so paid and without prejudice to the rights of FSCL under section (1) sub-section (2) of the said Act. CEO, FSCL shall be at liberty to recover the amount or any part thereof by deducting it from the security deposit or from any sum due by FSCL to the contractor whether under this contract or otherwise. FSCL may not be bound, to contest any claim made against them under section - 12 subsections (1) of the said Act except on the written request of the contractor and upon his giving to FSCL full security for all cases for which FSCL might become liable in consequence contesting such claim.

79. CHANGE IN THE CONSTITUTION OF FIRM:

In the case of tender by partners any change in the constitution of the firm shall be forthwith notified by the contractor to the CEO for his information, and contractor shall initiate steps for fresh & new registration which shall be assessed & decided by the competent authority for fresh registration.

80. EMPLOYMENT OF SCARCITY LABOUR:

If FSCL declare a state of Scarcity or famine to exist in any village situated within sixteen kilometers of the work the contractor, shall employ upon such parts of the work as are suitable for unskilled labor, any person certified to him by the CEO FSCL or by any person to whom the CEO FSCL may have delegated this duty in writing to be in need of relief and shall be bound to pay to such persons wages not below the minimum which FSCL may have fixed in this behalf. Any dispute, which may arise in connection with the implementation of this clause, shall be decided by the FSCL whose decision shall be final and binding on the contractor

81. PENALTY FOR BREACH OF CONTRACT:

On the breach of any term or condition of this contract by the contractor the said CEO, FSCL shall be entitled to forfeit the Security deposit or the balance thereof that may at the time be remaining, and to realize and retain the same as damages and compensation for the said breach but without prejudice to the right of the CEO to recover further sums as damages from any sums due or which may become due to the contractor By FSCL or otherwise howsoever.

82. JURISDICTION : All disputes or claim arising out of this contract shall be subject to the jurisdiction of courts in Faridabad, Haryana.

83. INTERPRETATION:

83.1 In interpreting these conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically, defined. The Engineer will provide instructions clarifying queries about the conditions of Contract.

83.2 If sectional completion is specified in the contract Data; references in the conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended completion date for the whole of the Works).

83.3 The documents forming the Contract shall be interpreted in the following order of priority:

- (1) Agreement
- (2) Letter of Acceptance, notice to proceed with the works
- (3) Contractor's Bid
- (4) Conditions of Contract including General Conditions of Contract and Special Conditions of Contract
- (5) Specifications

- (6) Drawings, if any.
- (7) Bill of quantities and all Annexures, Appendices and Forms
- (8) any other document listed in the **Special Conditions of Contract** as forming part of the Contract.

84. Video photography of the works.:

The contractor shall do video photography of the site firstly before the start of the work, secondly mid-way in the execution of different stages of work and lastly after the completion of the work. Video photography of all items which will be subsequently covered and difficult to be measured afterwards shall be done for record. No separate payment will be made to the contractor for this. VCD before start of work will be submitted to the Engineer and copy of the same to the employer for record within one month from start of work. VCD after completion of work will also be submitted to the Engineer and the employer within one month after completion of work.

85. Operating and Maintenance Manuals

85.1 "As built" Drawings and operating and maintenance manuals shall be supplied the Contractor within one month of issue of completion certificate. If the Contractor does not supply the Drawings and/or manuals by the stipulated date or they do not receive the Engineer's approval, the Engineer shall withhold INR 2 lakhs from payments due to the Contractor

SECTION 6: SPECIAL CONDITIONS OF CONTRACT

- 6.1 **General:** The special conditions are supplementary instructions to the tenders and shall form part of the contract.
- 6.2 **Drawing:** All Drawings/Layout plans given in Section 7 are for reference or guidance purpose only. The Bidder will submit the detailed construction plan of "Said Works" within 15 days from date of issuing work order or Agreement whichever is earlier. The same shall be reviewed and approved by Engineer – In charge of FSCL or through other agency approved by FSCL. This 15 days period is included in stipulated time for "Said Works". "Said Works" shall be carried out as per the approved drawings provided by FSCL.
- 6.3 **Data to be furnished by the Bidder:** The Bidder shall submit the following information to the Engineer-in-charge.
- 6.4 Proposed constructions Programme and time schedule showing sequence of operations within **15 days** of receipt of notice to proceed with the work in pursuance of the conditions of contract.
- 6.5 **Action when the progress of any item of work is unsatisfactory:** If the progress of a item of work during construction, which is important for timely completion of work is unsatisfactory, the Engineer-in-charge shall not withstanding that the general progress of work is satisfactory, after giving the Bidder **15 days'** notice in writing get the said work executed by employing other means including other labour / Bidder etc. and the Bidder will have no claim for compensation for any loss sustained by him owing to such action.
- 6.6 In case if any of the works under this contract are found unsatisfactorily by the Engineer in charge, the E in C shall either request the bidder to rectify the defect immediately or at his discretion may have it done by others (vendor or contractor) and deduct the actual amount incurred as per market rate plus 15 % extra incurred in such works from the bidders.
- 6.7 **Inspection and Tests:** Except as otherwise provided in here of all material and workmanship if not otherwise designated by the specifications shall be subject to inspection, examination and test by the Engineer-in-Charge at any and all times during manufacture and/or construction and at any/all places where such manufacture or constructions are carried on. The Engineer-in charge shall have the right to reject defective materials and workmanship or require its corrections. Rejected workmanship shall be satisfactorily replaced with the proper material without charge thereof and the Bidder shall properly segregate and remove the rejected material from the premises. If the Bidder fails to proceed at once with the replacement of the rejected material and/or the construction of defective workmanship the Engineer-in charge may replace such material and/or correct such workmanship and charge the cost thereof to the Bidder.
- The Bidder shall be liable for replacement of defective work up to the time of completion of DLP in accordance with the conditions of contract of all work to be done under the contract. The Bidder shall furnish promptly without additional charge all facilities, labour and material necessary for the safe and convenient inspection and tests that may be required by the Engineer-in-Charge. All inspections and tests by the departments shall be performed in such a manner as to not unnecessarily delay the work. Special full size and performance test shall be charged with any additional cost of inspection when materials and workmanship are not kept ready by the Bidder at the time of inspection.
- 6.8 **Removal of temporary work, Plant & Surplus materials:** Prior to final acceptance of the completed work, but excepting as otherwise expressly directed or permitted in writing, the Bidder shall, at his own expenses remove from the site and dispose of all the temporary structures including buildings, all plant and surplus materials, and all rubbish and debris for which he is responsible to the satisfaction of Engineer-in-Charge.
- 6.9 **Possession prior to completion:** The Engineer-in-Charge shall have the right to take possession of or use any completed part of the work. Such possession or use shall not be deemed as an acceptance of any work not completed in accordance with the contract.
- 6.10 **Damage to works:** The works whether fully completed or incomplete, all the materials, machinery, plants, tools, temporary building and other things connected there with shall remain at the risk and in the sole charge of the Bidder until the completed work has been delivered to the Engineer-in- Charge and till completion certificate has been obtained from the Engineer in- charge. Until such delivery of the completed work, the Bidder shall at his own cost take all precautions reasonably to keep all the aforesaid works, materials, machinery, plants, temporary buildings and other things connected there with free from any loss, damages and in the event of the same or any part there of being lost or damaged, he shall forthwith reinstate and make good such loss or damages at his own cost.
- 6.11 **Examination and tests on completions:** On the completion of the work and not later than three months thereafter, the Engineer-in-charge shall make such examination and tests of the work as may then seem to him to be possible, necessary or desirable, and the Bidder shall furnish free of cost any materials and labour which may be necessary

thereof and shall facilitate in every way all operations required by the Engineer-in-Charge, in making examination and tests.

- 6.12 **Climatic Conditions:** The Engineer-in-Charge may order the Bidder to suspend any work that may be subject to damage by climatic conditions and no claims of the Bidder will be entertained by the department on this account.
- 6.13 As per the Ministry of Environment and Forest Guidelines 2010 and Ministry of Urban Development notifications, the Site area shall be protected from dust by fixing Green Fencing around the Construction site area. The Contractor is instructed to strictly adhere to the following at his own cost.
- a) Supply and Fixing Green barriers and wind breaking walls around their sites.
 - b) Cover tarpaulin on scaffolding around area of construction,
 - c) Do not store construction material, particularly sand, on any part of the street, roads in any colony,
 - d) Cordon the work area with proper fencing by other means with due consideration of safety of workers, public, etc.
 - e) Dust emissions from construction site are controlled.
 - f) Sprinklers should be compulsorily used at the site and Wet jets in grinding and stone cutting must be used.
 - g) The work area shall be well illuminated during nights.
- 6.14 **Safety regulations:** During the entire contract period, while carrying out this works indicated in this tender, the Bidder will ensure compliance of all safety regulations as provided in the Safety Code (Annexure - D). The bidder will be responsible for safety of the works.
- 6.15 **The Bidder will make his own arrangement:** for supply of Water, Light & Power for his works and labour camps etc.: The Bidder will make his own arrangement for supply of water, light and power for his works and labour camps etc. The department will not entertain any claim what so ever for any failure or break down etc. in supply of to the Bidder. The Bidder will supply and fix his own tested meter of the approved make but the meter will be kept in the custody of the department.
- 6.16 **Interference with other Bidders:** The Bidder must not interfere with other Bidders who may be employed simultaneously or otherwise by the department at the Site. He will at no time engage departmental labour or that of other Bidders without the written permission of the Engineer-in-Charge. **Bidder is fully responsible for cause of damages of the adjoining works of different works at site and the same cost of rectification of damages shall be recovered from the Bidder as per Engineer In-charge instructions.**
- 6.17 **Regulations and bye laws:** The Bidder shall conform to the regulations, bye-laws any other statutory rules made by any local authorities or by the Government and shall protect and indemnify FSCL, against any claim or liability arising from or based on the violation of any such laws, safety, theft, ordinance, regulation, orders, decrees etc.
- 6.18 **Site Order Book:** A site order book shall be kept in the departmental office at the site of the work. As far as possible all orders regarding the works are to be entered in this book. All entries therein shall be signed by the departmental officers in direct charge of the work and the Bidder or his representatives. In the important cases the CEO or TA/GM/DGM of FSCL will countersign the entries which shall except with the written permission of the TA and the Bidders or his representative shall be bound to take note of all instructions meant for the Bidder as entered in the site order book without having to be called for separately to note them. The Engineer-in-charge shall submit periodically copies of the remarks of the site order book to the CEO, FSCL for record and to the Bidder for compliance and report.
- 6.19 **Conversion of units:** Whenever in the contract agreement dimensions and units have been expressed in F.P.S. system, the same will be converted in to metric system units by applying the standard conversion table of Indian Standard Institution so as to derive the corresponding figure arithmetically and the Bidder will have to accept the figures so derived without any claim or compensation whatsoever.
- 6.20 **Rights of other Bidders and persons:** If, during the progress of the work covered by this contract, it is necessary for other Bidders or persons to do work in or about the site of work, the Bidder shall afford such facilities, as the Engineer-in-charge may require.
- 6.21 **Employment of technical persons:** The Bidder shall employ or produce evidence of having in his employment a qualified technical person not below the rank of a Graduate Engineer from an Institution recognized by the Government of Haryana / Govt. of Other State / Govt. of India.
- 6.22 The above is the minimum requirement of Manpower. However contractor shall access the actual requirement and deploy the necessary manpower. The bidder shall include the cost of extra manpower if required in the Operation &

Maintenance cost. No extra cost will be paid for deployment of extra manpower if required.

- 6.23 The technical staff shall be got approved in writing from the Engineer (whose approval may be withdrawn any time) for supervision of works and to receive direction from the Engineer of the work on behalf of the contractor. The supervisory staff of the contractor will not be changed without the approval of the Engineer.
- 6.24 FSCL holds the right to generate the revenue and collect from the "Said Works". Contractor shall not claim any revenue generated from the "Said Works".

6.25 ADVANCES TO BIDDERS:

No Advance either Mobilization or Secured amount will be paid to the bidder.

- 6.26 Escalation: No escalation whatsoever shall be paid.
- 6.27 **Scope of Unit rate Contract:** The unit rate contract shall comprise for the "Said Works" which includes provision of all labour, materials, constructional plants, tools and tackles, transport and all works of a temporary or permanent nature required for such works as indicated above in so far as is necessary for providing the same and is specified in the contract.
- 6.28 Ground water level variation: It is liable to vary. No claim due to variation of low water level shall be entertained.

DETAILED PAYMENT SCHEDULE:

6.29 Schedule of running payment:

1. The Contractor shall submit running bills by 3rd of the every month. The payment will be based on the works billed in the Monthly running bills.
2. The Contractor representative and the FSCL staff shall collectively measure the quantities claimed in the Monthly bill.. The Monthly bill will be paid upon approval of the measurement from the FSCL.

Notes: [For 6.29]

1. The payments as indicated above are for complete works.
2. The Engineer in Charge may provide Adhoc payments to the contractor. However, the Adhoc payments shall be in proportion to the works executed and in no case shall it be more than the percentage stipulated for each phase in the payment schedule. The Engineer in Charge shall estimate the work done as per the milestones provided in the payment schedule and decide upon the proportion of executed works.
3. The milestones indicated above are for payment purpose and may therefore not indicate all items that have to be executed as part of the works under this tender. The payments for all such items, even though not explicitly mentioned above, shall therefore be deemed to have been included in the schedule mentioned above and no separate or additional payments whatsoever shall be made.
4. The Engineer in Charge shall verify the sum of all Adhoc payments made to the contractors and deduct the excess amount if paid over the stipulated percentage for milestones as provided in the payment schedule.
5. The Engineer- In-Charge, FSCL may require the Bidder to extend the validity period of the Bank Guarantee(s) for such period which he considers it proper and the Bidder shall extend the validity period of such Bank Guarantee accordingly, if the Bidder fails to extend the period accordingly, the Engineer-In-Charge, FSCL may encash the B.G. before the expiry of the validity period.
6. The Bidder shall carryout all necessary rectifications of defects noticed, caused due to any reasons at his own cost within such reasonable period as mentioned in such communication notice from the Engineer-in-Charge, FSCL to him.
7. Failure of Bidder to rectify the defects properly in the given period, it shall be open for the Engineer-In-Charge, FSCL to get the defect(s) rectified either departmentally or through other agency (Without calling any tender / Quotation) and recover the actual amount incurred as per market rate plus 15 % (Fifteen per cent) of such cost from the Bidder from any sum, in any form available with the department.
8. During the Construction and O & M period, If the Bidder or his work people shall break, deface, injure or destroy any part of building in which they may be working or any building road curbs, fences, enclosures, water pipes, cable/s, drains, electric or telephone posts or wires, trees, grassland cultivated ground continuous to the premises on which the work or any part of it is being executed or if any damage shall happen to the work while in progress from any cause whatever, or any imperfections become apparent in it within three months(Six month in the case of road works) after

a certificate final or otherwise or its completion shall have been given by the Engineer-In-Charge as aforesaid the Bidder 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 work men and deduct the expense of which certificate of the Engineer-In-Charge shall be final) from any sum that may be then or at any time thereafter, may become, due to the Bidder or from his security deposits, or the proceeds of sale thereof or of a sufficient portion thereof.

9. The Bidder hereby also covenants that it shall be his responsibility to see that the "Said Works" carried under this contract do/ does not leak during the rainy seasons period of DLP after its completion and if any defects are pointed out to him by the Engineer-In-Charge during the said period the same shall be removed by him own expenses or in default the Engineer-In-Charge. The Bidder needs to provide 10 years warrantee period from water proofing.
10. Proportional part payment may be made for incomplete items of work. These part payments shall be at the sole discretion of the Engineer-In-Charge of the Project.
11. The Bidder/Bidder shall give in advance authority letters(s) in favour of the Engineer-In-Charge of the Project authorizing him to get all Banks' Fixed deposit security, Bank Guarantees (either normal security deposit and or for performance security) to get these Bank Receipts and Guarantee deeds verified and confirmed from the concerned Bank. It will be only after getting such confirmation that the Engineer-In-Charge of the Project shall pay any amount accordingly or refund the equal amount for which BG submitted has been duly verified and confirmed.
12. The Bidder shall not remove minor mineral from borrow areas/ Quarries without prior payment of Royalty charges.
13. Extra work and rebate: Extra /Rebate work arising out of this contract shall be valued at HSR rate. If the rates are not available at HSR then the rate for such items shall be worked out by the Bidder in consultation with the Engineer-in-charge and approved by the Chief Executive Officer, FSCL. Such approval of rate[s] must invariably be obtained before taking-up of execution of such item[s] of work. This approved rate shall be final and binding on the Bidder.
14. **This is a unit rate contract where time is of utmost importance. No claims of any sort with regard to escalation shall be admissible and therefore no payment what so ever in this regard shall be made.**
15. Working during Night / Holiday : The contractor shall also plan to work during Holidays and Nights. However the contractor shall obtain necessary permission and approvals from all the relevant agency including FSCL
16. It is the bidders responsibility to plan the ready mix concrete for concrete works. In case of difficulty in concrete truck movements, ready mix concrete through pipe shall be considered.
17. The contractor has to maintain the finished road levels as shown in the Good for Construction (GFC) drawings.
18. The contractor shall match the finished floor level of buildings located adjacent to the road with the road finish level with proper slopes as directed by the E-in-C.
19. The contractor shall design the foundation of the High Mast by himself & submit it for FSCL approval. The manufacturers design can be submitted for this purpose. However the design shall be in accordance with relevant IS code & match the soil condition of Fatehpur Chandela.
20. The contractor shall modify the High Mast and its foundation design till it is approved by FSCL. The contractor shall coordinate with Manufacturer for modifying the design and submit it for FSCL's approval.
21. FSCL shall provide the Geo Technical Investigation Report covering the Soil Bearing Capacity (SBC) value for one location only. If further studies are required, the contractor shall have further studies done by himself.
22. FSCL shall also submit the Topographical Survey Report to the successful bidder.
23. All due care/approvals shall be taken while erecting the High Mast poles. This includes the preparation of Traffic Management Plan for diversion, road blockages, operation of cranes by approved operators etc.
24. The contractor shall take proper Insurance including the general public, employees, road users, operators, etc. for covering all risks while performing the works under this contract.
25. The contractor shall produce the manufacturer Test Reports for High Mast poles Inspection.
26. The contractor shall have the Third Party Inspection (TPI) of the High Mast poles prior to despatch and after installation of High Mast poles.
27. All risks associated with the transportation of poles to site is the sole responsibility of the contractor. No compensation shall be paid on account of transportation & damages associated with it.
28. The contractor is liable for all damages associated with the High Mast works.
29. The contractor shall have Quality Testing as per the relevant IS Codes.
30. Concreting on roads shall be done as per the GFC drawings & as per the direction of the E-in-C.
31. The contractor shall maintain the existing storm water system while performing the works.

32. The contractor may make alternate routing to ensure the storm water system is fully operational at all point of times. The debris taken out of the existing storm water system shall be disposed as per the direction of E-in-C and at no point it should obstruct the path of the resident and lead to foul smell. Temporary gutter may be considered as one option.
33. In case of discrepancy of site condition with the drawings or for any technical issues that hinders the construction, the contractor shall discuss with E-in-C & have clearances/decisions.

Project Management Consultancy:

OBJECTIVE The objective of this Consultancy (the “Objective”) is to assist the FSCL in implementation of the Project till the successful completion and handing over of all works to the FSCL and comprehensively supervise the works and activities carried out by the Bidder(s) as “Engineer’s Representative” under the respective contract(s) in a manner that would ensure:

- a. Total compliance of technical specifications and various other requirements contained in the respective contracts by the Bidder(s);
- b. High standards of quality assurance system in the Consultancy as well as the works and activities of the Bidder(s);
- c. Comprehensive and documented reporting to the FSCL of Consultant’s own activities, progress of the Project(s) and compliances/ non-compliances by the Bidder(s);
- e. Proper verification of measurements and bills submitted by the Bidder(s) so that payments made by the FSCL against these bills truly reflect the actual work done at site complying with the requirements of the respective contract(s);
- f. proper interface and coordination among the FSCL, Bidder(s), other Bidders/ Bidders and local bodies/ state government; and
- g. Full documentation of the completed works including applications for various approvals.

The objectives of the PMC is not limited to the above, CEO of FSCL have discretion implement other objectives or the completion of the project.

SECTION 7:

DESIGNS AND SPECIFICATIONS

This section has to be read along with the information provided in Scope of Tender in ITT Section 2

7.1 Drawings & Design:

FSCL will provide the following below Drawings & these drawings are enclosed in NIT:

Sr No	Drawing Title	Dwg No
1	Layout Plan of Base Map in Fatehpur Chandela	FSCL/PM/FC/01
2	Layout Plan of Drain Channel in Fatehpur Chandela	FSCL/PM/FC/02
3	Layout Plan of Sewerline in Fatehpur Chandela	FSCL/PM/FC/03
4	Layout Plan of Water Supply in Fatehpur Chandela	FSCL/PM/FC/04
5	Layout Plan of Road Repair in Fatehpur Chandela	FSCL/PM/FC/05
6	Layout Plan of High Mast in Fatehpur Chandela	FSCL/PM/FC/06
7	Layout Plan of Street Light in Fatehpur Chandela	FSCL/PM/FC/07
8	Sewer Manhole Detail in Fatehpur Chandela	FSCL/PM/FC/08

7.2 GOVERNING DESIGN PARAMETERS FOR CONSTRUCTION

All designs shall confirm to the various standards & codes as under:

1. Space Standard for Roads in Urban Areas (IRC:69-1977)
2. Guidelines on Road Drainage (IRC SP 42:2014)
3. Bureau of Indian Standards
4. Plain and Reinforce Concrete: Code of Practice IS: 456-2008
5. Design Aids for Reinforced Concrete SP-16
6. Handbook on Concrete Reinforcement and Detailing SP-34

The above list is indicative. Other codes/standards may also be required to be adopted. In such cases, the same shall be adopted upon approved from the Authority (the FSCL)

7.3 Approval of design mix for RCC: On approval of the tender, Bidder is required to arrange all for approval of design mix of RCC from any of the Indian Institute of Technology or National Institute of Technology or NABL accredited Laboratories.

7.3.1 Materials of construction of proposed at Fatehpur shall be governed by the relevant Indian Standards Codes of Practice.

7.3.2 The design procedure permissible stresses in material and other relevant stipulations shall be governed by the codes of practice published by BIS and other relevant IS codes.

7.3.3 New Codes of Practice and amendments issued by the Bureau of Indian standards till the date of tender will also be automatically applicable for the work, similarly amendments and revisions. Specifications made up to the date of tender shall also be applicable.

7.4 Testing of concrete: All concrete used in the RCC structure shall be mixed in power driven mechanical mixers and vibrated. The Bidder's unit Rate shall include the cost of testing of concrete cubes. Installation of a Calibrated Testing Machine at site by the Bidder will be acceptable. The testing will however, be done under the supervision of the Engineer-in-charge or his authorized representative. The Bidder shall finish a test certificate of the concrete test machine, to be used by him on the site of works sampling, strength test of concrete and acceptance criteria shall be in accordance with IS Codes.

7.5 Finish of concrete surface: Good surface of the exposed reinforced concrete members must be ensured by the Bidder by using plane and true to shape form work. Corrections of defects must be done as desired by the Engineer-in-charge. Tolerance in form work shall be in accordance with IS Codes.

7.6 Size of Aggregate: Size of aggregate to be used in plain concrete, RCC concrete structure shall be in accordance with specifications. However, for sections of structural components of 300 mm thickness and less only 20mm and downgraded aggregate shall be used.

4.7 Model Rules relating to labour, Water Supply & Sanitation in Labour Camps are given in ANNEXURE - A.

**Scope of work
for
Fatehpur Chandela**

Fatehpur Chandela is an urban village located in sector 21B of ward 19. Location of the Fatehpur Chandela is given in Figure 1 and which is spread over area of 22.75 Acres.

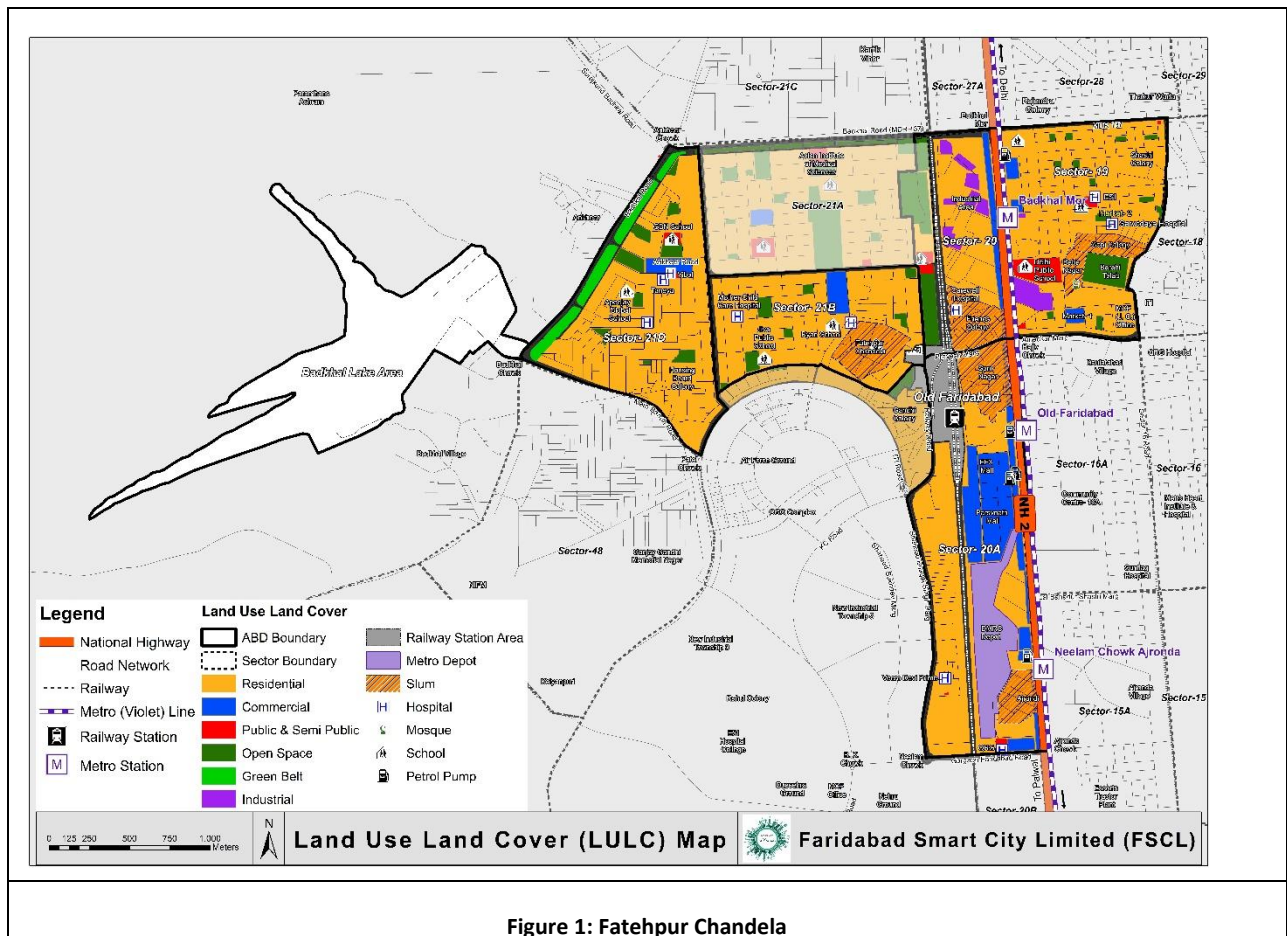


Figure 1: Fatehpur Chandela

Map showing the location of Urban Village- Fatehpur Chandela Figure 2 in dotted circle in ABD Area

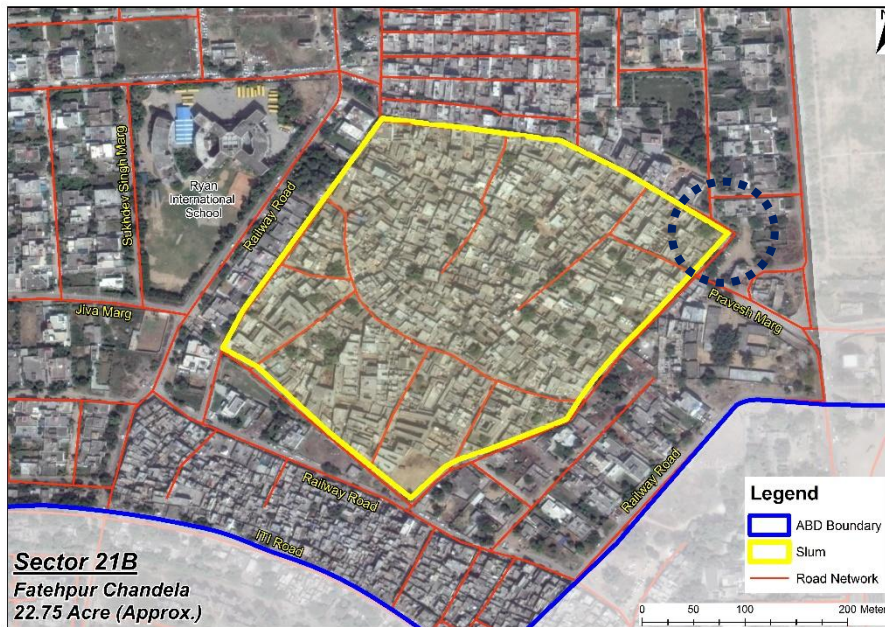


Figure 2: Blown-up location image of Fatehpur Chandela

Scope of Work for Fatehpur Chandela:

- (a) Breaking existing damaged concrete road and removing the debris away.
- (b) Concrete resurfacing to the damaged internal roads of length up to 1.25 km as per standard specifications and as directed by Engineer in Charge.
- (c) Constructing cast in situ/precast RCC storm water drain of suitable size and slope in place of existing brick drain and connecting the same to main drain.
- (d) Providing and installing including civil foundation works the High Mast Light poles with all fixtures, luminaries, cabling etc. connecting to the nearest LT pole and commissioning the same.
- (e) Developing and Making good (including landscaping and horticulture works) to the damaged existing parks at two locations in Fatehpur Chandela as directed by Engineer in Charge and as per standard specifications including civil repair works.
- (f) Various Civil and horticulture works, children play equipment of Parks as a recreational space as per design and drawing.
- (g) All the above works are to be maintained for 5 years by the contractors.

1. Detailed Scope of work:

Contractor shall visit the site before bidding and before start of any work and get himself acquainted with the things and site conditions for entire scope of work. It is envisaged that the contractor has done such works earlier.

It is proposed to redo concrete work of an existing lane of approximately 1.25 km, as it is damaged. It is proposed in this work that the existing damaged concrete layer will be removed. A suitable sub base coat of admixture with cement slurry for joining the old and new concrete layer will be laid as per direction of Engineer in Charge. Over that, a RMC concrete Layer of grade M30 and thickness up to maximum 200 mm will be laid. Further proper levelling and finishing shall be done. Due care shall be taken while construction and all existing underground and above ground services must be reinstated if removed or damaged. Contractor shall submit the sequence of construction program. Contractor shall do

proper curing arrangement. After completion of concrete work groove cutting as per standard practice shall be made by mechanical means. Suitable joint filler and joint sealing material shall be used in these grooves as per standard specifications and provisions of IRC SP 15: 2011. Use of fly ash based Cement is allowed as per SP 15: 2011.

It is expected that there will be proper slope to the newly laid roadside drains. Contractor has to ensure that existing final disposal shall not be disturbed and at suitable location so as to avoid any water logging in this area. It is proposed to dispose the storm water to the nearest drain location on peripheral roads. Contractor has to make necessary arrangement to remove existing waste water, wastage, debris etc and dispose off to the nearest location as directed by Engineer in Charge. At no point of time contractor shall not put debris/storm water on the road while working. The contractor shall ensure that the access to the households shall be available.

Storm water drain:

Main storm water channel of Fatehpur Chandela shall run in periphery of External drain of 600mm wide of RCC drain Channel & it shall be discharged to 2 disposal points. In Internal road of fatehpur chandela, width of drain channel shall be 150mm, 200mm, 300mm & 450mm. Storm water shall be covered with Cast in situ slab with perforated/Slot of 50mm at every distance of 200mm along with 100mm slot for rain water drain. Also there shall be removal Perforated slot cover at every 5m distance.

Tubewell drain water shall be properly drained to existing drain channel with proper concrete or brick work.

Necessary Shop Drawing Shall be approved by Vendor from FSCL before starting installation Work. Vendor need to resubmit Shopdrawing till the satisfaction of FSCL.

Bidder to Submit shop drawings for proposed utilities services as per RFP drawings and as per site conditions/invert levels before execution of work and have approval from FSCL. Bidder has to submit & resubmit shop dwg till satisfaction of FSCL

Bidder to Submit Co-ordination drawings for proposed utilities services as per RFP drawings and as per site conditions/invert levels before execution of work and have approval from FSCL. Bidder has to submit & resubmit shop dwg till satisfaction of FSCL

Before Installation of any utility & Road Work, Necessary approval need to be taken from FSCL, MCF and all other Statutory authority etc.

Sewer Water drains:

Main sewer Line shall run in periphery of External Road of fatehpur Chandela and shall be discharged at 2 disposal points of RCC NP2 pipe. Internally sewer Drain shall be connected to each household with inspection chamber with RCC NP2 for 150mm dia pipe, 300mm dia Pipe and 450mm dia pipe along with gully Trap. And uPVC IS 15392 for 100mm dia pipe & 200mm dia Pipe

Manhole shall be placed at a distance of 30m & also along sharp turn/curve. Manhole Cover shall be Heavy duty. Necessary Shop Drawing Shall be approved by Vendor from FSCL before starting installation Work. Vendor need to resubmit Shopdrawing till the satisfaction of FSCL.

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Before Installation of any utility & Road Work, Necessary approval need to be taken from FSCL, MCF, and all other Statutory authority etc.

Water Supply Pipe:

A proposed pipeline of dia300mm shall be installed from Underground Tank of Sector 21 A to Fatehpur Chandela Village of D.I K9 pipe.

Internally Water distribution shall be made to fatehpur Chandela village of diameter as shown in tender Dwg of D.I K7 Pipe .Also Individual water connection to household shall also be made.

Necessary Shop Drawing Shall be approved by Vendor from FSCL before starting installation Work.Vendor need to resubmit Shopdrawing till the satisfaction of FSCL.

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Before Installation of any utility & Road Work, Necessary approval need to be taken from FSCL, MCF, and all other Statutory authority etc.

2. High Mast Poles & Street Light

It is proposed to provide and fix High mast lights in selected locations so as to enhance the night lighting in this area. All the work to be done in coordination with DHBVN and FSCL. The proposed work will be including civil foundation, installing and commissioning the same. The power connection to be taken from nearest LT pole. The contractor has to coordinate properly with the proposed road repair works as above. The contractor has to submit the manufacturer's details and technical datasheets and get it approved from Engineer in Charge, before procurement. After formal approval of make, specification etc., then contractor can procure the material. Factory inspection is to be arranged by contractor at his own cost. All the necessary approvals from DHBVN will be done by FSCL. Contractor has to do only liasioning part of the same. Contractor is responsible for excavation for UG Cable laying, conduit fixing for the same of the required size, foundation of high mast light including foundation bolts, RCC civil work etc. SBC values shall be given by FSCL. The grade of concrete not less than M-30, erection/transportation with all erection equipment etc. is the responsibility of the contractor.

Also Existing Street Light shall be replaced along with arm as shown in tender dwg for location.

3. Redevelopment of Community parks.

It is proposed to redevelop two existing parks at Fatehpur Chandela. The scope includes miscellaneous and major civil works, horticulture works as per design drawings and specifications and as directed by Engineer in Charge. It is proposed to place children play equipment in one park as per design and drawing and as per specifications. It is contractor's responsibility to arrange for Inspection of children play equipment before dispatch at his own cost. Engineer in charge will then issue a dispatch clearance letter. All the equipment shall be laid and fixed in standard manner including all civil foundations etc.

Operation and Maintenance:

The contractor shall maintain the Road/Storm Water Drain/Community Park/High Mast light for a period of 5 (five) years commencing from the date of the Issue of Completion Certificate. Payment to the bidder/contractor for the maintenance shall be done on quarterly basis.

During the Maintenance Period, the Faridabad Smart City Limited (FSCL) shall provide to the Contractor access to the site for Maintenance in accordance with this Agreement. The obligations of the Contractor hereunder shall include:

- a) Permitting safe, smooth and uninterrupted flow of traffic on the Road;
- b) Undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;
- c) Undertaking repairs to structures if any within Community Park;
- d) Informing FSCL of any unauthorized use of the Road;
- e) Informing FSCL of any encroachments on the Road;

In respect of any deficiency, the Contractor shall, at its own cost, undertake repair or rectification in accordance with Good Industry Practice.

The Contractor shall remove promptly from the Road any waste materials (including hazardous materials and waste water), rubbish and other debris (including, without limitation, accident debris) and keep the Road in a clean, tidy and orderly condition, and in conformity with the Applicable Laws, Applicable Permits and Good Industry Practice.

Scope of Maintenance of Utility Services:

The Contractor will Operate and Maintain the facilities created for a duration of five (5) years, as per the KPIs defined below. The contractor will provide manpower and spare parts as deemed required at site for O&M of the facilities.

