DIU SMART CITY LIMITED

CIN: U74999DD2018PLC009814
C/o Diu Municipal Council,
Fort Road, Diu 362520
Contact: +91 2875 252126
Email: Diudscl@gmail.com

E – Tender (Online Tender)

TENDER NOTICE NO. 01/ 2020 – 2021

DMC/DIU/CONST/SMARTCITY/2019-20/27 **Date: 30 / 04 / 2020**

The Chief Executive Officer, DSCL, Diu, invites, on behalf of the President of India, the online item rate tenders from the experienced, eligible and reputed Contractors, registered, under CPWD, State PWD's or MES, railways, and also, invariably, with **VAT / GST Department of U.T. of Daman & Diu (Lowest bidder must obtain local VAT/GST Registration within 15 days)** for the below mentioned works.

Sr. No	Name of work and location	Estimated cost	EMD	Tender Fee	Time Limit
1.	Improvement of 1.34 Km Heritage Walkway on Diu City wall with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu	INR. 6,36,46,175 /-	INR. 12,73,000/-	INR. 10,000/-	12 Months
2.	Conservation & Façade Restoration of Heritage Precincts (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market at Fort Road with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu	INR. 7,07,88,187/-	INR. 14,15,800 /-	INR. 10,000/-	12 Months

Details of each works i.e. name of work, estimate cost, amount of EMD, tender fees, time limit etc. is available on	https://ddtenders.gov.in www.eprocure.com
* Online downloading of tender documents	**Up to 21 / 05 / 2020, 12:00 hrs.**
* Last date & time for Receipt of Bid/Uploading Bid	**Up to 21 / 05 / 2020, 12:30 hrs.**
* Pre bid Meeting	**14 / 05 / 2020 15:30 hours**
* Online Opening of Technical Bid	**On 21 / 05 / 2020 up to 15:00 hrs.**
* Online Opening of Price Bid	**On 21 / 05 / 2020, 15:30 hrs.** **(If Possible)**
Bidders have to submit price bid in electronic format only on (https://ddtenders.gov.in or www.eprocure.com) website till the last date and time for submission. Price Bid in physical shall not be accepted in any case.	

1. All the agencies are hereby directed to scan their tender fees and EMD online only. It is mandatory to submit tender fees and EMD online failing which the price bid of that agency will not be opened online and Physical submission of such scanned documents shall reach to office of the Executive Engineer within 3 (three) working days after closing of online bidding.

2. (i) Three similar completed works costing not less than the amount equal to 40% of the Estimated Project Cost.

Or

Two similar completed works, costing not less than the amount equal to 60% of the Estimated Project Cost.

Or

One similar completed work of aggregate cost not less than the amount equal to 80% of the Estimated Project Cost.

And

(ii) One Completed work of any nature (either part of (i) above or a separate one) costing not less than the amount equal to 40% of the Estimated Project Cost with some Central Government Department/State Government Department/Central Autonomous Body/Central Public Sector undertaking/ State Autonomous Body/ State Public Sector undertaking / City Development Authority / Municipal Corporation of city formed under any act by Central / State Government and published in Central / State Gazette.

The value of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to last date of receipt of application for tender.

The Tender Inviting Authority reserves the right to accept or reject any or all the tender to be received without assigning any reasons thereof.

Bidder shall have to post their queries on E-mail Address: - diudscl@gmail.com on or before dated **09 / 05 / 2020**

All the Contractors are directed to submit the scanned documents of the following: -

1) VAT/GST Registration.
2) Latest Solvency Certificate 40% of Estimate cost within one year from the last date of tender Uploading.
3) PAN Card.
4) Tender EMD in form of FDR (Jointly) valid for 6 months i.e. (180 days) from the last date of Tender uploading.
5) Tender Fee in form of Demand Draft. (Non-Refundable)
6) Experience certificate.
7) Registration Certificate.
8) Labour License Registration.
9) The documents prescribed in the NIT to be submitted along with bid.
10) For Electrical works Electrical license is mandatory.

If the scanned copies of the above documents are not visible during opening of the tender, the tender shall not be downloaded.

30/04/2020

Dated: 30 / 04 / 2020

Manager, Construction
DSCL, Diu
Email: diudscl@gmail.com
Phone:- 02875 - 252126

DIU SMART CITY LIMITED

(SMART CITY MISSION)

TENDER

FOR

Conservation & Façade Restoration of Heritage Precincts (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India

Estimated Cost: - INR. 7,07,88,187/-

Earnest Money: - INR. 14,15,800 /-

Period of Completion:

Construction	:	12 Months (01 Year) including monsoon
Defect and Maintenance Liability Period	:	60 Months (5 years)

NIT No. : - - - - - - -- - - - - -- - - - - -- - - - - -- - - - - -

Addition: ----------
Correction: ----------
Overwriting: ---------
Deletion: ----------

Chief Executive Officer (- - - -) DAO PMC(- - - - -)

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INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING FORMING PART OF BID DOCUMENT AND TO BE POSTED ON WEBSITE

Chief Executive Officer, Diu Smart City Limited. (DSCL), Diu, **on behalf of the President of India** invites **online** the Item rate bid from **firms/contractors** of repute in **two bid system** for the following work:

1	**Tender Notice No.**	
2	**Organizational Name**	Diu Smart City Limited (DSCL)
3	**Name of Work & Location**	Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability Period for Five Years under “SMART CITY MISSION” at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India
4	**Tender Type**	Item Rate
5	**Estimated Cost put to bid (in INR.)**	INR. 7,07,88,187/-
6	**Earnest Money (in INR.)**	INR 14,15,800 /-
7	**Period of Completion of Construction**	12 Months (01 Year) including monsoon
8	**Defect and Maintenance Liability Period**	60 Months (05 years)
9	**Last date and time of Online submission of bid, EMD, e-tender processing of opening fee and other documents as specified in the press notice**	**Date : 21/05/2020** **Time : 12.30 Hrs.**
10	**Last date and time of submission of Hard Copies of EMD, E-Tender Processing Fee and other Documents**	Within Three (03) Working Day from the due date and time specified for Online Bid Submission. The documents shall be accepted upto 17.00 Hrs within the above period.
11	**Time & date of opening of Technical bid**	**Date : 21/05/2020** **Time : 15.00 Hrs.**

1. Firms/contractors who fulfill the following requirements shall be eligible to apply. Joint ventures are not accepted. Following are initial criteria for eligibility.

(a) Should have satisfactorily completed the works as mentioned below during the last Seven

years ending previous day of last date of submission of tender.

Three similar completed works costing not less than the amount equal to 40% of the Estimated Project Cost.

or

Two similar completed works, costing not less than the amount equal to 60% of the Estimated Project Cost.

or

One similar completed work of aggregate cost not less than the amount equal to 80% of the Estimated Project Cost.

with Central Government Department / State Government Department / Central Autonomous Body / Central Public Sector undertaking / State Autonomous Body / State Public Sector undertaking / City Development authority / Municipal Corporation of city formed under any act by central / state Government and published in Central / State Gazette

The value of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to last date of receipt of application for tender.

(b) Should have had Average **Annual** F**inancial Turnover** on Construction work should be 50% of the Estimated Project Cost during the immediate last three consecutive financial year. **(Scanned copy of certificate from CA to be uploaded).**

(c) Should not have **incurred any loss** in more than two years during the last five years ending 31st March 2020. **(Scanned copy of certificate from CA to be uploaded).**

(d) The bidder should have a solvency of amount equal to 40% of the Estimated Project Cost certified by his Bankers.

2. The bidder should not have been blacklisted by any Central Government/State Government Offices/PSUs etc and self-certificate is to be scanned and uploaded.

3. The intending bidder must read the terms and conditions prescribed in Form **CPWD-6** carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.