Key Performance Indicators (KPIs)

This is to clarify that Penalty as indicated in the General Conditions of the Contract will be levied on the contractor only when the E in C finds the "Non Compliance" of the KPIs of the O&M phase, as detailed in the Contract Agreement. The Non Compliance may be due to an act of negligence, improper, un-professional methodology adopted for O&M of the system, by the contractor and/or absence of qualified and experienced manpower to be supplied by the contractor, at site.

Maintenance cost shall be included in the contract quotation along with road maintenance

1. The contractor shall submit a Periodic and Routine maintenance plan clearly indicating the frequency of maintenance, turnaround time etc. and have it approved by FSCL.
2. Periodic Maintenance of all types of manholes, including cleaning, inspection of chambers, removing debris if any from time to time and keeping the flow path in good condition so as to ensure smooth flow at all times including rainy season etc and record shall be kept with Engineer in charge .
3. Inspection of manholes covers, replacing the same if broken or damaged,
4. Attending to choked areas and make it functional immediately on 24 x 7 basis during the maintenance period.
5. Required work force and machinery shall be kept always available.
6. No overflows from the Manholes.
7. Frequency of cleaning of sewers with jetting machine.
8. Frequency of submission of photo inspection along with date for the sewers.
9. Silt removed from the sewerage system should be removed by next day from the roadside.
10. Photo inspection along with date to be carried out after removal of silt from the system and submitted to the Employer within a week.
11. The Contractor shall submit a weekly report to the Employer detailing the Operation and Maintenance indicating the labour hours expended, other Consumables consumed, and problems faced and rectified.
12. Record all complaints received regarding sewer blockage and clearance with same date and time.
13. Record condition of sewer found at the time of attending complaint. Damage notice should be recorded by attending staff

14. The Contractor shall carry out mandatory biannual cleaning of network before and after the monsoon season including cleaning of all manhole chambers and collection network irrespective of the regular maintenance work.
15. Identification and reporting of illegal connections on the sewerage network as soon as these are detected.'
16. Minimum time for rectification

Sr No	Nature of Defect	Minimum time for recification
1	Blockage/Leak and overflows	12hours
2	Stolen / Broken man hole covers	12hours
3	Sewer spills from main sewer, branch and house service connections (between property chamber and public	72hours

1. Maintenance Requirements

The Contractor shall ensure and procure that at all times during the Maintenance Period, the Project Road conforms to the maintenance requirements (the "Maintenance Requirements").

2. Maintenance Programme

The Contractor shall prepare a monthly maintenance programme (the Maintenance Programme") in consultation with the E in C and submit the same to the E in C not later than 10 (ten) days prior to the commencement of the month in which the Maintenance is to be carried out. For this purpose, a joint monthly inspection by the Contractor and the E in C shall be undertaken. The Maintenance Programme shall contain the following:

- a. The condition of the road in the format prescribed by the E in C;
 - b. The proposed maintenance works; and
 - c. Deployment of resources for maintenance
 - d. Frequency and turnaround time for addressing the issue.
- #### 3. Safety, vehicle breakdowns and accidents

The Contractor shall ensure safe conditions for the Users, and in the event of unsafe conditions, lane closures, diversions, vehicle breakdowns and accidents, it shall follow the relevant operating procedures for removal of obstruction and debris immediately. Such procedures shall conform to the provisions of this Agreement, Applicable Laws, Applicable Permits and Good Industry Practice.

The Contractor shall promptly remove any debris from the Project Road to enable safe movement of traffic and shall report all accidents to the FSCL and police forthwith.

4. Reduction of payment for non-performance of Maintenance obligations

In the event that the Contractor fails to repair or rectify any Defect or deficiency set forth in the below Table within the period specified therein, it shall be deemed as failure of performance of Maintenance obligations by the Contractor and the FSCL shall be entitled to penalise as per the clause indicated in the General Conditions of the Contract in lump sum payment for maintenance, without prejudice to the rights of the FSCL under this Agreement, including Termination thereof.

If the nature and extent of any Defect justifies more time for its repair or rectification than the time specified in the below Table 1, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the E in C and conveyed to the Contractor with reasons thereof

Table 1

Nature of Defect or deficiency		Time limit for repair/rectification
ROADS		
(a)	Carriageway and paved shoulders	
(i)	Pot holes	24 hours
(ii)	Any cracks in road surface	15 (fifteen) days
(iii)	Any depressions, rutting exceeding 10 mm in road surface	30 (thirty) days
(iv)	Bleeding/skidding	7 (seven) days
(v)	Any other defect/distress on the road	15 (fifteen) days
(vi)	Damage to pavement edges	15 (fifteen) days
(vii)	Removal of debris, dead animals	6 hours
(b)	Drains and culverts	
(i)	Damage to or silting of culverts 7 (seven) days and side drains	7 (seven) days
ii	Desilting of drains in urban/semi-urban areas	24 hours
iii	Railing, parapets, crash barriers	7 (seven) days (Restore immediately if causing safety hazard)
(c)	High Mast lighting	
i	Any major failure of the system	24 hours
ii	Faults and minor failures	8 hours
(d)	Trees and plantation	
i	Obstruction in a minimum head-room of 5 m above carriageway or obstruction in visibility of road signs	24 hours
ii	Removal of fallen trees from carriageway	4 hours
iii	Deterioration in health of trees and bushes	Timely watering and treatment
iv	Trees and bushes requiring replacement	30 (thirty) days
v	Removal of vegetation affecting sight line and road structures	15 days

Nature of Defect or deficiency		Time limit for repair/rectification
ROADS		
	Foundation	
i	Scouring and/or cavitation	15 days

Maintenance cost shall be included in the contract quotation along with road maintenance

1. The contractor shall submit a Periodic and Routine maintenance plan clearly indicating the frequency of maintenance, turnaround time etc. and have it approved by FSCL.
2. Periodic Maintenance of all types of manholes, including cleaning, inspection of chambers, removing debris if any from time to time and keeping the flow path in good condition so as to ensure smooth flow at all times including rainy season etc.
3. Inspection of manholes covers, replacing the same if broken or damaged,
4. Attending to choked areas and make it functional immediately on 24 x 7 basis during the maintenance period.
5. Required work force and machinery shall be kept always available.
6. No overflows from the Manholes.
7. Frequency of cleaning of sewers with jetting machine.
8. Frequency of submission of photo inspection along with date for the sewers.
9. Silt removed from the sewerage system should be removed by next day from the roadside.
10. Photo inspection along with date to be carried out after removal of silt from the system and submitted to the Employer within a week.
11. The Contractor shall submit a weekly report to the Employer detailing the Operation and Maintenance indicating the labour hours expended, other Consumables consumed, and problems faced and rectified.
12. Record all complaints received regarding sewer blockage and clearance with same date and time.
13. Record condition of sewer found at the time of attending complaint. Damage notice should be recorded by attending staff
14. The Contractor shall carry out mandatory biannual cleaning of network before and after the monsoon season including cleaning of all manhole chambers and collection network irrespective of the regular maintenance work.
15. Identification and reporting of illegal connections on the sewerage network as soon as these are detected.'
16. Minimum time for rectification

MAINTENANCE OF ROAD

Routine Maintenance in carrying out repair of potholes / patches, repair of shoulders, cleaning of drains / clearing of roadway, clearing / removal of vegetation / fallen tree on carriageway /dead animals etc. complete as per technical specifications-

O & M Scope of Road as mentioned -for 1st year to 5TH year

MAINTENANCE OF UTILTY

Routine Maintenance in carrying out repair of Storm Water System, complete as per Technical specifications or as approved by Engineer-in-charge,-

O & M Scope of Road as mentioned -for 1st year to 5th year

MAINTENANCE OF ELECTRICAL HIGH MAST WORKS

Providing O & M service as indicated in the scope of work for O & M. This includes but not limited to the supply of Manpower, Labour, Equipment, tools & tackles etc. for maintaining reliable power network. Contractor has to do contract for 5 years including DLP (Defect Liability Period). Scope includes all routine maintenance, attending the fault and restore power supply immediately, making alternate power supply arrangement during the maintenance and replacement of faulty component, maintain daily/weekly and monthly report and submit to DHBVN. Working with DHBVN with close coordination.

O & M Scope of High Mast as mentioned -for 1st year to 5th year

MAINTENANCE OF LANDSCAPE WORKS

Providing O& M service as indicated in the scope of work This includes but not limited to the supply of Manpower, Labour, Equipments, Tools & Tackles, Security, Spares of Installed Equipments, Complete maintenance of the entire smart road and features , lawn trees,

- a) Permitting safe, smooth and uninterrupted flow of traffic on the Smart Road;
- b) Undertaking routine maintenance including prompt repairs of potholes, cracks, joints, drains, embankments, structures, pavement markings, lighting, road signs and other traffic control devices;
- c) Undertaking repairs to structures/bore wells if any;

O & M Scope of Community Park as mentioned -for 1st to 5th year

Table 2 List of Drawings-Fatehpur Chandela

S.No.	Drawing No.	Title
1	FSCL/PMC/FC/01	Base map plan Fatehpur Chandela
2	FSCL/PMC/FC/02	Fatehpur Chandela Contour Map
3	FSCL/PMC/FC/03	Layout Plan of Road Repair Works
4	FSCL/PMC/FC/04	Layout Plan of Drain Channel Works
5	FSCL/PMC/FC/05	Layout Plan of High Mast works
6	FSCL/FC/Park/01	Fatehpur Chandela Park A
7	FSCL/FC/Park/02	Fatehpur Chandela Park B

Technical Specification

1. High Mast Poles

High mast lighting is preferred over conventional lighting, because it can achieve very large space to height ratios. It can illuminate large areas without the need for numerous lighting columns. It is proposed to procure install and commission 6-8 locations of high mast poles in this area. The technical specifications are as follows.

1.1. Scope

- 1.1.1. Average illuminance shall be as per IS 1944 public national lighting Code.
- 1.1.2. Scope of work under this section shall include inspection at supplier's/manufacturer's premises, appropriate, receiving at site, safe storage, transportation from point of storage to point of erection and installation of light fittings, fixtures and accessories including all necessary supports, brackets, down rods and painting as required. The contractor shall supply all materials and accessories, labour, tools, transportation, scaffolding etc., required for the completion of above work in all respects. Type of fixtures / lamps shall be as specified in the BOQ.
- 1.1.3. Applicable Standards
- 1.1.4. The lighting and their associated accessories such as lamps, reflectors, housings, ballasts etc., shall comply with the latest applicable standards, more specifically the following:
- 1.1.5. Luminaires: Part 5 Particular requirements, Section 3 Luminaires for road and street lighting (superseding IS:2149) IS 10322: Part 5 : Sec 3
- 1.1.6. Code of practice for interior Illumination IS - 1944
- 1.1.7. Electric light fittings General and safety requirements IS - 1913
- 1.1.8. Decorative lighting outposts IS - 5077
- 1.1.9. Luminaries for street lighting IS - 2149
- 1.1.10. Performing measurement of LEDs LM-79
- 1.1.11. Water proof electric lighting fitting IS-3528
- 1.1.12. Steel Tubes, Tubulars and Other Wrought Steel Fittings - Specification - Part 1 : Steel Tubes IS-1239: part 1
- 1.1.13. Mild steel tubes, tubulars and other wrought steel fittings, Part 2 Mild steel tubulars and other wrought steel pipe fittings IS-1239: part 2
- 1.1.14. Specification for Tubular Steel Poles for Overhead Power Lines IS 2713: Parts 1 to 3
- 1.1.15. Water tight electric lighting fittings IS 3553
- 1.1.16. Indian Electricity Act, 2003 and IE Rules, 1956 as amended
- 1.1.17. Regulations laid down by the Chief Electrical Inspector
- 1.1.18. Any other regulations laid down by the Local Authorities
- 1.1.19. The equipment should be compliant to IEC 60598 -1, 2, 3, IEC 62031 and IEC / PAS 62612 depending on the type of luminaries. In addition to the above, luminaries shall adhere to relevant BIS standards IS 15885, 16101,16102,16103,16104,16105,16106,16107 (Part I & II), 16108 as per the application requirement. The product shall be having proven design, should possess type test certificate / performance certificate from the accredited laboratory. The product and its major components shall be state of art and of proven design.

1.2. General Requirements

- 1.2.1. Fixtures shall be designed for continuous trouble free operation under atmospheric conditions, reduction in lamp life or without deterioration of materials and internal wiring. Outdoor fittings shall be weather - proof and rain proof
- 1.2.2. All fixtures shall be supplied with lamps and complete with accessories and fixings necessary for installation whether so detailed under fixture description or not.
- 1.2.3. Fixtures shall be so designed as to facilitate easy maintenance including cleaning, replacement of lamps/driver etc. Fixtures shall be installed at mounting heights as instructed on site by the The Engineers/ Employer's representative.
- 1.2.4. Detailed catalogue for all fixtures, or, if so required by the Engineers/ Employer's representative sample fixtures shall be submitted for approval to the Engineers/ Employer's representative before orders for the fixtures are placed. Shop drawings for non-standard fixture types shall be submitted for approval to the Engineers/ Employer's representative.
- 1.2.5. The fixture should conform to applicable IS 10322 / IEC60598 (All parts & amendments) and should have the associated LM-79 and LM-80 report from a recognized lab. Test reports shall be submitted along with relevant catalogs.

1.3. LED

- 1.3.1. High lumen efficacy LEDs suitable for the application along with following features shall be used:
- 1.3.2. LED Efficacy at the chip level shall be >120 lumen /watt (For High power LED)
- 1.3.3. The efficiency of the LED lamp at 85 Degree C junction temperatures shall be more than 85%.
- 1.3.4. The luminous efficacy of LED luminaire shall be at least 90 lumen / Watt for low wattage luminaires (<45W system – including driver losses) and at least 95 lumen/watt for high wattage luminaires (>45W system – including driver losses) at about 350 miliamps or so. On higher driving current higher output is expected without compromising the life of LEDs. The products showing more duration of L70 would be preferred.
- 1.3.5. Adequate heat sink with proper thermal management shall be provided.
- 1.3.6. Power factor of complete fitting shall be more than 0.90 at full load 220-240 V.
- 1.3.7. LED shall be surface mounted type duly soldered to PCB by Reflow system. The Solder used shall be ROHS compatible for environment friendliness.
- 1.3.8. Input frequency range shall be between 50Hz \pm 3%.
- 1.3.9. Color rendering index (CRI) shall be at least 70 for indoor as well as for outdoor applications.
- 1.3.10. Correlated color temperature shall ranged between 4000 to 6500 K.
- 1.3.11. Minimum view angle of the LED shall not be less than 120°

1.4. LED Driver

- 1.4.1. LED driver shall have following features:
- 1.4.2. Input voltage range within 160V(RMS) to 270 V(RMS)
- 1.4.3. Driver shall be designed to withstand surges of at least 1.5 KV.
- 1.4.4. Operating input voltage 220-240V (RMS)
- 1.4.5. Output voltage of the driver shall be designed to meet the power requirements of the system.
- 1.4.6. Input voltage ripple should be within 3%
- 1.4.7. Output over voltage protection 125 VDC
- 1.4.8. Power factor > 0.90
- 1.4.9. Full Load Efficiency \geq 85%
- 1.4.10. Total Harmonic Distortion (THD) shall be < 25 %
- 1.4.11. Current wave form should meet EN 61000-3-2
- 1.4.12. LED Driver should possess overvoltage cut off protection for supply over 270V AC.
- 1.4.13. The driver should comply to CISPR15 for limit and methods of measurement of Radio Disturbance characteristics
- 1.4.14. The equipment should comply to IEC 61547 for EMC immunity requirements
- 1.4.15. The control gear should be compliant to IEC 61347-2-13, IEC 62031 and IEC 62384.

1.5. General

- 1.5.1. The lumen maintenance of the LED fixtures shall not be less than 70% after 50,000 hours (Unless specified otherwise in the detailed specifications).
- 1.5.2. The supplier shall provide evidence that the LED chip set manufacturer has the patent right to produce the supplied LED chipset to avoid infringement of white LED patent. Warranty shall be provided by the supplier against all manufacturing defects for a period of 48 months from the date of supply or 24 months from the date of commissioning whichever is earlier. The warranty of replaced item shall re-start from date of attending defect / replaced.
- 1.5.3. From luminaire, lamps & control gear at least two components shall be from a single manufacturer to ensure continuity of spare supplies. The lighting supplier shall necessarily have been present in India for at least 10 years with an annual turnover of at least 100 crores in each of the last 3 years to ensure adequate solvency.
- 1.5.4. Test reports from various parameters i.e. flux, power, efficacy, chromaticity, temperature, protection etc. Issued by certified agency shall be furnished. Estimation on product's life and performance shall also be furnished.

1.6. Tests

Tests to be done:

- 1.6.1. Type test: Type tests shall be carried out to prove confirmation with the requirement of specification and general quality/design features of the unit by the firm on particular models of the luminaire. Necessary type test reports from NABL or ISO accredited Laboratory must be available with the firm & shall be submitted to The Engineers/ Employer's representative for Notice of No Objection.
- 1.6.2. Acceptance Tests: These tests are carried in the presence of The Engineers/ Employer's Representative at the supplier's premises on sample taken from a lot for the purpose of acceptance of a lot. The luminaries shall be selected from the lot at random Sample size shall be as per mutual agreement between supplier and client/client representative.

Table 3

Sr No.	Description of Test Type	Test Acceptance	Test
1	Visual and Dimensional Check	Y	Y
2	Resistance to humidity	Y	
3	Insulation resistance test	Y	Y
4	HV test	Y	Y
5	Over voltage protection	Y	
6	Surge Protection	Y	
7	Reverse polarity	Y	Y
8	Temperature rise Test	Y	
9	Color rendering Index measurement test	Y	Y
10	Photometry Test (LM79)	Y	Y
11	Fire Retardant test	Y	
12	Test for IP protection	Y	Y
13	Environmental Test	Y	
14	Reliability Test	Y	
15	Life Test	Y	
16	Endurance Test	Y	
17	Torsion Test	Y	
18	Emission of radio frequency disturbances	Y	
19	Harmonics	Y	Y
20	Vibration test	Y	

1.7. High Mast Material:

- 1.7.1. Pole Shaft - The masts shall be made with best grade steel in compliance with international/ Indian standards having following guaranteed characteristics;
- 1.7.2. Minimum yield strength: 355N/mm² for thickness < 30mm
- 1.7.3. Tensile strength ranging from 490 to 630N/mm²
- 1.7.4. Minimum elongation for thickness between 3mm and 30mm: 22%.
- 1.7.5. Foundation Bolt -The holding down bolts shall be of high tensile strength.
- 1.7.6. Lantern Carriage -The lantern carriage shall be fabricated of 4mm thick durable steel tube.
- 1.7.7. Junction Box - The weatherproof (IP-66) junction boxes shall be cast aluminum.
- 1.7.8. Pulleys - Pulley blocks shall be non- corrosive and made of die cast (LM-6) aluminium alloy

1.8. Construction:

- 1.8.1. The high mast shall be of polygonal cross section (20 sided). Height of the mast should not be more than 15 mtr. It should be presenting good visual appearance and shall be based on proven design, to give assured performance, reliability and service. The entire high mast and its accessories shall be as per relevant BS standard and test certificates shall be provided in proof of the same.

- 1.8.2. Pole Shafts - The Mast shall be fabricated from special steel plates, conforming to BS: 4360 cut and folded to form polygonal section and shall be telescopically painted and fillet welded.
- 1.8.3. The Mast shall have a minimum top diameter of 300 mm and a minimum bottom diameter of 560 mm. The weight of the Mast shall be such as to maintain good elasticity of slender structure. The minimum thickness of the bottom section sheet will be 6 mm, middle section will be 5 mm and that of top section will be 4mm (if in 3 sections).
- 1.8.4. Access Door - Door opening of 1400mm x 300mm shall be provided at the base of each Mast. The opening shall be such as to permit clear access to equipment like winches cable, plug, and socket, etc. The opening shall be complete with a close setting vandal resistant, weather-proof door provided with heavy duty double internal lock. The door opening shall be carefully designed and reinforced with welded steel section, such that the Mast section at the base is unaffected and undue buckling of cut portion is prevented (calculation to be submitted).
- 1.8.5. Flange - The Mast shall be provided with a flange, which shall be free from any lamination or incursions. The base shaft should penetrate the full length of base plate and should be welded both above & below. The base flange shall be provided with supplementary gussets between the bolt holds to ensure elimination of helical stress concentration for protection of metal of the Mast.
- 1.8.6. Welding -The high mast shall comprise of not more than 3 sections, preferably 2 sections and shall be fabricated from special steel plate and fillet welded without any circumferential weld. Welding done on the mast and especially in the overlap distance of longitudinal welds shall have full penetration between plates of all thickness and there should be no fissure, blow holes, porosity, undercutting or detectable angular inclusions. The welding shall be in accordance with BS: 5135. The procedural weld geometry and the workmanship shall be exhaustive, tested by the radiography on the completed welds and certificates submitted.
- 1.8.7. The welded connection of the base flange shall be fully developed to the strength of the entire section.
- 1.8.8. Galvanization - The entire fabricated Mast shall be hot dip galvanized internally and externally as per BS 729/1971-1986. Thickness of galvanizing shall be 85 microns for base, for middle and top section.
- 1.8.9. Foundation -The contractor shall be responsible for the design and construction of the foundation and safe erection and installation of the High Mast in mechanically and structurally safe working condition for the designed life of the Mast.
- 1.8.10. The contractor shall see the site closely and minutely with regard to the nature of the soil, average depth of decomposed garbage and debris at proposed Mast location and the other site conditions, before working out the type of foundation and its detailed design. If required the contractor shall carry out soil bearing test for the proposed High Mast.
- 1.8.11. The foundation shall be provided with a J shape pipe for cable entry into high mast of HDPE/GI as a part of foundation of high Mast.
- 1.8.12. Foundation Bolt -The holding down bolts shall be of high tensile strength, and shall be supplied complete with anchor plate of 4 mm thickness for casting into the foundation. The precision made steel template with tube holes shall be provided to ensure correct bolt alignment both vertically and horizontally.
- 1.8.13. Lantern Carriage -The fabricated lantern carriage of minimum diameter of 1600mm shall be provided to hold required number the floodlight fittings and control gear provided on each high mast. The lantern carriage shall be of special design and of durable steel tube construction of minimum 4mm thickness to act as electric conduit with cable hole fully protected by rubber/plastic grommets. The lantern carriage shall be fabricated in 2/3 halves, joined by bolted flanges with S.S. Bolts and nuts to enable easy removal from the erected mast for replacement /maintenance purpose. The lantern carriage shall be evenly balanced during raising and lowering. The lantern carriage shall be so designed that it does not touch and so not cause any damage to the surface of the Mast and is provided with protective buffer arrangement (effective lining). The complete lantern carriage shall be hot dip galvanized after fabrication.
- 1.8.14. The lantern carriage assembly shall be fitted with cast aluminum (IP-54) junction box (JB) and mounting plates from which the interconnection will be made to the designed number of floodlights fittings and lanterns on the carriage.
- 1.8.15. Winch -For installation and maintenance purpose, it will become necessary to raise or lower the lantern carriage assembly. To enable this, a suitable winch arrangement shall be provided in the base of the Mast, complete with top pulley, winch stainless steel wire ropes of adequate strength (supporting calculation to be furnished) and winch driving internal power tools.
- 1.8.16. The winch shall be of completely self-sustaining type without the need for break shoe, springs or clutches, so as to eliminate any requirement of adjustment or possibility of being affected by moisture or lubricant. The winches shall be of self-lubricating type by means of an oil bath and the lubricant shall be of recommended quality. The minimum safe working load shall not be less than 750 kgs.
- 1.8.17. Termination of the ropes of the winch shall be in such a way, that it does not involve distortion or twisting of the rope configuration. At least, 6 turns of rope shall remain in tension on the drum even when the lantern carriage is fully lowered. The winch shall be designed to be installed or removed from the door to ensure maintenance with

two slings supporting the wire rope and lantern carriage assembly with no chances of rope slippage. Each rope shall be laid directly from the lantern carriage assembly to the winch drum and shall include intermediate connection. The driving spindle of the winch shall be positively locked when not in use by gravity activated pawls. Winch should be double drum & both drums should move together. Manual movement of drums should be possible to keep the lantern carriage balanced. Each winch shall be provided with a galvanized water proof canopy. The capacity, operating speed and dimensions of the drum length and the recommended lubrication shall be clearly marked on each winch with an indelible ink. The winch shall be capable of operation by hand & by means of internal power tool. A test certificate shall be supplied along with each winch in support of the maximum load operated by the winch and for the safety of the operation at the rated full load. The handle shall also be provided for hand operation of the winches. The readily adjustable and local torque limit mechanism shall also be provided in manual handle. Torque limit shall be precision made, with fine adjustment and working on a system of balls and springs and shall be of standard model.

- 1.8.18. Top Pulley Assembly -The Top pulley shall be of diameter & width, appropriately large enough to accommodate the steel wire ropes and the flat multi-core electric cable. The non- corrosive die cast (LM-6) aluminium alloy Pulley Assembly shall be complete with self-lubricating bearings and stainless steel spindle. There should be 6/8 numbers pulleys two for each steel wire & electric cable.
- 1.8.19. External divider shall be provided on the pulleys to separate the stainless steel wire ropes and cables before passing over their respective pulleys so that chances of wrapping together of the ropes and the cable in windy condition or when the lanterns are in the lowered position are avoided. Close fitting guides shall be provided to ensure that the ropes and cables do not leave their respective positions on the pulley grooves.
- 1.8.20. The pulleys shall be housed in a chassis, which has integral sleeves arrangement that slip over the top of the mast. The sleeve pulley arrangement is secured axially. Azimuth guides and stops shall be provided for locking the lantern carriage. For a 3 point carriage an anchor point shall be securely welded to the assembly to receive the safety maintenance equipment and live load of about 250 kgs. The pulley assembly shall be protected by galvanized canopy.
- 1.8.21. Stainless Steel Wire Ropes -Stainless steel wire ropes shall be of 7/ 19 construction of minimum 6 mm diameter, having a breaking load of not less than 2634 kgs complete with stainless steel thimbles so that the lifting capacity of ropes shall have a factor of safety of more than 5. The end for connection to the winch drum shall be fitted with copper end stop and the thimble shall be secured by copper compression splices.
- 1.8.22. Cable and Cable Connection -A trailing cable shall be provided for connecting of power supply to the light fittings which shall terminate at the stationary connecting board/DB in the base compartment, with a metal caged multi point weather proof plug and socket coupler fitted with locking levers for matching socket provided in the base compartment to enable flexibility of operations. The connections shall be made with single Copper cores of this flexible anti twisting flat sheathed power cable, suitable for small bending radius, of appropriate rating as per the requirement with respect to the number of fixtures. The base compartment of the High Mast shall have one terminal box for terminating the incoming cable including one set of MCB's for complete disconnection of electric supply in a DB. A maintenance cable similar to that within the Mast and fitted with water proof multi point plug socket shall be provided to energize luminaries while lantern is in lowered position by hooking up to the base compartment power supply socket.
- 1.8.23. Similarly, a provision shall be made for electric supply at the base compartment to enable operation of the power tool for lowering or rising of the lantern carriage assembly.
- 1.8.24. Ferruling and labelling of the wiring shall be done as approved by the Engineer in chief.
- 1.8.25. Winch Driving Power Tool -The internal electric driven power tool shall be single speed, reversible (2.0 Mt./min) three phase, 415V, 50Hz, class B insulation, IP-55 protection, electric operated motor. Motor shall be IE2 class or higher. There shall be an arrangement for self-alignment of power tool which can be self supported during operation. Manual Handle shall be provided for hand operation of the winches and shall incorporate the torque limiter. The contractor shall specify the capacity, rating and speed of the electric motor used in the power tool.
- 1.8.26. Luminaries - All weatherproof integral LED fittings shall be provided as called for in the specification of high mast and should be generally as per the specifications of light fittings mentioned in this document.
- 1.8.27. Electric Control Panel - Control panel shall be equipped for termination of incoming three phase power cable, outgoing for the fixtures, MCBs, a power supply and control cable for power tool operation, emergency stop button, electronic torque control for safety against overloading or overheating of the hoist motor generally as per the manufacturer's specifications and the specifications of service pillar mentioned in this document.
- 1.8.28. Earthing Terminal -Two earthing terminals of 12 mm diameter with stainless steel shall be provided on the Mast structure at convenient points within the base compartment to provide lightning protection and cable earthing point. Each mast shall be connected to two earth stations as per IS 3043.

- 1.8.29. Distribution Board - It shall consist of one 63 Amp TPN MCB, 3 SP MCBs for 3 outgoing circuits, one TPN MCB for socket for power tool including the socket.
- 1.8.30. Lightning Conductor – Protection from Direct Lightning shall be provided for High Mast. Faraday’s Lightning Road shall be fitted on top of each mast. Lightning conductor shall be as per IS 2309/ IEC 62305
- 1.8.31. Aviation Obstructing Lights -Two Nos. aviation obstructing lights shall be provided on top of mast.
- 1.8.32. Name Plates with technical details and Caution boards shall be provided.

1.9. Guarantee and Warranty

The Bidder shall stand guarantee for the performance of entire equipment and components for twelve (12) months from the date of commissioning or eighteen (18) months from the date of dispatch.

S.No.	Description	12MTR	12.5MTR	16MTR	16MTR
1	Cat No.	VHM 0120	VHM 0125	VHM 0161	VHM 0162
2	Material Construction	MS IS 2062	MS IS 2062	MS IS 2062	MS IS 2062
3	No. of Longitudinal Welds	Single	Single	Single	Single
4	Cross Section of Mast in Polygon (No. of Sides)	12	12	20	20
5	No. of Sections	2	2	2	2
6	Thickness	3 MM	3 MM	3 MM	4, 3 MM
7	Individual Section' s Length	6300 MM	6500 MM	8300 MM	8300 MM
8	Base & Top Dia (OAF)	310/100	340/150	360/160	410/160
9	Thickness of Galvanization (Average)	86 Microns	86 Microns	86 Microns	86 Microns
10	Size of Opening door at base	300 x 1000	300 x 1000	300 x 1000	350 x 1400
11	Size of Base Plate Diameter	510 MM	540 MM	560 MM	610 MM
12	Size of Base Plate Thickness	25 MM	25 MM	25 MM	25 MM
13	Number of Foundation Bolts	6	6	6	8
14	Bolts Diameter.	25 MM	25 MM	25 MM	25 MM
15	Length of Foundation Bolt	750mm	830mm	830mm	830mm

Lantern Carriage

16	No. of fittings	As Per Customers Requirement
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Winch / PowerTool

17	Drum's	2Nos	2Nos	2Nos	2Nos
18	Capacity	750Kg.	750Kg.	750Kg.	750Kg.
19	Number of Ropes / Thickness	3Nos./6mm	3Nos./6mm	3Nos./6mm	3Nos./6mm
20	Motor Capacity	0.75HP	0.75HP	0.75HP	0.75HP



Table 4 Technical Data Sheet Sample.

2. Concrete

All Concrete grades shall be of Ready Mix type (M.C.G.M. approved) except otherwise permitted by the Engineer in Charge. In case the Batching plant is owned by the Bidder, the same should be got approved from MCGM. The bidder should note that he will not be permitted to use this plant for supplying R.M.C. for M.C.G.M. works till final approval to his R.M.C. plant is issued by M.C.G.M. All grades of RMC shall conform to M.C.G.M. Concrete Road Department specifications. The Bidder shall prepare the Design Mix in accordance to the requirement of site & get the same approved from Engineer in Charge.

2.1. Cement

- 2.1.1. All cement for use on the works shall be the ordinary Portland cement and shall conform to the IS 269/ IS 8112 . It shall be of the make and quality approved by the Engineer. The Contractor shall make their own arrangements for purchasing, transporting, and storing the cement required for the works.
- 2.1.2. The cement shall be stored in weather proof godown or cement silos specially constructed for the purpose in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. The weather proof godown shall have a solid impervious floor raised 300 mm. above the general ground level so that the cement stored thereon shall not come in direct contact with sub-soil moisture. The passages and the general construction shall be such that it affords full protection from weather effects. Large stocks of cement shall not be kept at the works but only sufficient quantities shall be kept to maintain continuity of the work.
- 2.1.3. No cement that has been stored for more than 90 days shall ordinarily be allowed to be used on the works. Cement stored for longer period than that mentioned above shall be used on works only with the Engineer's specific written permission who shall ascertain its quality after due testing, in the laboratory, before giving such permission. All the expenses in connection with the tests shall be borne by the Contractors.
- 2.1.4. For testing the quality of cement, samples shall be taken from every consignment arrived at the site of work at the option of the Engineer. The Contractors shall afford every facility to the Engineer for inspection and sampling of cement. The cement godown shall be so arranged by the Contractors that each consignment could be stacked separately and in such a manner so as to allow counting of bags in each row with comparative ease. The test results shall, ordinarily be available within a week of sampling and the Contractors shall not use any part of the consignment until the results of tests are received and are found satisfactory. Should, however, the use of such cement becomes imperative before the test results are received the Contractors may do so entirely at their own risk and cost and the whole of such work carried out by them is liable for rejection, if the test results are found unsatisfactory. any consignment failing to meet the requirements of IS 269/ IS 8112 shall be rejected and shall be removed from the work site within 48 hours of the intimation from the Engineer.
- 2.1.5. The decision of Engineer in this respect shall be final and binding on the Contractors.
- 2.1.6. All charges in connection with the testing of cement such as transport of samples, testing fees etc. shall be borne by the Contractors.
- 2.1.7. The cement used in any type of concrete shall always be measured by weight and one cubic meter shall be taken as weighing 1450 kgs.

2.2. Aggregates

- 2.2.1. All the aggregates shall conform to the latest BIS 383. The aggregate shall consist of naturally occurring sand and gravel or stone crushed or uncrushed or combination thereof. They are classified broadly under two categories viz. (i) sand or fine aggregates and (ii) coarse aggregate depending upon their sizes. The fine aggregates are those which pass through BIS sieve 4.75 mm. and the coarse aggregate are those which are retained on IS Sieve 4.75 mm.
- 2.2.2. The aggregates both fine and coarse shall be hard, strong, durable, clean, free from veins and adherent coatings. The use of flaky and elongated pieces of aggregate shall be prohibited.
- 2.2.3. The aggregates shall not contain deleterious materials such as iron pyrite, coal, mica, shale, or similar laminated material, clay, alkali, soft fragments, sea shells, organic impurities etc. in such quantity as to affect the strength or durability of concrete or the reinforcement embedded in such reinforced concrete.
- 2.2.4. The maximum quantities of deleterious materials that may be permitted shall conform to the following limits by weight.

Table 5

Sr. No.	Deleterious Substances	Fine Aggregates (%) by weight (Max.)		Coarse Aggregates (%) weight (Max.)	
		Uncrushed	Crushed	Uncrushed	Crushed
1	2	3	4	5	6
i)	Coal and lignite	1	1	1	1
ii)	Clay lumps	1	1	1	1
iii)	Soft fragments	-	3	-	
iv)	Material passing through 75 micron sieve	3	15	3	3
v)	Shale	1	-	-	
vi)	Total of all Deleterious materials (except mica) including Sr. .No. (i) to (iv) for col.3.5 & 7 8 & sr. No. (i) & (ii) for col.4 only.	5	2.00	5.00	5.00

2.2.5. The total of various deleterious materials occurring in any sample shall, in no case, exceed 5%.

2.2.6. Sampling and testing of aggregates shall be carried out in accordance with the requirements of the appropriate section of BIS 2386. The tenderer shall satisfy the Engineer that the aggregate to be supplied shall not give rise to an alkali reaction with the cement.

2.2.7. If the aggregate supplied is unclean it shall be washed. If it is not properly graded, it shall be screened by hand or by mechanical means and the various sizes proportioned to get the required grading.

2.2.8. Storing of aggregates on dusty, muddy, and grassy spots shall be avoided. They shall be stored on the works in such a manner as to prevent intrusion of foreign matter, and shall be protected from exposure to dust. They shall be placed in stock piles in individual units of suitable sizes and in suitable layers to prevent segregation. They shall not be allowed to run down slopes.

2.2.9. Sand or fine aggregate: All fine aggregate shall consist of clean, hard, strong, durable uncoated, siliceous gritty material well graded particles obtained from rock fragments. It shall be free from clay, lumps, injurious amounts of dust, mica, shells, soft or flaky particles, shale, alkali, organic matter, loam or other deleterious substances.

2.2.10. The sand shall be taken from a source approved by the Engineer. The sand or fine aggregate shall conform to the latest IS No.383.

2.2.11. If the Engineer considers it necessary, it shall be washed and/or screened before use, at the expense of the contractors.

2.2.12. The sand shall have a fineness modulus of not less than 2.5 and not more than 3.00 and the grading shall conform as far as possible to the following analysis:

Table 6 Percentage passing for

IS Sieve Designation	Grading Zone-I	Grading Zone - II	Grading Zone-III	Grading Zone-IV
10mm.	100	100	100	100
4.75 mm	90-100	90-100	90-100	95-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100

600 micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

- **NOTE 1** - For crushed stone sands, the permissible limit on 150-micron IS Sieve is increased to 2.0 percent. This does not affect the 5 percent allowance permitted in clause 4.3 of IS 383 - 1970 applying to other sieve sizes
- **NOTE 2** - Fine aggregate complying with the requirements of any grading zone in this table is suitable for concrete but the quality of concrete produced will depend upon a number of factors including proportions.
- **NOTE 3** - Where concrete of high strength and good durability is required, fine aggregate conforming to any one of the four grading zones may be used, but the concrete mix should be properly designed. As the fine aggregate grading becomes progressively finer, that is, from Grading Zones I to IV, the ratio of fine aggregate to coarse aggregate should be progressively reduced. The most suitable fine to coarse ratio to be used for any particular mix will, however, depend upon the actual grading, particle shape and surface texture of both fine and coarse aggregates.
- **NOTE 4** - It is recommended that fine aggregate conforming to Grading Zone IV should not be used in reinforced concrete unless tests have been made to ascertain the suitability of proposed mix proportions.

2.2.13. The specific gravity of sand shall not be less than 2.6.

2.2.14. In no case shall fine aggregate be accepted containing more than 2% by dry weight nor more than 3.5% by dry volume; not more than 5% by wet volume of clay, loam or silt. If any sample of fine aggregate shows, more than 5% of clay, loam silt in one hour's settlement after shaking in an excess of water the material represented by the sample shall be rejected.

2.2.15. The following two field tests are recommended for ascertaining the percentage of clay lumps and impervious organic material, and the contractors shall carry out the same if the Engineer deems fit.

2.3. Test for determining silt in sand :

Fill a calibrated tumbler with sand to be tested to half its volume and add water thereto until the tumbler is three quarter full. Shake up the mixture vigorously and allow it to settle for about an hour, The volume of silt visible on top of the sand shall be measured. If the volume of the silt standing over the sand exceeds 5% of total volume of sand, the sand shall be rejected.

2.4. Calorimetric test for organic impurities

2.4.1. The sample of sand shall be mixed with equal volume of 3% solution (about 3 gms in a litre of water) of caustic soda or sodium hydroxide taken in a plain glass and the mixture shall be allowed to stand for 24 hours. The liquid standing above the sand shall not be darker than light straw (Pale yellow). If colour is marked yellow or brown the test would indicate presence of organic material in excessive amount. In case suitable sand is not available in adequate quantities within a reasonable and economical limit, the contractors may be allowed use of crushed or pulverised stone or gravel either alone or mixed with natural sand in parts. The stone or gravel shall be clean sharp and free from dust etc., and shall conform to the latest IS 383., The percentage of crushed stone to be mixed with sand shall be such as to obtain the fineness modulus of the blended sand within the limit specified above, and/or as approved by the Engineer after laboratory tests.

2.4.3. Coarse aggregate: All coarse aggregates used in concrete works shall consist of crushed metal, gravel or other approved inert material.

2.4.4. Broken or crushed metal from sound blue basalt or black trap rock free from zeolite or other common impurities, shall be used in the concrete as coarse aggregate. The particles of aggregate shall be clean, hard, tough, durable, free from deleterious substances and shall not contain soft, flat or elongated pieces. The coarse aggregate shall have specific gravity not less than 2.6 and the water absorption measured after being immersed for 24 hours in water shall not be more than 5% by weight. The maximum percentage of deleterious materials in the coarse aggregate shall not exceed 5% by weight in the aggregate when tested in conformity with IS 383.

2.4.5. The nominal size of the coarse aggregate for reinforced concrete work shall be 20 mm. Larger coarse aggregate upto 40mm size may be used if approved by the Engineer, in plain concrete work. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case shall be greater than one quarter of the minimum thickness of the member, provided that the concrete can be placed in the formwork without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form-work. The minimum size of coarse aggregate shall be, as mentioned earlier, such as to retain most of the material (90% - 95% maximum) on BIS Sieve 4.75 mm.

2.4.6. The aggregate shall be screened and, if necessary, blended to give the required grading when tested in the laboratory at contractor's cost by means of standard mesh sieves, the grading shall fall within the following limits.

- 2.4.7. In the event of undesirable segregation occurring in coarse aggregates, the contractors shall separate the coarse aggregate in two or more suitable fraction as directed by the Engineer, who shall set up the required limits for each such fraction. The grading so specified shall be such as to give a dense, water- tight concrete of specified proportion and strength and required consistency.
- 2.4.8. The Engineer shall have the right and authority to carry out routine control tests analysis of the broken rock at any stage of the work processing and/or concreting operation and the contractors shall give all necessary facilities in respect of such testing. The sampling and testing shall be carried out as per Standard IS practice at the entire cost of the Contractor.

IS Sieve Designation	PERCENTAGE PASSING FOR SINGLE SIZED AGGREGATE OF NOMINAL SIZE						PERCENTAGE PASSING FOR GRADED AGGREGATE OF NOMINAL SIZE			
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20mm	16 mm	12.5 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
80 mm	100	-	-	-	-	-	100	-	-	-
63 mm	85 to 100	100	-	-	-	-	--	-	-	-
40 mm	0 to 30	85 to 100	100	-	-	-	95 to 100	100	-	-
20 mm	0 to 5	0 to 20	85 to 100	100	-	-	30 to 70	95 to 100	100	100
16 mm	-	-	-	85 to 100	100	-	-	-	90 to 100	-
12.5 mm	-	-	-	-	85 to 100	100	-	-	-	90 to 100
10 mm	0 to 5	0 to 5	0 to 20	0 to 30	0 to 45	85 to 100	10 to 35	25 to 55	30 to 70	40 to 85
4.75 mm	-	-	0 to 5	0 to 5	0 to 10	0 to 20	0 to 5	0 to 10	0 to 10	0 to 10
2.367 mm	-	-	-	-	-	0 to 5	-	-	-	-

Table 7 Surface water carried by Average Aggregate

Aggregate	Approximate Quantity of surface water L/cu. M.
(1)	(2)
Very wet sand	120
Moderately wet sand	80
Moist Sand	40
Moist gravel or crushed rock	20 & 40

2.5. Water

The water used for the preparation of concrete, for washing sand etc. and for curing shall be clean and free from objectionable quantities of silt, organic material, acid, alkali, salts, oil and other deleterious impurities and it shall be obtained from the sources approved by the Engineer. Potable water shall generally be acceptable. The quantity of water to be added for making concrete shall be properly measured and controlled.

Suitable water/cement ratios for the different mixes and uses shall be determined in consultation with the Engineer and the exact value being fixed after taking into account all relevant factors such as strength required, weather conditions, water absorbed by material, workability and slump required consistent with the work requirements, methods of compaction etc.

2.6. Cement Concrete (Plain or reinforced)

- 2.6.1. All cement concrete whether used in R.C.C. work or plain concrete work shall be designated in grades (by the strength it acquires at the age of 28 days) M-10, M-15, M-20, M-25 and M-30 where M refers to the mix and the number 10, 15; 20, 25 and 30 represent the specified 28 days work cube crushing strength of the mix under reference, expressed in N/Sq.mm.
- 2.6.2. The cement concrete to be used in the construction of works covered under this specification can be broadly classified as (i) ordinary concrete and (ii) Controlled concrete.
- 2.6.3. The concrete to be used in the structural work shall be controlled concrete while that used in the mass concrete work such as concrete for anchor block, thrust block, concrete to be used in the leveling course of foundation etc. shall be ordinary concrete. All cement concrete to be used in the work shall conform to the requirements of BIS 456. Cement concrete used in any water retaining structure shall in addition to BIS 456 conform to BIS 3370.
- 2.6.4. In the concrete used in water retaining structures, and for concrete members enclosing the space above liquid concrete mix weaker than M:25 shall not be used. The minimum quantity of cement in such concrete mix shall not be less than 330 Kg/cu.m.

2.7. Ordinary cement concrete

- 2.7.1. Ordinary cement concrete is that cement concrete which is not required to be designed by preliminary test. The proportions of cement, aggregate, water for ordinary cement concrete designated below shall generally consist of quantities as given in the table below per bag of cement.

Table 8: Concrete mix proportion for ordinary concrete

Grade of concrete	Total quantity of dry aggregate (fine and coarse) by Mass per 50 kg of cement	Quantity of Water per 50 kg of cement
	(Max. in Kg.)	(Max. in litres)
M - 10	480	34
M - 15	330	32
M - 20	250	30

- 2.7.2. The proportion of fine aggregate to coarse aggregate for the various mixes listed above shall generally be 1:2 by mass but variation from 1:1.5 to 1:2.5 depending upon the grading of the aggregates, may be permitted by Engineer. The total quantity of fine and coarse aggregate, however, shall not in any case exceed the quantity given in the above table 1. For the purpose of this tender, the ordinary concrete specified by strength as M-10, M-15, M-20 shall be considered to be equivalent to nominal mixes specified as 1:3:6, 1:2:4 and 1:1.5:3, respectively, and any mentioned to these mixes under one system of nomenclature and shall mean their corresponding equivalent under other system of nomenclature. The strength requirements for 28 days and 7 days test under both the system of nomenclature shall be in conformity with those in table (2) and (3) given hereinafter.

2.7.3. The cement concrete shall be tested for compressive strength at the age of 28 days on 150 mm. cubes in accordance with the latest IS 516 and the strengths developed for all types of concrete shall not be less than those given in Table 2.

Table 9: Strength requirement of concrete

Grade of concrete	Minimum compressive strength of 150 mm cubes at 28 days in N./sq.mm	
	PRELIMINARY TEST	WORKS TEST
M – 10	13.5	10.0
M – 15	20.0	15.0
M - 20	26.0	20.0
M - 25	32.0	25.0
M – 30	38.0	30.0

2.7.4. For quick results, the contractors shall carry out compression tests on representatives 150 mm. cubes cast in accordance with relevant BIS at 7 days in addition to the normal 28 days compressive strength. The 7 days strength of the various concrete mixes shall not be less than the values given in the Table No.3 below.

2.7.5. However, the 28 days compressive strength alone shall be the criterion for acceptance or rejection of the concrete, unless the Engineer is satisfied on the relation between the 7 days compressive strength and the 28 days compressive strength, established by carrying out a number of tests in which case he may relax the test frequency of 28 days compressive strength specified hereinafter.

Table 10: Optional works test requirement of concrete

Grade of Concrete	Minimum compressive strength on 150 mm cube at 7 days in N/sq. mm
M-10	7.0
M-15	10.0
M-20	13.5
M-25	17.0
M-30	20.0

2.7.6. All test strength specified above are exclusively for 150mm. size cubes and they shall be adequately modified to suit the requirements of 150mm.dia. and 300mm.long cylinder moulds wherever used. In the case of cylinder, the strength values obtained should be multiplied by 1.25 to obtain the equivalent cube strength.

2.7.7. Controlled concrete: Controlled concrete when used in plain and reinforced concrete structure shall be of the grades M-10, M-15, M-20, M-25; M-30, M-35, M-40. In controlled concrete the determination of the proportions of cement, aggregate and water to attain the required strength shall be made with the preliminary test by designing the concrete mix.

2.7.8. For the purpose of designing concrete mix for controlled concrete works IS 10262-1982, 'Recommended Guide lines for concrete mix design' may be adopted. However, this standard does not debar the adoption of any other accepted methods of mix design being followed on the works.

- 2.7.9. The concrete mix shall be designed to have an average strength corresponding to the values specified for preliminary tests in Table 4. The proportions chosen should be such that the concrete is of adequate workability for the conditions prevailing on the work in question, and can be properly compacted with the means available.
- 2.7.10. The maximum total quantity of aggregate by weight per 50 kg. of cement shall not exceed 450 kg. except where otherwise specifically permitted by the Engineer.
- 2.7.11. Except where it can be shown to the satisfaction of the Engineer that supply of properly graded aggregate of uniform quality can be maintained over the period of work, the grading of aggregate should be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions when required, the different sizes being stocked in separate stock piles. The material should be stock-piled for several hours preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible, the frequency for a given job being determined by the Engineer, to ensure that the Suppliers are maintaining the grading uniform with that of the samples used in preliminary tests.
- 2.7.12. In proportioning concrete, the quantity of both cement and aggregate should be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags should be weighed separately to check the net weight. Where the cement is weighed on the site and not in bags it should be weighed separately from the aggregate. Water should either be measured by volume in calibrated tanks or weighed. All measuring equipment should be maintained in a clean serviceable condition, and their accuracy periodically checked.
- 2.7.13. It is most important to maintain the water cement ratio constant at its correct value. To this end, determination of moisture contents in both fine and coarse aggregate should be made as frequently as possible, the frequency for a given job being determined by the Engineer according to weather conditions. The amount of the added water should be adjusted to compensate for any observed variations in the aggregate IS : 2386 (Part-III)-1963 Methods of Tests for aggregate for Concrete: Part III Specific gravity, density voids, absorption and bulking may be referred to. To allow for the variation in weight of aggregates due to variation in their moisture content, suitable adjustments in the weights of aggregates should also be made.
- 2.7.14. No substitution in materials used on the work or alterations in the established proportions, except as permitted in the above paragraph, shall be made without additional tests to show that the quality and strength of concrete are satisfactory.
- 2.7.15. Workability of the concrete should be checked at frequent intervals, The slump test, or where facilities exist, the compacting factor test in accordance with BIS:1199-1959 may be adopted for this purpose.
- 2.7.16. A competent person should be employed whose first duty will be to supervise all stages in the preparation and placing of the concrete. All works test specimens should be made and site tests carried out under his direct supervision.
- 2.7.17. In order to get a relatively quicker idea of the quality of concrete, or compressive strength, tests at 7 days may be carried out in addition to 28 days compressive strength tests. In all cases, the 28 days compressive strength specified in Table 4 shall alone be the criterion for acceptance or rejection of the concrete. If however, from tests carried out in a particular job over a reasonably long period it has been established to the satisfaction of the Engineer that a suitable ratio between the 28 days compressive strength and compressive strength at 7 days may be accepted, the Engineer may suitably relax the frequency of 28 days compressive strength test provided the expected strength values at the specified early age are consistently met. For this purpose the value given in Table 5 may be taken for general guidance in the case of concrete made with ordinary cement.
- 2.7.18. For detailed Specifications regarding preliminary and work test relevant paragraphs are reproduced from BIS : 516-1959 methods of test for strength of concrete and BIS : 1199-1959 methods of sampling and analysis of concrete as given below:

Table 11 : Strength requirements of concrete. All values in N/sq.mm.

Grade of concrete	Compressive strength of 150 mm cubes at 28 days after mixing conducted on accordance with BIS 516 -1959	
	PRELIMINARY TEST (Min)	WORKS TEST (Min)
(1)	(2)	(3)
M-10	13.5	10.0
M-15	20.0	15.0
M-25	32.0	25.0
M-30	38.0	30.0
M-35	44.0	35.0
M-40	50.0	40.0

➤ **Note 1:**

Preliminary Test - A test conducted in a laboratory on the trial mix* of concrete produced in the laboratory with the object of:

- a) Designing a concrete mix before the actual concreting operations start.
- b) Determining the adjustments required in the designed mix when there is a change in the materials used during the execution of work,
- c) Verifying the strength of concrete mix.
- d) **Works Test** - A test conducted either in the field or in a laboratory, on the specimens made on the works, out of the concrete being used on the works.

➤ **Note : 2**

- a) **Size of Cubes** - In the works test, with the approval of the Engineer, 100 mm. cubes may be used in place of 150 mm. cubes provided the maximum nominal size of aggregate does not exceed 20 mm. Even the use of 150 mm. cubes should normally be restricted to concretes having nominal size of aggregate not exceeding 40 mm. Where concrete with aggregate larger than 40 mm. size is required to be tested, the sizes of cubes should be specified by the Engineer keeping in view that generally the length of side of the cube should be about four times the maximum nominal size of aggregate in the concrete constituting the cube specimen.
- b) **Strength in Relation to size of the cube**-where 100 mm. cubes are used, the values obtained from tests on 100 mm. cubes shall be reduced to the extent established by comparative preliminary tests, with 100 and 150 mm. cubes or in the absence of such comparative test by 10 percent of the value determined from the tests, in order to give the equivalent strength for 150 mm. cubes. Where cubes larger than 150 mm. are adopted, generally no modification is necessary unless otherwise specified by the Engineer.

2.8. FORM WORK

2.8.1. Material

All formwork for concrete work shall be made either of planed and matched timber or M.S.Plates. The timber for the formwork shall be hard wood dry and well seasoned. It shall not be so dry as to absorb water from concrete nor shall it be so green as to shrink after erection. When steel plates are used for forms, the plates shall be free from wrinkles, debts, lumps or other imperfections. The timber boards or steel plates shall have sufficient thickness to withstand the construction loads and the pressure exerted by the wet concrete as well as vibration during placing of concrete. Normally, the thickness shall not be less than 38 mm. for timber, 18-gauge for M.S.Plates. However, incase where the depth of concrete to be poured in the formwork is small, the thickness of timber planks may be reduced in consultation with the Engineer. Wherever the quantum of M-10 mass concrete is 20 cu.m. or more, steel formwork should be used. Similarly, for M-15 in R.C.C. concrete pedestals or M-15-mass concrete, steel form work should be used.

2.8.2. Arrangements

- 2.8.2.1. All forms shall conform to the shape, tines, dimensions as shown on the plans of the concrete members. The framework shall include all wedging, bracing, the rod, clamps, stop off boards and other devices necessary to 2 mould the concrete to the desired shape. The formwork shall be constructed as to remain sufficiently rigid during the placing and compacting of the concrete and shall withstand the necessary pressure, ramming and vibrations without any deflection from the prescribed lines and curves. It shall be properly strutted and braced in at least two directions. It shall be sufficiently tight to prevent loss of liquid slurry from the concrete. It shall be strongly and firmly erected. The moulds shall be planed smooth, free from knots, holes, open joints and other imperfections. The use of bolts passing through concrete members which form parts of any water retaining structure shall not be permitted for the purpose of securing the alignment of the formwork. The formwork shall be so arranged as to permit easy erection initially and easy removal without jarring or disturbing the concrete finally. Wedges and clamps shall be used wherever practicable instead of nails.
- 2.8.2.2. Where the depth of formwork exceeds 1.5 meters, the contractors shall keep one side partly open, from which the concrete could be placed and the planking on the open side could be raised as the work proceeds. This will avoid segregation of material in concrete and also facilitate its proper vibration.

2.8.2.3. Before concrete is placed; all rubbish shall be removed from the interior of the form and the surfaces of the formwork in contact with concrete shall be cleaned and thoroughly wetted. The inside surface of the form work shall be treated with a coat of lime, oil or any other material approved by the Engineer. Care shall be taken to see that the above approved composition is kept out of contact with the reinforcement. The slat; centering shall be covered with "Double Wax" water proofing paper or tar paper or polythene sheet as directed by the Engineer.

2.8.2.4. Where no special finish is desired i.e. in slabs, columns of the reservoir etc. and where form finish is acceptable, the formwork may be prepared out of 'Anchor' brand plywood or similar material, which shall give a good finish to the concrete surface and thus there will be no necessity of providing cement plaster finish. For work, which are of repetitive nature, such as column footings, pedestals for pipes, pedestal footings, the form work shall be fabricated out of steel plates and structures to obtain uniform finish throughout the work. In all cases the formwork shall be inspected and approved by the Engineer, before any concreting is started. The contractors shall, however, be solely responsible for the proper design, adequacy and stability of the formwork. If at any time, in the opinion of the Engineer, the formwork provided is not considered sufficiently rigid and/or is defective, the contractors shall improve or strengthen the same in such manners as the Engineer may direct.

2.9. Removal of Formwork

In no circumstances shall form be struck off until the concrete reaches adequate strength as required or without obtaining permission of the Engineer. All formwork shall be removed without such shock or vibration as would damage the concrete. Before the soffit and the struts are removed the concrete surface shall be exposed where necessary in order to ascertain that the concrete has hardened sufficiently. The responsibility for the removal of the formwork whether whole or part, shall rest, entirely with the contractors who must nevertheless be guided by the opinion of the Engineer in this regard. The work of striking and the removal of formwork shall be conducted in the presence of the Engineer and under personal supervision of a competent Foreman in the employment of the contractors.

Normally, the forms shall be struck after the expiry of the following periods

Table 12

1.	Vertical formwork to columns, walls, beams	16-24hrs day
2.	Soffit formwork to slabs (props to be refixed immediately after removal of formwork)	3 days
3.	Soffit formwork to beams (props to be refixed immediately after removal of formwork)	7 days
4	Removal of props under slabs	
	Span over 4.5 m	14 days
5.	Removal of props to beams & arches	
	Span upto 6 m	14 days
	Span over 6 m	21 days

2.10. Surface Treatment & Finish

When the formwork is struck, all the faces of concrete shall be smooth and sound, free from voids, and air holes. Any roughness or irregularity on the exposed surfaces shall be immediately filled up while the concrete is still green with cement grout, cement wash and/or 1:1.112 mortar properly trowelled and finished. Such patching of the concrete face shall be carried only with the permission of the Engineer. If the concrete is found honeycombed, the honeycombed portion and whatever surrounding concrete that may be considered unsatisfactory by the Engineer shall be dismantled and fresh concrete of proper quality shall be reinstated at contractors' cost.

Chemical Admixtures When required, admixtures of approved quality shall be mixed with concrete, as specified. The admixtures shall conform to IS 9103 and as specified in Chapter 5 - R.C.C.

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Admixtures may be any one of the following classes for use in concrete:- (a) Water Reducing Admixtures (b) Retarding Admixtures (c) Accelerating Admixtures. (d) Water Reducing and Retarding Admixtures. (e) Water Reducing and Accelerating Admixtures. (f) Permeability Reducing (water proofing) Admixtures.

Liquid Admixtures: Admixtures introduced into the concrete as liquids generally fall into the following categories. (a) Air Entraining, (b) Water Reducing, (c) Water Reducing Retarders. (d) Retarders. (e) Water Reducing Accelerators. (f) Accelerators.

Dosage of these admixtures may vary according to manufacturers specification.

Two or more admixtures may not be compatible in the same solution. It is therefore mandatory that when two admixtures manufactured by the same manufacturers is being used simultaneously, the manufacturer shall certify their compatibility. In case the two or more admixtures are produced by different manufacturers, then, before their use in concrete, test shall be performed by the manufacturer to establish their compatibility, all such test reports shall be furnished to the Engineer-in-Charge for his approval before their use in concrete.

Some admixture may be in the form of powder, particle or high concentration liquids which may require mixing with water prior to dosing. Under these conditions water in solution shall be considered as part of total water content in the batch in order to maintain the water-cement ratio.

Admixture manufacturer's recommendation shall be carefully followed so as to ensure complete solution of the product or to prepare a standard solution of uniform strength for easier use.

Certain admixtures may contain significant amounts of finely divided insoluble materials or active ingredients which may or may not be readily soluble. It is essential for such admixtures that precautions be taken to ensure that these constituents be kept in a state of uniform suspension before actual batching. When relatively small amounts of powdered admixtures are to be used directly, these shall be pre-blended with cement.

Admixtures are sold under various trade names and may be in the form of liquids or powders. The proprietary name and the net quantity of content shall be clearly indicated in each package or container of admixtures. The admixtures shall be uniform within each batch and uniform between all batches.

No admixtures shall be accepted for use in concrete unless these are tested in accordance with IS 9103 and the test results are approved by the Engineer-in-Charge.

3. CEMENT CONCRETE PAVEMENT UNDER CONTROLLED CONDITIONS

3.1. Materials

- 3.1.1. Cement (a) Cement used on work shall be as per sub head cement concrete of CPWD specifications- 2009 (Vol. – D).
- 3.1.2. Water : Water used on work shall conform to SH: cement concrete of CPWD, Specification 2009- Vol. I.
- 3.1.3. Coarse Aggregate : These shall be crushed or broken from hard stones obtained from
- 3.1.4. Coarse Aggregate : These shall be crushed or broken from hard stones obtained from approved quarry. These shall be clean strong, durable of fairly cubical shape and free from soft, friable, thin elongated and laminated disintegrated pieces. These shall also be free from dirt, organic deleterious and any other foreign matter and adherent coatings and shall satisfy the physical requirements laid down in para 16.37.19 under quality control.
- 3.1.5. Fine Aggregate : This shall be coarse sand conforming to CPWD Specification 2009 Vol. I.
- 3.1.6. Grading of Mixed Aggregates : The grading of all aggregates (coarse and fine aggregates) to be used in the work shall be determined in the laboratory. The coarse and fine aggregates shall be mixed in suitable proportions so that the grading of the mixed aggregates shall be in the range indicated in Table 16.32.
- 3.1.7. I.S. Sieve Size (IS 460) %age passing
- 3.1.8. I.S. Sieve Size (IS 460) %age passing by weight 45 mm 100 22.4 mm 55 - 60 11.2 mm 45 - 50 5.6 mm 35 - 40 2.8 mm 30 - 35 1.4 mm 20 - 25 710 microns 15 - 20 355 microns 10 - 14 180 microns 2 - 5
- 3.1.9. Mix Design
- 3.1.10. The mix shall be approved by Engineer-in-Charge so as to obtain the following mean strength that exceeds the minimum specified flexural strength by 1.64 times the designed standard deviation.
- 3.1.11. Minimum works beam flexural strength at 28 days = 300 kg/sqm. for M-30 or specified in item Designed standard deviation = 60 kg/sqm. for M-30 or for specified grade(s)
- 3.1.12. For the purpose of tendering the contractor shall base his rate on the assumption that the quantity of cement used for one cum. of finished concrete shall be 340 kg. or M - 30. If the actual quantity of cement required to be used as a result of the laboratory test is different from that assumed above, necessary adjustment in the cost due to short cement used shall be made on the basis of issue rate of cement including storage charges plus 2.5% for handling charges. However, under no circumstances the quantity of cement to be used shall either exceed 350 kg./cum or fall below 330 kg. per cum of finished concrete.
- 3.1.13. Statistical Field Check
- 3.1.14. Samples of concrete shall be taken at the mixer and works beams, made, cured and tested in accordance with IS 1199 and IS 516.
- 3.1.15. When a mix is used for the first time, it is important to get a large number of results, as soon as possible, in order to establish the level of control and then suitability of the mix proportions. A sample of concrete shall be taken at random on eight separate occasions during each of the first five days of using that mix. From each sample two beams shall be made one for test at 7 days and the other for test at 28 days.
- 3.1.16. The work beam results shall be examined both individually and in consecutive (but not overlapping) sets of four, for which the average and the range of each set is calculated. The mix proportions shall be modified to increase the strength, if in the first ten consecutive (but not overlapping) sets any of the following conditions are not satisfied.
- 3.1.17. Each sample has a test strength not less than the minimum specified strength i.e. 30 kg/sq. cm. (or otherwise specified in item).
- 3.1.18. Not more than two individual results (Not more than one of first twenty) of the 40 beams tests shall fall below the minimum work beam strength but they shall not be less than 80% of the specified beam strength of 30 kg./sq. cm (or otherwise specified in item) or the minimum specified strength minus 1.35 times the standard deviation whichever is greater.
- 3.1.19. No value of the range in any set shall exceed 3 times the designed standard deviation.
- 3.1.20. The average for all samples (10 sets) shall not be less than the minimum specified strength i.e. 30 kg/sq. cm (or otherwise specified in item) plus 1.64 times the designed standard deviation 60 kg./sq.cm M-30.
- 3.1.21. If either of these conditions (16.37.3.3 I or 16.37.3.3 II) are not satisfied, the mix shall be modified and the procedure described above shall be repeated till results satisfying the above criterias are obtained.

- 3.1.22. Subsequently samples shall be taken at the rate of one for every 30 cubic metre of concrete laid. Eight beam specimen shall constitute one sample. A set of 4 specimen shall be tested after 7 days and another set of 4 specimen shall be tested after 28 days. These test results shall be checked individually and in sets of four as the work progresses. If at any stage it is found that either of conditions 16.43.4.3,I or 16.4.3,II are not satisfied, the overall average and the standard deviation of the previous consecutive 40 beam test results including the non-complying set shall be calculated. If the overall average strength minus 1.64 times the standard deviation is more than the specified beam strength (30 kgm/sq.cm) (or otherwise specified in item) the concrete shall be accepted. But if it is less than the concrete work corresponding to these 40 beams tests shall be rejected and the mix proportion shall be modified forth with for further work. The rejected work shall be replaced by the contractor immediately at his own cost and expense.
- 3.1.23. The statistical field checks described in 16.37.3.1 to 16.37.3.2 are meant to control the quality of concrete. The standard of acceptance of concrete shall be governed by the provision of para 16.37.3.3 to 16.37.3.5.
- 3.1.24. Slump Test The test shall be carried out as per IS 1199. A slump test shall be carried out at each mixer at least one in fifty batches mixed or more frequently if directed by the Engineer-in-Charge. Any batch from which slump test is being made shall not be transferred to the place of laying till the slump test has been completed. Not only the batch which gives a slumps in excess of that specified shall be rejected but the concrete already laid immediately preceding the batch tested upto the nearest last transverse joint may be rejected by the Engineer-in-Charge or his subordinate, if he is satisfied that such preceding batches were substandard in this respect. The decision of the Engineer-in-Charge in this respect shall be final and binding on the contractor. Such rejected concrete shall be removed by the contractor immediately and replaced with proper slump concrete at his cost and expense.
- 3.1.25. Steel Forms
- 3.1.26. All side forms shall be of mild steel. The steel forms shall be of M.S. Channel sections and their depth shall be equal to the thickness of the pavement.
- 3.1.27. The side forms shall have a length of at least 3.0 metres except on curves of less than 4.5 metres radius where shorter lengths may be used. When set to grade and stacked in place the maximum deviation of the top surface of any section from a straight line shall not exceed 3 mm. The method of connection between sections shall be such that the joint formed shall be free from play or movement in any direction. The use of bent, twisted or worn out forms shall not be permitted. At least three stake pockets for bracing pins or stakes shall be provided for each 3.0 M length of forms. Bracing and supports must be ample to prevent the springing of forms under pressure of concrete or weight or thrust of the machinery (like screed vibrator) operating on the forms. Support to the forms shall be sufficiently rigid to hold them in position during the entire operation of laying and compacting and finishing and that they shall not at any time deviate more than 3 mm from straight edge 3 metres in length. Forms which show a variation from the required rigidity of the alignment and levels shown on the plans shall be reset or removed as directed. The length and number or pins or stakes shall be such as to maintain the forms at the correct line and grade.
- 3.1.28. The supply of forms shall be sufficient to permit their remaining in place for at least 12 hrs. after the concrete has been placed or longer, if in the opinion of the Engineer-in-Charge, it is necessary.
- 3.1.29. The top line of the forms is not to vary from the correct level or alignment and the levels and alignment of the forms are to be checked and corrected as necessary immediately prior to the placing of concrete. The top edges and faces of the forms are to be carefully cleaned and maintained in clean condition.
- 3.1.30. While removing the steel forms, care shall be taken to withdraw them gradually, any damage to the bull nosed edges shall be made good while the concrete is still green.
- 3.1.31. Setting of Forms (a) Setting of forms shall be according to the slab plan subject to the approval of Engineer-in-Charge and concreting shall not commence until the setting of forms is approved.
- 3.1.32. Forms shall be set for at least 50 metres in advance of the point where the concrete is being laid and shall not be removed until at least 12 hrs. of placing of the concrete or longer if in the opinion of Engineer-in-Charge is necessary.
- 3.1.33. After setting, the working faces shall be thoroughly oiled by using approved oil before concrete is placed against them.
- 3.1.34. The pavement joints of overlay layer would overlap with the joints of underlay cement concrete.
- 3.1.35. Batching and Mixing As detailed in SH: 5 of reinforced cement concrete work of CPWD specifications 2009.
- 3.1.36. Placing of Concrete As detailed in SH: 5 of reinforced cement concrete work of CPWD specifications 2009.
- 3.1.37. Compaction of Concrete
- 3.1.38. Compaction shall be carried out by electrically (or) diesel operated needle and screed vibrators as stipulated hereafter. Needle vibrator should be used all over the area for obtaining initial compaction of concrete. These should be of diameter not less than 4.5 cm. If the vibrator are pneumatic the pressure must not be below 4 kg/sq.cm. If electrically operated, they should have a minimum frequency of 3500 impulses per minute.

- 3.1.39. There should be at least three needle vibrators working in any bay. A vibrating screed consisting of a steel or timber section weighing not less than 15 kg. per metre with a tamping edge of not less than 7 cm width and having a vibrator mounted thereon shall follow needle vibrators to obtain full compaction. The face of the wooden tamping edge of the screed shall be lined with M.S. Plate rigidly fixed by means of counter sunk screw. Where screed vibrators are used for compaction, a standby unit shall always be maintained ready for use, should the other one go out of order. Where electrically driven vibrators are employed, a standby diesel pneumatic unit shall be kept ready for use in case of power failure. At the discretion of the Engineer-in-Charge, for compaction at edges and joints, vibrators may be supplemented by hand tamping and rodding for securing satisfactory results. Under no circumstances, honey combing of concrete at joints or elsewhere shall be permitted.
- 3.1.40. When using screed vibrator for compaction it should not be dragged over the concrete. During the initial passes it shall be lifted to the adjacent forward position in short steps, subsequently, it shall be slowly slid over the surface with its axis slightly tilted away from the direction of sliding and the operation repeated until a close, dense surface is obtained.
- 3.1.41. Concreting shall be carried out in one operation between the expansion joints and construction joints without any break at the dummy joints.
- 3.1.42. Concrete shall be deposited on the base as near the joints as possible without touching them. It shall then be shoveled against the sides, maintaining equal pressure and deposited approx. 50 mm higher than the depth of the joints, care being taken that it is worked well around the joints. The concrete shall not be dumped from the bucket directly upon or against the joints.
- 3.1.43. Workmen shall not be allowed to walk on freshly laid concrete and proper cat walk shall be provided with independent supports beyond concreting bays.
- 3.1.44. Finishing of Concrete
- 3.1.45. During compaction, any low or high spots shall be made up by adding or removing concrete. After longitudinal floating has been completed but while concrete is still plastic, the slab surface shall be tested for trueness with a 3 m straight edge. Any depressions or high spots showing departure from the true surface shall be immediately rectified. High spots shall be cut down and refinished. Depressions shall be enlarged to about 8-10 cm and filled up with fresh concrete, compacted and finished.
- 3.1.46. The straight edge testing the re-floating is to continue until the entire surface:
- 3.1.47. Is free from observable departure from the straight edge,
- 3.1.48. Conforms to the required levels and across section, and
- 3.1.49. The foregoing work is to be carried out while the concrete is still plastic and workable.
- 3.1.50. Belting
- 3.1.51. Just before concrete becomes non-plastic, the surface shall be belted with a two ply canvas belt not less than 20 cm wide and at least 1 metre longer than the width of the slab. Hand belts shall have suitable handles to permit controlled uniform manipulation. The belt shall be operated with short strokes transversed to the centre line of the pavement and with rapid advance parallel to the centre line.
- 3.1.52. Brooming
- 3.1.53. After belting and as soon as the surplus water, if any, has risen to the surface, the pavement shall be given a broom finish with an approved steel or fiber broom not less than 45 cm wide. The broom shall be pulled gently over the surface of the pavement from edge to edge. Adjacent strokes shall be slightly overlapped. Brooming shall be perpendicular to the centre line of the pavement and so executed that the corrugations formed shall be uniform in character and width and not more than 1.5 mm deep.
- 3.1.54. Brooming shall be completed before the concrete reaches such a stage that the surface is likely to be torn or unduly roughened by the operation. The broomed surface shall be free from porous or rough spots, irregularities, depressions, and small pockets such as may be caused by accidental disturbing of particles of coarse aggregates embodied near the surface. The brooming shall be of uniform pattern all through.
- 3.1.55. Edging : After belting/brooming has been completed but before the initial setting of concrete, the edges of the slab shall be carefully finished with an edger of 6 mm radius, and the pavement edges shall be left smooth and true to line.
- 3.1.56. Honey Combing
- 3.1.57. The side forms shall not be removed until 12 hours or such longer period as the Engineer-in- Charge may decide after the laying of concrete.
- 3.1.58. As soon as the side forms are removed, any minor honey combed area shall be filled with mortar composed of one part of cement and two parts of fine aggregate. Major honey combing areas or segregated concrete or other defective work or areas damaged by removal of the forms or concrete damaged by rain or due to any other reason whatsoever shall be considered as defective work and shall be removed and replaced by the contractor at his own expense. The total area of honey combed surface shall not exceed 4 per cent of the area of the slab side.

However, no individual honeycomb patch shall exceed 0.1 sqm. Engineer-in-Charge's decision as to whether the concrete is defective or not shall be final and binding.

3.1.59. Surface Accuracy

3.1.60. After the concrete has sufficiently hardened after about 12 hours and not later than 24 hours, the surface shall be tested again for high spots. All high spots shall be marked and those exceeding 3 mm shall be ground down immediately. Care shall be taken to see that the grinding does not in any way damage the concrete surface.

3.1.61. The final surface finish is to be such that when tested with a profilograph/roughness indicator/or a 3 metre long straight edge or an equivalent mechanical unevenness indicator placed anywhere within the same or adjoining slab in any direction on the surface, there shall be no variation greater than 3 mm. (c) shall conform to the specified surface when the concrete has hardened.