4. Information and Instructions for bidders posted on website shall form of bid document.

5. The bid document consisting of indicative drawings specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from **website** https://ddtenders.gov.in , www.diu.gov.in,

6. But the bid can only be submitted **after filling the details of EMD** in favor **Chief Executive**

Officer, DSCL, Diu, (UT) and other documents as specified. e-Tender Processing Fee - Rs. 10000/-(Non-refundable) shall be payable to inform of DD in favour of Chief Executive Officer, DSCL, Diu,(UT).

7. Those contractors not registered on the website mentioned above, are required to get registered beforehand. If needed they can be imparted training on online bidding process as per details available on the website.

8. The intending bidder must have valid digital signature to submit the bid.

9. **Certificate of Financial Turnover:** At the time of submission of Bid, Contractor shall upload Affidavit/ Certificate from CA mentioning Financial Turnover of last 3 years or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.

10. Contractor must ensure to quote rate of each item specified in **Schedule of Quantity**, considering the Defect and Maintenance Liability Period of 5 Years

11. The technical bid shall be opened first on due date and time as mentioned above. The time and date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.

12. Pre Bid conference shall be held at the office of Chief Executive Officer, DSCL, Diu. on **14/05/2020 at 15.30 Hrs.** to clear the doubts of intending bidders, if any.

13. The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.

14. The bidder has to furnish three affidavits as follows.

a) I/We …… S/o …… R/o …….. Undertake and confirm that eligible similar works has /have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred from tendering in Diu Smart City Limited in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

b) I/We…… S/o……R/o…….. hereby declare that:-

i) I have submitted the requisite EMD amount, scanned copy uploaded

ii) In case of my tender is not accepted as per terms & condition of NIT and for any refund is made to me, the refund may please be made to my account as per details given below:-

A. Name of agency: - ……..

B. Bank, Branch code, Place details etc.:-…….

C. Account No.:- …….

D. IFSC code No.:-……

E. UTR/RTGS No.:-……

Chief Executive Officer, DSCL, Diu, shall not be responsible in any way for none crediting of EMD/amount in the account of Chief Executive Officer, DSCL, Diu, by due date and time as mentioned in NIT.

c) I/We …… S/o……. resident of …….. Hereby solemnly affirm and declare as under:-

i) That I am sole proprietor/Partner of M/s…….. , R/o…….

15. **List of documents to be scanned and uploaded within the period of bid submission**.

i) Copy of FDR/ Bank Demand Draft/ bank guarantee if any towards EMD to CEO,DSCL

ii) Certificates of Work Experience and other details as per Forms A to E.

ii) Certificate of Financial Turnover and Profit and loss details from CA.

iii) Bank Solvency Certificate.

iv) Any other Document as specified in the NIT.

v) Affidavit as per provisions of CPWD-6.

vi) Copy of Pan Card.

vii) Copy of Registration certificate of GST

GST registration Certificate of the State in which the work is to be taken up, if already obtained by the bidder.

If the bidder has not obtained GST registration in the State in which the work is to be taken up, or as required by GST authorities then in such a case the bidder shall scan and upload following undertaking along with other bid documents.

“If work is awarded to me, I/we shall obtain GST registration Certificate of the State, in which work is to be taken up within one month from the date of receipt of award letter or before release of any payment by CPWD, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by CPWD or GST department in this regard.

viii) An Affidavit regarding work not executed through another agency.

16. It is mandatory to submit tender processing fees and EMD online failing which the bid of that agency will not be opened.

17. The Bidder may modify, substitute or withdraw its e- BID after submission prior to the BID Due Date. No BID shall be modified, substituted or withdrawn by the Bidder on or after the BID Due Date & Time.

18. For withdrawal of bid, the bidder has to click on withdrawal icon at e-tendering portal and can withdraw its e-bid.

19. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.

20. It is mandatory to fill details / upload scanned copies of all the documents including GST registration as stipulated in the bid document. If such document is not uploaded his bid will become invalid & processing fee shall not be refunded.

21. If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the contractor the bid shall become invalid and processing fee shall not be refunded.

22. Financial bid document shall be submitted only Online, Hard copies will not be acceptable in any case.

FORM OF EARNEST MONEY DEPOSIT

BANK GUARANTEE BOND

WHEREAS, contractor..... (Name of contractor) (Hereinafter called “the contractor”) has submitted his tender dated ..... for the construction of ..... (name of work) (hereinafter called “the Tender”) KNOW ALL PEOPLE by these presents that we ..... (name of bank) having our registered office at ..... (hereinafter called “the Bank”) are bound unto Chief Executive officer, DSCL, Diu,(hereinafter called "the Employer") in the sum of INR. ..... (INR In words .....) for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this .....day of 2020

THE CONDITIONS of this obligation are:

(1) If after tender opening the Contractor withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;

(2) If the contractor having been notified of the acceptance of his tender by the Employer:

(a) Fails or refuses to execute the Form of Agreement in accordance with the Instructions to contractor, if required;

OR

(b) Fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor, OR

We undertake to pay to the Employer either up to the above amount or part thereof upon receipt of his first written demand, without the Employer having to substantiates his demand, provided that in his demand the Employer will note that the amount claimed by his is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date* 25/11/2020 after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the Employer , notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the

above date.

DATE ..... SIGNATURE OF THE BANK

WITNESS ..... SEAL

(SIGNATURE, NAME AND ADDRESS)

*Date to be worked out on the basis of validity period of 6 months from last date of receipt of tender.

SECTION - I

BRIEF PARTICULARS OF THE WORK

1. Salient details of the work for which bids are invited are as under :

Sl. No.	Name of Work	Estimated Cost	Period of Completion
1.	Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India	INR. 7,07,88,187/-	12 Months (01 Year) including monsoon Defect and Maintenance Liability Period 60 Months (05 years)

2. The work is situated at : Diu

3. General features and Major Components of the Work are as under

3.1 Zampa Precinct :

i. Reorganization and regularization of the outer chowk and approach road, along with re-surfacing of the space and providing contextual lighting, Historic map of Diu, Information Kiosk and landscape features to create a pleasant and vibrant atmosphere keeping the importance of heritage in mind, along with upgradation of services and utilities.

ii. Conservation and restoration of the City wall at Zampa & its surrounding heritage building facades (225 Sqm area)

iii. Defects replacement & Maintenance

3.2 Market Precinct and Upgradation of Fruits and vegetable market at Fort Road

i. Reorganization and regularization of the existing access/pathway along with re-surfacing of the space and providing contextual lighting and landscape features to create a pleasant and vibrant atmosphere keeping the importance of heritage in mind, along with upgradation of services and utilities.

ii. Upgradation of the Heritage Market, including new roofing, flooring, lighting and vendor facilities.

iii. Conservation and restoration of centrally mounted Memorial pillar and the surrounding heritage building facades.

iv. Defects replacement & Maintenance

General Conditions of Contract of Central P.W.D. Works 2019 shall be conditions of the Contract for executing of construction works under the Improvement Heritage Precinct (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market

4. General Description

4.1 Zampa Precinct

'Zampa Chowk' is situated within the old city area along the Zampa Gate & City Wall. It is a public open space which has formed on account of the enclosure of several structures. The presence of Movie Theatre & retail shops always keeps the chowk active. It is Used by the locals as a gathering space at various time of the day. It can be accessed from the fort road only by pedestrians and vehicular access is possible from the rear side road

Historically, the Zampa Gate served as the primary entry point for Diu town. The gate has influenced the growth of the city and its urban fabric as it proved to be the central point for dispersal in all directions. Various districts within the town were conveniently accessed from here.

The location of Zampa at the centre of the Diu City Wall also allows for the potential to climb up the staircase next to the gate to the top of the wall and connect to either end of the town easily and quickly.

The Zampa precinct is not only of historic importance but even today, it acts as a central point of dispersal to travel across the town in all directions and important historic places such as the Fort road, Naida caves, Beach promenade and also to the inner streets which house Diu's rich and varied architectural heritage.

There is a need to re-establish the identity and memory of Zampa as Diu's primary point of entry. It is acknowledged that since the gateway itself is narrow and cannot handle large volume of traffic, most of the vehicular traffic across the city will continue in its present state.

4.2 Navratri Chowk & Old Market Precinct at Fort Road

'Navratri Chowk' is situated within the old city area along the Fort road. It is a public open space which has formed on account of the enclosure of several structures. The celebration of Navratri Festival, a local traditional festival happens in this place; thus giving it the name of Navratri chowk. It can be accessed from the fort road only by pedestrians & from the rear side road by the vehicles. The Old Market structure, an old Heritage structure forms one of the enclosure of the chowk.

Navratri Chowk is dotted with unregulated, informal activities. The Chowk being of heritage importance has no traditional character as the heritage buildings that surround the chowk are in poor condition and need to be conserved. The vendors are registered ones, but in the absence of any formal arrangement of placement, end up located haphazardly. The chowk remains busy during the morning hours with vegetable vendors and in the evenings with vendor's selling accessories, stationary, etc. There is no proper allotment of space for the vendors, no tourist activities and most importantly it does not set the traditional character of a heritage space.

There is a need to re-organise the chowk and the approach road keeping in mind the present context, the requirement of the dedicated space for vendors and need for conservation and restoration of the heritage chowk.

5. Scope of Work

5.1 Zampa Precinct

S.No	Component	Details
1.	Survey	i. Site Assessment ii. Before the Commencement of Works, or any part thereof, the Contractor make a complete survey, and take levels, of the Project features and agree on the dimensions upon which setting out of the Works shall be eased
2.	Removal of Vegetation and existing features on the Pathway	i. Removal of Vegetation such as grass and shrubs on Surface ii. Dismantling of existing Cement concrete pavement of 3525 Sq.mt area of Zampa precinct. iii. Demolition of 19 m long Existing compound wall of Sports Complex iv. Dismantling of existing toilet block near the city wall which is in an area of 50 Sq.m v. Removal of Existing 1 No's of High-mast pole and 20 No's of electrical poles in the precinct areas.
3.	Resurfacing and Filling work of Precinct area	i. Filling the excavated surface with moorum or selected earth, providing of GSB layer course and PCC over the levelled surface for an area about 3500 Sq.mt. as per drawing (DDX2.2.A03) ii. Resurfacing the pathway with multi-colored Rajuala, Limestone & Granite cobble stones for the area of 2300 Sq.m as per drawings (DDX2.2.A03) iii. Resurfacing the 'Green moat area as shown in DDX2.2.A03 with Inter locking grass pavers of an area of 460 Sq.mt iv. Provide Pre-Cast Kerb Stone for the parking area of length 555 Rmt
4.	Cleaning of City wall at Zampa & its surrounding heritage building facades	i. Removing dry or oil bound distemper by washing, scraping and sand papering the City wall surface of an area of 1900 Sq.m ii. Cleaning the external and internal Sandstone surface of the wall with Liquid Ammonia Chemical of 5% solution or chemical cleaning agent for the

S.No	Component	Details
		area of 1900 Sq.m as per the technical Specifications.
5.	Civil Works	i. Construction of Seating facilities at Historic map of Diu with Bela stones and plastering the external surfaces for an area of 12 cum ii. Providing grey rajula stone Slab over the top surface of the seating's of an area of 24 Sq.m
6.	Historic map of Diu	i. Model of Historic Diu made in Brick work and Carton Steel with inlaid Marbel in an areas of 7. 3 Sqm ii. Providing granite slab around Historic map of Diu in an area of 200 Sq.m. as per drawing no. DDX2.2.A03
7.	Landscaping	i. Providing Shrubs and Pongmia glabra trees at the specified locations as per the architect plan ii. Providing 4 No's of sprinklers for landscaping and other purposes
8.	Informatory and Directional Sign board	i. Providing 1 No's of informatory and directional boards at the entrance of the Precinct as per the design approved by the architect/Engineer – In - Charge. ii. Providing and Installing of 5 No's of E toilets with plumbing and drainage connections as per the specifications and drawings provided.
9.	Storm water drains	Construction of Underground RCC storm water drains and fixing of RCC gratings at equal intervals for the length of 900 meter
10.	Road Furniture & Markings	i. Road Marking with hot applied thermoplastic compound for parking areas indications. ii. Providing 19 No's of Cast Iron bollards in front of Aradhana theatre.
11.	Sculpture	Providing and fixing 1 No's of Artistic sculpture at the Chowk as per the design approved by the architect/Engineer – In - Charge.

S.No	Component	Details
12.	Illumination	Supply and installation of the distribution boards, Armored Cables, Installation Of External Light Fixtures, Installation Of External Spyke Lights, Post top lamps, LED wall washers, Recessed in ground, column & tree up lights and other light for the precinct and Façade lighting of City wall

5.2 Market Precinct

S.No	Component	Details
1.	Survey	i. Site Assessment ii. Before the Commencement of Works, or any part thereof, the Contractor make a complete survey, and take levels, of the Project features and agree on the dimensions upon which setting out of the Works shall be eased
2.	Dismantling of existing features	i. Dismantling of existing cement concrete flooring, Jalis, seating and vendor spaces of an area 290 Sq.m. ii. Dismantling of existing dilapidated RCC structure located on rear side of Market. iii. Dismantling of Asbestos sheet roofing and removal of GI Pipes sections under sheet roofing iv. Cleaning & Brushing of the dismantled surface with wire brushes of an area 290 Sq.m v. Removal of existing lighting fixtures, Junction boxes and cables
3.	Wooden roofing and Cortern arches	i. Providing new wooden roof for the Market area which consists of Joists, rafters, purlins etc and fixing Mangalore tiles on the of an area 500 Sq.mt top as per the approved design by the Architect and Engineer-in-Charge ii. Fixing Cortern steel arches at the entrances for external cladding as per the design provided by the architect which is of an area of 40 Sq.m
4.	Structural repairs &	i. Removal of old Lime plaster from walls, soffits of

S.No	Component	Details
	Lime Plaster Works	the central dome, and the exterior surfaces. ii. Cleaning the external and internal Sandstone surface of the wall with Liquid Ammonia Chemical of 5% solution or chemical cleaning agent for the area of 600 Sq.m as per the technical Specifications. iii. Stitching of cracks developed in stone masonry and its joints at various locations as per the specifications iv. Treatment to corroded reinforcement steel to corrosion affected RCC elements of canopy and other such areas by applying rust remover and by providing concrete penetrating corrosion inhibitor on concrete surface to treat corroded reinforcement steel. v. Repairing Plaster work for ornamental features like urns, domes ,parapets ,chajjahs , fenials , cornices , lintels etc 10% pozzolonic lime mortar for an area of 65 Sq.m vi. Providing Lime plaster for external and internal surface of the walls, domes and other places for an area of 600 Sq.m as per the specifications provided vii. Ruled/Flush pointing for masonry wall with lime Surkhi and marble dust wherever necessary and application of verona Vapour Permeable, water based Mature Lime wash finish for about an area of 600 Sq.m.
5.	Civil Works	i. Fixing Cast Iron Grills of 18 No's on the façade of the walls as per the details provided (DDA2.2.B04) ii. Providing Granite slabs for Flooring and fixing over the Vendor racks for an entire area of 115 Sq.m including water repellent coating.
6.	Metal racks	Providing and fixing of 36 No's of Mild Steel metal racks for the vendors inside the market as per the Architect specified design and quality (DDA2.2.B04)
7.	Illumination	i. Removal of existing lighting fixtures, solar panels, Junction boxes and cables inside the building ii. Supply and Installation of Cables & lighting fixtures

S.No	Component	Details
		such as flexible light LED strips, in ground column uplight, wall mounted down lights at different locations internally and at the façade of the market walls as per the approved lighting plans. (DDE2.1B08) and specifications provided