3.1.62. If the surface irregularity exceeding 3 mm still remains despite grinding as per para 16.37.13.2 the concrete shall be removed to its full depth. The area of concrete to be removed shall be complete slab between the nearest joints, where the defective slab is less than 4.5 metres from the expansion joint, the whole area upto the expansion joint shall be removed to the full depth. The concrete so removed shall not be reused in the work. Fresh concrete shall be laid in the manner already de- scribed in above paras and shall again be subject to test for surface accuracy and other quality control measures. Nothing extra shall be paid on this account.

3.1.63. Every slab shall bear an impression not exceeding 3 mm in depth comprising the number allotted to the slab and the date on which it is laid. This impression shall be formed by the contractor when the concrete is green so as to leave permanent mark on setting.

3.1.64. Initial Curing

3.1.65. Immediately after completion of the finishing operations, the surface of the pavement shall be entirely covered with wetted burlap, cotton or jute mats. The mats used shall be of such length (or width) that as laid they shall extend at least 45 cm beyond the edges of the slab. The mats shall be placed so that the entire surface and both edges of the slab are completely covered. This covering shall be placed as soon as, in the judgment of the Engineer-in-Charge the concrete has set sufficiently to prevent damage to the surface prior to being placed, the mats shall be thoroughly saturated with water and shall be placed with the wettest side down. The mats shall be so placed and weighed down as to cause them to remain in intimate contact with the surface covered, and the covering shall be maintained full wetted and in position for 24 hours after the concrete has been placed or until the concrete is sufficiently hard to be walked on without suffering damage. Water shall be gently sprayed so as to avoid damage to the fresh concrete. If it becomes necessary to remove a mat for any reason, the concrete slab shall not be exposed for a period of more than half an hour.

3.1.66. Worn burlap or burlap with holes shall not be permitted. Burlap reclaimed from previous use other than curing concrete shall be thoroughly washed prior to use for curing purposes. If burlap is obtained in strips, shall be laid to overlap by at least 150 mm.

3.1.67. Burlap shall be placed from suitable bridges. Walking on freshly laid concrete to facilitate placing burlap shall not be permitted.

3.1.68. Final Curing

3.1.69. Upon the removal of the burlaps, the slab shall be thoroughly wetted and then cured as follows:-

3.1.70. All joints shall be filled with filler in order to prevent the edges of joints from getting damaged and entry of clay materials into the joints during final curing. Exposed edges of the slab shall be banked with a substantial berm of earth. Upon the slab shall then be laid a system of transverse and longitudinal dykes of clay about 50 mm high immediately covered with a blanket of sandy soil free from stones to prevent the drying up and cracking of clay. The rest of slab shall then be covered with sufficient sandy soil so as to produce a blanket of earth not less than 40 mm deep after wetting. The earth covering shall be thoroughly wetted while it is being placed on the surface and against the sides of the slab and kept thoroughly saturated with water for 21 days and thoroughly wetted down during the morning of the 22nd day and shall thereafter remain in place until the concrete has attained the required strength and permission is given by the Engineer-in-Charge. Thereafter the covering shall be removed and the pavement cleaned and swept. If the earth covering becomes displaced during the curing period, it shall be replaced to the original depth and resaturated.

3.1.71. Contractor shall appoint chowkidars at his expense to prevent workmen, cattle, etc., straying on the pavement concrete.

3.1.72. Concrete shall not be subjected to any load or weight of any plant until at least 28 days after laying.

3.2. EXPANSION JOINT

3.2.1. Materials Premoulded Joint Filler in Expansion Joint : It shall conform to IS 1838 (Pt. I). The thickness shall be 25 mm with tolerance 1.5 mm. and shall be of the maximum available standard length not less than one lane

width. The filler board shall be positioned vertically with the prefabricated joint assemblies along the line of the joint within tolerance of + 10 mm from the intended line of the joint. The depth of board shall be 25 mm less than thickness of slab within a tolerance of ± 3 mm so that the top of the board shall be below the surface or will not impede the passage of the finishing straight edge or oscillating beam of the paving machine.

- 3.2.2. Bitumine Hot Sealing Compound : The joint sealing compound shall be fuel and heat resistant type complying to grade B of IS 1834. It shall be capable of adhering to the concrete without cracking, spalling and disintegration.
- 3.2.3. Expansion joints shall be provided as shown in the drawing and as per directions of Engineer-in- Charge. All joints shall be constructed true to line with their faces perpendicular to the surface of the pavement. The joint shall be 20 mm wide. The depth of the non-extruding filler pad shall be 25 mm less than the depth of the concrete slab.
- 3.2.4. Before the provision of expansion joint, the face of the already laid concrete slab shall be painted with primer at the rate of 2.6 liters per 10 square metres. The expansion pad shall be properly cut to shape and shall then be placed in position abutting the painted face of the already laid concrete slab. The adjacent slab shall then be concreted. The face of the pad against which the new concrete slab is to be laid shall also be painted with primer before laying the concrete, while concreting a neat groove of size 20 mm x 25 mm as per drawing shall be formed on top of the pad taking care that the edges are absolutely straight and that the groove so made does not get filled with any material like concrete, mortar and other rubbish.
- 3.2.5. Before the curing process is started, the top of expansion joint shall be filled with bitumen sand mixture in order to ensure that no foreign material used in curing enters into the joint. This filling shall be removed before filling the joints with sealing compound.
- 3.2.6. For sealing the joints following operations shall be carried out :—
- 3.2.7. The joints are cleared of any foreign matter to the full depth upto the top of expansion pad with steel spatula.
- 3.2.8. The joints are blown with compressed air.
- 3.2.9. Cleaning is done with Kerosene oil.
- 3.2.10. Priming is done with spray gun @ 2.6 liters per 10 sqm of the surface to be primed.
- 3.2.11. The primer is allowed to dry completely before pouring the sealing compound.
- 3.2.12. The sealing compound grade 'A' is heated to the required temperature ranging between 155 deg. C to 165 deg. C or to the temperature range specified by the manufacturer. Over heating shall be avoided. Pouring shall be done from vessel with spout in such a manner that the material will not get spilled on the exposed surface of the concrete, any excess filler on the surface of the pavement shall be removed immediately and the pavement surface cleaned.
- 3.2.13. The filling shall be worked into the joints with hot flats to ensure escape of trapped air.
- 3.2.14. The filling is then ironed with hot iron. It is recommended that while in summer the joints may be sealed flush with the adjacent pavement surface, in winter the sealing compound may be filled to a depth 3-4 mm below the surface.
- 3.2.15. The edges of the joints are then cut and trimmed to ensure neat and straight line finish.
- 3.2.16. To prevent tackiness or pick up under traffic, the exposed surfaces of the sealing compound shall be dusted with hydrated lime, if directed by Engineer-in-Charge (Nothing extra shall be paid for the same).
- 3.2.17. Measurements: The measurement of the specified depth of joint shall be recorded in metres correct to two places of decimals.

3.3. REINFORCEMENT:

3.4. SUPPLY:

The steel reinforcement to be used on the works shall conform to the specifications of the latest BIS No.432, BIS No.1139, BIS No.1786, BIS No. 1566, BIS No.226 as the case may be in respect of physical properties, chemical requirements, tolerance limits etc. .

The steel reinforcement required for the work shall be bought by the contractors who shall make their own, arrangement for the procurement of reinforcement bars from the open market.

All steel brought at site shall be stored in proper manner as approved by the Engineer to avoid distortion, deterioration and corrosion. The Contractors shall maintain proper registers for the receipt, the consumption, the use of steel and the balance work of site as per requirements of the Engineer.

3.5. Cleaning

All steel reinforcement placed in position shall be clean, free from loose mill scales, dust, loose rust, oil, paint, grease, cement grout or other deleterious coating which may impair or reduce bonding property of steel and shall be maintained in clean conditions until they are finally embedded in the concrete.

3.6. Bending

The reinforcement shall be cut and bent cold to the correct size and shape as shown in the drawing. The requirement of the latest BIS No.2502 shall be complied with. The reinforcement shall not be bent or straightened in a manner which will injure the material. The bends, cranks, hooks and other angles on the steel reinforcement shall be carefully formed as per ISS practice, twisting of bars being avoided. If any bend shows a sign a brittleness or cracking, the steel bars shall be rejected and removed immediately from the work site.

3.7. Placing and fixing

All reinforcement cut and bent as described above shall be placed and maintained in position exactly as required and shown in the drawing or as directed by the Engineer. All working drawings showing the details of reinforcement be used on the work shall be supplied by the Engineer. Proper cover to the reinforcement shall be maintained as per BIS No.456 and BIS 3370 of 1967 for water retaining structures, by means of suitable mortar cubes, made from rich mortar, which shall be tied to the reinforcement in it. The reinforcement shall be bound together with pliable iron binding wire so that the reinforcement may not be disturbed during concrete placement operations. The binding wires shall be of annealed soft iron No.16 S.W.G. Tack welding for fixing reinforcement in their position shall be permitted.

3.8. Inspection

After the reinforcement is placed in position, it shall be inspected and approved by the Engineer just before the starting of concreting operations.

3.9. Welding :

Welding of reinforcement by gas or electricity may be permitted under suitable conditions and with suitable safeguards, in accordance with relevant Indian Standards for welding M.S. bars used in R.C.C. works; when specially authorized by the Engineer, welding shall be done by experienced and licensed welders. Welding of joints where transverse bars are in contact, shall be permitted. Forged welding shall be prohibited.

3.10. Measurement & Rates :

The steel bars used as reinforcement shall be measured from the drawings and the theoretical weight thereof will be calculated.

Wastage in cutting will not be paid for only steel actually fixed in position will be paid by linear measurement, including hooks and bends. No payment will be made for binding wire, pins, chairs and laps (except for columns at floor level or where the length of bar to be provided is more than 10 to 12 meters, the length generally manufactured) and/or welding and this should be taken into consideration while quoting the rates.

The length of bars shall be measured in meters correct to two places of decimals and the weight payable should be worked out on the following basis correct to 0.1 kg.

Table 13

Sr. No.	Dia of bars in mm	Weight in Kg/mt.
1	6	0.22
2	8	0.39
3	10	0.62
4	12	0.88
5	16	1.58
6	18	2.00
7	20	2.47
8	22	2.98
9	25	3.85
10	28	4.83
11	32	6.31

Sr. No.	Dia of bars in mm	Weight in Kg/mt.
12	36	7.99
13	40	9.87

The steel spacers used for keeping the reinforcement in position shall not be measured separately and the cost thereof shall be deemed to have been covered by the rate of M.S. reinforcement which shall include providing steel reinforcement, bending, cutting, placing, cleaning, supporting on spacers, cost of binding wires, welding etc. as specified. The unit of measurement for reinforcement shall be 1 metric tons.

3.11. REFILLING OF TRENCHES:

On completion of the pipe laying operations in any section, for a length of about 100 meters and while further work is still in progress, refilling of trenches shall be started by the Contractors with a view to restrict the length of open trenches. Pipe laying shall follow closely upon the progress of Trench Excavation and the Contractor shall not permit unreasonable excessive lengths of trench excavation to remain open while awaiting testing of the pipeline. If the Engineer considers that the Contractor is not complying with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipe and refilling of trenches. Only soft earth of good quality free from stones greater than 75 mm. in size for pipes without bitumen sheeting and 20 mm. in size for pipes with bitumen sheeting, free from boulders: roots, vegetation etc. shall be utilized after the lumps are broken, particularly for filling in around the pipes for at least 30 cm. all round. The excavated material nearest to the trench shall be used first. Care shall be taken when back filling, not to injure or disturb the pipe or joints of the out coating, filling shall be carried out simultaneously on both the sides of the pipes so that unequal pressure does not occur. Walking or working on the completed pipeline shall not be permitted unless the trench has been filled to a height of at least 30 cm. over the top of the pipe except as may be necessary for tamping etc. during back filling work. The remaining portion of the trench may be filled in with a mixture of hard and soft material, free from boulders and clods of earth larger than 150 mm. in size, if sufficient quantity of good earth are not available. Filling in shall be done in layers not exceeding 30 cm. in thickness accompanied by adequate watering, ramming etc. so as to obtain good compaction. Water contents of the soil shall be as near as the optimum moisture content as possible. The trench shall be refilled so as to build up to the original ground level, keeping due allowance for subsequent settlement likely to take place.

4. Excavation

EARTHWORK, EROSION CONTROL AND DRAINAGE

4.1. Excavation for Roadway and Drains

4.1.1. Scope:-

This work shall consist of excavation, removal and disposal of materials necessary for the construction of roadway, side drains and waterways in accordance with requirements of these Specifications and the lines, grades and cross-sections shown in the drawings or as indicated by the Engineer. It shall include the hauling and stacking of or hauling to sites of embankment and subgrade construction suitable cut materials as required, as also the disposal of unsuitable cut materials in specified manner, with all leads and lifts, reuse of cut materials as may be deemed fit, trimming and finishing of the road to specified dimensions or as directed by the Engineer.

4.1.2. Classification of Excavated Material

4.1.3. Classification:

The Engineer in the following shall classify all materials involved in excavation manner:

A. **Soil** :This shall comprise topsoil, turf, sand, silt, loam, clay, mud, peat, black cotton soil, soft shale or loose moorum, a mixture of these and similar material which yields 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 anyone direction not exceeding 75 mm shall be deemed to be covered under this category.

B. Ordinary 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 bound. soling of roads, cement concrete pavement, cobblestone, etc. compacted moorum or stabilized soil requiring use of pickaxe or Shovel or both.
- iii) lime concrete, stone masonry 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 riverbed, soil, talus, slope wash and terrace material of dissimilar origin.

4.1.4. Authority for Classification:-

The Engineer shall decide the classification of excavation and his decision shall be final and binding on the Contractor. Merely the use of explosives in excavation will not be considered as a reason for higher classification unless blasting is clearly necessary in the opinion of the Engineer.

4.2. Construction Operations: -

4.2.1. Setting Out:-

After the site has been cleared as per Clause, the limits of excavation shall be set out true to lines, curves, slopes, grades and sections as shown on the drawings or as directed by the Engineer. Clause shall be applicable for the setting out operations.

4.2.2. Stripping and Storing Topsoil:-

When so directed by the Engineer, the topsoil existing over the sites of excavation shall be stripped to specify depths and stockpiled at designated locations for re-use in covering embankment slopes, cut slopes, berms and other disturbed areas where re-vegetation is desired in accordance with Clause Prior to stripping the topsoil, all trees, shrubs etc. shall be removed along with their roots, with approval of the Engineer.

4.2.3. Excavation-General:-

All excavations shall be carried out in conformity with the directions laid here-in-under and in a manner approved by the Engineer. The work shall be so done that the suitable materials Available from excavation are satisfactorily utilized as deemed fit or as approved by the Engineer. While planning or executing excavations, the Contractor shall take all adequate precautions against soil erosion, water pollution etc. as per Clause ., and

take appropriate drainage measures to keep the site free of water in accordance with Clause. The excavations shall conform to the lines, grades, side slopes and levels shown on the drawings or as directed by the Engineer. The Contractor shall not excavate outside the limits of excavation. Subject to the permitted tolerances, any excess depth/width excavated beyond the specified levels/dimensions on the drawings shall be made good at the cost of the Contractor with suitable material of characteristics similar to that removed and compacted to the requirements of Clause. All debris and loose material on the slopes of cuttings shall be removed. No backfilling shall be allowed to obtain required slopes excepting that when boulders or soft materials are encountered in cut slopes, these shall be excavated to approved depth on instructions of the Engineer and the resulting cavities filled with suitable material and thoroughly compacted in an appropriate manner. After excavation, the sides of excavated area shall be trimmed and the area contoured to minimize erosion and ponding, allowing for natural drainage to take place.

4.2.4. Methods, Tools and Equipment:-

Only such methods, tools and equipment as approved by the Engineer shall be adopted/ used in the work. If so desired by the Engineer, the Contractor shall demonstrate the efficacy of the type of equipment to be used before the commencement of work.

4.2.5. Excavation for Surface/Subsurface Drains:-

Where the Contract provides for construction of surface/sub-surface drains, the same shall be done as per Clause . Excavation for these drains shall be carried out in proper sequence with other works as approved by the Engineer.

If water is met with in the excavations due to springs, seepage, rain or other causes, it shall be removed by suitable diversions, pumping or bailing out and the excavation kept dry whenever so required or directed by the Engineer. Care shall be taken to discharge the drained water into suitable outlets as not to cause damage to the works, crops or any other property. Due to any negligence on the part of the Contractor, if any such damage is caused, it shall be the sole responsibility of the Contractor to repair restore to the original condition at his own cost or compensate for the damage.

4.2.6. Use and Disposal of Excavated Materials:-

All the excavated materials shall either be reused with the approval of the Engineer or disposed of with all loads and lifts as directed by the Engineer.

Permission of the Engineer. The Contractor at his own cost shall make any damage arising out of such use good.

4.2.7. Preservation of Property:-

The Contractor shall undertake all reasonable precautions for the protection and preservation of any or all existing roadside trees, drains, sewers, sub-surface drains, pipes, conduits and any other structures under or above ground, which may be affected by construction operations and which, in the opinion of the Engineer, shall be continued in use without any change. Safety measures taken by the Contractor in this respect, shall be got approved from the Engineer. However, if any, of these objects is damaged because of the Contractor's negligence, it shall be replaced or restored to the original condition at his cost. If the Contractor fails to do so, within the required time as directed by the Engineer or if, in the opinion of the Engineer, the actions initiated by the Contractor to replace restore the damaged objects are not satisfactory, the Engineer shall arrange the replacement/restoration directly through any other agency at the risk and cost of the Contractor after issuing prior notice to the effect.

4.2.8. Preparation of Cut Formation:-

The cut formation, which serves as a sub-grade, shall be prepared to receive the subbase base course as directed by the Engineer. Where the material in the subgrade has a density less than specified in Table 300-1, the same shall be loosened to a depth of 500 mm and compacted in layers in accordance with the requirements of Clause adding fresh material, if any required, to maintain the formation level as shown on the drawings. Any unsuitable material encountered in the subgrade level shall be removed as directed by the Engineer, replaced with suitable material and compacted in accordance with Clause.

In rocky formations, the surface irregularities shall be corrected and the levels brought up to the specified elevation with granular base material as directed by the Engineer, laid and compacted in accordance with the respective Specifications for these materials. The unsuitable material shall be disposed of in accordance with Clause. After satisfying the density requirements, the cut formation shall be prepared to receive the sub-base/base course in accordance with Clauses

Finishing Operations:-

Finishing operations shall include the work of properly shaping and dressing all excavated surfaces. When completed, no point on the slopes shall vary from the designated slopes by more than 150 mm measured at right angles to the slope, except where excavation is in rock (ordinary or hard) where no point shall vary more than 300 mm from the designated slope. In no case shall any portion of the slope encroach on the roadway. The finished cut formation shall satisfy the surface tolerances described in. Where directed, the topsoil removed and conserved shall be spread over cut slopes, shoulders and other disturbed areas. Slopes may be roughened and moistened slightly, prior to the application of topsoil, in order to provide satisfactory bond. The depth of topsoil shall be sufficient to sustain plant growth, the usual thickness being from 75 mm to 100 mm.

4.2.9. Measurements for Payment:-

Excavation for roadway shall be measured by taking cross-sections at suitable intervals before the excavation starts (after clearing and grubbing/stripping etc. as the case may be) and after its completion and computing the volumes in cum. by the method of average end areas for each class of material encountered. Where it is not feasible to compute volumes by this method because of erratic location of isolated deposits, the volumes shall be computed by other accepted methods. At the option of the Engineer, the Contractor shall leave depth indicators during excavations of such shape and size and in such positions as directed so as to indicate the original ground level as accurately as possible. The Contractor shall see that these remain intact till the final measurements are taken. For rock excavation, the overburden shall be removed first so that necessary cross-sections could be taken for measurement. Where cross-sectional measurements could not be taken due to irregular configuration or where the rock is admixed with other classes of materials, the volumes shall be computed on the basis of measurement of stacks of excavated rubble allowing a deduction of 35% therefrom. When volume is calculated on the basis of measurement of stacks of the excavated material other than rock, a deduction of 16% of stacked volume shall be allowed. Works involved in the preparation of cut formation shall be measured in units indicated below:

4.2.10. Rates

The Contract unit rates for the items of roadway and drain excavation shall be payment in full for carrying out the operations required for the individual items including full compensation for:

- i) Setting out;
- ii) Transporting the excavated materials for use or disposal with all leads and lifts by giving suitable credit towards the cost of re-usable material and salvage value of unusable material;
- iii) Trimming bottoms and slopes of excavation;
- iv) Dewatering;
- v) Keeping the work free of water as per Clause
- vi) Arranging disposal sites; and
- vii) All labour, materials, tools, equipment. Safety measures, testing and incidentals necessary to complete the work to Specifications. Where presplitting of rock is prescribed, Clause shall govern it.

The Contract unit rate for loosening and compacting the loosened materials at subgrade shall include full compensation for loosening to the specified depth, including breaking clods, spreading in layers, watering where necessary and compacting to the requirements.

Clauses 3.9.1 and 3.8 shall apply as regards Contract unit rate for item of removal of unsuitable material and replacement with suitable material respectively.

The Contract unit rate for item of preparing rocky sub-grade as per Clause shall be full compensation for providing, laying and compacting granular base material for correcting surface irregularities including all materials, labour and incidentals necessary to complete the work and all leads and lifts.

The Contract unit rate for the items of stripping and storing topsoil and of reapplication of topsoil shall include full compensation for all the necessary operations including all lifts and leads.

4.3. Excavation for structures

4.3.1. Scope:-

Excavation for structures shall consist of the removal of material for the construction of foundations for bridges, culverts, retaining walls, headwalls, cutoff walls, pipe culverts and other similar structures, in accordance with the requirements of these Specifications and the lines and dimensions shown on the drawings or as indicated by the Engineer. The work shall include construction of the necessary cofferdams and cribs and their subsequent removal; all necessary sheeting, shoring, bracing, draining and pumping; the removal of all logs, stumps, grubs and other deleterious matter and obstruction, necessary for placing the foundations; trimming bottoms of excavations; backfilling and clearing up the site and the disposal of all surplus material.

4.3.2. Borrow Materials:-

The arrangement for the source of supply of the material for embankment and sub-grade and compliance with the guidelines, and environmental requirements, in respect of excavation and borrow areas as stipulated, from time to time by the Ministry of Environment and Forests, Government of India and the local bodies, as applicable shall be the sole responsibility of the Contractor. Borrow pits along the road shall be discouraged. If permitted by the Engineer, these shall not be dug continuously. Ridges of not less than 8 m width should be left at intervals not exceeding 300 m. Small drains shall be cut through the ridges to facilitate drainage. The depth of the pits shall be so regulated that their bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of the bank, the maximum depth in any case being limited to 1.5 m. Also, no pit shall be dug within the offset width of a minimum of 10m. Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction plant is operating at the place of deposition. Where the excavation reveals a combination of acceptable and unacceptable materials, the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the unacceptable materials. The acceptable materials shall be stockpiled separately. The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, use of plants or siting of temporary buildings or structures.

4.3.3. Compaction Requirements

The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing programme approved by the Engineer. It shall be ensured that the subgrade material when compacted to the density requirements as in Table 300-2 shall yield the specified design CBR value of the sub-grade.

Table 14: Compaction Requirements for Embankment and Sub-grade

Type of work/material	Relative compaction as % of max. laboratory dry density as per IS:2720 (Part 8)
Subgrade and earthen shoulders	Not less than 97%
Embankment,	Not less than 95%

The Contractor shall at least 7 working days before commencement of compaction submit the following to the Engineer for approval:

- i) The values of maximum dry density and optimum moisture content obtained in accordance with IS:2720 (Part 8), appropriate for each of the fill materials he intends to use.
- ii) A graph of dry density plotted against moisture content from which each of the values in (i) above of maximum dry density and optimum moisture content were determined. The maximum dry density and optimum moisture content approved by the Engineer shall form the basis for compaction.

4.4. SURFACE/SUB-SURFACE DRAINS

4.4.1. Scope:-

The work shall consist of constructing surface and/or sub-surface drains in accordance with the requirements of these Specifications and to the lines, grades, dimensions and other particulars shown on the drawings or as directed by the Engineer. Schedule of work shall be so arranged that the drains are completed in proper sequence with road works to ensure that no excavation of the completed road works is necessary subsequently or any

damage is caused to these works due to lack of drainage.

4.4.2. Surface Drains:-

Surface drains shall be excavated to the specified lines, grades, levels and dimensions to the requirements of Clause. The excavated material shall be removed from the area adjoining the drains and if found suitable, utilized in embankment/sub-grade construction. All unsuitable material shall be disposed of as directed. The excavated bed and sides of the drains shall be dressed to bring these in close conformity with the specified dimensions, levels and slopes.

Where so indicated, drains shall be lined or turfed with suitable materials in accordance with details shown on the drawings. All works on drain construction shall be planned and executed in proper sequence with other works as approved by the Engineer, with a view to ensuring adequate drainage for the area and minimizing erosion/sedimentation.

5. HORTICULTURE WORKS

5.1. General

- 5.1.1. Scope: Contractor to furnish all materials labor and related items necessary to complete the work indicated on drawing and specified herein including maintenance of the premises for 60 months after completion.
- 5.1.2. Materials
- 5.1.3. Plant materials
- 5.1.4. Plant materials shall be well formed and shaped true to type, and free from disease, insects and defects such as knots, windburn, injuries, abrasion or disfigurement.
- 5.1.5. All plant materials shall be healthy, sound, and vigorous, free from disease, insect pests, or their eggs, and shall have healthy, well – developed root systems.
- 5.1.6. All plants shall be hardy under climatic conditions similar to those in the locality of the project.
- 5.1.7. Plants supplied shall conform to the names listed on both the plan and the plant list.
- 5.1.8. No plant material will be accepted if branches are damaged or broken.
- 5.1.9. All material must be protected from the sun and weather until planted.
- 5.1.10. Any nursery stock shall have been inspected and approved by the Engineer-In-Charge.
- 5.1.11. All plants shall conform to the requirements specified in the plant list, except those plants larger than specified may be used if approved, but use of such plants shall not increase the Contract price. If the use of the larger plant is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant.
- 5.1.12. Deliver plants with legible identification labels.
- 5.1.13. The minimum acceptable size of all trees after pruning, with branches in normal positions, will conform to the measurement specified in the Bill of Quantities unless stated otherwise. Calliper measurement will be taken at a point on the trunk 1.0 meter above natural ground. Plants that meet the specified measurement, but do not possess a normal configuration or balance of height and spread will be rejected
- 5.1.14. All trees supplied will be branched as specified in the Bill of Quantities. All trees supplied must have terminal shoots.
- 5.1.15. All specimen trees must have a minimum crown spread of not less than half the size of the overall height.
- 5.1.16. The contractor shall provide and supply jute ropes to train the creepers grow along the boundary wall/ at suitable position
- 5.1.17. The root system shall be conducive to successful transplantation. Where necessary, the root - ball shall be preserved by support with hessian or other suitable material. On soils where retention of a good ball is not possible, the roots should be suitably protected in some other way which should not cause any damage to roots.
- 5.1.18. Topsoil: (Good earth) pH range 6.5 to 7.5
- 5.1.19. Topsoil or good earth shall be a friable loam; typical of cultivated top soils of the locality containing at least 2%of decayed organic matter (humus). It shall be taken from a well-drained arable site.
- 5.1.20. It shall be free of subsoil, stones, earth clods, sticks, roots or other objectionable extraneous matter or debris.
- 5.1.21. It shall contain no toxic material. No topsoil shall be delivered in a muddy condition.

5.2. Fertilizer

- 4.2.1. Dry farm yard manure shall be used measurement shall be in stacks, with 8% reduction for payment.
- 4.2.2. It shall be free from extraneous matter, harmful bacteria insects or chemicals.
- 4.2.3. Condition
- 4.2.4. Trees and shrubs shall be substantially free from pests and diseases, and shall be materially undamaged.
- 4.2.5. Torn or lacerated roots shall be pruned before dispatch.
- 4.2.6. No roots shall be subjected to adverse conditions, such as prolonged exposure to adverse conditions, such as prolonged exposure to drying winds or subjection to water-logging, between lifting and delivery.

5.3. Supply and substitution:

- 5.3.1. Upon submission of evidence that certain materials including plant materials are not available at time. Of contract, the contractor shall be permitted to substitute other material and plants, with an equidistant adjustment of price. All substitutions shall be subject to the approval of the Engineer-In-Charge.

5.3.2. Packaging:

- 5.3.3. Packaging shall be adequate for the protection of the plants and such as to avoid heating or drying out.

5.3.4. Marking: Each specimen of tree and shrub, or each bundle, shall be legibly labeled with the following particulars:

5.3.5. Its name

5.3.6. The name of the supplier.

5.3.7. The date of dispatch from the nursery.

5.3.8. Execution

5.3.9. Fine Grading

5.3.10. The nominated Landscape contractor will adjust with screened soil as necessary. Grades will be smooth and even on a uniform plane without abrupt changes or pockets and slope it away from the buildings.

5.3.11. The nominated Landscape Contractor will verify the surface drainage of planting areas and notify the Engineer-In-Charge of any discrepancies, obstructions or other conditions considered detrimental to proper execution of the work and plant growth.

5.3.12. Landscape work will be tied to the existing condition such as existing trees , palms , landscape features, utility lines , pavement curbs , etc. Finished grade will bear proper relationship to such control.

5.3.13. The nominated Landscape Contractor will adjust all works as necessary to meet the conditions and fulfil the intention of the Drawings.

5.3.14. After initial settlement the finish grade will be :

5.3.15. Turf 20mm lower than adjacent walks, kerbs.

5.3.16. Shrubs and Ground covers 40mm lower than adjacent walks, kerbs.

5.3.17. Prior to planting operation, the contractor will ensure all planting areas free of weeds, debris, rocks over 25mm in diameter and clumps of earth that will not break up.

5.3.18. Tree Planting

5.3.19. Digging

5.3.20. Trees should be supplied with adequate protection as approved. After delivery, if planting is not to be carried out immediately, balled plants should be placed cheek to cheek and the ball covered with sand to prevent drying out. Bare rooted plants can be heeled in by placing the roots in a prepared trench and covering them with earth which should be watered in to avoid air pockets round the roots.

5.3.21. Digging of Pits

5.3.22. Tree pits shall be dug a minimum of three weeks prior to backfilling.

5.3.23. The pits shall be 120cms in diameter and 120cms deep. While digging the pits, the topsoil upto a depth of 30cms may be kept aside, if found good (depending upon site conditions), and mixed with the rest of the soil.

5.3.24. If the soil is bad below, it shall be replaced with the soil mixture as specified further herein. If the soil is normal it shall be mixed with manure; river sand shall be added to the soil if it is heavy.

5.3.25. Flooding of Pits to reduce air pockets

5.3.26. The soil backfilled watered through and gently pressed down, a day previous to planting, to make sure that it may not further settle down after planting. The soil shall be pressed down firmly by treading it down, leaving a shallow depression all rounds for watering.

5.3.27. Planting

5.3.28. No tree pits shall be dug until final tree positions have been pegged out for approval.

5.3.29. Care shall be taken that the plant sapling when planted is not buried deeper than in the Nursery, or in the pot.

5.3.30. Planting should not be carried out in water logged soil. Plant trees at the original soil depth; the soil marks on the stem is an indication of this and it should be maintained on the finished level, allowing for setting of the soil after planting.

5.3.31. All plastic and other imperishable containers should be removed before planting.

5.3.32. Any broken or damaged roots should be cut back to sound growth. The bottom of the planting pit should be covered with 50mm to 75mm of soil. Bare roots should be spread evenly in the planting pit; and small mound in the centre of the pits on which the roots are placed will aid an even spread.

5.3.33. Soil should be placed around the roots, gently shaking the trees to allow soil the particles to shift into the root system to ensure close contact with all roots and to prevent air pockets.

5.3.34. Back fill soil should be firm as filling proceeds, layer by layer, care being taken to avoid damaging the roots, as follows:

5.3.35. 25gms of 50% BHC shall be sprinkled on walls of pit, and initially pit shall be filled to 200 depth with earth mixed with 10gm of BHC. The balance earth shall be filled in a mixture of 1 : 2 (1 part manure to 2 part earth). Aldrin or equivalent shall be applied every 15 days in a mixture 0.2% which comes to 6cc in 1 litre of water.

5.3.36. Staking

5.3.37. Newly planted trees must be held firmly although not rigidly by staking to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.

5.3.38. Methods: The main methods of staking shall be:

- 5.3.39. A single vertical stake, 900mm longer than the clear stem of the tree, driven 600mm to 900mm into the soil.
- 5.3.40. Two stakes as above driven firmly on either side of the tree with cross-bar to which the stem is attached. Suitable for small bare-rooted or balled material.
- 5.3.41. A single stake driven in at an angle 45° and leaning towards the prevailing wind, the stem just below the lowest branch being attached to the stake, Suitable for small bare-rooted or balled material.
- 5.3.42. The end of stake should be pointed and the lower 1m to 1.2m should be coated with non -injurious wood preservative allowing at least 150mm above ground level.

5.3.43. Tying

- 5.3.44. Each tree should be firmly secured to the stake so as to prevent excessive movement. Abrasion must be avoided by using a buffer, rubber or hessian, between the tree and stake. The tree should be secured at a point just below its lowest branch, and also just above ground level ; normally two ties should be used for tree. These should be adjusted or replaced to allow for growth.

5.3.45. Watering

- 5.3.46. The contractor should allow for the adequate watering in all newly planted trees and shrubs immediately after planting and he shall during the following growing season, keep the plant material well watered.
- 5.3.47. Fertilizing
- 5.3.48. Fertilizing shall be carried out by application in rotation of the following fertilizers, every 15 days from the beginning of the monsoon till the end of winter:
 - 5.3.49. Organic well-rotted dry farmyard manure : 0.05 cum or 1 tassa
 - 5.3.50. Urea 25gm Or Ammonium sulphate 25gm
 - 5.3.51. Potassium sulphate 25gm
 - 5.3.52. All shrubs, which are pot grown, shall be well soaked prior to planting.
 - 5.3.53. Watering in and subsequent frequent watering of summer planted container-grown plants is essential.
 - 5.3.54. Shrub Planting in Planters and Beds
 - 5.3.55. All areas to be planted with shrubs shall be excavated, trenched to a depth of 600mm, refilling the excavated earth after breaking clods and mixing with manure in the ratio 8:1 (8 parts of stacked volume of earth after reduction by 20%: 1 part of stacked volume of manure after reduction by 8%).
 - 5.3.56. For planting shrubs and ground cover shrubs in planters, good earth shall be mixed with manure in proportion as above and filled in planters.
 - 5.3.57. Tall shrubs may need staking: which shall be provided if approved by the Engineer-In-Charge, depending upon the conditions of individual plant specimen.
 - 5.3.58. Positions of shrubs to be planted should be marked out in accordance with the planting Plan.
 - 5.3.59. When shrubs are set out, precautions should be taken to prevent root drying. Planting holes 60cm dia. and 60cm deep should be excavated for longer shrubs.
 - 5.3.60. Polythene and other non- perishable containers should be removed and any badly damaged roots carefully pruned.
 - 5.3.61. The shrubs should then be set in holes so that the soil level, after settlement, will be at the original soil mark on the stem of the shrub.
 - 5.3.62. The hole should be back-filled to half its depth and firmed by treading. The remainder of the soil can then be returned and again firmed by treading.
- 5.3.63. **Grassing**
- 5.3.64. Preparation
- 5.3.65. The soil shall be ploughed and trenched (3 times) up to 45 cm depth and any hard substances including stones, old masonry, etc. shall be removed.
- 5.3.66. All roots and other corms of vegetation shall be removed.
- 5.3.67. During period prior to planting the ground shall be maintained free from weeds.
- 5.3.68. Grading and final levelling of the lawn shall be completed at least three weeks prior to the actual sowing.
- 5.3.69. Regular watering shall be continued until sowing by dividing the lawn area into portions of approx. 5mts square by constructing small bunds to retain water. These “bund” shall be levelled just prior to sowing of grass plants.
- 5.3.70. At the time of actual planting of grass, it shall be ensured that the soil has completely settled.

5.4. Soil

- 5.4.1. The soil shall be mixed with termite control and weed control agents @ 5 kg per 1000 sqm. Also well rotten FYM (farm yard manure) @2.0 kg / sqm, bone meal @100gm / sqm, Neem Cake @100 gm / sqm. , Single Super Phosphate @ 15 gms / sqm and Copper Sulphate @ 2.5 gms / sqm shall be mixed and the soil dressed upto

1cm thickness, with soil and river silt in the ratio 1:2. The soil itself shall be ensured to the satisfaction of the Engineer-In-Charge to be a good fibrous loam, rich in humus.

5.4.2. Sowing the grass roots

5.4.3. Grass roots (Selection No.1 or a local genus approved by the Engineer-In-Charge) shall be obtained from a grass patch, seen and approved before hand.

5.4.4. The grass roots stock received at site shall be manually cleared of all weeds and water sprayed over the same after keeping the stock in a place protected from sun and dry winds.

5.4.5. Grass stock received at site may be stored for a maximum of three days.

5.4.6. In case grassing for some areas is scheduled for a later date fresh stock of grass roots shall be ordered and obtained.

5.4.7. Small roots shall be dibbled about 7.5cms apart into the prepared grounds.

5.4.8. Watering shall be done sparingly but regularly till new growth starts.

5.4.9. Grass areas will only be accepted as reaching practical completion when germination has proved satisfactory and all weeds have been removed.

5.5. Maintenance

5.5.1. As soon as the grass is approximately 3cm high it shall be rolled with a light wooden roller in fine, dry weather – and when it has grown to 5 to 8cms above ground, weeds must be removed and regular cutting with the scythe and rolling must be begun.

5.5.2. A top – dressing of farm yard manure, Bone meal @50gm / sqm and NPK @10 gm / sqm shall be applied when the grass is sufficiently secure in the ground to bear the mowing machine, the blades must be raised an inch above the normal level for the first two or three cuttings. That is to say, the grass should be cut so that it is from 4 to 5cms in length, instead of the 3cm necessary for mature grass.

5.5.3. Micronutrients mixture shall be sprayed after 30 days from the first growth. In the absence of rain, in the monsoon the lawn shall be watered with sprinklers every, three days soaking the soil to a depth of at least 20cms.

5.5.4. Damage, failure or dying back of grass due to neglect of watering especially for seeding out of normal season shall be the responsibility of the contractor. Any shrinkage below the specified levels during the contract or defects liability period shall be the rectified at the contractor's expense.

5.5.5. The contractor is to exercise care in the use of rotary cultivator and mowing machines to reduce to a minimum the hazards of flying stones and brickbats. All rotary mowing machines are to be fitted with safety guards.

5.6. Rolling

Lawn mower with roller shall be used periodically, taking care that the lawn is not too wet and sodden.

5.7. Edgings

These shall be kept neat and must be cut regularly with the edging shears.

5.8. Watering

Water shall be applied at least once in three days during dry weather. Water whenever done should be through and should wet the soil at least up to a depth of 20cms.

5.9. Weeding

Prior to regular mowing the contractor shall carefully remove rank and unsightly weeds.

5.10. COCONUT PEAT BLOCK

Supplying and stacking at site COCONUT PEAT BLOCKS (0.3X0.3X0.14 M) , including carriage up to 1 km (1 block is equivalent to 70 litres(approx.)/0.07 Cu.M/5 Kg+ /-0.3Kg) with moisture content Less than 20% , with pH value 5.2 to 6.8 .

5.11. HORTICULTURE

5.11.1. Work under this Contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely finish including testing and commissioning of all the landscape works including plantation of trees, shrubs, groundcovers, palms, climbers, etc. and maintenance as specified in the Bill of Quantities and/or shown on the drawings.

5.11.2. The planting work shall include but not be limited to the following:

5.11.3. Provide for all plant material as per the BOQ

- 5.11.4. Provide labour, equipment, services and transport.
- 5.11.5. Provide planting soil from approved source.
- 5.11.6. Provide topsoil for all plants.
- 5.11.7. Provide fertilizers, chemicals and manure and stakes as specified.
- 5.11.8. Prepare and stake out all planting locations.
- 5.11.9. Prepare plants pits, back filling; prepare "sources" for watering, adding soil after settlement.
- 5.11.10. Spraying insecticides as required, before planting.
- 5.11.11. Staking, supporting, wrapping and tying all major trees and shrubs.
- 5.11.12. Transplanting, if any
- 5.11.13. Disposal of debris and unused materials.
- 5.11.14. Guarantee of trees and plants for a period of twelve months.
- 5.11.15. Provide necessary labour and staff for maintenance work for 60 months.

5.12. PLANT MATERIALS/LAWNS

- 5.12.1. Area : all exterior ground area, except surfaces occupied by structures and paving as well as areas indicated to be undisturbed or planted (trees, shrubs, ground covers, creepers, vines, annual plants, etc.), shall be planted as shown on drawing.
- 5.12.2. Materials
- 5.12.3. Top soil shall be fertile, friable, natural topsoil typical of locality, and shall be obtained from a well-drained site that is free of flooding. It shall be without admixture of subsoil or slag and shall be free of stones, lumps, plants or their roots, stics and other extraneous matter and shall not be delivered or used while in a frozen or muddy condition.
- 5.12.4. Top soil as delivered to the site shall have an acidity range of PH 6.5 to 7.5 and shall not contain less than 5% organic matter. Sufficient horticulture grade lime shall be added to topsoil to bring it to a range of PH 6.5 to 7.5.

5.13. Ground Preparation

- 5.13.1. Grading - Grade lawn areas to finish grades, filling as needed or removing surplus dirt and floating areas to a smooth, uniform grade as indicated. All lawn areas shall slope to drain. Where no grades are shown, areas shall have a smooth and continual grade between existing contours (such as walks, curbs, catch basin, elevation at steps or building) and elevation shown on plans. roll, scarify, rake and level as necessary to obtain true, even lawn surfaces, all finish grades shall meet approval of the Landscape Architect or his authorized representative, before lawn is laid.
- 5.13.2. Chemical fertilizer shall be spread on areas to be seeded at the rate of 20 lbs. per 100 square feet. The fertilizer shall be 50% organic and shall be applied from a suitable spreader.
- 5.13.3. Natural fertilizer-manure shall be well un-leached, Okhla khad or cattle manure free from sawdust shavings, refuse and harmful chemicals, manure shall contain no lumps which will not pass a 2 inch sieve. Spreading of 1 inch thick layer of manure on the ground and mixing with the good earth.
- 5.13.4. After incorporation of fertilizer in the soil, the lawn bed, shall be fine graded to remove all ridges and depressions, and surface cleared of all stones 1 inch or more in diameter and of other debris. At least 1 inch layer of manure to be spread on the ground and mix with earth for grassing. Ref. given specification for lawn bed preparation.
- 5.13.5. Planting of rooted cuttings grass at a regular distance of 5cm centre to centre. After 15 days 1st mowing should be done. Or Laying grass carpet directly on prepared ground.

5.14. Lawn Maintenance

- 5.14.1. Maintenance shall consist of watering, weeding, fertilizing, liming, disease and pest control, aerating, protective spraying, replacement of unacceptable material and any other procedure consistent with good horticulture practice necessary to ensure normal, vigorous and healthy growth of all planted area.
- 5.14.2. For the first 30 days, it requires approximately 500 gallons of water for every 100 square feet every day for each application to penetrate the soil to a depth of 4 to 6 inches. After the, same quantity of water shall be applied on alternate dates.
- 5.14.3. Keep all planting areas free from weeds and undesirable grasses.
- 5.14.4. Mow all grass areas at regular intervals which will keep grass height from exceeding 2.5 inches. Remove all grass clippings during or immediately after mowing.

5.14.5. Maintenance shall also include all temporary protection fences, barriers and signs and all other work incidental to proper maintenance.

5.15. PLANT MATERIAL A. TREES, SHRUBS, GROUND COVERS, CREEPERS, VINES, ETC.

5.15.1. Plant List - Plants are listed in the drawings; the plant list is enclosed herein.

5.15.2. Nomenclature - The names of the plants confirm to standardize botanical names.

5.15.3. Quality and General Requirements of Plants.

5.15.4. Plants shall be typical of their species and variety, have normal growth habits, well developed branches, densely foliated with vigorous and fibrous root systems.

5.15.5. Plants shall be free from defects and injuries. Bark shall be free from abrasion.

5.15.6. Plants shall be freshly dug and nursery grown. Plants shall have been grown under climatic conditions similar to those of the locality of project, or have been acclimated for at least 2 years to conditions of project location. Nursery grown plants shall have been at least once transplanted.

5.15.7. Each bundle of plants and all separate plants shall be properly identified by weatherproof labels securely attached there to before delivery to project site.

5.15.8. B & B (Balled and Burlap) plants must be moved with the root system as solid units in balls of each firmly wrapped with burlap, The diameter and depth of the balls of earth must be sufficient to encompass the fibrous and feeding root system necessary for the healthy development of the plant. No plant shall be used when the ball of earth surrounding its roots have been badly cracked or broken preparatory to or during the process of planting or after the equipment required in connection with its transplanting has been removed. The plant and ball shall remain intact as one unit during all operations.

5.15.9. Container grown stock shall have been grown in container long enough for the root system to have developed sufficiently to hold its soil together, firm and whole. No plant shall be loose in container.

5.15.10. All plants shall be readied under climatic conditions similar to those in the locality of the project. When plants of kinds or sizes specified are not available substitution may be made upon request by the Contractor if approved by the Landscape Architect.

5.15.11. All trees, soon after planting shall be properly supported to ensure their safety against wind or other factors which may effect it adversely. A minimum of 3 stakes per tree shall be provided by the contractor.

5.16. Size of Plants

5.16.1. All plant shall be equal to or exceed the sizes given in the plant list, which are minimum acceptable sizes. Plants shall be measured before planting, with branches in normal position.

5.16.2. Trees shall be minimum length as specified and shall be straight and symmetrical with a crown and having a persistent main stem. The size of the crown shall be in good overall proportion to the height of the tree shall be measured from the top of the root ball or pot. In case of palms, height will be measured from top of root ball to the point of branching of leaves.

5.16.3. Shrubs shall be well formed with a crown typical of the species and variety. Shrub height dimension shall be the average height of the all stems and not of longest stem.

5.16.4. Medium & small shrubs bed - 0.45m depth of bed and in case of individual shrubs, 0.60 dia and 0.60 depths.

5.16.5. Ground Cover bed - The bed shall be dug a depth of 20 cms,

5.16.6. Topsoil shall be made ready for planting before plants are delivered to the site. The pits/beds shall be given anti-termite treatment before back filling.

5.16.7. Placing of plants - Plants shall be centre of pits plumb and straight.

5.16.8. Final Considerations - Topsoil shall be compacted around basin of balls to fill all voids. Roots shall be properly spread out and topsoil carefully worked in among them.

5.16.9. Watering - Immediately after plant pit is back filled, a shallow base slightly larger than pit shall be formed with a ridge of soil to facilitate and contain watering. After planting, cultivate the soil between plant pit and rake smooth. Spray the soil with water to settle.

5.17. AFTER PLANTING CARE

5.17.1. Watering - Water trees and other plants by flooding twice within first 24 hours of the time of planting. Tree requires 6 gallons per plant per day for first 45 days from the date of planting and subsequently every alternate day for the next 6 months. Thereafter watering twice a week at the rate of 10 gallons per plant.

5.18. GUARANTEE

- 5.18.1. Period All plants and lawns shall be guaranteed by the contractor for 12 (twelve) months after the certified date of completion.
- 5.18.2. Conditions During this period, any plant that is found missing, dead or not true to name or size as specified, or not in satisfactory growth shall be replaced immediately with approved size and shape.
- 5.18.3. Replacement - All replacements shall be plants of the same species, variety and size as specified in the plant list. The cost of replacement resulting from removal, loss or damage due to the occupancy of the project in any part, or vandalism or acts of neglect on the part of others, in which case the cost will be borne by the clients.

6. Manhole and Chambers:

6.1. Brick Masonry Work:

Brick masonry will be required for chambers and other appurtenances etc.

6.2. Materials

6.3. Bricks:

Bricks to be whole, sound well burnt, free from cracks, to give ringing sound when struck against each other and not to crack or break when soaked in water or thrown on the ground on their flat face in a saturated condition from a height of 60 cm. regular in shape and uniform in size. They shall be of the best description available in market, and of the best quality and colour and shall conform to the latest IS No. 1077. They shall not absorb water more than 20% of their dry weight when immersed in water for 24 hours. They shall have a crushing strength of not less than, 50kg. per sq.cm., when dry (about 40 T/sq.ft.).

6.4. Brickwork

- 6.4.1. Sampling and Tests Samples of bricks shall be subjected to the following tests : (a) Dimensional tolerance. (b) Water absorption. (c) Efflorescence. (d) Compressive strength. Classification The brick work shall be classified according to the class designation of bricks used.
- 6.4.2. Mortar The mortar for the brick work shall be as specified, and conform to accepted standards. Lime shall not be used where reinforcement is provided in brick work.
- 6.4.3. Soaking of Bricks Bricks shall be soaked in water before use for a period for the water to just penetrate the whole depth of the bricks. Alternatively bricks may be adequately soaked in stacks by profusely spraying with clean water at regular intervals for a period not less than six hours. The bricks required for masonry work

6.5. Laying

- 6.5.1. Bricks shall be laid in English Bond (Fig. 6.2, 6.3, 6.4) unless otherwise specified. For brick work in half brick wall, bricks shall be laid in stretcher bond. Half or cut bricks shall not be used except as closer where necessary to complete the bond. Closers in such cases, shall be cut to the required size and used near the ends of the wall. Header bond shall be used preferably in all courses in curved plan for ensuring better alignment.
- 6.5.2. **Note:** Header bond shall also be used in foundation footings unless thickness of walls (width of footing) makes the use of headers impracticable. Where thickness of footing is uniform for a number of courses, the top course of footing shall be headers.
- 6.5.3. All loose materials, dirt and set lumps of mortar which may be lying over the surface on which brick work is to be freshly started, shall be removed with a wire brush and surface wetted. Bricks shall be laid on a full bed of mortar, when laying, each brick shall, be properly bedded and set in position by gently pressing with the handle of a trowel. Its inside face shall be buttered with mortar before the next brick is laid and pressed against it. Joints shall be fully filled and packed with mortar such that no hollow space are left inside the joints.
- 6.5.4. The walls shall be taken up truly in plumb or true to the required batter where specified. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in the alternate course shall come directly one over the other. Quoin, Jambs and other angles shall be properly plumbed as the work proceeds. Care shall be taken to keep the perpend properly aligned within following maximum permissible tolerances : (a) Deviation from vertical within a storey shall not exceed 6 mm per 3 m height. (b) Deviation in verticality in total height of any wall of building more than one storey in height shall not exceed 12.5 mm. (c) Deviation from position shown on plan of any brick work shall not exceed 12.5 mm. (d) Relative displacement between load bearing wall in adjacent storeys intended to be vertical alignments shall not exceed 6 mm. (e) A set of tools comprising of wooden straight edge, masonic spirit levels, square, 1 metre rule line and plumb shall be kept on the site of work for every 3 masons for proper check during the progress of work.
- 6.5.5. All quoins shall be accurately constructed and the height of brick courses shall be kept uniform. This will be checked using graduated wooden straight edge or storey rod indicating height of each course including thickness of joints. The position of damp proof course, window sills, bottom of lintels, top of the wall etc. along the height of the wall shall be marked on the graduated straight edge or storey rod. Acute and obtuse quoins shall be bonded, where practicable in the same way as square quoins. Obtuse quoins shall be formed with squint showing three quarters brick on one face and quarter brick on the other.

- 6.5.6. Work of cutting chases, wherever required to be made in the walls for housing G.I. pipe, CI pipe or any other fixtures shall be carried out in various locations as per guidelines given below : (a) Cutting of chases in one brick thick and above load bearing walls. (i) As far as possible services should be planned with the help of vertical chases. Horizontal chases should be avoided. (ii) The depths of vertical chases and horizontal chases shall not exceed one-third and one-sixth of the thickness of the masonry respectively. (iii) When narrow stretches of masonry (or short length of walls) such as between doors and windows, cannot be avoided they should not be pierced with openings for soil pipes or waste pipes or timber joints, etc. Where there is a possibility of load concentration such narrow lengths of walls shall be checked for stresses and high strength bricks in mortar or concrete walls provided, if required. (iv) Horizontal chases when unavoidable should be located in the upper or lower one-third of height of storey and not more than three chases should be permitted in any stretch of a wall. No continuous horizontal chase shall exceed one metre in length. Where unavoidable, stresses in the affected area should be checked and kept within the permissible limits. (v) Vertical chases should not be closer than 2 m in any stretch of a wall. These shall be kept away from bearings of beams and lintels. If unavoidable, stresses in the affected area should be checked and kept within permissible limits. (vi) Masonry directly above a recess, if wider than 30 cm horizontal dimension) should be supported on lintel. Holes in masonry may be provided upto 30 cm width and 30 cm height without any lintel. In the case of circular holes in the masonry, no lintel need be provided for holes upto 40 cm in diameter. (b) Cutting of chases in half brick load bearing walls. No chase shall be permitted in half brick load bearing walls and as such no recessed conduits and concealed pipes shall be provided with half brick thick load bearing walls. (c) Cutting of chases in half brick non-load bearing wall : Services should be planned with the help of vertical chases. Horizontal chase should be provided only when unavoidable.
- 6.2.5 Joints The thickness of all types of joints including brick wall joints and cross joints shall be such that four course and three joints taken consecutively shall measure as follows: (i) In case of modular bricks conforming to IS 1077 specification for common burnt clay buildings bricks, equal to 39 cm. (ii) In case of non-modular bricks, it shall be equal to 31 cm.
- 6.5.7. **Note:** Specified thickness of joints shall be of 1 cm. Deviation from the specified thickness of all joints shall not exceed one-fifth of specified thickness.
- 6.5.8. Finishing of Joints: The face of brick work may be finished flush or by pointing. In flush finishing either the face joints of the mortar shall be worked out while still green to give a finished surface flush with the face of the brick work or the joints shall be squarely raked out to a depth of 1 cm while the mortar is still green for subsequently plastering. The faces of brick work shall be cleaned with wire brush so as to remove any splashes of mortar during the course of raising the brick work. In pointing, the joints shall be squarely raked out to a depth of 1.5 cm while the mortar is still green and raked joints shall be brushed to remove dust and loose particles and well wetted, and shall be later refilled with mortar to give ruled finish. Some such finishes are 'flush', 'weathered', ruled, etc.
- 6.5.9. Curing: The brick work shall be constantly kept moist on all faces for a minimum period of seven days. Brick work done during the day shall be suitably marked indicating the date on which the work is done so as to keep a watch on the curing period.

6.6. Measurements

- 6.6.1. Brick work shall be measured in cubic metres unless otherwise specified. Any extra work over the specified dimensions shall be ignored. Dimensions shall be measured correct to the nearest 0.01 m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq mtrs and the cubic contents shall be worked out to the nearest 0.01 cubic metres.
- 6.6.2. Brick work shall be measured separately in the following stages: (a) From foundation to floor one level (Plinth level) (b) Plinth (floor one) level to floor two level (c) Between two specified floor levels above floor two level
Note : (i) Brick work in parapet walls, mummy, lift machine room and water tanks constructed on the roof up to 1.2 m height above roof shall be measured together with the corresponding work of the floor next below.
- 6.6.3. No deductions or additions shall be done and no extra payment made for the following:
- 6.6.4. **Note:** Where minimum area is defined for deduction of an opening, void or both, such areas shall refer only to opening or void within the space measured. (a) Ends of dissimilar materials (that is, joists, beams, lintels, posts, girders, rafters, purlins, trusses, corbels, steps, etc.); up to 0.1 m² in section; (b) Opening up to 0.1 m² in area (see Note); (c) Wall plates, bed plates, and bearing of slabs, chajjas and the like, where thickness does not exceed 10 cm and bearing does not extend over the full thickness of wall; (d) Cement concrete blocks as for hold fasts and holding down bolts; (e) Iron fixtures, such as wall ties, pipes upto 300 mm diameter and hold fasts for doors

and windows; and (f) Chases of section not exceeding 50 cm in girth. (g) Bearing portion of drip course, bearing of moulding and cornice

6.6.5. Walls half brick thick and less shall each be measured separately in square metres stating thickness.

6.6.6. HALF BRICK WORK Brick work in half brick walls shall be done in the same manner as described above in 6.2.4 except that the bricks shall be laid in stretcher bond. When the half brick work is to be reinforced, 2 Nos. M.S. bars of 6 mm dia., shall be embedded in every third course as given in the item (the dia of bars shall not exceed 8 mm). These shall be securely anchored at their end where the partitions end. The free ends of the reinforcement shall be keyed into the mortar of the main brick work to which the half brick work is joined. The mortar used for reinforced brick work shall be rich dense cement mortar of mix 1:4 (1 cement: 4 coarse sand). Lime mortar shall not be used. Over laps in reinforcement, if any shall not be less than 30 cm.

6.7. SUPPLYING AND LAYING PAVER BLOCK

6.7.1 PERFORMANCE BASED SPECIFICATIONS:

The following is a Performance based Specification which relates to the supply and laying of Paver blocks.

6.7.1.1 Methodology and Sequence of Work

The Contractor shall not commence any Hardscape work until the following have been completed:

- a. All in ground drainage completed
- b. All Kerb edge restraints completed
- c. All other in ground services laid and complete
- d. All areas surveyed and string lines set to establish the final finished level.
- e. Any pre-existing manhole covers or drainage covers adjusted and raised or lowered to conform to the final finished Pavement Level.
- f. The Contractor shall submit a full methodology, setting out his proposed sequence of work and trade before commencing paver blocks laying works.

6.7.1.2 Setting Out

- a. The Contractor shall achieve the formation levels required for paving as indicated in the Contract Drawings listed in Appendix-A.
- b. The line and levels of the paved areas shall be carefully set out in accordance with the Contract Drawings and be frequently checked by the Contractor, care being taken to ensure that correct gradients and cross falls are achieved.
- c. The finished gradients of all pavements shall be formed so as to provide adequate falls for drainage as shown on the Contract Drawings.

6.7.1.3 Storage

Paving materials shall be stored in a place on-site, as agreed with the Engineer-In-Charge. Supply to site shall be timed to minimize the required storage period for all materials. Method of storage shall avoid damage to all materials. Damaged units shall be replaced by the Contractor at his expense.

Due care should be taken to handle all units in a manner that will keep the risk of strain and deformation to a minimum.

6.7.1.4 Cutting

All paving materials requiring cutting shall be cut using a diamond blade bench saw to give an acceptable quality edge to the satisfaction of the Engineer-In-Charge. A sample of cutting must be approved by the Engineer-In-Charge prior to any cutting taking place on site.

Paving materials showing a jagged or irregular edge will be rejected by the Engineer-In-Charge and must be replaced to the approval of the Engineer-In-Charge entirely at the Contractors expense. The Contractor must allow for the periodic replacement of blades in cutting equipment to ensure clean cut edges to paving units.

6.7.1.5 Trip Hazard

A trip hazard is defined as any deviation in the pavement by $\pm 10\text{mm}$, including failure to adapt the finished levels to any pre-existing manhole cover or grating. The Contractor shall, therefore,

carefully survey all areas to be paved, prior to commencing work. On completion of the works, the Completed hardscape shall be carefully inspected for any Trip Hazards and these shall be rectified entirely at the Contractor's cost.

6.7.1.6 Construction in Inclement Weather

All newly laid paving shall be protected against the harmful effects of weather until such a time as the work is completed to the approval of the Engineer-In-Charge. Areas of paving damaged by inclement weather prior to Completion shall be replaced entirely at the Contractor's expense.

6.7.1.7 Sample Areas

The Contractor shall lay a 2.0 x 2.0 meter sample section of each paving type together with edge restraints and drainage furniture and obtain the approval of the Engineer-In-Charge before proceeding with laying of each of the paving types. The size, unless outlined in this Specification, and location of the sample area shall be agreed with the Engineer-In-Charge. Sample panels may be incorporated into the completed works by prior agreement with the Engineer-In-Charge.

6.7.1.8 Finished Levels of all Hardscape Surfaces

The finished level of the Hardscape surfaces is to be shown on the General Arrangement drawings. However, these are indicative only and the Contractor shall always extend a string line between edge restraints to establish smooth flowing gradients. The Contractor shall allow for in his rates the readjustments, raising, or lowering of any pre-existing manhole (of any type) that may be required in order to achieve the finished levels. The Contractor may in situation, readjust the finished level of the Hardscape areas, to match a pre-existing manhole, cover, or grating, provided prior consent is given by the Engineer-In-Charge.

6.7.1.9 Finishing Work against all Items of Lighting Poles, Manhole and Drainage Covers.

The Contractor shall extend his Hardscape finishes right up to the edge of all items of Lighting Poles, Manhole and Drainage Covers. Cement mortar filler pieces in excess of 25mm wide shall be rejected and the Contractor shall make all efforts to ensure a neat, crisp and seamless joint.

6.7.1.10 Protection of the Completed Work

The Contractor shall protect and barricade off all areas of completed Hardscape upon completion, until Handover to the Client. The Contractor shall be responsible for ensuring that the works are handed over in a clean and tidy condition, and any staining in the completed Hardscape will be rejected.

6.8 Paver

6.9 LAYING OF INTERLOCKING PAVERS

All pavers shall be of approved brand and manufacturer – Pave Espania, Super Tiles or KJS makes approved by FSCL.

6.9.2 Characteristics

Concrete pavers shall be of M40 grade concrete, precast, and 60mm thickness. Tolerance in dimension allowed is ± 2 mm.

Shape	As per client's Drawing/BOQ
Edges	Chamfered
Application	Walkway, Driveway
Thickness	60 mm

Compressive Strength /finish	200 kg/cm ² ,300 kg/cm ² ,300-500kg/cm ² . Smooth, Coarse.
No. Of layers	Two
Top Layer	1:1
Bottom Layer	Design mix as per strength criteria.(M-40)
Bed preparation	WBM or lean P.C.C. (1:4:8 or 1:5:10) 75 mm thick.
Fixing Medium	Mortar 25 mm (1:6) or 40mm sand with vibratory Compaction.
Slope / Gradient	Adequate (Minimum 1% preferably 2%)
Grouting	Dry Grouting
Edge Restraint	Kerbstone or Retaining wall.
Abrasion Resistance	Less than 3.
Water Absorption	Less than 7% (After 24 Hrs.)

6.9.3 Sand Bedding

The paving blocks are indicated in the Contract Drawings to be bedded on sand (flexible paving) this material shall be naturally occurring sand or shall consist of crushed rock or gravel or a combination thereof with naturally occurring sand, hard, clean, free from all adherent coatings. It shall comply in all respects with relevant Indian Standards and be well graded down from 5mm.

The moisture content of the laying course should be as uniform as possible and at or about its optimum. Where material is to be stockpiled it should be covered.

The laying course should be such that, after compaction, it forms a nominally uniform layer, 20mm thick below the pavers.

The material should be spread loose in a uniform layer and screeded to a thickness required to give nominal 20mm layer after completion of the paving or the material should be spread in a loose, uncompacted layer to approximately 2/3rd of the required final thickness. This layer should be lightly compacted by means of a vibrating plated compactor. A further layer of loose material should be spread and screeded to create a loose surface on to which the units can be placed.

Care should be taken to avoid localized disturbance of the prepared laying course sand by pedestrian or wheeled traffic prior to placing units. The area of laying course prepared should be such that the position of its boundary is not more than one meter from the position of the laying face at the end of the working period wherever practicable.

6.9.4 Joints in Flexible Paving

Joints are to be 2mm when placed hand-tight. Pavers shall be laid working from an existing laying face edge or edge restraint. Full pavers should be laid first; closure units should then be laid. The area to be laid should be completed as far as is possible in entire paver units. Wherever possible, infilling to boundaries and obstructions should proceed as the laying of the surface course proceeds and infilling should be completed before compaction commences. Mechanical force shall not be used to obtain tight joints.

For flexible paving sand shall be brushed into the joints until they are filled to the top surface of the paving blocks. Sand for joint filling should be dry with a minimum particle size no greater than 1.18mm containing about 10% by weight passing a 0.75mm sieve. Sand colour shall be agreed with Engineer-In-Charge prior to brushing into joints.

The Contractor shall allow for cutting units to achieve laying to curves (without opening up joints).

6.9.5 Laying Pavers

The units shall be laid to the patterns shown in the drawings.

Laying of paver blocks:

- 1) Paver blocks shall be laid in pattern specified in drawing throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not to be permitted in other than approved locations.
- 2) Paver blocks shall be placed on the un-compacted screened sand bed to the nominated laying pattern, care being taken to maintain the specified bond throughout the job. The first row shall be located next to an edge restraint.
- 3) Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.
- 4) Paver blocks shall be placed to achieve gaps nominally 2 to 3 wide between adjacent paving joints. No joint shall be less than 1.5 mm and not more than 4 mm.
- 5) Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two metres as the face proceeds.
- 6) Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.
- 7) In each row, all full blocks shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closure blocks shall consist of not less than 25 % of full blocks.
- 8) To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix and strength of 45 N/sq.mm shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used. Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks, necessary care shall be taken to avoid the premature compaction of the sand bedding.

Initial Compaction:

- 9) After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than two (2) passes of a suitable plate compactor.
- 10) The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks.
- 11) Prior to compaction all debris shall be removed from the surface. Compaction shall proceed as closely as possible following laying and prior to any traffic. Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recomputed as described in relevant Clause.
- 12) All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.
- 13) Any blocks that are structurally damaged prior to or during compaction shall be immediately removed and replaced.
- 14) Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

6.9.6 Cutting Pavers

Paving blocks requiring cutting shall be cut using a diamond blade bench saw to give an acceptable quality edge to the satisfaction of the Engineer-In-Charge and prior to general cutting taking place on site.

Pavers shall be cut to form, neat junctions/boundaries with other paving materials/kerbs, street furniture, etc. fillets of colour matched mortar in lieu of small pieces of unit paving shall be avoided where possible and only be used with the approval of the Engineer-In-Charge.

Paving blocks showing a jagged or irregular edge will be rejected by the Engineer-In-Charge and must be replaced to the satisfaction of the Engineer-In-Charge all at the Contractors expense.

Care shall be taken to avoid placing more than one cut kerb and/or paver unit in close proximity to another cut unit at junctions/changes of direction of paving.

The Contractor must allow for the periodic replacement of blades in cutting equipment to ensure clean cut edges to paving units.

6.9.7 Compaction of Flexible Paving

Pavers on sand bed shall be subjected to passes of a steel-faced vibrating plate compactor to adequately compact the laying course and to bed and regulate the paving blocks. The vibrating-plate compactor shall have a centrifugal force of 16-20KN, a plate area of 0.35-0.5 sqm and a frequency of 75-100Hz. Enough passes shall be made to compact the paving course and produce an even surface. All trimming should be completed before the area is compacted.

Compaction should follow laying as soon as possible but should not be carried out within 1m of the laying edge. Apart from this edge strip no area of paving should be left without being compacted at the completion of the day's work. The E in C approval must be obtained if compaction is not to be completed at the end of the day's work.

6.9.8 Finished Levels

Finished levels of the paving units shall not deviate by more than 2mm against adjacent units whilst the deviation from the design profile measured under a 3m straight edge should not exceed 10mm. The units shall form neat junctions with and prevent damage to adjacent work.

6.9.9 Cleaning on Completion of Work

On completion the face of the units must be clear of all dust, rust and other stains, adhering mortar and other droppings. Any units from which stains cannot be removed shall be replaced at the Contractor's expense and to the approval of the E in C.

Flexible paving surfaces are to be brushed down with a soft bristle brush with joints refilled with sand where required. The paved areas must be left in a neat and tidy condition to the satisfaction of the Engineer-In-Charge.

1.1

6.10 Subgrade (Footpath/Parking Area)

All sub-grades shall be constructed in accordance with the requirements of this section and in conformity with the lines, grades, and cross-sections as shown in the contracted drawing listed in Appendix A or as directed by the Engineer.

6.10.10 Materials and General Requirements

Physical requirements

The materials used in sub-grades shall be soil, murrum, gravel, a mixture of these or any other material approved by the Engineer. Such materials shall be free of logs, stumps, roots, rubbish or any other ingredient likely to deteriorate or affect the stability of the sub-grade.

The following types of material shall be considered unsuitable for sub-grade:

- a. Materials from swamps, marshes and bogs;
- b. Peat, log, stump and perishable material; any soil that classifies as OL, OI, OH or Pt in accordance with IS:1498;
- c. Materials susceptible to spontaneous combustion;
- d. Materials in a frozen condition;
- e. Clay having liquid limit exceeding 70 and plasticity index exceeding 45; and

- f. Materials with salts resulting in leaching in the embankment.

Expansive clay exhibiting marked swell and shrinkage properties ("free swelling index" exceeding 50 per cent when tested as per IS:2720-part 40) shall not be used as a fill material. Whereas expansive clay with acceptable "free swelling index" value can be used as a fill material.

Any fill material with a soluble sulphate content exceeding 1.9 grams of sulphate (expressed as SO₃) per litre when tested in accordance with BS:1377 (Test 10), but using a 2:1 water-soil ratio shall not be used as a sub-grade.

Materials with a total sulphate content (expressed as SO₃) exceeding 0.5 percent by mass, when tested in accordance with BS:1377 (Test 9) shall also not be used as a sub-grade.

The size of coarse material in the mixture of earth shall ordinarily not exceed 50mm when placed in the sub-grade. However, the Engineer may at his discretion permit the use of material coarser than this also if he is satisfied that the same will not present any difficulty as regards the placement of fill material and its compaction to the requirements of these specifications. The maximum particle size shall not be more than two-thirds of the compacted layer thickness.

Ordinarily, only the materials satisfying the density requirements given in Table No. 1 shall be employed for the construction of the sub-grade.

Table 15 DENSITY REQUIREMENTS OF SUBGRADE MATERIALS

<i>S. No.</i>	<i>Type of Work</i>	<i>Maximum laboratory dry unit weight when tested as per IS:2720 (Part 8)</i>
<i>1</i>	<i>Sub-grade</i>	<i>Not less than 17.5 kN./cum</i>

Note: (1) This Table is not applicable for lightweight fill material e.g. cinder, fly ash, etc.

(2) The Engineer may relax these requirements at his discretion taking into account the availability of

materials for construction and other relevant factors.

(3) The material to be used in sub-grade should also satisfy design CBR at the dry unit weight applicable as per Table No. 1.

6.10.10.1.1 General Requirements

The materials for embankment shall be obtained from approved sources with preference given to materials becoming available from nearby roadway excavation or any other excavation under the same Contract.

The work shall be so planned and executed that the best available materials are saved for the sub-grade.

Borrow Materials: Where the materials are to be obtained from designated borrow areas, the location, size and shape of these areas shall be as indicated by the Engineer and the same shall not be opened without his written permission. Where specific borrow areas are not designated by the Employer/the Engineer, arrangement for locating the source of supply of material for sub-grade as well as compliance to environmental requirements in respect of excavation and borrow areas as stipulated from time to time by the Ministry of Environment and Forests, Government of India and the local bodies, as applicable shall be the sole responsibility of the Contractor.

Borrow pits along the road shall be discouraged. If permitted by the Engineer, these shall not be dug continuously. Ridges of not less than 8.00m width should be left at intervals not exceeding 300m. Small drains shall be cut through the ridges to facilitate drainage. The depth of the pits shall be so regulated that their bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of the bank, the maximum depth in any case being limited to 1.50m. Also, no pit shall be dug within the offset width from the toe of the embankment required as per the consideration of stability with a minimum width of 10m.

Haulage of material of fill shall proceed only when sufficient spreading and compaction plant is operating at the place of deposition.

No excavated acceptable material other than surplus to requirements of the Contract shall be removed from the site. Should the Contractor be permitted to remove acceptable material from the site to suit his operational procedure, then he shall make good any consequent deficit of material arising therefrom.

Where the excavation reveals a combination of acceptable and unacceptable materials, the Contractor shall, unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the acceptable materials are excavated separately for use in the permanent works without contamination by the unacceptable materials. The acceptable materials shall be stockpiled separately.

The Contractor shall ensure that he does not adversely affect the stability of excavation or fills by the methods of stockpiling materials, use of plants or siting of temporary buildings or structures.

The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing programme approved by the Engineer. It shall be ensured that the sub-grade material when compacted to the density requirements as in Table 2 shall yield the design CBR value of the sub-grade.

The Contractor shall at least 7 working days before commencement of compaction submit the following to the Engineer for approval:

- (i) The values of maximum dry density and optimum moisture content obtained in accordance with IS:2720 (Part 7) or (Part 8), as the case may be, appropriate for each of the fill materials he intends to use.
- (ii) A graph of density plotted against moisture content from which each of the values in (i) above of maximum dry density and optimum moisture content were determined.
- (iii) The Dry density-moisture content-CBR relationships for light, intermediate and heavy compactive efforts (light corresponding to IS: 2720 (Part 7), heavy corresponding to IS: 2720 [Part 8] and intermediate in-between the two) for each of the fill materials he intends to use in the sub-grade. Once the above information has been approved by the Engineer, it shall form the basis for compaction.

Materials finer than 425 micron shall have Plasticity Index (PI) not exceeding 6.

The final gradation approved within these limits shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa.

6.10.10.2 Bedding sand course:

The bedding sand shall consist of clean well graded sand passing through 4.75mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the grading limits as shown in Table 2.

Table-16 Gradation for Sand Bedding

<i>Sieve size</i>	<i>% passing</i>
9.5 mm	100
4.75 mm	95-100
2.36 mm	80-100
1.18 mm	60-100
600 microns	25-60
300 microns	10-30
150 microns	5-15
75 microns	0-10

- 1) Contractor shall be responsible to ensure that single-sized, gap-graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp (not rounded) as sharp sand possess higher strength and resist the migration of sand from under the block to less frequency areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand used for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence. The sand shall be of uniform moisture content and within 4 % - 8 % when spread and shall be protected against rain when stock piled prior to spreading.
- 2) Saturated sand shall not be used. The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45mm and within +/- 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface. The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screening. Any pre-compacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.
- 3) Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit.
- 4) Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and rescreeded before laying of paving blocks.

6.11 SAMPLING AND TESTING PROCEDURES FOR PAVER BLOCKS

6.11.11 Sample size

- Internal – Average of minimum 3 samples per 5000 blocks – for paver block manufacturers.
- Internal – Minimum 9 blocks per 5000 blocks. Average of minimum 9 blocks per site or captioned contractors.