5.3 Navaratri Chowk

S.No	Component	Details
1.	Survey	i. Site Assessment ii. Before the Commencement of Works, or any part thereof, the Contractor make a complete survey, and take levels, of the Project features and agree on the dimensions upon which setting out of the Works shall be eased
2.	Dismantling of Resurfacing	i. Dismantling, excavation and removal of existing cement concrete pathway of the Navaratri Chowk covering an area of 1830 Sq.m ii. Filling the excavated surface with moorum or selected earth, providing levelling of GSB layer course and PCC over the levelled surface for an area about 1830 Sq.m as per drawings provided (DDA2.2.B03). iii. Resurfacing the pathway with multi-colored Rajuala, Kota & Granite cobble stones for the area of 1750 Sq.m as per drawings
3.	Other Civil Works	i. Construction of Waste collection points and different varieties of Seating's with Bela stones and plastering and Painting the internal and external surfaces for an area of 14.5 cum ii. Providing granite Slab over the top surface of the seating's of an area of 54 Sq.mt
4.	Vendor Zone	Providing and fixing of aluminum extruded tubular and other aluminum sections long with canvas cloth for newly created vendor area as per the architect plans
5.	Façade improvement	i. Removing of dry or oil bound distemper by

S.No	Component	Details
		washing, scraping and sand papering the wall surface of centrally located Memorial pillar and the surrounding buildings of an area of 470 Sq.mt ii. Cleaning the external and internal Sandstone surface of the wall with Liquid Ammonia Chemical of 5% solution or chemical cleaning agent for the area of 470 Sq.mt as per the technical Specifications. iii. Finishing wall with weather proof exterior emulsion paint on external wall surface of centrally located Memorial pillar and the surrounding buildings of an area of 470 Sq.mt
6.	Landscaping	i. Providing local lawn grass, shrubs and Pongmia glabra trees at the specified locations as per the architect plan ii. Providing sloping grass mounds at specified locations as per the architect plan
7.	Road furniture's	i. Providing saucer drain for an area about 44 Sq.mt and Kerb stone for about 1.26 Sq.mt iii. Installing signage boards and Garden wooden bench with back and arm rest as per the specifications
8.	Illumination	Providing lighting in the form of Post-top lamps along the street, inground uplighters, vendor zone and in the chowk as per the lighting network plan (DDE2.1.B08)

5.4 Defect and Maintenance Liability

The Defect and Maintenance Liability Period for the Work shall be of the Five year (5) years from the date of completion of Construction. The above mentioned period shall supersede the defect liability period provided in the Clause 17 of General condition of Contract (GCC) and shall be applicable for the Work with reference to the provisions of clause 17 of GCC and Article 6 of the Integrity Agreement as per the GCC and also shall ensure the following**.**

i. Correction of all defects noticed during the defect liability period such as Rectification of Defects / Leakages / Cracks, Replacement of defective materials such as Mosaic Tiles, Rejula/ Kota slabs, Granite, cobble stones, etc., whereby they cannot be repaired during the O&M Period and also all defective electrical items/Fixtures

ii. The Contractor shall promptly rectify all defects pointed out by the Engineer-in-Charge well before the end of the Defect Liability Period. The Defect Liability Period shall automatically stand extended until the defect is rectified.

iii. If the Contractor has not corrected a Defect pertaining to the Defect Liability Period to the satisfaction of the Engineer-In Charge, within the time specified by the Engineer, the Engineer will assess the cost of having the Defect corrected, and the cost of correction of the Defect shall be recovered from the Performance Security or any amount due or that may become due to the Contractor and other available securities.

iv. The maintenance for all Electrical and illumination components will be comprehensive in nature and it will be contractor's responsibility to replace them as and when required (whether under guarantee period or not) during the whole defect & maintenance liability Period including the defects caused by the Public / Tourists

v. Preparation of Maintenance manual

vi. Provide required manpower, tools and spares required for day to day maintenance works

vii. Daily cleaning and maintenance of Heritage Precincts premises

viii. Make arrangement for collection and disposal of solid waste

ix. Maintenance of all the Electrical illumination components

x. Maintain operating logs and records on daily basis

xi. Submission of Monthly Progress Report

xii. Provide Training on Maintenance to personnel nominated by the Employer for a period of two months prior to the Employer issuing Taking over certificate

6. Supplementary Information

6.1 Construction Program and Progress of Works

6.1.1 Construction Program

Contractor shall prepare Construction Program showing the sequences, dependencies, durations and dates for execution of all major items including sectional completion following the sub-divisions in the Bills of Quantities for the execution of the Works within the periods stated in the Contract. It shall be supported by:

a) Data of the construction methods
b) Equipment Utilization Schedule
c) Manpower Utilization Schedule
d) Subcontracting Schedule

e) Mobilization/Demobilization Schedule

6.1.2 Progress Reports

The Contractor shall furnish 5 copies of Progress Reports at regular monthly intervals in a form determined by the Engineer-in-Charge, containing the following information:

- physical progress for the report month and estimated progress for the next month;
- updated S-curves for physical progress at different sections of the Works
- Any report which may be specifically requested by the Employer and/or the Engineer.

The monthly progress reports shall be submitted not later than 7 days after the end of the report month.

6.2 Preconstruction Survey and Setting out

The Contractor shall verify all measurements and be responsible for their correctness. Any differences which may be found between actual measurements and the dimensions given In the Contract Documents shall be submitted to the Engineer-in-Charge, in writing, for consideration and directives before proceeding with the Works.

Site bench marks shall be accurately and safely established, maintained and removed upon completion of the Works, all to the satisfaction of the Engineer-in-Charge The Contractor shall prepare a plan detailing the location of the bench marks and keep this up to date throughout the period of the Contract.

The Engineer reserves the right to order levels, considered necessary for the full and proper supervision and measurement of the works, to be taken at any time.

Before the Works, or any part thereof, are commenced, the Contractor make a complete survey and take levels, of the site and agree on the dimensions and elevations upon which setting out of the Works shall be eased.

These levels shall be related to the bench marks and shall be plotted and drawn up by the Contractor. After agreement of the drawings, which shall be signed by the Engineer-in-Charge and the Contractor, these levels shall form the basis of setting out of the Works.

The Contractor shall be responsible for the true and proper setting out of the Works in relation to reference data given on the Drawings and shall accurately set out the positions, levels and dimensions of all parts of the Works. Any delay or loss resulting from errors in the setting out of the Works shalt be the responsibility of the Contractor

Setting out shall be reviewed by the Engineer-in-Charge before commencing the Works, but any approval shall, in no way, relieve the Contractor of his responsibility for the correct execution of the Work.

6.3 AS Built Drawings

The Contractor shall Submit 1 (one) reproducible copy and 3 (three) prints of all As-Built drawings clearly named as such to the Engineer-in-Charge for approval before applying for the Taking-Over Certificate , After approval of the As Built Drawing the Contractor shall supply an electronic copy of the drawing in together with a licensed copy of the drafting software .During the course of the Works, the Contractor shall maintain a fully detailed record of all changes from the approval to facilitate easy and accurate preparation of the As-Built Drawing.

SECTION - II

INFORMATION & INSTRUCTIONS FOR BIDDER

1.0 General

1.1 Letter of transmittal and forms for deciding eligibility are given in **Section III**.

1.2 All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even if no information is to be provided in a column, a "nil" or "no such case" entry should be made in that column. If any particulars / queries are not applicable in case of the bidder, it should be stated as "not applicable". The bidders are cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms or deliberately suppressing the information may result in the PQ application being summarily disqualified. Application made by telegram or telex and those received late will not be entertained.

1.3 Overwriting should be avoided. Correction, if any, should be made by neatly crossing out, initialing, dating and rewriting. Pages of the eligibility criteria document are numbered. Additional sheets, if any added by the contractor, should also be numbered by him. They should be submitted as a package with signed letter of transmittal.

1.4 References, information and certificates from the respective clients certifying suitability, technical knowledge or capability of the bidder should be signed by an officer not below the rank of Executive Engineer, or equivalent.

1.5 After opening of the Technical bids, Chief Executive Officer, DSCL shall prepare a list of deficiencies noticed in the bids of each bidder vis-a-vis requirements as per NIT and the respective bidders will be communicated by email with a request to furnish required documents within one week of receipt, failing which it will be presumed that they do not have any further documents to furnish and decision on bids will be taken accordingly.

1.6 The bidder may furnish any additional information, which he thinks is necessary to establish his capabilities to successfully complete the envisaged work. He is, however, advised not to furnish superfluous information. No information shall be entertained after submission of eligibility criteria document unless it is called for by the employer.

1.7 Any information furnished by the bidder & found to be incorrect either immediately or at a later date, would render him liable to be debarred from tendering / taking up of work in DSCL and PWD Diu. Such bidder will be debarred from tendering DSCL, Diu and entire amount of EMD shall be forfeited.

1.8 The contractor shall carry out performance tests of entire installation as per standard specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the tests.

1.9 The contractor shall be responsible to arrange at his own cost all necessary Tools and Plants

(T&P) required for the execution of work.

1.10 The contractor(s) shall make his/their own arrangements for water required for the work at their own expenses and nothing extra will be paid for the same. This will be subject to the following conditions as per Clause 30 of CPWD GCC 2019

(i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-Charge

(ii) The Engineer-in-Charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the Engineer-in-Charge, unsatisfactory.

1.11 The contractor shall be deemed to have fully acquainted himself with the nature and extent of the work and working conditions at site before submitting the tender. The work shall be executed as per preference of items approved by Engineer-in-Charge If the drawing, designs etc. are not available due to any conditions ,the work programme of the contractors shall be modified accordingly and no compensations/damages shall be payable.

1.12 Contractor shall be required to provide necessary safety arrangements throughout execution, completion , maintenance and defect liability period to avoid any accidents or damage to adjacent buildings, roads and service lines.

1.13 Safety of the works

i. The agency shall be fully responsible for safety of labor, working staff etc. Proper safety equipment's like helmets, safety belts, gumboots, barricading etc. as per requirement of site shall be provided by the agency and agency shall be fully responsible for any accident and consequent claims etc. if any and Employer shall not be responsible in any more.

ii. All temporary warning/ caution boards display such as "Construction Work in progress", "keep away", "No parking", "Diversion ahead" etc. shall be provided and displayed during day as well as night time by the contractor, wherever required and as directed by the Engineer-in-Charge

iii. Whenever any work is required to be carried out at night in the interest of structural safety or any other reason with authorized to supervise, adequate lighting and other arrangement shall be made in advance by the contractor for proper execution and supervision of such work. The contractor shall not be however entitled to any extra payments for night work. The responsibilities of all kind shall be of contractor

1.14 If the work(s) be delayed by:- (i) force majeure, or (ii) abnormally bad weather, or serious loss or damage by fire, or (iv) civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or (v) delay on the part of other contractors or tradesmen engaged by Engineer-in- Charge in executing work not forming part of the Contract, or (vi) any other cause like above which, in the reasoned opinion of the Engineer-in-Charge is beyond the Contractor's control, then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-

in-Charge but shall nevertheless use constantly his best endeavors to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works. The contractor shall have no claim of damages for extension of time granted or rescheduling of milestone/s if any for events listed in sub clause 5.2 of CPWD GCC 2019.

1.15 The rates of all items of work shall, unless clearly specified otherwise are including cost of all labor, material and other inputs involved in the execution of the item.

1.16 The Mandatory tests required for materials shall be got done from the NABL certified labs & all the testing charges shall be borne by the contractor, cost of sample and its carriage shall also be borne by the contractor.

1.17 The time of completion shall be essence of the contract and to be strictly adhered to by the contractor. He shall provide a work schedule showing all the activity for timely completion of the project.

1.18 The Contractor shall be responsible for:

i) The accurate setting out of the Works in relation to original lines, levels and points of reference given by the Engineer -in-Charge in writing.

ii) The correctness of all positions, levels, dimensions and alignment of all parts of the Works, and

iii) The provision of all necessary instruments, appliances and labour in connection with the foregoing responsibilities.

1.19 Any defect, error, omission, fault shall be immediately brought to the notice of the Engineer-in-Charge before or during the execution of the works.

1.20 Tenders with any conditions including that of conditional rebate shall be rejected forthwith.

1.21 The contractor should make necessary arrangement for working except National holidays & the planning should be done accordingly.

1.22 The Contractor shall make necessary arrangements for medical aid / first aid to all his workers including availability of first aid box all the time at the site of work

1.23 Deleted

1.24 Even BIS marked material may be subjected to the quality test at the discretion of the Engineer-in-Charge Whenever BIS marked materials are brought to the site of work the contractor shall, if required by the Engineer-in-Charge, furnish manufacturers test certificate or test certificates confirming to the relevant IS Codes.

1.25 Contractor is required to fulfill the provisions of PF (under EPF Scheme) and other labor laws as applicable time to time. The ESI & EPF contribution on the part of employer in respect of this contract shall be paid by the contractor.

1.26 Employer. Any deduction/ compensation proposed by CVC or Employer, in regard to defective work or work not confirming to specifications, loss of time, amount shall be deducted from running bills. No claim of the contractor whatsoever shall be entertained on this account.

1.27 The department will be responsible only to the contractor and his authorized representative and none else, with whom contractor may be in liaison or associated in any manner.

1.28 The contractor shall also make necessary agreement at his own cost for diesel generator sets required for the work, so that the same can be used by him during failure/none availability of electricity. Necessary permission etc. if required shall be taken by him from the concerned authorities. Nothing extra shall be paid on this account

1.29 Nothing extra, what so ever shall be payable to the contractor for executing the work as per general specifications and special conditions in all the above paras.

1.30 The quality assurance of the work shall be got done through the PMC, DSCL appointed by the Employer, and the payment of work done shall be released to contractor after certification of PMC for its quality etc.

2.0 Definitions

In these documents, the following words and expression have the meaning here by assigned to them.

2.1 **Employer:** means the Chief Executive Officer, DSCL, Diu on behalf of the President of India.

2.2 **Bidder:** means the Individual, proprietary firm, partnership firm, limited company private or public corporation.

2.3 **Year** means “Financial Year” unless stated otherwise.

3.0 Method of Application

3.1 If the bidder is an individual, the application shall be signed by him above his full type written name and current address

3.2 If the bidder is a proprietary firm, the application shall be signed by the proprietor above his full type written name and the full name of his firm with its current address.

3.3 If the bidder is a firm in partnership, the application shall be signed by all the partners of the firm above their full typewritten names and current addresses, or, alternatively, by a partner holding power of attorney for the firm. In the later case a certified copy of the power of attorney should accompany the application. In both cases a certified copy of the partnership deed and current address of all the partners of the firm should accompany the application.

3.4 **If the bidder is a limited company or a corporation, the application shall be signed by** a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum of

Articles of Association duly attested by a Public Notary.

4.0 Final Decision Making Authority

The employer reserves the right to accept or reject any bid and to annul the process and reject all bids at any time, without assigning any reason or incurring any liability to the bidders.

5.0 Particulars Provisional

Deleted.

6.0 Site Visit

Bidders are encouraged to submit their respective BIDs after visiting the Project site and ascertaining for themselves the site conditions, location, surroundings, , availability of power, water and other utilities for construction, access to site, handling and storage of materials, , applicable laws and regulations, and any other matter considered relevant by them.

7.0 Criteria for Eligibility

7.1 Should have satisfactorily completed the works as mentioned below during the last Seven years ending previous day of last date of submission of tender.