6.11.12 Water Absorption:

Testing for water absorption shall be in accordance with IS: 2185: 1979: Part-(Specifications for Concrete Masonry Blocks) Appendix C.

6.11.13 Sampling of Paver Blocks

6.11.13.1 Method of sampling:

Before laying paver blocks, each designated section comprising not more than 50,000 blocks shall be divided into ten approximately equal groups. Nine blocks shall be drawn from each group.

6.11.13.2 Marking and Identification:

All samples shall be clearly marked at the time of sampling in such a way that the designated section of part thereof and the consignment represented by the sample are clearly defined. The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The samples shall be stored in water at 20 °C + 5 °C for 24 hours prior to testing.

6.12 PROCEDURE FOR TESTING OF COMPRESSIVE STRENGTH FOR PAVER BLOCKS SHALL BE AS PER RELEVANT BIS.

7. LIST OF IS CODES AND STANDARDS:

CEMENT AND CONCRETE

Plain & reinforced concrete (Fourth revision) 456 : 2000

Prestressed Concrete (first revision) (Amendment No 1) 1343 : 1980

Concrete structures for the storage of liquids: Part I general requirements (Amendment No 1) 3370 (Part 1) : 1965

Concrete structures for the storage of liquids: Part 2 Reinforced concrete structures (Amendment No-2) 3370 (Part 2) : 1967

Concrete structure for the storage of liquids: Part 3 Prestressed concrete structures (Amendment No I) 3370 (Part 3) : 1967

Concrete structures for the storage of liquids Part 4: Design table (Amendment No. 2) 3370 (Part 4) : 1967

Use of immersion vibrators for consolidating concrete (first revision) 3558 : 1983

Extreme Weather concreting: Recommended practice for hot weather concreting. (Amendment No. 1) 7861 (Part 1) 1975

Extreme Weather concreting: Recommended practice for hot weather concreting. (Amendment No. 1) 7861 (Part 2): 1981

Methods of non-destructive testing of concrete : Part 1 Ultrasonic pulse velocity 13311 (Part 1) : 1992

Methods of non-destructive testing of concrete: Part 2: Rebound hammer 13311 (Part 2) : 1992

Methods of Sampling & analysis of concrete 1199 : 1959

Recommended guidelines for concrete mix design 10262 : 1982

Concrete slump test apparatus 7320 : 1974

Ready mixed concrete (2nd revision) 4926 : 2003.

Artificial lightweight aggregates for concrete masonry units

IS 7861 Part II:1981 Code of Practice for Cold Weather Concrete.

IS 9103::1999 Concrete Admixture specification.

7.1. List of IS Standards Reinforcement

Mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement Part 1 Mild Steel and medium tensile Steel bars (Third Revision) 432 (Part I) : 1982

Mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement Part 2 Hard Drawn Steel wire (Third Revision) 432 (Part I) : 1982

High strength deformed steel bars and wires for concrete reinforcement (Third Revision) Amendment No.11786 : 1985

Masonry

Brick Work (First revision) 2212 : 1991

Sand for masonry mortars (first revision) 2116 :1980

IS 3495 : Part 1 to 4 : 1992 Methods of Tests of Burnt Clay Building Bricks - Part 1 : Determination of Compressive Strength - Part 2 : Determination of Water Absorption - Part 3 : Determination of Efflorescence - Part 4 : Determination of Warpage

IS 2250 : 1981 Code of Practice for Preparation and Use of Masonry Mortars

Precast concrete pipes

Precast concrete manhole covers and frames: Part 1 Covers (Amendment No 3)

12592 (Part 1) : 1988

Precast concrete manhole covers and frames : Part 2 frames 12592 (Part 2) : 1991

Ancillary structures in sewerage system: Part 1 Manholes (First revision)4111(Part 1):1986

IS 458 : 2003 Precast Concrete Pipes (With and Without Reinforcement) – Specification

IS 5455 : 1969 Specification for cast-iron steps for manholes

IS 783 : 1985 Code of practice for laying of concrete pipes

IS 3597 : 1998 Methods of test for concrete pipes

IS 4111 : Part IV : 1968 Code of Practice for Ancillary Structures in Sewerage System - Part IV : Pumping Stations and Pumping Mains (Rising mains)

Ductile pipes

IS 8329 : 2000 Centrifugally Cast (Spun) Ductile Iron Pressure Pipes for Water, Gas and Sewage - Specification

IS 9523 : 2000 Ductile Iron Fittings for Pressure Pipes for Water, Gas and Sewage - Specification

IS 11906 : 1986 Recommendations for cement mortar lining for cast iron mild steel and ductile-iron pipes and fittings for transportation of water

IS 12288 : 1987 Code of Practice for Use and Laying of Ductile Iron Pipes

Earthwork safety

IS 3764 : 1992 Code of safety for excavation work

IS 1838 : Part 1 : 1983 Specification for preformed fillers for expansion joint in pavements and structures (non extruding and resilient type): Part 1 Bitumen impregnated fibre

IS 7245 : 1974 Specification for concrete pavers

7.2. List of IS Standard Concrete Roads

Standard specifications and code of practice for construction of Concrete Roads – IRC-15-2002.

7.3. Cement Mortar

All cement mortar to be used on this work shall be as specified and directed by Engineer. The ingredients shall be measured dry, by means of properly made gauge boxes, on a covered platform and shall be thoroughly mixed dry before adding water to get the required consistency. Only such quantity of mortar shall be prepared at a time as can be used up immediately. Mortar after it has begun to set, shall not be allowed to be raked up again, but shall be rejected and the Contractors shall remove the same from the work site immediately.

7.4. Workmanship

The brick work shall be carried out in a workmanlike manner and in perfect plumb, line and level as required. Bricks shall be thoroughly cleaned, well watered or soaked in water for at-least 12 hours before being used on the work. No broken bricks shall be permitted to be used except as closures. Good bond shall be preserved throughout the work both laterally and transversely. All bed joints shall be horizontal in vertical walls, radial in arches and at right angles to the slope in battered walls. In walling the course shall be kept perfectly horizontal and shall rise in plumb. The vertical, joints shall break joints with the course below and above. Use of bats shall be avoided as far as practicable. The joints shall be close and regular and shall not exceed 12 mm. in thickness. The bond shall be English bond unless otherwise permitted by the Engineer.

The Contractors shall provide at their own expenses all moulds, templates, centers, scaffolding etc. as may be required for the proper execution of the work and nothing extra will be paid for the same.

The mortar used should be stiff. The brick work shall be kept wet for at least seven days after completion to the entire satisfaction of the Engineer. On Sundays and holidays when the work is not in progress, the masonry shall be watered continuously by engaging Bhisties. Watering shall be done carefully so as not to wash out the mortar of the joints. The Engineer shall be at liberty to engage labourers at Contractors' cost to water the work, should the Contractors fail to do so. Should the mortar perish that is become dry, white or powdery, through neglect in watering, the work shall be pulled down and rebuilt at Contractors cost.

The whole of the masonry work shall be carried out at one uniform level throughout but where breaks are unavoidable, the joints shall be made in good long steps raked so as to prevent cracks arising due to separation of old and new work. All junctions of walls shall be formed at the time the walls are being built and cross walls shall be carefully bonded into the main wall.

When new work is to be added to existing structure, the old work must be prepared to receive new work by roughening and grouting with a layer of rich mortar and both must be carefully bonded together.

During rains the works shall be carefully covered without extra charge so as to avoid fresh mortar being washed away.

7.5. CEMENT PLASTER

Cement plaster shall be provided to brick masonry or rubble masonry whenever directed by the Engineer.

Cement :- Cement shall conform to the specification detailed in cement concrete.

Sand :- Sand shall conform to the specifications detailed in.

Cement Mortar: - Refer to Clause.

Workmanship:- All stone or brick masonry shall be thoroughly wetted and joints raked to a depth of 2 cms. and walls washed with water before any plastering is done. The surface shall then be rendered with mortar of specified proportion as stated above to the thickness of 3 to 4 cms, in case of rubble masonry and 2 cms. in case of brick masonry and roughened but not beaten. The surface shall then be floated or set with a thin coat of cement 3 mm. thick and polished well with a trowel or flat board. Before any plaster work is started, patches of plaster 15 cm x 15 cm shall be put on at every 3 meters apart as gauges so as to ensure an even thickness throughout the work. Cement plaster shall be done in even squares or strips. Care shall be taken to keep the whole surface of plaster thoroughly wetted for at-least a week.

7.6. POINTING

Before pointing work is taken up, the old mortar in the masonry or pitching work shall be raked out of the joints at least to a depth of 20 mm. The dust shall be brushed out of the joints and the walls shall be well wetted with fresh water until the old mortar in the wall is wet to the satisfaction of the Engineer. The pointing shall then be made with fine mortar of cement and fine sand, in the proportions as specified. The joints shall be neatly defined by pointing, and the same shall be raised or sunk as directed. In no case false joints shall be allowed. The pointing shall be kept wet until the cementing material sets and becomes

hard. The whole surface shall be left clean at the completion of the work. Cement mortar to be used on this work shall be in proportions 1:2 or as directed by the Engineer.

7.7. CLEARING THE SITE ON COMPLETION:

In case pipes, specials, etc. become surplus in any section the Contractor shall forthwith remove the same to next section for use in the work. On completion of the whole work, however, if any pipes and specials etc. become surplus and are stacked on the site, they should be removed from site immediately.

Similarly, any mild steel scrap which may result during the process of pipe laying, shall on completion of the whole work, be collected by the Contractors and shall be removed from the site immediately.

Where any pavements, trees, shrubs, fencing poles or other property and surface structures have been damaged, removed or disturbed during the course of work, the same shall be replaced or repaired after completion of the work and restored to a condition equal to that before the commencement of the work.

On the completion of the whole of the work, the Contractors shall clear the site of all rubbish, building materials, debris, excavated stuff etc. and restore the work site to its original condition, neat tidy, clean to the satisfaction of the Engineer, and hand over the same to the Engineer. No extra payment shall be made to the Contractors for these works and the rates for laying the pipes shall cover the cost of loading, transporting and unloading the surplus material on the site.

7.8. Extra over the above for obtaining the materials from beyond 50m.

If suitable material for refilling is not available within 50m. (from excavation taken for the present work), extra over the above rate for the same quantity under item PL.63.69 shall be paid under this item, for additional transport of refilling material taking into consideration the free lead of 50m. as follows:

Beyond 50m.	upto 1 Km.
Beyond 1 Km	upto 3 Kms.
Beyond 3 Kms.	upto 5 Kms.
Beyond 5 Kms.	upto 10 Kms.

For example, if the material required for refilling is to be obtained from a total distance of say 1.05 Kms. measured along the shortest practicable route then permissible payable lead shall be one Km. and whatever quantity of material required for refilling is obtained shall be paid per cu.m. under the slab PL.63.70 (a) i.e. beyond 50m. and upto 1 Km.

Refilling the trenches with contractors' Earth, murum etc. of approved quality around and over the pipeline upto ground level and also above ground level if required in layers not exceeding 30cm. including consolidation by watering, ramming, with power rammer etc. complete as directed.

If suitable material for refilling of trenches is not available within a lead of 50m. or beyond, the contractor shall bring earth, murum etc. of approved quality at his cost for refilling purpose. Other specifications as stated under item PL.63.69 shall hold good for this item also.

Power ramming shall be started after refilling has come up about 450 mm. above the top of the pipe. Before commencement of ramming the surface should be copiously watered and the surface allowed to dry out. Ramming shall be continued until the impressions left by the stroke of the rammer indicate satisfactory consolidation. The above specifications of power ramming shall also apply to work under item PL.63.69.

The rate under this item covers;

Refilling the trenches with contractor's earth, murum, etc., around & over the pipeline upto an also above ground level if required in layers not exceeding 30cm.

Consolidation by watering, ramming with power rammer etc.

Supplying the earth murum etc. including loading, unloading, and shall be paid per cu.m. of the final volume of the compacted filling.

7.9. General

The cement shall be stored in weather proof godown or cement silos specially constructed for the purpose in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. The weather proof godown shall have a solid impervious floor raised 300 mm above the general ground level so that, the cement stored thereon shall not come in direct contact with sub-soil moisture. The passage and the general construction shall be such that it affords full protection from weather effects. Large stock of cement shall not be kept to maintain continuity of the work.

No cement that has been stored for more than 120 days shall ordinarily be allowed to be used on the work. Cement stored for longer period than 90 days shall be used on works only with the specific written permission of the Engineer who shall ascertain its quality after due testing in the laboratory before giving such permission. All expenses in connection with the tests shall be borne by the contractors.

For testing the quality of cement which is procured by the contractors, samples shall be taken from every consignment arrived at the site of the work at the option of the Engineer. The contractors shall afford every facility to the Engineer for inspection and sampling of cement.

The cement shall be so arranged by the contractor that each consignment could be stacked separately and in such a manner so as to allow counting of bags in each row with ease. The test results, shall ordinarily, be available within week of sampling and the contractors shall not use any part of consignment until the results of tests are received and are found satisfactory. Should however, the use of such cement becomes imperative before the test result are received, the contractors may do so entirely at their own risk and cost. The whole of such work carried out by them is liable for rejection, if the test results are found unsatisfactory. Any consignment failing to meet the requirements of accepted standard shall be rejected and shall be removed from the work site within 48 hours of the intimation from the Engineer. The decision of the Engineer in this respect shall be final and binding on the contractor.

The cement is to be procured by the contractor directly from open market, all charges in connection with the testing of cement such as transport of samples, testing fees etc. shall be borne by the contractor.

The cement used in any type of concrete shall always be measured by weight & one cubic meter shall be taken as weighing 1450 kg.

The quantity of cement consumed per day will be considerably large, contractor should make adequate arrangement for procurement and transporting of cement and storing at site stores and re-transporting of cement to work site etc. Contractor will be fully responsible for the quality and quantity of cement on site, notwithstanding the control, custody and supervision of the Engineer.

7.10. OTHER RESPONSIBILITIES OF THE CONTRACTOR

Temporary approach roads to the access openings if required shall be constructed by the contractor at his cost and they shall be maintained in good condition till the completion of the work. Right of way to the access opening shall also be arranged by the contractor. The Corporation however, shall render all necessary help to the contractor in obtaining the right of way. No extra payment shall be made for this work.

7.11. CEMENT CONCRETE PIPES (WITH AND WITHOUT REINFORCEMENT)

The pipes shall be with or without reinforcement as required and shall be of class not lesser than NP2. These shall conform to IS 458 and shall be capable of withstanding a test pressure of 0.07 MPa (7 m head). The reinforced cement concrete pipes shall be manufactured by centrifugal (or spun) process while unreinforced cement concrete pipes by spun or pressure process. All pipes shall be true to shape, straight, perfectly sound and free from cracks and flaws. The external and internal surface of the pipes shall be smooth and hard. The pipes shall be free from defects resulting from imperfect grading of the aggregate mixing or moulding.

Concrete used for the manufacture of un-reinforced and reinforced concrete pipes and collars shall not be leaner than 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate). The maximum size of aggregate should not exceed one third of the thickness of the pipe or 20 mm whichever is smaller for pipes above 250 mm internal diameter. But for pipes of internal diameter 80 to 250 mm, the maximum size of aggregate should be 10mm. The reinforcement in the reinforced concrete pipes shall extend throughout the length of the pipe. The circumferential and longitudinal reinforcements shall be adequate to withstand the specified hydrostatic pressure and further bending stresses due to the weight of water when running full across a span equal to the length of pipe plus three times its own weight.

The dimensional requirements of concrete pipes are given in Appendix I.

The minimum clear cover for reinforcement in pipes and collars shall be as given in Table 19.3.

Table 17		
Sl. No.	Precast concrete pipe/collar	Minimum clear cover, mm
(i)	Barrel wall thickness	
(a)	Upto and including 75 mm	8
(b)	Over 75 mm	15
(ii)	At spigot steps	5
(iii)	At end of longitudinal	5

- **Note:** An effective means shall be provided for maintaining the reinforcement in position and for ensuring correct cover during manufacture of the unit. Spacers for this purpose shall be of rust proof material or of steel protected against corrosion.

7.12. Laying and Jointing Cement Concrete Pipes and Specials

7.12.1. Trenches:

The trenches shall be so dug that the pipes may be laid to the required alignment and at required depth.

Cover shall be measured from top of pipe to the surface of the ground.

The bed of the trench, if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions, if any, shall be properly filled with earth and consolidated in 20 cm layers.

If the trench bottom is extremely hard or rocky or loose stony soil, the trench shall be excavated at least 150 mm below the trench grade. Rocks, stone or other hard substances from the bottom of the trench shall be removed and the trench brought back to the required grade by filling with selected fine earth or sand (or fine moorum if fine soil or sand is not available locally) and compacted so as to provide a smooth bedding for the pipe. Where excavation requires blasting operation, it shall be ensured that no pipes have been stacked in the vicinity and completed pipe line in the vicinity has already been covered before starting of blasting operations; this is necessary to prevent damage to the exposed pipes in the vicinity by falling stones as a result of blasting. After the excavation of the trench is completed, hollows shall be cut at the required position to receive the socket of the pipes and these hollows shall be of sufficient depth to ensure that the barrels of the pipes shall rest throughout their entire length on the solid ground and that sufficient spaces left for jointing the underside of the pipe joint. These socket holes shall be refilled with sand after jointing the pipe.

Roots of trees within a distance of about 0.5 metre from the side of the pipe line shall be removed or killed.

The excavated materials shall not be placed within 1 metre or half of the depth of the trench, whichever is greater, from the edge of the trench. The materials excavated shall be separated and stacked so that in refilling they may be re-laid and compacted in the same order to the satisfaction of the Engineer-in-Charge.

The trench shall be kept free from water. Shoring and timbering shall be provided wherever required. Excavation below water table shall be done after dewatering the trenches.

Where the pipe line or drain crosses an existing road, the road crossing shall be excavated half at a time, the 2nd half being commenced after the pipes have been laid in the first half and the trench refilled. Necessary safety measures for traffic as directed shall be adopted. All types, water mains cables, etc. met within the course of excavation shall be carefully protected and

supported. Care shall be taken not to disturb the electrical and communication cable met with during course of excavation, removal of which, if necessary, shall be arranged by the Engineer-in-Charge.

Where the pipes are to be bedded directly on soil, the bed shall be suitably rounded to fit the lower part of the pipe, the cost for this operation being included in the rate for laying the pipe itself.

Loading, transporting and unloading of concrete pipes shall be done with care. Handling shall be such as to avoid impact. Gradual unloading by inclined plane or by chain pulley block is recommended. All pipe sections and connections shall be inspected carefully before being laid. Broken or defective pipes or connections shall not be used. Pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Pipes shall be laid true to line and grade as specified. Laying of pipes shall proceed upgrade of a slope.

If the pipes have spigot and socket joints, the socket ends shall face upstream. In the case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid. Adequate and proper expansion joints shall be provided where directed.

In case where foundation conditions are unusual such as in the proximity of trees or holes, under existing or proposed tracks manholes etc. the pipe shall be encased all-around in 15 cm thick cement concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) or compacted sand or gravel.

In cases where the natural foundation is inadequate the pipes shall be laid either in concrete cradle supported on proper foundations or on any other suitably designed structure. If a concrete cradle bedding is used the depth of concrete below the bottom of the pipe shall be at least 1/4th of the internal dia of the pipe subject to the min. of 10 cm and a maximum of 30 cm. The concrete shall extend up the sides of the pipe at least to a distance of 1/4th of the outside diameter of pipes 300 mm and over in dia. The pipe shall be laid in this concrete bedding before the concrete has set. Pipes laid in trenches in earth shall be bedded evenly and firmly and as far up the haunches of the pipe as to safely transmit the load expected from the backfill through the pipe to the bed. This shall be done either by excavating the bottom of the trench to fit the curve of the pipe or by compacting the earth under around the curve of the pipe to form an even bed. Necessary provision shall be made for joints wherever required.

When the pipe is laid in a trench in rock hard clay, shale or other hard material the space below the pipe shall be excavated and replaced with an equalising bed of concrete, sand or compacted earth. In no place shall pipe be laid directly on such hard material.

When the pipes are laid completely above the ground the foundations shall be made even and sufficiently compacted to support the pipe line without any material settlement. Alternatively the pipe line shall be supported on rigid foundations at intervals. Suitable arrangements shall be made to retain the pipe line in the proper alignment, such as by shaping the top of the supports to fit the lower part of the pipe. The distance between the supports shall in no case exceed the length of the pipe. The pipe shall be supported as far as possible close to the joints. In no case shall the joints come in the centre of the span. Care shall be taken to see that super imposed loads greater than the total load equivalent to the weight of the pipe when running full shall not be permitted.

Suitably designed anchor blocks at change of direction and grades for pressure lines shall be provided where required.

7.13. Jointing:

Joints are generally of rigid type. Where specified flexible type joints may also be provided.

Rigid Spigot and Socket Joint : The spigot of each pipe shall be slipped home well into the socket of the pipe previously laid and adjusted in the correct position. The opening of the joint shall be filled with stiff mixture of cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) which shall be rammed with caulking tool. After a day's work any extraneous material shall be removed from the inside of the pipe and the newly made joint shall be cured.

Rigid Collar Joint : The two adjoining pipes shall be butted against each other and adjusted in correct position. The collar shall then be slipped over the joint, covering equally both the pipes. The annular space shall be filled with stiff mixture of cement mortar 1:2 (1 cement: 2 fine sand) which shall be rammed with caulking fool. After a day's work any extraneous materials shall be removed from the inside of the pipe and the newly made joint shall be cured.

Semi Flexible Spigot and Socket Joint : The joint is composed of specially shaped spigot and socket ends on the concrete pipes. A rubber ring shall be placed on the spigot which shall be forced into the socket of the pipe previously laid. This compresses the rubber ring as it rolls into the annular space formed between the two surfaces of the spigot and the socket, stiff mixture of cement mortar 1:2 (1 cement: 2 fine sand) shall then be filled into the remaining annular space and rammed with a caulking tool. After day's work any extraneous materials shall be removed from the inside of the pipe and the newly made joint shall be cured.

Semi Flexible Collar Joint: This is made up of a loose collar which covers two specially shaped pipe ends. Each end shall be fitted with a rubber ring which when compressed between the spigot and the collar, seal the joint. Stiff mixture of cement mortar

1:2 (1 cement: 2 fine sand), shall then be filled into the remaining annular space and rammed with a caulking tool. After day's work, any extraneous material shall be removed from the inside of the pipe and the newly made joint shall be cured. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe.

In all pressure pipe lines the recess at the end of the pipe line shall be filled with jute braiding dipped in hot bitumen or other suitable approved compound. Pipes shall be so jointed that the bitumen ring of one pipe shall set into the recess of the next pipe. The ring shall be thoroughly compressed by jacking or by any other suitable method.

The number of pipes that shall be jacked together at a time shall depend on the diameter of the pipes and the bearing capacity of the soil, for small pipes up to 25 cm diameter, six pipes can be jacked together at a time.

The quantity of jute and bitumen in the ring shall be just sufficient to fill the recess in the pipe when pressed hard by jacking or by any other suitable method. Before and during jacking care shall be taken to see that there is no offset at the joint.

7.14. Testing:

For pressure pipes, the completed pipeline shall be tested for pressure (Known as site test pressure) which shall not be less than the maximum pipeline operating pressure plus the calculated surge pressure, but in no case shall it exceed the hydrostatic test pressure.

7.15. Refilling of Trenches:

In case where pipes are not bedded on concrete special care shall be taken in refilling, trenches to prevent the displacement and subsequent settlement at the surface resulting in uneven street surfaces and dangers to foundations etc. The backfilling materials shall be packed by hand under and around the pipe and rammed with a shovel and light tamper. This method of filling will be continued up to the top of pipe. The refilling shall rise evenly on both sides of the pipe and continued up to 60 cm above the top of pipe so as not to disturb the pipe. No tamping shall be done within 15 cm of the top of pipe. The tamping shall become progressively heavier as the depth of the backfill increases.

7.16. MANHOLE COVERS & FRAMES

7.16.1. Manhole Covers

The covers and frames shall conform to IS 1726 for cast Iron and IS 12592 for pre-cast concrete covers and shall be of the following grades and types.

Table 18

Grades	Grade Designation	Type/shape of cover
Light Duty	LD - 2.5	Rectangular, Square, Circular
Medium Duty	MD - 10	Rectangular, Circular and Square (for pre-cast concrete manhole covers)
Heavy Duty	HD - 20	Circular-Square, Rectangular, (Scraper Manhole)
Extra Heavy Duty	EHD - 35	Circular, Square, Rectangular, (Scraper Manhole)

7.17. Cast Iron Manhole Covers and Frames

Manhole covers and frame shall be manufactured from appropriate grade of grey cast iron not inferior than FG150 grade of IS 210.

They shall be cleanly cast and shall be free from air and sand holes, cold shuts and warping.

Covers shall have on its operative top a raised chequered design to provide for an adequate no-slip grip. The rise of chequers shall be not less than 4mm.

Key holes, keys and lifting devices shall be provided in the manhole covered to facilitate their placement in the frames and their operative maintenance.

Manhole covers and frames shall be coated with materials having base with a black bituminous composition. The coating shall be smooth and tenacious. It shall not flow when exposed to temperature of 63°C and shall not be so brittle as to chip off at temperature of 0°C.

Size and shape and performance requirement of manhole covers and frames shall conform to IS 1726.

Each manhole covers and frame shall have cast on them the following information:

Manufacturer's name or trade-mark

Grade designation

Date of manufacturer

The words SWD or 'Sewer' to denote 'storm water drain' or 'sewer' respectively

Identification marks as required by Engineer-in-Charge.

The cover shall be gas tight and water tight.

The sizes of covers specified shall be taken as the clear internal dimensions of the frame.

The approximate weight of the various type of manhole covers and frames shall be as per IS 1726.

The cover shall be capable of easy opening and closing and it shall be fitted in the frame in workmanship like manner.

7.18. Pre-Cast Concrete Manhole Covers & Frames

Pre-cast reinforced cement concrete manhole covers intended for use in sewerage and water works shall generally conform to IS 12592.

7.19. Materials

Cement: Cement used for the manufacture of pre-cast concrete manhole covers shall be 43 grade Portland cement conforming to IS-8112.

Aggregates: The aggregates used shall be clean and free from deleterious matter and shall conform to the requirements of IS - 383. The aggregates shall be well graded and the nominal maximum size of coarse aggregate shall not exceed 20 mm.

Concrete: The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense concrete without voids, honey combing etc. The minimum cement content in the concrete shall be 410 kg/m³ with a maximum water cement ratio of 0.45. Concrete weaker than grade M-30 (design mix) shall not be used. Compaction of concrete shall be done by machine vibration.

7.20. Reinforcement

The reinforcement steel shall conform to IS 1786. Reinforcement shall be clean and free from loose mill scale, loose rust, and mud, oil, grease or any other coating which may reduce or destroy the bond between the concrete and steel. A light film of rust may not be regarded as harmful but steel shall not be visibly pitted by rust.

Fibers Steel: The diameter/equivalent diameter of steel fibers where used, shall not be greater than 0.75 mm. The aspect ratio shall be in the range of 50 to 80. The minimum volume of fibers shall be 0.5 percent of the volume of concrete. The reinforced concrete manhole cover and frame shall be designed in accordance with the provisions of IS 456. Clear cover to reinforcement shall not be less than 15 mm.

Shapes and Dimensions: Shape, dimensions and tolerance of pre-cast concrete manhole covers and frames shall conform to IS 12592. Outside dimension of cover at top shall match with corresponding frame so that the maximum clearance at top between the frame and the cover all round the periphery is not more than 5 mm and the top surface of the frame and covers, is in level within a tolerance of ± 5 mm.

For facility of removing the cover from the frame, suitable taper matching with taper given for the frame shall be provided to the periphery of the cover.

Lifting Device: The minimum diameter of mild steel rod used as lifting device shall be 12 mm for light and medium duty covers and 16 mm for heavy and extra heavy duty covers. The lifting device shall be protected from corrosion by hot galvanising or epoxy coating or any other suitable treatment.

Finishing & Coating: To prevent any possible damage from corrosion of steel the underside of the covers shall be treated with anticorrosive paint. The top surface of the covers shall be given a chequered finish.

In order to protect the edges of the covers from possible damage at the time of lifting and handling it is necessary that the manhole covers shall be cast with a protective mild steel sheet of minimum 2.5 mm thickness around the periphery of the covers. Exposed surface of mild steel sheet shall be given suitable treatment with anticorrosive paint or coating. To prevent the top outer edge of frame from possible damages, it shall be protected by 25 mm X 3 mm mild steel flat as part of the frame.

7.21. Physical Requirements

General: All units shall be sound and free from cracks and other defects which interface with the proper placing of the unit or impair the strength or performance of the units. Minor chipping at the edge/surface resulting from the customary methods of handling during delivery shall not be deemed for rejecting.

Load Test: The breaking load of individual units when tested in accordance with the method described in IS 12592 shall be not less than the values specified in Table 19.4.

Table 19

Grade of Cover	Type	Load in Tonnes	Diameter of Blocks in mm
EHD - 35	Circular, Square or Rectangular	35	300
HD - 20	Circular, Square or Rectangular	20	300
MD - 10	Circular or Rectangular	10	300
LD - 2.5	Rectangular, Square or Circular	2.5	300

Fixing: The frames of manhole shall be firmly embedded to correct alignment and level in RCC slab or plain concrete as the case may be on the top of masonry which shall be paid as extra unless specified otherwise.

7.22. MANHOLES

At every change of alignment, gradient or diameter of a drain, there shall be a manhole or inspection chamber. Bends and junctions in the drains shall be grouped together in manhole as far as possible. The maximum distance between manholes shall be 30 m.

Manholes of different types and sizes as specified shall be constructed in the sewer line at such places and to such levels and dimensions as shown in the drawings or as directed by the Engineer -in-Charge. The size specified shall indicate the inside dimensions between brick faces of the manholes.

Where the diameter of the drain is increased, the crown of the pipe shall be fixed at the same level and necessary slope given in the invert of the manhole chamber. In exceptional cases and where unavoidable, the crown of the branch sewer may be fixed at lower level but in such cases the peak flow level of the two sewers shall be kept the same.

Sewers of unequal sectional area shall not be jointed at the same invert in a manhole. The invert of the smaller sewer at its junction with main shall be at least 2/3 the diameter of the main above the invert of the main. The branch sewers shall deliver sewage in the manhole in the direction of main flow and the junction must be made with care so that flow in main is not impeded. No drain from house fittings, e.g. gully trap or soil pipe, etc. to manhole shall normally exceed a length of 6 m unless it is unavoidable.

Manholes 90 × 80 cm are generally constructed within compound for house drainage only and near the buildings for house drainage. Manholes 1.2 m × 90 cm are generally constructed for main drainage work for depths less than 1.5 m.

Manhole 1.4 m × 90 cm is of the arched type and is generally constructed for main drainage works where depth is 1.50 m or more. The width of manholes shall be increased more than 90 cm on bends or junctions or pipes with diameter greater than 450 mm and that the benching width on either side of the channel is minimum 20 cm.

Manholes 1.4 m internal diameter are generally constructed for main drainage works where depth is 2.45 m or more as an alternative to manholes of arch type. The diameter shall be increased suitably, for pipes with diameter greater than 450 mm in the same manner as in the case of rectangular manholes.

Before deciding size of manholes, Local Municipal Bye Laws shall be consulted. As a general guide some typical type designs of manholes followed in Delhi have been shown in Fig. 19.4 to 19.7. When manholes are constructed on foot path, these shall be provided with cover of medium duty casting and when built within the width of the road under vehicular traffic, these shall be provided with cover of heavy duty casting.

Excavation

The excavation for manhole shall be true to dimensions and levels shown on the plans or as directed by the Engineer-in-Charge.

Bed Concrete

The manhole shall be built on a bed of cement concrete 1:4:8 (1 cement: 4 coarse sand: 8 graded stone aggregate 40 mm nominal size) unless required by local authorities. The thickness of the bed concrete shall be 20 cm for manholes up to 4.25 m depth and 30 cm for depths beyond 4.25 m unless otherwise specified or directed by the Engineer-in-Charge. In bad ground, special foundations as suitable shall be provided.

7.23. Brick Work

The brick work shall be with class 75 bricks in cement mortar 1:4 (1 cement: 4 coarse sand). The external joints of the brick masonry shall be finished smooth, and the joints of the pipes with the masonry shall be made perfectly leak proof. For arched type and circular manholes, brick masonry in arches and arching over the pipes shall be in cement mortar 1:3 (1 cement: 3 fine sand). In the case of manholes of circular type the excess shaft shall be corbelled inwardly on three sides at the top to reduce its size to the cover frame to be fitted.

The walls shall be built of one brick thickness for depths up to 4.25 m. Below a depth of 4.25 m in ordinary subsoil the wall thickness shall be increased to one and half brick and at 9.75 m below ground two brick thick walls shall be built.

7.24. Plaster and Pointing

The walls of the manholes shall be plastered inside with 12 mm thick cement plaster 1:3 (1 cement: 3 coarse sand) finished smooth. In the case of arched type manhole the walls of the manhole shall be plastered inside all-around only up to the crown level, and flush pointed for the shaft with cement mortar 1:2 (1 cement: 2 fine sand). Where the saturated soil is met with, also the external surface of the walls of the manhole shall be plastered with 12 mm thick cement plaster 1:3 (1 cement: 3 coarse sand) finished smooth up to 30 cm above the highest sub-soil water level with the approval of the Engineer-in-Charge. The plaster shall further be water proofed with addition of approved water proofing compound in a quantity as per manufacturer's specifications. In case Local Authorities/Bye Laws specify richer specifications, the same shall be adopted.

For earth work excavation, bed concrete brick work, plaster and pointing, R.C.C. work and refilling of earth, respective specifications shall be followed.

7.25. Foot Rests

All manholes deeper than 0.8 m shall be provided with M.S. foot rests. These shall be embedded 20 cm deep in 20 x 20 x 10 cm blocks of cement concrete 1:3:6 (1 cement: 3 coarse sand 6 graded stone aggregate 20 mm nominal size). The concrete block with M.S. foot rest placed in its centre shall be cast in situ along with the masonry and surface finished with 12 mm thick cement plaster 1:3 (1 cement: 3 coarse sand) finished smooth.

Foot rests which shall be of 20 × 20 Sq. M.S. bars as shown in Fig. 19.8 shall be fixed 40 cm apart vertically and staggered laterally and shall project 10 cm beyond the surface of the wall. The top foot rest shall be 45 cm below the manhole cover.

Foot rests shall be painted with coal tar, the portion embedded in the cement concrete block being painted with thick cement slurry before fixing.

7.26. Manhole Covers and Frames

The frame of manhole shall be firmly embedded to correct alignment and levels in R.C.C. slab or plain concrete as the case may be on the top of the masonry. After completion of the work, manhole covers shall be sealed by means of thick grease.

Ductile Iron Pipes (DI Pipes)

DI Pipes are centrifugally cast (spun) in accordance with IS 8329. DI Pipes are also called spheroidal graphite iron pipes or nodular pipes. Advantages of DI Pipes over cast iron pipes are greater tensile strength, significant elongation at break, high resistance against breakage due to impact and lighter in mass as compared to cast iron pipes. DI fittings shall conform to IS 9523. CI fittings in accordance with IS 13382 can also be used in DI pipe lines. DI pipes are available in standard lengths of 4m, 5m, 5.5m and 6m. Common sizes available are from 80mm to 2000mm. Size referred to is the internal diameter.

Classification of DI Pipes

DI Pipes are classified as K7, K8, K9, K10 and K12 depending upon the service conditions and Manufacturing process. For screwed or welded flanged pipes, the minimum classes based on Working pressure criteria are as follows.

Table 20 Minimum class for DI flanged pipes

Nominal dia in mm	Screwed on flange Minimum				Welded on flange minimum in mm			
	PN-10	PN-16	PN-25	PN-40	PN-10	PN-16	PN-25	PN-40
80-450	K9	K9	K9	K9	K9	K9	K9	K9
500-600	K10	K10	K10	K10	K9	K9	K9	K10
700-1200	K10	K10	K10	-----	K9	K9	K9	-----
1400-2000	K10	K10	-----	-----	K9	K9	-----	-----

Coating

Pipes shall be protected internally and externally with coating.

External Coating: External coating shall be with metallic zinc rich paint not less than 130 grams per square metre with a local minimum of 110 grams per square metre or bitumen coating with mean thickness not less than 70 microns or polythene sleeving of density between 910 and 930 kg/cubic metre.

Internal Lining: The following lining shall be provided Sulphate resisting cement mortar lining (IS. 12330 or IS. 6909) or High alumina cement mortar lining (IS. 6452)

Method of Lining.

Cement mortar lining shall be done in the factory by centrifugal process to ensure uniform thickness.

Marking

Each pipe shall be marked with the details of manufacturer, nominal diameter, class, last 2 digits of the year of manufacture and a short white line at the spigot end of pipe with push button joints.

Ductile Iron Fittings

Ductile iron fittings shall conform to IS. 9523.