Three similar completed works costing not less than the amount equal to 40% of the Estimated Project Cost

Or

Two similar completed works, costing not less than the amount equal to 60% of the Estimated Project Cost

Or

One similar completed work of aggregate cost not less than the amount equal to 80% of the Estimated Project Cost

with Central Government Department / State Government Department / Central Autonomous Body / Central Public Sector undertaking / State Autonomous Body / State Public Sector undertaking / City Development authority / Municipal Corporation of city formed under any act by central / state Government and published in Central / State Gazette

Definition of Similar Nature of work: The Bidder should have required experience in executing Rehabilitation/ Restoration works for Heritage structures / Old structures similar in nature to the Project applied comprising of Structural Repairs (Lime Based Works, Traditional Lime stone/Sand stone/Bela Stone masonry), Resurfacing work, Façade illumination works Electrical works(Internal & External) etc.,

Note: TDS (Tax deducted at Source) certificate for Private works shall be enclosed other than Govt. works for above mentioned criteria.

a) The value of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to last date of receipt of application for tender.

7.2 The bidder should have had Average Annual Financial Turnover of 50% on Civil/Electrical construction work during the last three consecutive years Balance sheets duly audited by Chartered Accountant. Year in which no turnover is shown would also be considered for working out the average.

7.3 Experience gained as nominated sub-contractor shall be considered provided following conditions are met:

a) If the contract signed between the employer and main contractor has provision for sub-contracting and a signed copy of such contract or its relevant part is submitted

b) Work completion certificate from the Main Contractor is provided

7.4 Firm must be registered as Class A with for state Government, R&B Division or central Government or CPWD Class II Contractors as well non CPWD Contractors.

7.5 Bidder Should not have incurred any loss in more than two years during the last five years ending 31st March 2020 . (Scanned copy of certificate from CA to be uploaded).

7.6 The bidder should have a Solvency of the amount equal to 40% of the Estimated Project Cost certified by his Banker

7.7 Experience of similar works shall only be considered of the Main firm with valid documents

7.8 The bidder should not have been blacklisted by any Central Government/State Govt. Offices/PSUs and self-certificate is to be scanned and uploaded.

7.9 The bidder should own construction equipment as per list required for the proper and timely execution of the work. Else, he should certify that he would be able to manage the equipment by hiring etc., and submit the list of firms from whom he proposes to hire.

7.10 The bidders should have sufficient number of Technical and Administrative employees for the proper execution of the contract. The bidder should submit a list of these employees stating clearly how these would be involved in this work within 15 days of award of work. .

7.11 The bidder's performance for each work completed in the last seven years and in hand should be certified by an officer not below the rank of Executive Engineer

8.0 Evaluation criteria

8.1 The details submitted by the bidder will be evaluated for eligibility by Competent Authority or a Committee constituted by him. If required, the works executed by the bidder, who otherwise qualify, may be got inspected by a Committee or any other authority as decided by Competent

Authority. The details submitted by the bidders will be generally evaluated in the following manner:

8.1.1 The criteria prescribed under Clause 7 above in respect of experience of similar class of works completed, bidding capacity and financial turn over etc. will first be scrutinized and the bidder's eligibility for the work shall be determined.

8.1.2 The bidders qualifying the criteria as set out in Clause 7 above will be evaluated for following criteria by scoring method on the basis of details furnished by them:

S.No	Details	Marks
1.	Financial strength (Form 'A' & 'B')	20
2.	Experience in similar nature of work during last ***seven*** years (Form 'C')	20
3.	Performance on works (Form 'D') – Time over run	20
4.	Performance on works (Form 'D') – Quality	40
	Total	**100**

To become eligible for short listing, the bidder must secure at least **fifty** percent marks in each (Section 1, 2, 3 & 4) and **sixty** percent marks in aggregate.

The Authority, however, reserves the right to restrict the list of such qualified contractors to any number deemed suitable by it.

Note: The average value of performance of works for time overrun and quality shall be taken on the basis of performance report and eligible similar works

8.2 Even though any bidder may satisfy the above requirements, he would be liable to disqualification if he has:

8.2.1 **Made misleading or false representation or deliberately suppressed the information** in the forms, statements and enclosures required in the eligibility criteria document,

8.2.2 Record of poor performance such as abandoning work, not properly completing the contract, or financial failures / weaknesses etc.

9.0 Financial information

Bidder should furnish the following financial information:

Annual financial statement for the last five year in (**Form "A")** and solvency certificate in (**Form "B")**

10.0 Experience in works highlighting experience in similar works

10.1 Bidder should furnish

The List of eligible similar nature of works successfully completed during the last seven years in (**Form "C")**.

Bidder should furnish the Particulars of completed works(Civil/Electrical) etc, and performance of the bidder duly authenticated/certified by an officer not below the rank of Executive Engineer or equivalent should be furnished separately for each work completed or in progress in (**Form " D**")

11.0 Organization information

Bidder is required to submit the information in respect of his organization in **Forms "E"**

12.0 Letter of Transmittal

The bidder should submit the letter of transmittal attached with the document.

13.0 Opening of Price Bid

After evaluation of applications, a list of short listed agencies will be prepared. Thereafter the financial bids of only the qualified and technically acceptable bidders shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives. The bids shall remain valid for 120 days (as prescribed **in CPWD-6** for e-tendering) from the opening of technical bid.

14.0 Award criteria

14.1 The Authority shall award the work to the eligible bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest Evaluated Price Bid.

14.2 The employer reserves the right, without being liable for any damages or obligation to inform the bidder, to:

(i) Amend the scope and value of contract to the bidder.

(ii) Reject any or all the applications without assigning any reason.

14.3 Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer would result in rejection of his bid. Canvassing of any kind is prohibited.

15.0 Criteria for Evaluation of the Performance of Contractors for Pre-Eligibility

	Attributes		Evaluation	
(a)	**Financial strength**		**(20 marks)**	
	(i) Average annual turnover 16 marks (ii) solvency Certificate 4 marks		(i) 60% marks for minimum eligibility criteria (ii)100% marks for twice the minimum eligibility criteria or more In between (i) & (ii) – on pro-rata basis.	
(b)	**Experience in similar class**		**(20 marks)**	
	Class of works		(i) 60% marks for minimum eligibility criteria (ii)100% marks for twice the minimum eligibility criteria or more In between (i) & (ii) – on pro-rata basis.	
(c)	**Performance on works (time over run)**		**(20 marks)**	
	Parameter	**Calculation for points**	**Score**	**Marks**
	(i) Without levy of compensation. (ii) With levy of compensation. (iii) Levy of compensation not decided	If TOR=	1.00 2.00 3.00 >3.50 20 15 10 10 20 5 0 -5 20 10 0 0	20
TOR = AT/ ST, where AT = Actual time; ST = Stipulated Time. **Note:** Marks for value in between the stages indicated above is to be determined by straight line variation basis.				
(d)	**Performance of works (Quality)**		**(40 marks)**	
	(i) Very Good (ii) Good (iii) Fair (iv) Poor		40 30 20 0	

SECTION III

INFORMATION REGARDING ELIGIBILITY

LETTER OF TRANSMITTAL

From:

To

Chief Executive Officer,

Diu Smart City Limited,

Fort Road, Diu 362520(UT)

Subject: Submission of Bid for the work **"Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India"**

Having examined the details given in press notice and bid document for the above work, I/we hereby submit the relevant information.

1. I / we hereby certify that the statement made and information supplied in the enclosed Forms A to G and accompanying statement are true and correct.

2. I / we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.

3. I / we submit the requisite certified solvency certificate and authorize **Chief Executive Officer, DSCL, Diu, (UT)** to approach the Bank issuing the solvency certificate to confirm the correctness thereof. I / we also authorize **Chief Executive Officer, DSCL, Diu,** to approach individuals, employers, firms and corporation to verify our competence and general reputation.

4. I / we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following works:

   Name of work: Certificate from

   Enclosures:

   Seal of bidder

   Date of submission:

Signature(s) of Bidder(s)

FORM 'A'

FINANCIAL INFORMATION

I. Financial Analysis: - Details to be furnished duly supported by figures in balance sheet / profit & loss account for the **last five years** duly certified by the Chartered Accountant, as submitted by the bidder to the Income Tax Department (Copies to be attached).

Year	**Gross Annual turnover on construction works.**	**Profit / Loss**
2015-16		
2016-17		
2017-18		
2018-19		
2019-20		

II. Financial arrangements for carrying out the proposed work.

III. Solvency Certificate from Bankers of the bidder in the prescribed Form 'B'.

Signature of Chartered Accountant with seal

Signature of Bidder(s).

FORM 'B'

FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s…….. having marginally noted address, a customer of our bank are / is respectable and can be treated as good for any engagement up to a limit of Rs……. (Rupees …… ……..…… only).

This certificate is issued without any guarantee or responsibility on the Bank or any of the officers.

(Signature)

For the Bank

Note:-

1. Bankers certificates should be on letter head of the Bank, sealed in cover addressed to tendering authority.
2. In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

FORM 'C'

DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED DURING THE LAST SEVEN YEARS ENDING PREVIOUS DAY OF THE LAST DATE SUBMISSION OF TENDERS

S. No.	Name of work / project & location	Owner or sponsoring organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation arbitration cases pending / in progress with details *	Name and address / telephone number of officer to whom reference may be made	Whether the work was done on back to back basis Yes/No
1	2	3	4	5	6	7	8	9	10

* Indicate gross amount claimed and amount awarded by the Arbitrator.

Signature of Bidder(s)

FORM 'D'

PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS 'C '

1.	Name of work / project & location	:	
2.	Agreement No.	:	
3.	Estimated cost	:	
4.	Tendered cost	:	
5.	Date of start	:	
6.	Date of completion (i) Stipulated date of completion (ii) Actual date of completion	: :	
7.	(a)Whether case of levy of compensation For delay has been decided or not	:	Yes/No
	(b) If decided, amount of compensation levied for delayed completion if any	:	
8.	Performance report: 1) Quality of work 2) Financial soundness 3) Technical Proficiency 4) Resourcefulness 5) General Behavior	: : : : :	Outstanding/Very Good / Good / Fair / Poor Outstanding/Very Good / Good / Fair / Poor Outstanding/Very Good / Good / Fair / Poor Outstanding/Very Good / Good / Fair / Poor Outstanding/Very Good / Good / Fair / Poor

Dated: Executive Engineer, or Equivalent

Addition: ----------
Correction: ----------
Overwriting: ---------
Deletion: ----------

Chief Executive Officer (- - - -) DAO PMC(- - - - -)

FORM 'E'

STRUCTURE & ORGANISATION

1. Name & address of the bidder

2. Telephone no. / Telex no. / Fax no.

3. Legal status of the bidder (attach copies of original document defining the legal status)

   (a) A proprietary firm

   (b) A firm in partnership

   (d) A limited company or Corporation

4. Particulars of registration with various Government Bodies (attach attested photocopy)

Organization / Place of Registration	**Registration No.**
1. **2.**	

5. Names and titles of Directors and Officers with designation to be concerned with this work.

6. Designation of individuals authorized to act for the organization.

7. Has the bidder or any constituent partner in case of partnership firm/Limited company/Joint Venture, ever been convicted by the court of law? If so give details.

8. In which field of Civil Engineering construction the bidder has specialization and interest?

9. Any other information considered necessary but not included above.

Signature of Bidder(s)

FORM CPWD-6

FOR e-Tendering

1. Item rate bids are invited by Chief Executive Officer, DSCL on behalf of President of India, from approved and eligible firms/ contractors of repute in Two bid system for the work of: **"Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India"**

   The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.

1.1 The work is estimated to cost: - INR: 7,07,88,187/-

This estimate, however, is given merely as a rough guide.

1.2 Intending tenderer is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below.

1.2.1 Criteria for Eligibility for the Registered Contractor in last 7 years ending previous day of last date of submission of bids

Three similar completed works costing not less than the amount equal to 40% of the Estimated Project Cost

Or

Two similar completed works, costing not less than the amount equal to 60% of the Estimated Project Cost

Or

One similar completed work of aggregate cost not less than the amount equal to 80% of the Estimated Project Cost

with Central Government Department / State Government Department / Central Autonomous Body / Central Public Sector undertaking / State Autonomous Body / State Public Sector undertaking / City Development authority / Municipal Corporation of city formed under any act by central / state Government and published in Central / State Gazette

Definition of Similar Nature of work: The Bidder should have required experience in executing Rehabilitation/ Restoration works for Heritage structures / Old structures similar in nature to the Project applied comprising of Structural Repairs (Lime Based Works, Traditional Lime stone/Sand stone/Bela Stone masonry), Resurfacing works, Façade illumination works, Electrical works (Internal & Exteral) etc.,

Note: TDS (Tax deducted at Source) certificate for Private works shall be enclosed other than Govt. works for above mentioned criteria

a) The value of executed work shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to last date of receipt of application for tender.

1.2.2. To become eligible for issue of bid, the bidders shall have to furnish an affidavit as under:-

1. I/We undertake and confirm that eligible similar works(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for bidding in DSCL, Diu in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee. **(Scanned copy to be uploaded at the time of submission of bid).**

2. Agreement shall be drawn with the successful bidders on prescribed **Form No. CPWD-8** which is available as a Govt. of India Publication and also available on website https://ddtenders.gov.in , www.diu.gov.in Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.

3. The time allowed for carrying out the work will be 15 Days from the date of start as defined in **Schedule 'F'** or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.

4. (i)The site for the work is available.

   Or

   (ii) The Architectural and Structural Drawings with specifications for various components for the work are attached as **Appendix 1** with NIT.

5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website https://ddtenders.gov.in , www.diu.gov.in,www.eprocure.comon free of cost.

6. After submission of the bid the contractor can re-submit revised bid any number of times but before last time and date of submission of bid as notified

7. The Earnest Money of INR 14,15,800/- Drawn in favor of Chief Executive Officer, DIU SMART CITY LTD, Diu, in the shape of Fixed Deposit Receipt (FDR)/Demand Draft shall be scanned and uploaded to the e-Tendering website within the period of bid submission. It is mandatory to submit tender fees and EMD online failing which the price bid of that agency will not be opened online and Physical submission of such scanned documents shall reach to office of the Chief Executive Officer, DIU SMART CITY LTD, within 3 (three) working days after closing of online bidding.

8. The bid submitted shall become invalid if: (i) The bidders are found ineligible. (ii) The bidders do

not upload all the documents (GST registration) as stipulated in the bid document. (iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically in the office of tender opening authority.

9. The contractor whose bid is accepted will be required to furnish **performance guarantee of 5% (Five Percent) of the bid amount** within the period specified in **Schedule F**. 50% of said Performance Guarantee Amount or 20 Lakhs whichever is less shall have to deposit in the shape of Fixed Deposit Receipt (FDR) and the remaining amount shall be submitted in the form of an irrevocable bank guarantee bond of any scheduled bank or the State Bank of India in the prescribed form given in this document. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The Earnest money deposited along with tender shall be returned after receiving the aforesaid performance.

10. Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground, the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidders shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidders shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidders implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

11. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidders shall be summarily rejected.

12. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.

13. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.

14. The contractor shall not be permitted to bid for works in DSCL, PWD, DMC, District Panchayat, Diu and other govt. similar agency in which his near relative is posted as a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any

gazetted officer, DSCL, Diu. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.

15. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.

16. The tender for the works shall remain open for acceptance for a period of One Twenty (120) days from the date of opening of technical bid. If any tenderer withdraws his tender before the said period or issues of letter of acceptance, whichever is earlier, or makes any modification in the terms and conditions of the tender which are not acceptable to the department, then the Government shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money as aforesaid. Further the tenderer shall not be allowed to participate in the retendering process of the work

17. This notice inviting Bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:-

    a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, BOQ's forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.

    b) Standard CPWD **Form-8 and Rules and directions provided in the General Contract Conditions 2019 published by CPWD.**

Chief Executive Officer, DSCL, Diu,(UT).

INTEGRITY PACT

To,

……..,

……..,

……..