Unplasticised Polyvinyl Chloride (UPVC) Pipes :

PVC and Polyethylene pipes fall under the general title of Plastic pipes. uPVC pipes are manufactured in accordance with IS:4985. The pipes are produced by extrusion process. The compound for extrusion comprises PVC resin, colouring pigments, opacifiers and heat stabilizers. Advantages of uPVC pipes are resistance to corrosion, light weight, toughness, rigidity, ease of fabrication, economical in laying, jointing and maintenance. Sizes available are 16mm, 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm, 110mm, 125mm, 140mm, 160mm, 180mm, 200mm, 225mm and 250mm. uPVC pipes are referred to the outer diameter.

7.27. Classification of pipes

PVC pipes are available in working pressure ranges of 2.5, 4, 6, 8 and 10 kg/cm² at 27°C and classified under the same working pressure.

High Density Polyethylene Pipes (HDPE pipes)

HDPE pipes shall conform to IS 4984. The pipes shall be manufactured by extrusion technique. HDPE pipes are classified on pressure ratings as Class 1 for 0.2 MPa, Class 2 for 0.25 MPa, Class 3 for 0.4 MPa, Class 4 for 0.6 MPa and Class 5 for 1 Mpa.

The pipes shall be used for a temperature range up to 45°C. The recommended maximum working stress for the material at 27°C in a pipe is 50 kg/sq.cm. The pipes are referred to in terms of outer diameter.

HDPE pipes shall be flexible and tough, and at the same time resilient in order to conform to the topography of the land/trench when laid. They should be coilable. The diameter of the coil shall not be less than 25 times the outside nominal diameter of the pipe without any kinks. These pipes should be easily bent in installations reducing the specials like bend and elbow.

The pipes shall be marked with white paint on either side of the pipes. For coils, marking shall be made at both ends and at spacing not exceeding 5 metres in between.

Alternatively marking shall be done hot embossed on white base, every metre throughout the length of the pipe or coil. Marking shall contain the following information

Manufacturer's name/ Trade name

Designation of pipe (Grade of raw material, class of pipe, nominal outside diameter)

Lot/batch number

ISI certification mark and

Raw material manufacturers

Table 21 Class of pipes and color of marking

Class of pipe	Class 1	Class 2	Class 3	Class 3	Class 5
Kg/cm ²	2	2.5	4.0	6.0	10
Colour	Orange	Red	Blue	Green	Yellow

The color used for marking shall be as given below.

Verification of Dimensions :

Method of measurement of diameter, thickness and ovality: Outside diameter shall be taken as the average of two measurements taken at right angles for pipes upto 110 mm dia. As an alternative, diameter shall be measured preferably by using a flexible Pi tape or circometer, having an accuracy of not less than 0.1mm.

Thickness shall be measured by a dial vernier or ball ended micrometer. Resulting dimension shall be rounded to 0.1mm. Outside diameter shall be measured at a distance of at least 300 mm from the end of the pipe. In case of dispute, the dimension of pipes shall be measured after conditioning at room temperature for 4 hours.

Ovality: It is the difference between maximum outside diameter and minimum outside diameter at the same cross section at 300mm away from the cut end. For coiled pipes, it shall be measured prior to coiling (or after re-rounding of pipes).

Performance requirements :

Visual appearance: Internal and external surfaces shall be smooth, clean and free from grooving and other defects. Ends shall be square with the axis of pipe. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided that the wall thickness remains within the permissible limits. The outside diameter, thickness, tolerance in thickness and ovality shall be as per relevant IS.

Hydraulic characteristics: When subjected to internal pressure creep rupture test, the pipes shall not show signs of localised swelling, leakage or weeping and shall not burst during the test duration. The temperature, duration of test and induced stress for the test shall be as per details given in the table below:

The internal test pressure for the above test shall be calculated by adopting the formula given below

$$P = \frac{2 \times p \times s}{(d - s)}$$

where p=test pressure in MPa

s=minimum wall thickness in mm

d=outside diameter in mm

P=induced stress in MPa as given in the table above

Reversion test: Longitudinal reversion shall not be greater than 3%

Overall migration test: When tested from a composite sample of minimum of 3 pipes as per IS 9845, the overall migration of constituents shall be within the limits specified in IS 10146.

Density: Composite sample of minimum of 3 pipes as per IS 7328 shall have a density of 940.3-946.4 kg/ cu m at 27 deg C. The value of density shall not differ from the nominal value by more than 3 kg/cu.m as per clause 5.2.1.1 of IS 7328.

Melt flow rate (MFR): Composite sample of minimum of 3 pipes as per IS 2530 at 190 deg C with nominal load of 5 kgf , MFR shall be 0.4 -1.1 g/ 10minutes and also shall not differ by more than 30% of the material used in manufacturing of pipes. The MFR of the material shall be 0.41-1.10g/10minutes when tested at 190deg C with nominal load of 5kgpf as determined

by method prescribed in 7 of IS 2530. The MFR of the material shall be c within +20% of the value declared by the manufacturer

Carbon black content and dispersion: For composite sample of minimum of 3 samples in accordance with IS 2530, the carbon black content shall be within 2.5+ 0.5% and the dispersion of carbon black shall be satisfactory.

Sampling, frequency of tests and criteria for conformity for acceptance tests:

Lot: It shall consist of same size, same pressure rating, same grade and manufactured essentially under similar conditions. The number of samples to be collected for various tests based on the size of lot shall be as per the table given below. The pipes shall be selected at random for sampling. Starting from any pipe in the lot, count them as 1,2,3,4 etc upto 'r' and so on where 'r' is the integral part of N/n, N being the number of pipes in the lot and 'n' is the number of pipes in the sample. Every Rth pipe so counted shall be drawn as to constitute the required sample size.

8. DETAILED SPECIFICATIONS FOR PLAY EQUIPMENT

8.1. Play Equipment

8.1.1 UPRIGHT POSTS:

- a. All upright posts are to be schedule HOT DIP Galvanized steel with a 114mm OD {Outer Diameter} and
- b. 2.2mm (wall) thickness of the tubing.
- c. Steel quality is BS1387-1985 technical standard BS1387-1985.
- d. Posts are to be finished with a baked on powder coat finish.
- e. Electro - statically applied polyester powder must have a tough finish with maximum durability.
- f. The pretreatment and curing process includes the following: -

Sand blasting > acid wash > freshwater rinse > iron phosphate rinse > final rinse > seal & dry-off > oven baked electro-static powder application and dual zone curing in the oven.

- g. Finished products have the following typical characteristics: 0.5mm thickness, oven cured between 191oC and 220oC, to achieve Flexibility, Impact, Salt Spray {Corrosion} Resistance, Hardness, and Adhesion.

8.1.2 POST CAPS:

- h. All post caps are to be cast from aluminum which is pretreated, cured and sandblasted, 114mm diameter,
- i. with a baked on powder coat finish.
- j. All post caps are to be made from Aluminum with a 114mm OD {Outer Diameter}.
- k. Posts Caps are to be finished with a baked on powder coat finish.
- l. Electro - statically applied polyester powder must have a tough finish with maximum durability.
- m. The pretreatment and curing process includes the following: -
- n. Sand blasting > acid wash > freshwater rinse > iron phosphate rinse > final rinse > seal &
- o. dry-off > oven baked electro-static powder application and dual zone curing in the oven.
- p. Finished products have the following typical characteristics: 0.5mm thickness, oven cured between 191oC
- q. and 220oC, to achieve Flexibility, Impact, Salt Spray {Corrosion} Resistance, Hardness, and Adhesion.

8.1.3 BASE PLATES:

All base plates to be made from steel with 114mm inner diameter.

The pre treatment and curing process or each Base Plate must include the following:- sandblasting > acid wash > freshwater rinse > iron phosphate rinse > final rinse and seal > dry-off > oven electro-static powder application, and dual zone cure in oven. Finished products have the following typical characteristics: 0.5mm thickness, oven cured between 191oC and 220oC, Flexibility, Impact, Salt Spray resistance, Hardness, and Adhesion

8.1.4 Clamp:

Clamps are to be cast from aluminum which is pretreated, cured and sandblasted , 114mm diameter, with a baked on powder coat finish.

8.1.5 Couplings:

Couplings are to be cast from aluminum which is sandblasted, pretreated, and cured, 32mm diameter, with a baked on powder coat finish.

DECK, STEP PLATFORM, STAIRS, and BAFFLE:

Shall be an all-ROBOTIC welded assembly fabricated from

2mm perforated punched steel. Deck perimeter is precision pre punched for attachments. Decks are pressed, punched, and welded; sand blasted to remove rust & impurity; powder coated to 2.2mm thickness or vinyl plastic coated to a thickness of 4mm [optional].

8.1.6 MATERIALS: All materials shall be of first grade quality as per specified standard sections in accordance with relevant I.S. code provisions.

(A) G.I. PIPES G.I. PIPES G.I. PIPES :- The G.I. Pipe of 'B' Class of approved make Viz. Zenith / TATA / Jindal / SAIL I.S. 1239 (part i) 1979, with UV. U.V stabilised pure polyster powder coating shall be used.

(B) M.S. ANGLES M.S. ANGLES M.S. ANGLES :- All M.S. Angle shall be in accordance with I.S. 226 of 1975 (Latest) and of CIDCO approved make Viz. Jindal Power / TATA / SAIL with U.V. stabilized pure polyster powder coating shall be used.

(C) ELECTRICAL WELDING RODS: - Electrical welding rods shall be manufactured by advani oerliken or sunarc equipment. The welding rods shall not be kept in open environment much before in use as it may get affected by water vapors from the air, which may be result in priority defect in the weld.

(D) NUT BOALTS & OTHER FASTENERS :- Galvanised iron nuts, bolts, and other fasteners must be used for all moving and non-moving type of play equipment. All the fasteners used shall be standard ones.

(E) JOINTING: - The jointing work shall be done by metal inter welding process. The welded joint shall be ground with electric surface grinder and finally polished the ground surface are then finished with epoxy sealant of m-seal brand. Utmost care shall be taken while welding ensures that won't be any under cuts or foreign particles entrapment or hydrogen embitterment in the welded joints. Contractor No. of Corrections Executive Engineer 79

(F) BENDING: - During bending operation it is ensured that there won't be any deformation in the diameter of the pipe more than 1.2 times the dia. This shall be achieved by use of slip guages, and the usage of special bending dies suitable for different diameter. All the bending are done by using mechanical bending machine , to give the perfect curves.

(G) DRILLING: - All the holes shall be drilled by the use of specially designed hardened drilling fixtures to ensure repeatability and interchangeability of the components.

(H) CUTTING: - All the cutting shall be done by the use of bend saw machine and cross cutting manchines to ensure linearity and exact length.

(I) PLANTING: - All the plated parts shall be of hot dipped galvanized or electro galvanized which shall be passivized and thickness of all plating are ensured to be minimum of 10 microns.

(J) F.R.P. MATERIAL :- All the fiber reinforced plastic (FRP) material shall be processed by he hand laid process which is considered to be the best of its type in the wherein the process it as follows : After the preparation of the mould shall be done a layer of gel coat is applied which is of N.P.G which is duly mixed with U.V stabilized pigment to give the required colour to the product. Then a coat of G.P. resin above the surface of the gel coat after it becomes tack free.

8.1.7 PIT INFORMATION: -

The fixing shall be done in C.C. 1:11/2:3 grade PCC with minimum 45 cm X 45 cm X 45 cm deep size pit. A) The constitutive layers C.S.M (chopped strand matt.) Glass fiber shall be laid down along with resin to the required extend to build up the required thickness in sandwich pattern. * The back side coating of the resin shall be done to give a smooth finish. The moulds are to be kept open to dry for a specified duration. This procedure strengthens the F.R.P. * after the mould shall be completely cured for the specified duration the FRP shall be removed from the mould. Then all the corners and edges of it shall be removed from the mould. Then all the corners and edges of it shall ground to make them smooth and harmless from the strands of the glass wool. 8)

8.1.8 PAINTING PROCESS:-

All the items that are to be painted are first to be made free from. Any burr and welding spots are ground to finish and cleaned with degreasing chemical solutions and phosphating is done then all the welded joints are applied with epoxy sealant to avoid any exposure to atmosphere so that further corrosion is not going to take place. Beside the sealing process it gives smooth and better aesthetics to the product. The powder is to be sprayed onto the items by means of static electric gun at 8000 volts, ensure uniform powder thickness all over. The thickness to be maintained shall be minimum of 60 to 80. micron. (dry films thickness) The coated product is then to be cured in oven at 200 degree Celsius for twenty minutes.

8.1.9 INSPECTION: -

All the raw materials and parts shall be inspected for any defects like scratches, dents, cracks and similar shortcoming. The in-process parts shall be inspected while working on them by the skilled operator themselves and by the supervisor for matching ability and conformance to the dimension. The agency shall carry out 100% inspection of the final goods produced for the conformation with specification. All the parts assemblies shall be checked for their matching with corresponding parts and their interchangeability.

8.1.10 PACKING:-

All the equipment manufactured , painted and rested for quality are to be packed to make them ready for dispatch. This packing facility in order to provide dirt and scratch proofing. * For any additional specification the work shall be For any additional specification the work shall be executed as executed as directed by engineer in charge. directed by engineer in charge. reected by engineer in charge.

8.2. GENERAL MATERIALS SPECIFICATIONS

- a. PIPES :- All pipes shall be galvanized steel confirming to IS : 1239 (part) of reputed make like TATA , Zenith, Jindal Bhushan (NB = Nominal Bore i.e inner diameter) of 'A' Class with stabilized pure polyester powder coating.
- b. FIBREGLASS REINFORCED PLASTIC :- All FRP product shall be made of top quality polyester resin of reputed brands and virgin standard glass made of reputed brand only. The molding of FRP is done by contact molding and has a minimum tensile strength of 60 mpa. The FRP products to be all self pigmented , food grade materials with U.V stablized.
- c. MOULDED PLASTICS :- LLDPE and HDPE with self pigmented colour and U.V stabilized shall be use in the moulded plastic product. The product are seamless for long life and durability (LLDPE : Linear Low Density Poly Ethylene & HDPE : High Density Poly Ethylene.
- d. SWING SEATS :- It shall be made of sythetic rubber reinforced wih heavy duty canvas & has a chequered and water silence.
- e. BEARINGS :- All bearing shall be of reputed make (SKF) & press fitted for smoot rotation with lubricant and water silence.
- f. FASTERNERS :- All bolts & nuts totally galvanized.
- g. FABRICATION :- All steel components shall be welded by electric are welding using the best quality welding rods confirming to is : 814. All welded joints are to be properly rounded & coated with an epoxy sealant for rust resistance. All sheet components shall be galvanized for rust resistance.
- h. POWDER COATING :- The powder is to sprayed onto the substrate by means of static electric gun at 8000 volts, ensure uniform powder thickness all over. The thickness maintained shall be a minimum of 60 to 80 microns. (dry films thickness) The coated product is then cured in oven at 200 degree Clesius for twenty minutes. .
- i. MANUFACTURING :- The relevant Indian, British & European standard shall be followed for playground equipment as BN 1176 : 1999 parts 1 to 7 IS : 1239 (Part 1) 1990 : mild steel tubes tubular and other wrought steel fitting part 1 mild steel tubes (fifth revision) IS : 1363 (part 1) 1992 : hexagon head bolts, screws and nuts of product grade c : part 1) hexagon head bolts (size range m5 to m64) third revision) part3) 1992 : hexagon head nuts (size range m5 to m64) third revision) IS : 2429 (PART1) 1987 : round steel short link chain (electric butt welded), grade 1 (3) part 1 non-calibrated load chains for lifting purpose (third revision) IS : 3109 (part 2) 1982 : short link chain, grade m (4) part 2 calibrated lad chain for pulley blocks and other lifting appliances (second revision) IS : 6869 (part 1) 1973 :

8.3. ITEM DESCRIPTION

8.3.1. Item Descriptions:

Product Name :	Straight Slide
Product Area :	5.0 m x 0.6 m
Safe Play Area :	6.0 m x 1.6 m
Ideal For :	4-12 Years

Technical Specification :

This Straight Slide consists of ISI marked structure.

The attractive Straight Slide chute is made up of LLDPE (Linear Low Density Polyethylene) material of Grade-36RA045, UV-8 (Food Grade Plastic).

The structure is made up of 20 NB and 25 NB powder coated GI pipes.

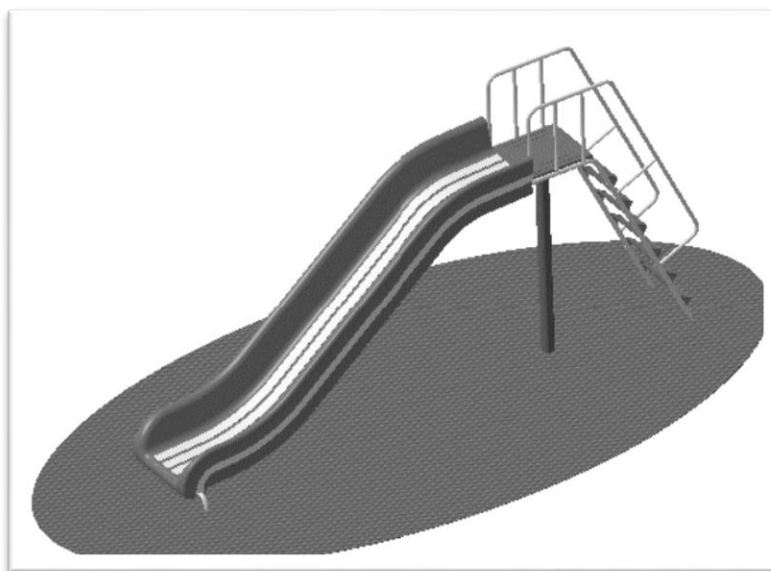
The slide is supported on 80 NB powder coated GI pipes.

The ladder cum railing is made 20 NB and 25 NB GI pipes respectively.

The platform of the slide is made up of 14 SWG GI sheet with anti-skid for firm foot grip.

There are triangular steps 16 SWG GI sheet.

The slide chute has its end such as it causes safe landing of the child.



8.3.2. Item Descriptions:

Product Name :	Standard See-saw
Product Area :	2.5m X 0.3m (8.2ft X 1ft)
Safe Play Area :	3.5m X 1.3m (11.5ft X 4.3ft)
Ideal For :	4-10 Years
Friends at a time :	2

Technical Specification:

Frame: Frame of standard see-saw is designed using 15NB , 20NB & 25NB G.I. pipe and it has been given radius by suitable bending techniques. Plates has been welded at places were seat has to be installed so that seats can be fixed to the frame with suitable bolting arrangement.

Seat : Rotational molded seats of thickness 6mm are used in these see-saw , it has been provided with bolts to fix it too see-saw frame which has a plates of 200X150X5mm welded on to the frame. Handle has been provided on the frame made up of 20NB pipe and also conforming to EN standards.The Multi Seater See saw comprises four seats.

For product: The products are manufactured using material LLDPE (Linear Low Density Polyethylene) with UV stabilization of Food Grade Non Hazardous Plastic compiled to ROHS. Thickness of the products varies from 5 mm to 8 mm as per the product. The overall product obtain is a seamless to ensure perfect lend of uniform thickness & durability.

See-saw stand : 50NB Hot dip Galvanized Pipe conforming to IS 1239 with GI thickness of 60 μ ,Pipe length 550mm Plate 150X150X5mm is used as a foundation plate for the vertical pipe

Standard See-saw Clamp: Standard see saw clamp is used in see saw so as to provide required motion for the see saw.

Bearing: The bearing used in this item is heavy duty nylon bush type

Pipes: All metal pipes are Hot Dipped Galvanized Pipes conforming to IS 1239 (Part 1) with GI thickness of 60micron.

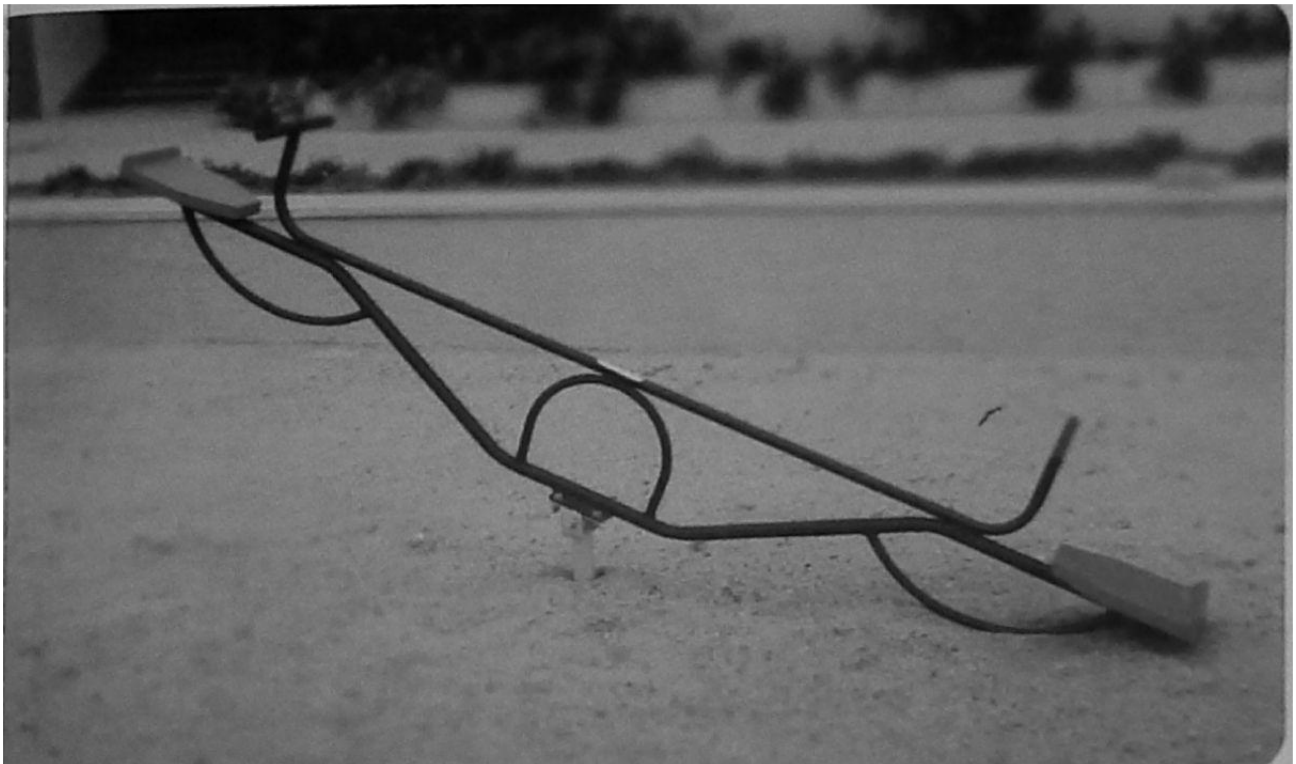
Pipe Materials or Class: Light Duty ('A' Class) & Medium Duty ('B' Class) Series of pipes only. Wall thickness of pipe varies according to class / series of pipe used.

Powder coating: It shall be done with pure polyester raw material.Dry film Thickness maintained within the range of 50-70 microns. It is tested for adhesion test (According to ASTM-D-3359) with the help of cross hatch cutter instrument.

Nut and Bolts: Galvanized/ S.S./Allen Bolt/Button Head Allen Bolt & Nuts / Nylon Lock Nuts are used with PVC Bolt Caps. All open ends of pipe been closed by GI / PVC caps for user safety against entrapment.

Color: Multicolor for optional or customized & according to RAL shade.

Packaging: Safety 3 layer packaging like 1st EPE Foam 2nd HDPE Film and 3rd is Stretch wrap.



8.3.3. Item Descriptions:

Product Name : Double Post Swing
Product Area : 3.5m x 1.0m (11.5ft x 3.3ft)
Safe Play Area : 4.5m X 2.0m (14.8ft X 6.6ft)
Ideal For : 4-14 Years
Friends at a time : 2

Technical Specification:

Vertical support : 100NB Pipe welded together with a flat 50x5mm thick & 10mm thick base plate to form a strong frame. The 100NB pipe is hot dip galvanized pipe of height 2950mm conforming to IS 1239 with GI thickness of 60µ.

Top pipe : 50NB Top Pipe with two Arc Swing Flanges welded at both its ends. Pipe can withstanding torsional stress created due to swinging motion. These 50NB top pipe is hot dip galvanized pipe of length 2950mm conforming to IS 1239 with GI thickness of 60µ.

Seat assembly :

Swing clamp assembly : Swing clamps made up of two parts are joined together with M6 Allen bolts along with S-Hook & a specially designed swing pin. The S-Hook is specially designed to house a bearing for smooth & noiseless swinging. The clamps are made from injection molded Nylon-6 plastic.

Chain : Rubber dip molded swing chain of dia. 6mm & 1450mm Long.

Hook : S-Hook of dia 8mm & 145x130 Triangular hook of Grade SS 304.

4) Seat : Rubber Seat made by Natural Rubber with sufficient reinforcement.

Pipe Materials or Class: Light Duty ('A' Class) & Medium Duty ('B' Class) Series of pipes only. Wall thickness of pipe varies according to class /series of pipe used.

Powder coating : It shall be done with pure polyester raw material. Dry film Thickness maintained within the range of 50-70 microns. It is tested for adhesion test (According to ASTM-D-3359) with the help of cross hatch cutter instrument.

Bearing: Bearing is self-lubricated made of SKF/ NTN/ NACHI make shall be provided for smooth & trouble-free movement.

Pins and Circlips: 12mm diameter pins shall be made from EN8 material & Circlip A10.

Nut and Bolts: Galvanized/ S.S./Allen Bolt/Button Head Allen Bolt & Nuts / Nylon Lock Nuts are used with PVC Bolt Caps. All open ends of pipe been closed by GI / PVC caps for user safety against entrapment.

Color: Multicolor for optional or customized & according to RAL shade.

Packaging: Safety 3 layer packaging like 1st EPE Foam 2nd HDPE Film and 3rd is Stretch wrap



9. LIST OF MINIMUM EQUIPMENT REQUIRED IN THE THIRD PARTY TESTING LABORATORY.

9.1. THE COST OF ALL SUCH TESTING SHALL BE BORNE BY THE CONTRACTOR.

9.1.1. Concrete Section

9.1.1.1. Sieve Analysis of stone ballast (a) 11.2 mm, 5.60 mm. etc.

9.1.1.2. Sieve analysis of sand (a) Sets of I.S. sieves of sizes 2.36 mm, 1.18 mm, 600 micron, 355 micron and 180 micron.

9.1.1.3. Silt content of sand (a) Graduated glass cylinders 500 C.C. capacity.

9.1.1.4. Bulkage of sand (a) Graduated glass cylinders 500 C.C. capacity.

9.1.1.5. Slump test. (a) Slump cones. (b) Slump rods 3/8" dia. 24" long bullet pointed. (c) Steel plates 24" x 24" (d) Steel scales.

9.1.1.6. For making beam specimens for flexural strength. (a) Beam moulds. (b) Tamping rods.

9.1.1.7. Testing flexural strength of concrete:- (a) 100 ton capacity compressive strength testing i/c hand operated in two numbers with flexure test attachment.

9.1.1.8. Other miscellaneous items. (a) Physical balance with set of weights. (b) Pan balances. (c) Spring balances. (d) Glass measuring jar. (e) Beakers. (f) Towels, glass plates etc.

SECTION 8: ANNEXURES

PART A: Annexure A to K

ANNEXURE- "A"

MODEL RULES RELATING TO LABOUR, WATER SUPPLY AND SANITATION IN LABOUR CAMPS

Note: These model rules are intended primarily for labour camps which are not of a permanent nature. They lay down the minimum desirable standard which should be adhered to Standards in Permanent or semi-permanent labour camps should not obviously be lower than those for temporary camps.

- 1. Location:** The camp should be located in elevated and well drained ground in the locality.
- 2. Labour:** Huts are to be constructed for one family of 05 persons each. The layout is to be shown in the prescribed sketch.
- 3. Hut line:** The huts to be built of local materials. Each hut should provide at least **20 Sqm.** of living space.
- 4. Sanitary facilities:** There shall be provision of latrines and urinals at least **15 M** away from the nearest quarter separately, for men and women specially so marked.
- 5. Latrines:** Pit provided at the rate of 10 users or three families per set. Separate Urinals as required as the privy can also be used for this purpose.
- 6. Drinking water:** Adequate arrangement shall be made for the supply of drinking water. If practicable, filtered and chlorinated supply shall be arranged. Where supply is from intermittent sources, an overhead covered storage tank shall be provided with a capacity of five litres per person per day. Where the supply is to be made from a well it shall conform to the sanitary standards laid down in the report of the Rural Sanitation Committee. The well should be at least 30 meters away from any latrine or other sources of pollution. If possible a hand pump should be installed for drawing the water from well. The well should be effectively disinfected once every month and quality of water should be got tested at Public Health institution between each work of disinfection. Washing and bathing should be strictly prohibited at places where water supply is from a river. The daily supply must be disinfected. In the storage reservoir and given at least 3 minutes contact with the disinfectant before it is drawn for use.
- 7. Bathing and Washing:** Separate bathing and washing place shall be provided for men and women for every **25 persons** in the camp. There shall be a gap and space of **2 Sqm.** for washing and bathing. Proper drainage for waste water should be provided.
- 8. Waste disposal:** Dustbins shall be provided at suitable place in camp and the residents shall be directed to throw all rubbish into these dustbins. The dustbins shall be provided with covers. The contents shall be removed every day and disposed of by trenching or through Municipal solid waste disposal system, if the same exists.
- 9. Medical facilities.**
 - a) Every camp where **1000 or more persons** reside shall be provided with full time doctor and dispensary. If there are women in the camp a full time nurse shall be employed.
 - b) Every camp where less than 1000 but more than 250 persons reside shall be provided with dispensary and a part time nurse/midwife shall also be employed.
 - c) If there are less than 250 persons in any camp a first aid kit shall be maintained by the in- charge of the whole time persons. All medical facilities mentioned above shall be for all residents in the camp, including a dependent of the workers, if any, free of cost. Sanitary Staff: For each labour camp there should be qualified sanitary Inspector & Sweepers should be provided in the following scale:
 1. For Camps with strength over 200 One Sweeper for every 75 persons but not exceeding 500 persons above the first 200 for which three sweepers should be provided.
 2. For camps with strength over 500 One sweeper for every 100 persons above the first 500 for which six Sweepers should be provided.

ANNEXURE – “B”
BIDDER’S LABOUR REGULATIONS.

The Bidder shall pay not less than fair wage to Labourers engaged by him in the work.

Explanation:

- a) “Fair Wages” means wages whether for time or piece work as notified at the time of inviting tenders for the works and where such wages have not been so notified the wages prescribed by the Labour Department for the division in which the work is done.
- b) The Bidder shall, notwithstanding the provisions of any contract to the contrary, cause to be paid a fair wage to labourers indirectly engaged on the work including any labour engaged by his sub- Bidders in connection with the said work as if labourers had been immediately employed by him.
- c) In respect of all labour directly or indirectly employed on the works on the performance of his contract, the Bidder shall comply with their cause to be complied with the labour act in force.
- d) The Chief Executive Officer/Engineer in Charge shall have the right to reduce from the money due to the Bidder any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or the deductions made from his or their wages, which are not justified by the terms of the contract or non-observance of regulations.
- e) The Bidder shall be primarily liable for all payments to be made under and for the observance of the regulations aforesaid without prejudice to his right to claim indemnity from his sub-Bidders.
- f) The regulations aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be breach of this contract.
- g) The Bidder shall obtain a valid license under the contract (Regulations and Abolition) Act in force and rules made there under by the competent authority from time to time before commencement of work and continue to have a valid license until the completion of the work. Any failure to fulfil this requirement shall attract the penal provisions of this contract arising out of the resulted non-execution of the work assigned to the Bidder.

Annexure C-I:

(Irrevocable Bank Guarantee Bond) (GUARANTEE BOND)

(In lieu of performance Security Deposit) (To be used by approved Scheduled bank)

1. In consideration of the Chief Executive Officer (CEO), Faridabad Smart City Limited, Faridabad (here in after called the CEO having office at Bk Chowk NIT Faridabad Haryana 121001 agreed to exempt M/s. (Bidders Firm name) having its registered office(write the official address of the Bidder) (Herein after called the Bidder (s) from the demand under the terms and conditions of an agreement datedmade between, for the work (Name of Work) (Here in after called the said Agreement) of Performance Security deposit for the due fulfilment by the said Bidder (s) of the terms and conditions contained in the said agreements on production of a **Bank Guarantee** for (RupeesOnly).

We. (herein after referred to as " the bank (at the request of the said Bidder (s) do here by undertake to pay the FSCL, an amount not exceeding against any loss or damage caused to or would be caused to or suffered by the Faridabad Smart City Limited , by reasons of any breach by the said Bidder (s) of the terms or conditions contained in the said agreement.

2. We (Banks Name) do here by undertake to pay the amount due and payable under this guarantee without any demur merely on demand from the Chief Executive Officer- FSCL stating the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the FSCL, Faridabad by reason of breach by the said Bidder (s) of any of the terms or conditions contained in the said agreements or by reasons of the Bidder (s) failure to perform the said agreement, Any such demand made on the bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee, However our liability under this Guarantee shall be restricted to an amount not exceeding.....

3. We undertake to pay to the FSCL, Faridabad any money so demanded not withstanding any dispute or disputes raised by the Bidder (s) in any suit or proceedings pending before any court or tribunal relating thereto, our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Bidder (s) shall have no claim against us for making such payments.

4. We (Bank Name) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the **performance** of said agreement and that it shall continue to be enforceable till all the dues of the FSCL under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till the Chief Executive Officer, FSCL. Certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said Bidder (s) and terms and conditions of the said agreement have been fully and properly carried out by the said Bidder (s) and accordingly discharged this guarantee, unless a demand to claim under this Guarantee is made on us in writing on or before the (here indicate a date which will be the end of Defect Liability Period)..... We shall be discharged from all liability under the guarantee.

5. We (.) further agree with the Chief Executive Officer that the FSCL shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Bidder (s) from time to time or to postpone for any time or for time to time any of the powers exercisable by the Chief Executive Officer / TA/GM against the said Bidder (s) and to for bear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reasons of any such variations or extension being granted to the said Bidder (s) or for barnacle, act or Chief Executive Officer on the part of the FSCL. Or any indulgence by the FSCL to the said Bidder (s) or by any such matter or thing what so ever which under the law relating to sureties would but for this provision have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Bidder.

7. We (Bank Name).....lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Chief Executive Officer in writing:-

Dated the..... Day of..... for

().....

(.) Indicate the Name of the Bank.....

Annexure C-II

To,

.....
.....
.....

Dear Sir,

We enclose Demand Draft / Bank Guarantee/Cash Certificate other similar instrument no. for
..... in favour of Designation of the Officer concerned in lieu of deposits required
from for the due fulfilment by him/them of the terms of Bidder dated..... for during
the period commencing from there of if any.

Yours faithfully,

For and on behalf.

ANNEXURE-D
SAFETY CODE

1. Scaffolding:

(i) S
Suitable scaffold should be provided for workman 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 ladder is used on extra labour shall be engaged for holding the ladder for carrying materials as well suitable foot holes and hand holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than ¼ to ¼ Horizontal and 1 vertical).

(ii) S
Scaffolding or staging more than 12 M above, the ground floor swung or suspended from an overhead support or erected with stationer/support shall have a guard rail property attached, bolted, braced or otherwise secured at least 1 meter high above the floor platforms of such scaffolding or staging and extending along the entire length of the outside the ends thereof with only such opening as may be necessary for the delivery of the materials. Such scaffolding or staging shall be fastened as to prevent it from swaying from the building of structure.

(iii) Working platform gangways and stairway should be so constructed that they should not away unduly or unequally and if the height of the platform of the Gangway or the stairway is more than 3.54 meters above ground level and or floor level they should be closely bearded, should have adequate width and should be suitably fenced as described (ii) above.

(iv) Working platform be provided with suitable means to prevent the falling of persons or materials by providing suitable fencing or railing whose minimum height shall be 1 meter.

(v) Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable ladder shall be over 9 meter in length while the width between side rails in ring ladder shall be in no case be less than 0.3 meters from ladder up to and including 3 meter length. For longer ladders this width should be increased at least 2 cm. For each additional meter of length. Uniform step spacing shall not exceed 0.3 M adequate precaution shall be taken to prevent danger form electrical equipment. No material on any of the work site shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Bidder shall also provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit action or other precautions of law that may be brought by any person for injury sustained owing to neglect of the above and to pay any damages and costs which may be awarded in any such suit action or proceeding to any such person or which may with consent of the Bidder be paid to compromise by any such person.

2 Excavation and Trenching: All trenches 1.2 meter or more in depth, shall at all times be supplied with at least one ladder for each 30 Meter in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least 1 meter above the surface of the ground. The side of trenches which are 1.5 meter or more in depth shall be stepped back to give suitable slopes or securely held by timber bracing so as to avoid the danger of sides to collapse The excavated materials shall not be placed within 1.5 meter of the edge of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or under cutting shall be done.

3 Demolition: Before any demolition work is commenced and also during the process of the works.

(a) All roads and open area adjacent to the work site shall either be closed or suitably protected.

(b) No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.

(c) All precautionary steps shall be taken to prevent danger to persons employed from risk of fire or explosion of flooring. No floor roof or other part of the building shall be so overloaded with debris of materials as to render it unsafe.

4 Painting: All necessary personal safety equipment as considered adequate by the Engineer-in-charge should be kept available for the use of person employed on the site and maintained in a condition suitable for immediate use and the Bidder should take adequate steps to ensure proper use of equipment by those concerned.

a) Workers employed on mixing asphaltic materials cement lime mortars shall be provided with protective footwear and protective goggles.

b) Stone brackets shall be provided with protective goggles and protective clothing, and seated at sufficiently safe intervals.

c) Those engaged in welding works shall be provided with welder's protect.

- d) When workers are employed in sewers and manholes which are in use, the Bidders shall ensure that the manhole covers are open and are ventilated at least for an hour before the work shall be coronet off with suitable railing and provided with warning signals or boards to prevent accident to the public.
- e) The Bidder shall not employ men below the age of 19 and women on the work of painting with products containing lead in any form whenever men above the age of 18 are employed on the work of lead painting the following precautions should be taken.
- f) No paint containing lead or lead shall be used except in the form of paste or readymade paint.
- i)** Suitable face masks should be supplied for use by the workers when paint applied in the form of spray or a surface having lead paint dry rubble and scrapped.
- ii)** Overhauled shall be supplied by the Bidder to the workman and adequate facilities shall be provided to enable the working painters to wash during the cessations of work.
5. Drawing: When the work is done near any place where there is risk a drawing of all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment for all injuries likely to be sustained during the course of the work.
6. Every crane driver or hosing equipment operator shall be properly qualified and should not have any personal disorder. Such person must be of a minimum age of 21 years.
- a) In case of every hoisting machine and every chain ring lowering or as means of suspensions. The safe working load shall be ascertained by adequate means. Every hoisting machine and gear referred to above shall be plainly marked with the safe working load. In case of hoisting machine having a variable safe working load of the conditions under which it is applicable shall be clearly indicated. No part of any machine or of any gear referred to above in this paragraph shall be loaded beyond the safe working load except for load purpose of testing.
- b) In case of departmental machine the safe working and load shall be notified by the Electrical Engineer-in-charge. As regarded Bidder's machine the Bidder shall notify the safe working load of the machine to the Engineer-in-charge, whenever he brings any machinery to site of work and get verified by the Electrical Engineer concerned.
- c) Motors, gearing transmission, Electric wiring and other dangerous part of the hoisting appliance should be provided with efficient safe guards and with such means as well reduce adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load be coming accidentally displaced When workers employed on Electrical installations which are already unregistered insulating mats wearing apparel such as gloves sleeves and boots as may be necessary should be provided the workers should not wear rings, watches and carry keys, or other materials which are good conductors of electricity.
7. All scaffolds, ladders and their safety device mentioned or described herein shall be maintained in safe condition and no scaffold ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities shall be provided at or near places of work.
8. These safety provisions should be brought to the notice of all concerned by display on a Notice Board at prominent places at the work spot. The persons responsible for compliance of the safety code shall be named therein by the Bidder.
9. To ensure effective endorsement of the rules and regulations relating to safety precautions the arrangement made by the Bidder shall be open to inspection by the Labour Officer, Engineer-in-charge, or the Department or their representatives.
10. Notwithstanding the above clause (1) to (9) there is nothing in these three except the Bidders to exclude the operations of any other act or rule in force in the Republic of India.
11. The bidder has to place the safety sign board in the work area which should be properly visible to prevent any accident.
12. The bidder has to take 3rd party Insurance of the work area, equipment(s), Tools and Tackles.
13. The bidder shall keep the Safety Engineer / Officer who shall take care for safety related issues and shall be present on work area on full time basis during construction work.

ANNEXURE – E

List showing the name of near relative working in FSCL as required vide

S. No.	Name of Officers working in FSCL,	Relationship with self	Name of Person working with the Bidder who are near relative to officer mentioned in column(2)	Relationship
1	2	3	4	5

ANNEXURE-F

GENERAL SPECIFICATION

1. The successful Bidder shall carry out the construction of at Fatehpur as per the approved drawings which shall be provided by FSCL. All norms of IS/NBC shall be fully complied. Before commencing construction work the successful bidder shall submit the construction plan to FSCL. The Authority shall study all such submissions and either approve the same or provide its suggestions or comments on the submissions. The successful bidder shall duly incorporate all such suggestions or comments, and if required by the Authority, and make fresh submissions to the Authority for approval. In no case shall any work be commenced by the successful bidder before obtaining all necessary approvals from the Authority. The bidder shall always commence the construction work as per Approved drawings provided by FSCL.

All designs must fully take into account conditions/terms stipulated in Section 2: Instruction to Bidders, Or any other conditions mentioned elsewhere in the Tender document.

2. It is to be noted that the works are in the ABD area of the proposed smart city and as such is prone to many challenges from the residents and users. The bidder shall cooperate with the FSCL in resolving the challenges.

3. The works shall be constructed in such a way that it will not damage the existing facilities and the entire existing operations function normally.

General Specifications:

All material should be ISI mark / ISO 9000 accredited company or manufactured by Public sector/Govt. Owned Companies or of the firms of repute. However Govt. / Public Sector makes are preferred makes. It is necessary to mention make of equipment Bidder intends to use. If Bidder does not mention make, the Owner would be free to mention the make of his choice.

Notes:

1. Complete copies of the drawings & Designs must be submitted by the successful bidder for obtaining approval of the Authority before commencing works.

2. General specification for work following order of priority regarding specification for work shall be followed by the Bidder.

(i) Relevant B.I.S. Specification.

(ii) Specifications as may be given in writing by the Engineer-in-charge from time to time.

(iii) C P.W.D / Haryana P.W.D. specification/N.B.O./MORTH.

3. Nothing in these clauses, however, shall curtail the right of the "Engineer-In- Charge" to alter the specification for any part or whole of the work, if he considers it necessary in the interest of work. On all matters where there is a deference of opinion between the Bidder and the Engineer-In-Charge the matter will be referred to the Chief Executive Officer, FSCL whose decision will be final conclusive and binding on the Bidder.

4. The Bidder shall ensure the quality and workmanship of work as per approved drawings.

5. The existing development should not be damaged by the successful Bidder and he should hand them back as in original constructed condition.

6. Materials to be get approved before providing, execution and installation from the Engineer-in- charge. Further the bidder shall provide Ready Mix Challan clearly indicating the mix time, cement quantity, setting times, etc.

7. **The Bidder shall supply manufacturing certificates along with the supply of materials.**

LIST OF APPROVED MANUFACTURERS / MAKES

All material should be ISI mark / ISO 9000 accredited company or manufactured by Public sector/Govt. owned Companies or of the firms of repute. However Govt. / Public Sector makes are preferred makes. It is necessary to mention make of equipment Bidder intends to use. If Bidder does not mention make, the Owner would be free to mention the make of his choice.

S.No.	MATERIAL	MAKE
1	Structural/Reinforcement Steel:	SAIL/TATA/RINL/JINDAL
2	Stainless Steel:	SAIL/TATA/RINL/JINDAL
3	GI Pipes	ZENITH /TATA/JINDAL
4	Cement:	ACC/Ultra tech/Century/Lafarge/Ambuja
5	UPVC pipes / HDPE Pipes/LLDP	Astral / Finolex / Prince / Supreme
6	Ready/Mixed concrete	ACC/L&T/Ultratech/RMC/Godrej
7	Cables	Polycab / Finolex / RPG / Gemscab /Havells / KEI
8	LED Light	K-Light / Philips / Bajaj
9	Light Pole	K- Light / Philips / Bajaj
10	Distribution Board & Switchgears	L&T /LEGRAND /SIEMENS
11	Poly Carbonate Sheet	LEXAN/GALLINA/TUFLITE
12	Water Proofing Compound	FOSROC/SIKA/PIDILITE
13	Paints	ASIAN / BERGER/ NEROLAC
14	Interlocking Paver Block	NILITE CONCRETE/PAVERS INDIA/NIMCO
15	Water Fountain Nozzles	PREMIER / RIPPLE

ANNEXURE G: TESTING & SPECIFICATION OF MATERIAL

FOR WORKS:

i) Rates include the element of testing of samples of various materials brought by the Bidder for use in the work as per list of mandatory tests attached herewith. Frequency of such tests to be carried out shall not be less than the prescribed frequency. Bidder shall arrange a third party testing agency which shall be approved by the Engineer-in-charge. The tests shall have to be conducted by the Bidder's material under the supervision of Engineer-in-charge or his authorized representative. A record of such tests shall be maintained in a duplicate register at site of work Duplicate copies of such tests shall be submitted to office along with running account bills. The original register shall also be submitted along with the final bill. Failure to conduct any of the test or not up to the prescribed frequencies would invite following consequences. The Engineer-in-charge may reject the work, but if in his opinion the work can be accepted despite the aforesaid shortcomings, then he may do so subject to a recovery of money to be decided by the E in C for each default and simultaneously inform the Chief Executive Officer.

ii) Wherever applicable As regards steel reinforcement; TMT Steel – confirming to IS-1786:2008 shall be provided.

All reinforcement shall be free from loose mill scales, loose rust and coats of paints, oil, mud or other costing which may destroy or reduce bond.

Only such steel as is obtained from main producers of steel as indicated in the approved makes list.

The Bidder shall have to produce Test Certificate in the Performa prescribed/ approved by B.I.S. from the manufacturer for every batch of steel brought to site of work.

Before commencement of use of steel, from any batch, brought to site of work by the Bidder, the Engineer-in-charge shall arrange to get samples tested for nominal mass, tensile strength, bend test and rebind test from any Laboratory of his choice at the cost of Bidder. The selection of test specimens and frequency shall be as per relevant I.S. Specification of steel to be used.

iii) W
here, contract provides for cement to be arranged by the Bidder himself, only M25 Grade and above cement of relevant I.S. standard specifications shall be allowed to be used in the work subject to the following tests. The arrangement for necessary equipment and testing shall have to be made by the Bidder, himself at a site to be decided by the Engineer-in-charge. All expenses shall be borne by the Bidder. Any lot of cement brought to site by the Bidder would be permitted to be used in the work under the supervision of the Engineer-in-charge or his authority's representative. The record of the tests results shall be maintained in the register referred in subsequent Para.

iv)

Type of Test	Frequency	Minimum
a) Test for initial & final /setting time as per IS: 4031 (Part 5)-1988.	1st Test for 10 tonnes or part thereof	10 tonnes
b) Test for determination of compressive strength of cement as per IS: 4031 (Part 6)-1988.	1st test for 50 tonnes or part thereof.	

A Duplicate register as per format hereunder shall be maintained at site of work. Extract certified copies of the entries for each month shall be submitted to the Engineer-in-charge by the Bidder. The original register shall also be submitted to the Engineer-in-charge on completion of the work by the Bidder.

S. No	Place of receipt of cement	No. of bags	Name and Address of firm From whom Purchased	Signature of Bidder or his authorized representative	Signature of authorized representative of Engineer- in charge.	Results of test for initial and final setting time	Result of tests for compressive strength of cement	Remark
1	2	3	4	5	6	7	8	9

When the strength of concrete required is up to M-20, then O.P.C. conforming to I.S.: 269-2013 or PPC conforming to IS: 1498-1976 may be used.

When the strength of concrete required is more than M-20 but up M-30, the O.P.C. Conforming to IS: 8112-2013 shall be used.

Nominal mix would be adopted for Cement concrete M-7.5 M-10 and M-15. Design mix shall have to be adopted for concrete of higher strengths.

iv) If any item of work found to be substandard by the Engineer-in-charge who is the opinion that the same is structurally adequate and can be accepted at a reduced rate, then in such cases, the Engineer- in-charge shall have to submit proposals for appropriate reduction of rates supported by an analysis, in justification thereof, though a D.O. Letter to the commissioner to obtain his approval expeditiously (ordinarily within 15 days). The approved analysis along with orders of the Chief Executive Officer shall have to be appended to the bills of the Bidder.

v) The Bidder shall have to be provided a ruled duplicate register at site named "Site Order Book" it shall be in the custody of departmental supervisory staff. The Engineer-in-charge or his authorized representative may record their instruction in this book, which shall be noted by the Bidder or his authorized representative for compliance.

vi) Ready mix concrete :The bidder shall have to supply the ready-mixed concrete on either of the following basis :

i) Specified strength based on 28-day compressive strength of 15 -cm cubes tested in accordance with IS : 456-2000.

ii) Specified mix proportion.

NOTE: Under special circumstances and as specified the strength of concrete in (a) above may be based on 28-day or 7-day flexural strength of concrete instead of compressive strength of 15-cm cube tested in accordance with IS : 456-2000.

When the concrete is manufactured and supplied on the basis of specified strength, the responsibility for the design of mix shall be that of the manufacturer and the concrete shall conform to the requirements specified.

When the concrete is manufactured and supplied on the basis of specified mix proportions, the responsibility for the design of the mix shall be that of the purchaser and the concrete shall conform to the requirements specified.

Pipes: The length of pipes shall be measured in running meter nearest to a centimetre along the center line of the pipes over all fittings such as collars, bends, junctions etc. Fittings/specials shall not be measured separately.

UPVC PIPES : The pipes shall be round and shall be supplied in straight lengths with socketed ends. The internal and external surfaces of pipes shall be smooth, clean, free from groovings and other defects. The ends shall be cleanly cut and square with the axis of the pipe. The pipes shall be designed by external diameter and shall conform to IS:4985-1981 or IS:13592. The pipes shall be of Class-III; 6 Kg/sqm pressure rating or type B.

Fittings

Fittings shall be of the same make as that of pipes, injection moulded and shall conform to IS:14735.

List of mandatory Tests:					
Material	Test	Relevant IS code of testing	Field/Laboratory Test	Minimum Quantity of material work for Carrying out test.	Frequency of Testing
1	2	3	4	5	6
Cement concrete or reinforced cement concrete not leaner than M-15	Slump Test	IS: 1199	Field	15 Cum more	15 Cum or part there of frequently by Engineer In charge
Reinforced cement concrete	Cube strength	For Building IS; 456, for bridges/ Culverts IRC: 21-1987	Field	15 Cum in slab 5 cum or Columns.	15 Cum
Steel (arranged by the Bidder)	a)Tensile strength	IS: 1608	Laboratory	20 tonnes	Every 20 tonne thereof, conforming to IS: 1786-1985
	b) Bend test	IS: 1599	Laboratory	-do-	--do
Cement (arranged by the Bidder)	a) Test for Initial &Final setting.	IS: 4031-Part 5	Field	10 tonnes	IS: 4031-1988
	b) Test for determination of compressive strength of Cement.	IS: 4031 Part 6	Field	50 tonnes	-do-
Sand	a) Silt content.	IS:2386 Part III	Field		Every 20 cum or part or more frequently as by the Engineer-in charge. Every 20
	b) Particle size distribution	IS: 2386 Part I	Field		Cum or
	c) Bulking of sand	IS: 2386 Part III	Field		part or more frequently as by the Engineer-in charge. -do
Stone Aggregate	a) Percentage of soft or deleterious material.		Central visual inspection, laboratory test where required by the Eng.-in-charge Or as Specified.	0.00 Cum	As required Engineer-in charge.
Ready Mixed Cement (IS-4926) concrete	Cube test	IS 516 and as per 6.3.2 of IS 4926-2003	Lab	50 Cum	On eper every 50 cum of production or every 50 batches, whichever is greater frequency

RCC Spun Pipes (NP-3 class)	a) ater test and leak test at joints		visual inspection	Water test with minimum head 1.2m and maximum 1.8 m	Check for head drop in the pipe for duration of 2 hrs. Check for the leakages at Joints.
Water for construction purposes	Ph value Limits of acidity percentage of soilds choliorides suspended matter sulphates in organic soilds and organic soilds	IS 3025	Lab	Water from each source	Before commencement of work & there after mandatory-Once in 3 months from each source,Municipal supply - Optional
UPVC pipes	Entire drainage system shall be tested for water tightness and smoke tightness during and after completion of the installation. No portion of the system shall remain untested. Contractor must have adequate number of expandable rubber bellow plugs, manometers, smoke testing machines, pipe and fitting work tests,		Visual inspection	Water test with minimum head 1.2m and maximum 1.8	Check for head drop in the pipe for duration of 2 hrs. Check for the leakages at Joints.

ANNEXURE-H

AFFIDAVIT (SELF CERTIFIED)

(On company's Original Letter head)

I, Mr/Ms.....S/o / D/o.....

Aged.....years.....(Address.....
.....)
.....)

(For and on behalf of),

I hereby certify that ESIC does not apply for our Firm.

(.....)

Authorized signatory / for and on behalf of

.....

(Affix seal)

ANNEXURE-I

POWER OF ATTORNEY

(On Rs. 100 Stamp Paper duly notarized on all pages)

Power of Attorney for Authorized Representative

The firm M/s.....authorize the following Representative to sign and submit the tender document, negotiate terms and conditions for the contract, to sign the contract, to deal with the _____, to issue and receive correspondence related to all matters of the tender "-----". We / M/s _____ undertake the responsibility due to any act of the representative appointed hear by.

For Partnership Firm's

S.No.	Name of All Partner	Signature of Partner with Seal
1		
2		
3		
4	Name and Designation of the person Authorized	
5	Attested Signature of the Authorized Representative	

For Limited Firm's

Name and Designation of the person Authorized	
Firm	
Address	
Telephone No.	
Mobile No.	
Authority By which the Powers is delegated	
Attested Signature of the Authorized Representative	
Name and Designation of person attesting the signatures	

ANNEXURE-J

Format for Joint Bidding Agreement for JV/Consortium

(To be executed on Stamp paper of (appropriate value))

THIS JOINT BIDDING AGREEMENT is entered into on this the day of 20...

AMONGST

1. { Limited, and having its registered office at} (hereinafter referred to as the "First Part" which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

2. { Limited, having its registered office at} and (hereinafter referred to as the "Second Part" which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

3. { Limited, and having its registered office at} (hereinafter referred to as the "**Third Part**" which expression shall unless repugnant to the context include its successors and permitted assigns)

The above mentioned parties of the FIRST, {SECOND and THIRD} PART are collectively referred to as the "**Parties**" and each is individually referred to as a "**Party**"

WHEREAS,

- A. FARIDABAD SMART CITY LIMITED, established under the companies Act 2013, represented by its Chief Executive Officer and having its principal offices at B K Chowk, NIT, Faridabad, Haryana - 121001, (hereinafter referred to as the "Authority" which expression shall. Unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited bids (the Bids") by its BID No..... date..... (the "BID") for award of contract for (Name of the Project ******) on Annuity Payment Mode (the Project").

- B. The Parties are interested in jointly bidding for the Project as members of a JV/Consortium and in accordance with the terms and conditions of the BID document and other bid documents in respect of the Project, and

- C. It is a necessary condition under the BID document that the members of the JV/Consortium shall enter into a Joint Bidding Agreement and furnish a copy thereof with the Bid.

NOW IT IS HEREBY AGREED as follows

1. Definitions and Interpretations

In this Agreement, the capitalized terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the BID.

2. JV/Consortium

2.1 The Parties do hereby irrevocably constitute a JV/Consortium (the "JV/Consortium") for the purposes of jointly participating in the Bidding Process for the Project.

2.2 The Parties hereby undertake to participate in the Bidding Process only through this JV/Consortium and not individually and/ or through any other JV/Consortium constituted for this Project, either directly or indirectly or through any of their Associates.

3. Role of the Parties

The Parties hereby should declare their respective roles and responsibilities that shall be undertaken during the course of the contract period in their BID's.

4. Joint and Several Liability

The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Project and in accordance with the terms of the BID.

5. Representation of the Parties

Each Party represents to the other Parties as of the date of this Agreement that:

- (a) Such Party is duly organized, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;
- (b) The execution, delivery and performance by such Party of this Agreement has been authorized by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favor of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the JV/Consortium Member is annexed to this Agreement, and will not, to the best of its knowledge:
 - (i) require any consent or approval not already obtained;
 - (ii) Violate any Applicable Law presently in effect and having applicability to it;
 - (iii) Violate the memorandum and articles of association, by-laws or other Applicable organizational documents thereof;
 - (iv) Violate any clearance, permit, concession, grant, license or other governmental authorization, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
 - (v) create or impose any liens, mortgages, pledges, claims, security interests, charges or Encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or Prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;
- (b) This Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Affiliates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement.

8. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect until the completion of the work in accordance with the Contract Agreement, in case the Project is awarded to the JV/Consortium. However, in case the JV/Consortium is either not pre-qualified for the Project or does not get selected for award of the Project, the Agreement will stand terminated in case the Applicant is not pre-qualified or upon return of the Bid Security by the Authority to the Bidder, as the case may be.

9. Miscellaneous

- 9.1 This Joint Bidding Agreement shall be governed by laws of {India}.
- 9.2 The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Authority.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED

SIGNED, SEALED AND DELIVERED

For and on behalf of

LEAD MEMBER by: SECOND PART

(Signature)

(Signature)

(Name)

(Name)

(Designation)

(Designation)

(Address)

(Address)

SIGNED, SEALED AND DELIVERED SIGNED, SEALED AND DELIVERED

For and on behalf of

For and on behalf of

THIRD PART

FOURTH PART

(Signature)

(Signature)

(Name)

(Name)

(Designation)

(Designation)

(Address)

(Address)

In the presence of:

1. 2.

Notes:

I. The mode of the execution of the Joint Bidding Agreement should be in accordance with the procedure, if any, lay down by the Applicable Law and the charter documents or the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.

2. Each Joint Bidding Agreement should attach a copy of the extract of the charter documents and documents such as resolution / power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Consortium Member.

3. For a Joint Bidding Agreement executed and issued overseas, the document shall be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney has been executed.

ANNEXURE-K

Format for Power of Attorney for Lead Member of JV/Consortium

Whereas the Faridabad Smart City Limited (FSCL) ("the Authority") has invited bids from interested parties for the (Name of the Project *****). ("the Project").Whereas, and..... (collectively the " JV/Consortium") being Members of the JV/Consortium are interested in bidding for the Project in accordance with the terms and conditions of the BID and other connected documents in respect of the Project, and

Whereas, it is necessary for the Members of the JV/Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the JV/Consortium, all acts, deeds and things as may be necessary in connection with the JV/Consortium's bid for the Project and its execution.

NOW THEREFORE KNOW ALL MEN BY THESE PRESENTS

We,..... Having our registered office at M/s....., having our registered office at and M/s...., having our registered office at, (hereinafter collectively referred to as the "Principals") do hereby irrevocably designate, nominate, constitute, appoint and authorize M/s.., having its registered office at....., being one of the Members of the JV/Consortium as the Lead Member and true and lawful attorney of the JV/Consortium (hereinafter referred to as the "Attorney") and hereby irrevocably authorize the Attorney (with power to sub-delegate) to conduct all business for and on behalf of the JV/Consortium and any one of us during the bidding process and in the event the JV/Consortium is awarded the Concession/ Contract, during the execution of the Project, and in this regard, to do on our behalf and on behalf of the JV/Consortium, all or any or such acts, deeds or things as are necessary or required or incidental to the submission of its bid for the Project, including but not limited to signing and submission of all applications, bids and other documents and writings, accept the Letter of Award. participate in bidders' and other conferences, respond to queries, submit information/ documents, sign and execute contracts and undertakings consequent to acceptance of the bid of the JV/Consortium and generally to represent the JV/Consortium in all its dealings with the Authority, and/ or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the JV/Consortium's bid for the Project and/ or upon award thereof till the Concession Agreement is entered into with the Authority.

And hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us/ JV/Consortium.

IN WITNESS WHEREOF WE THE PRINCIPALS ABOVE NAMED HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS..... DAY OF 20.....

For.....
(Signature, Name & Title)

For.....
(Signature, Name & Title)

For.....
(Signature, Name & Title)

Witnesses:

- I.
- 2.

(Executants)
(To be executed by all the Members of the JV/Consortium)

Notes:

- *The mode of execution of the Power of Attorney should be in accordance with the procedure, (any, laid down by the applicable law and the charter documents of the executant(S) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.*
- *Wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a resolution/ power of attorney in favor of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.*

For a Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention, 1961 are not required to be legalized by the Indian Embassy (if it carries a conforming Appostille certificate.

PART B: Annexure 1 to 9

Annexure 1

Qualification Information:-				
1.1 (A)	Constitution or legal status of Bidder [attach copy]			
(B)	Place of registration of Firm/ Company (in case of other than individuals)			
(C)	Principal place of business:			
(D)	Name of Power of attorney holder for Signing of the Bid. (bidder)[attach copy]			
1.2	Total annual volume of civil engineering construction work executed and Payments received each year in the immediate five years preceding the year in which tenders are invited. (Attach certificate from Chartered Accountant)- indexed @ 10% (ten per cent) compounded per year	Financial Year	(Rs. in crores)	
			Turnover in the year	Add for indexing

- Proprietary firm. Partnership firm with the certificate of registration by registrar of firms & article and Memorandum of Association with Certificate of Incorporation.
- Mention and highlight the year, which the Bidder considers for evaluation by the committee.

Signature:

Bidder's Seal

ANNEXURE-2

BANKERS CERTIFICATE

This is to certify that M/s. _____ is a reputed company with a good financial standing. If the contract for this work, namely _____ (Name of the work) is awarded to the above firm, we shall be able to provide Over Draft/ Credit Facilities to the extent of Rs.----- to meet the working capital requirements for executing the above contract.

Sd/- Senior Bank Manager, Name of the Bank, Address:

.....

Note: The original letter of credit shall be submitted in Envelope 'B' to the Employer without fail.

The solvency certificate should not be more than twelve months old. The solvency certificate shall be on Banks Letter Head (original) and duly signed by the Banks Designated Authority in Original. The solvency Certificate shall be as per the prescribed format.

Annexure 3

INFORMATION ON EXECUTION OF SIMILAR WORKS [REFER QUALIFICATION CRITERIA, S.NO.1]									
S. No.	Name of Project	Name of Employer	Value of contract	Contract No.	Date of Issue of Work Order	Stipulated Date of Completion	Actual Date of Completion	Value of work done	Remarks
1	2	3	4	5	6	7	8	9	10

Note:

1. below the rank of Executive Engineer or equivalent.
2. completion certificate issued by the Engineer in Charge not below the rank of an Executive Engineer.
3. clearly indicate the value of work completed.

Signature:

Bidder's Seal

Attach relevant certificates from the Engineer in charge, not

Bidder may attach certified copies of work order(s) and

The Supporting documents (completion certificate etc) shall

ANNEXURE-4

Work performed on all classes of Civil Engineering Construction Works over the last five years

S No	Name of Project	Name of Employer	Description of work	Value of contract (Rs.in Lacs)	Contract No.	Date of Issue of Work Order	Stipulated Date of Completion	Actual Date of Completion	Year wise value of work done as per certificate from the employer (Rs. In Lacs)					Remarks explaining reasons for Delay, if any; and the amount of deductions due to delay Also mention if any claim or dispute is pending in any forum.
									10	11	12	13	14	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Note: (i) Attach relevant certificates from the Engineer in charge, not below the rank of Executive Engineer or equivalent.

(ii) Bidder may attach certified copies of work order(s) and completion certificate(s) issued by Engineer in charge not below the rank of Executive Engineer

(iii) clearly indicate the value of work completed.

The Supporting documents (completion certificate etc) shall

Signature :

Bidder's seal :

ANNEXURE-5

Existing commitments and ongoing works in all classes of construction works

S. No.	Name of Project	Description of work	Contract No & Year	Name & address of the employer	Value of contract	Date of Issue of Work Order	Stipulated Date of Completion	Stipulated period of completion in months	Anticipated date of completion	Value of work done up to the date of issue of this N.I.T	Probable value of works balance to be completed	Anticipated months required for completion of balance works	Value of claims or dispute if any, pending
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Note: The Supporting documents (completion certificate etc) shall clearly indicate the value of work completed.

ANNEXURE-6

Information regarding current claims, arbitration, litigation the Bidder is involved in.

S. No.	Name of Other party(s)	Agreement Date Dept.	No. year and	Brief of cause of claims, arbitration /dispute (give reference of contract details)	Where Litigation is pending (in the department /Court/arbitration) (mention Dept./Court/Arbitration)	Amount involved/ claimed

Can use separate sheets for each agreements if necessary.

ANNEXURE-7

Affidavit

I,.....S/o.....Aged.....year
s.....(Address.....
.....)
.....)

(For and on behalf of, do here by and
herewith solemnly affirm / state on oath that: -

- 1. All documents and Information's furnished are correct in all respects to the best of my knowledge and belief**

- 2. I have not suppressed or omitted any required/relevant information.**

- 3. I hereby authorize the Faridabad Smart City Limited, Faridabad Officials to get all the documents submitted verified from appropriate source(s).**

(.....)
Authorized signatory / for and on behalf of
.....
(Affix seal)

SECTION 9: PRE CONTRACT INTEGRITY PACT

(To be submitted on Rs 100 Stamp Paper)

1. GENERAL

1.1. This pre-bid contract agreement (herein after called the Integrity Pact) is made onday of the monthbetween the Faridabad Smart City Limited (FSCL) acting through Shri/Smt..... (Designation of the FSCL officer)(Hereinafter called the “BUYER” which expression shall mean and include, unless the context otherwise requires, his successors in the office and assigns) and the First Party, proposes to procure..... (Name of the Store/Equipment/ Work/ Service) and M/s.represented by Shri (herein after called the BIDDER/Seller, which expression shall mean and include, unless the context otherwise requires, his successors an permitted assigns) and the Second Party, is willing to offer/ has offered.

1.2. WHEREAS the BIDDER is a Private Company/ Public Company/ Government Undertaking/ Partnership/ Registered Export Agency, constituted in accordance with the relevant law in the matter and the BUYER, performing its function as SPV under provision of Companies Act 2013.

2. OBJECTIVES:

NOW, THEREFORE, the BUYER and the BIDDER agree to enter into this pre-contract agreement, hereinafter referred to as Integrity Pact to avoid all forms of corruption by following a system that is fair, transparent and free from any influence/ prejudiced dealings prior to ,during and subsequent to the Contract to be entered into which a view to:-

2.1. Enabling the BUYER to obtain the desired Stores/ Equipment/Work/Service at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

2.2. Enabling BIDDER to abstain from bribing or indulging in any corrupt practices in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing any corrupt practices and the BUYER will commit to prevent corruption, in any form, by its official by following transparent procedures.

3. COMMITMENTS OF THE BUYER

The BUYER commits itself to the following:-

3.1. The BUYER undertakes that no official of the BUYER connected directly or indirectly with the contract, will demand, take promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefits or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation , contracting or implementation process related to the contract.

3.2. The BUYER will, during the pre-contract stage, treat BIDDERS alike, and will provide to all BIDDERS the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to the other BIDDERS

3.3. All the officials of the BUYER will report the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.

3.4. In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the BUYER with the full and verifiable facts and the same *prima facie* found to be correct by the BUYER, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BUYER and such a person shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the BUYER the proceedings under the contract would not be stalled.

4. COMMITMENTS OF BIDDERS

The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means an illegal activities during any stage of its bid or during any pre-contract or pre-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following:-

4.1. The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the BUYER, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

4.2. The BIDDER further undertakes that it has not been given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage, or inducement to any official of the BUYER or otherwise in procuring the Contract of forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the Government for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with the Government.

4.3. The BIDDER further confirms and declares to the BUYER that the BIDDER in the original Manufacture/Integrator/Authorized government sponsored export entity of the stores and has not engaged in individual or firm or company whether Indian or Foreign to intercede, facilitate or in any way to recommend to the BUYER or any of its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

4.4. The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payment he has made, is committed to or intends to make to officials of the BUYER or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

4.5. The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation contracting and implementation of the contract.

4.6. The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

4.7. The BIDDER shall not use improperly, for purpose of competition or personal gain, or pass on to others, any information provided by the BUYER as part of the business relationship, regarding plans, technical proposal and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.

4.8. The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.

4.9. The BIDDER shall not instigate or cause to instigate any third person to commit any of the acts mentioned above.

5. PREVIOUS TRANSGRESSION

5.1. The BIDDER declares that no previous transgression occurred in the last three years immediately before signing this Integrity Pact with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify Bidder's exclusion from the tender process.

5.2. If the BIDDER makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reasons.

6. EARNEST MONEY (SECURITY DEPOSIT)

6.1. Every BIDDER while submitting commercial bid, shall deposit an amount as specified in RFP as Earnest Money/ Security Deposit, with the BUYER through any of the following instruments:

6.1.1. Bank Draft or Pay Order in favour of

6.1.2. A Confirmed guarantee by an Indian Nationalized Bank, promising payment of the guaranteed sum to theon demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the BUYER shall be treated as conclusive proof of payment.

6.1.3. Any other mode or through any other instrument (to be specified in the RFP).

6.2. The Earnest Money/ Security Deposit shall be valid up to a period of five years or the complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and BUYER, including warranty period, whichever is later.

6.3. In the case of successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the Purchase Contract that the provisions of Sanctions for violation shall be applicable for forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.4. No interest shall be payable by the BUYER to the BIDDER on Earnest Money/ Security Deposit for the period of its currency.

7. SANCTIONS FOR violations'

7.1. Any breach of the aforesaid provisions by the Bidder or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the BUYER to take all or any one of the following actions, wherever required:-

7.1.1. To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(S) would continue.

7.1.2. To forfeit fully or partially the Earnest Money Deposit (in pre-contract stage) and/ or Security Deposit/ Performance Bond (after the contract is signed), as decided by the BUYER and the BUYER shall not be required to assign any reason therefore.

7.1.3. To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.

7.1.4. To recover all sums already paid by the BUYER, and in case of the Indian BIDDER with interest thereon at 2% higher than the prevailing Prime Lending Rate while in case of a BIDDER from a country other than India with interest there on at 2 % higher than the LIBOR. If any outstanding payment is due to the BIDDER from the BUYER in connection with any other contract such outstanding payment could also be utilized to recover the aforesaid sum and interest.

7.1.5. To encash the advance bank guarantee and performance bond/ warranty bond, if furnished by the BIDDER, in order to recover the payments already made by the BUYER, along with interest.

7.1.6. To cancel all or any other contracts with the BIDDER and the BIDDER all be liable to pay compensation for any loss or damage to the BUYER resulting from such cancellation/rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

7.1.7. To debar the BIDDER from part on behalf of the participating in future bidding processes of the Government of Haryana for a minimum period of five years, which may be further extended at the discretion of the BUYER.

7.1.8. To recover all sums paid in violation of this Pact by BIDDER(S) to any middlemen or agent or broken with a view to securing the contract.

7.1.9. In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the BIDDER, the same shall not be opened.

7.1.10. If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or indirectly is closely related to any of the officers of the BUYER or alternatively, if any close relative of an officer of the BUYER has financial interest/stake in the BIDDER'S firm, the same shall be disclosed by the BIDDER at the time of filling of tender. Any failure to disclose the interest involved shall entitle the BUYER to rescind the contract without payment of any compensation to the BIDDER.

The term 'close relative' for this purpose would mean spouse whether residing with the Government servant or not, but include a spouse separated from the Government servant by a decree or order of a competent court: son or daughter or custody the step son or step daughter and wholly dependent upon Government servant, but does not include a child or step child who is no longer in any way dependent upon the Government servant or of whose the Government servant has been deprived of by or under any law; any other person related, whether by blood or marriage, to the Government servant or to the Government servant's wife or husband and wholly dependent upon Government servant.

7.1.11. The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the BUYER, and if he does so, the BUYER shall be entitled forthwith to rescind the contract and all other contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such rescission and the BUYER shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

7.2. The decision of the BUYER to the effect that a breach of the provisions of this pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the BIDDER can approach the Monitor(s) appointed for the purpose of this Pact.

8. FALL CLAUSE

8.1. The BIDDER undertakes that it has not supplied/is not supplying similar product/ systems or subsystems at a price lower than that offered in the present bid in respect of any other Department of the Government of Haryana or PSU and if it is found at any stage that similar product/ systems or sub systems was supplied by the BIDDER TO any other Department of the Government of Haryana or PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the BUYER, if the contract has already been concluded.

9. INDEPENDENT MONITORS

- 9.1. The BUYER will appoint Independent Monitors (hereinafter referred to as Monitors) for this Pact.
- 9.2. The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.
- 9.3. The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- 9.4. Both the parties accept that the Monitors have the right to access all the documents relating to the project/ procurement, including minutes of meetings. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Sub Bidder(s) with confidentiality.
- 9.5. As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BUYER.
- 9.6. The Monitor will submit a written report to the designated Authority of BUYER/ Secretary in the Department/ within 8 to 10 weeks from the date of reference or intimation to him by the BUYER/BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

10. FACILITATION OF INVESTIGATION

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information of the relevant documents and shall extend all possible help for the purpose of such examination.

11. LAW AND PLACE OF JURISDICTION

This Pact is subject to Indian Law, the place of performance and jurisdiction shall be the seat of the BUYER.

12. OTHER LEGAL ACTIONS:

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the any other law in force relating to any civil or criminal proceedings.

13. VALIDITY

13.1. The validity of this Integrity Pact shall from the date of its signing and extend up to 5 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/Seller whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

13.2. If one or several provisions of this Pact turn out to be invalid; the remainder of this pact shall remain valid. In such case, the parties will strive to come to an agreement to their original intentions.

14. The parties hereby sign this Integrity Pact aton

BUYER

BIDDER