Sub: NIT No. ……. for the work **"Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India"**

Dear Sir,

It is here by declared that Chief Executive Officer, DSCL, Diu, is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the President of India.

Yours faithfully

Chief Executive Officer, DSCL, Diu,

ACKNOWLEDGEMENT BY BIDDER FOR ACCEPTANCE OF PRINCIPAL OF INTEGRITY

To,

Chief Executive Officer,

Diu Smart City Limited,

Fort Road,

Diu -362520 (UT).

Sub: Submission of Tender for the **"Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India"**

Dear Sir,

I/We acknowledge that Chief Executive Officer, DSCL,, Diu is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by Chief Executive Officer, DSCL,, Diu. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, Chief Executive Officer, DSCL, Diu, shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid is accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

To be signed by the bidder and same signatory competent / authorized to sign the relevant contract on behalf of president of India.

INTEGRITY AGREEMENT

This Integrity Agreement is made at ..... on this..... day of 2020

BETWEEN

President of India represented through **Chief Executive Officer, DSCL, Diu,(UT)** (Hereinafter referred as the which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

…….....

(Name and Address of the Individual/firm/Company)

through ..... (Hereinafter referred to as the (Details of duly authorized signatory)

"**Bidder/Contractor**" and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No. .....) (hereinafter referred to as "**Tender/Bid**") and intends to award, under laid down organizational procedure, contract for …….....

(Name of work)

hereinafter referred to as the "**Contract**".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "**Integrity Pact**" or "**Pact**"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

Article 1: Commitment of the Principal/Owner

1) The Principal/Owner commits itself to take all measures necessary to prevent

corruption and to observe the following principles:

(a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

(b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

(c) The Principal/Owner shall endeavor to exclude from the Tender process any person, whose conduct in the past has been of biased nature.

2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of **fraud or corruption or Coercion or Collusion** of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.

2) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:

a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.

b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.

c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the

Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.

e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose (with each tender as per proforma enclosed) any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice **means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.**

5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/ her reputation or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.

2) **Forfeiture of EMD/Performance Guarantee/Security Deposit**: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.

3) **Criminal Liability:** If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of Indian Penal code (IPC)/Prevention of Corruption Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.

2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.

3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Subcontractors/ sub-vendors.

2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.

3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor after the completion of work under the contract or till the continuation of defect and Maintenance liability period whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, Chief Executive Officer, DSCL,, Diu.

Article 7- Other Provisions

1) This Pact is subject to Indian Law, place of performance and jurisdiction is the Headquarters of the Division of the Principal/Owner, who has floated the Tender.

2) Changes and supplements need to be made in writing. Side agreements have not been made.

3) If the Contractor is a partnership firm, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partnership firm members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.

4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intensions.

5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this **Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.**

Article 8- Legal and Prior Rights

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....
(For and on behalf of Principal/Owner)
.....
(For and on behalf of Bidder/Contractor)
WITNESSES:
.....
(Signature, Name and Address)
Place:
Dated:
.....
(Signature, Name and Address)
Place:
Dated:

FORM CPWD - 8

ITEM RATE TENDER & CONTRACT FOR WORKS

(A) Tender for the work of: - **"Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India".**

(i)	To be Uploaded online by	21 / 05 / 2020 at 12:00 Hrs.
(ii)	Pre Bid conference	14 / 05 / 2020 at 15:30 Hrs.
(iii)	Technical Bid to be opened online on	21 / 05 / 2020 at 15:00 Hrs**.**
(iv)	Financial Bid to be opened online on	21 / 05 / 2020 at 15:30 Hrs**. (If Possible)**

(After approval of technical bid by the competent authority)

T E N D E R

I/We have read and examined the notice inviting tender, schedule, A, D ,E & F. Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the Chief Executive Officer, DSCL, Diu, within the time specified in Schedule 'F', viz., schedule of quantities and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract (CPWD GCC 2019) and with such materials as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

I/We agree to keep the tender open for acceptance for the period of One Twenty (120) days from the date of opening of technical bid and not to make any modifications in its terms & conditions.

A sum of INR. 14,15,800/- is hereby forwarded in cash/receipt treasury challan/deposit at call receipt of a scheduled bank/fixed deposit receipt of scheduled bank/demand draft of a scheduled bank/bank guarantee issued by a scheduled bank as earnest money.

A copy of earnest money in receipt treasury challan/deposit at call receipt of a scheduled bank/fixed deposit receipt of scheduled bank/demand draft of a scheduled bank/bank guarantee issued by a scheduled bank is scanned and uploaded (strike out as the case may be). If I/We, fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said President of India or his successors (CEO, DSCL), in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/ We agree that President of India or the successors (CEO, DSCL), in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance

guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

Further, I/We agree that in case of forfeiture of Earnest Money or both Earnest Money and performance guarantee as aforesaid, I / We shall be debarred for participation in the re-tendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back to back basis. Further that, if such a violation comes to the notice of Department, then I/we shall be debarred for tendering in DSCL, Diu in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest money Deposit/Performance Guarantee.

I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information / derived therefrom to any person other than a person to whom I/We, am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the state.

Dated …………………

Signature of the Contractor

Postal Address ---

Telephone No.---

FAX ------------------------------------

E-MAIL ---

Witness:------------------------------ -----

Address:--------------------------------

Occupation:----------------------------

ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf President of India for a sum of Rs. *_ _ _ _ _ _ _ _ _ (Rupees *_)

The letters referred to below shall form part of this contract Agreement:-

(a) ----------*

(b) ----------*

(c) ----------*

For & on behalf of the Chief Executive Officer, DSCL,, Diu

Signature……..

Dated ……..

Designation…….

SCHEDULES

SCHEDULE 'A'

Schedule of quantities is given below.

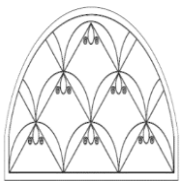
SCHEDULE OF QUANTITIES

Name of Work: "Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability Period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India"

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
1	_	Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth up to 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials (C) By mechanical means including lead and lift	Sqm	3524.00			
2	_	Excavation for foundation upto 1.5m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50m for all lead (A) Loose or soft soil	Cum	2180.00			
3	_	Felling trees of the any girth and height including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material and filling the excavated earth and making good as per direction	Each	5.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		of Engineer-in-Charge					
4	_	Demolition and disposal of unserviceable materials with all lead and lift. (ii) Unreinforced cement concrete / Pavements / rubble by manually/mechanically as per direction of Engineer-in-Charge	Cum	757.00			
5	_	Preparing surface by brushing with wire brushes for removing caked mud etc., sweeping with brooms and finally fanning the cleared surface with gunny bags to remove all loose dirt etc.,	Sqm	5644.00			
6	_	Demolition including stacking of serviceable material and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work	Cum	40			
7	_	Dismantling tiled of stone floors laid in mortar including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.	Sqm	2120.00			
8	_	Providing material and labour for Demolition of Brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.(ii) In Cement Mortar.	Sqm	123.00			
9	_	Demolition and disposal of unserviceable materials with	Cum	8.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		all lead and lift.(i) Cement concrete. (Jalis) of Vegetable market					
10	_	Dismantling roofing including ridges, hips, valleys and gutters etc., and stacking the material at suitable place as per direction of Engineer-in-Charge : Asbestos cement sheet	Sqm	529.00			
11	_	Dismantling G.I. pipes (external work) above 40 mm nominal bore including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means including stacking of pipes for all lead as per direction of Engineer-in-Charge	Sqm	274.00			
12	_	Rolling of earthwork in layers with power roller including filling in depressions which occur during the process	Cum	914.00			
13	_	Watering of earth work as directed	Cum	914.00			
14	_	Filling in foundation and plinth with morrum or selected soil in layers of 20cm, thickness including watering, ramming and consolidating etc., complete	Cum	1443.00			
15	_	Providing and laying plain cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6-hand broken stone aggregates 40 mm nominal size) and curing complete	Cum	698.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		excluding cost of formwork in (A) Foundation and Plinth					
16	_	Construction of granular sub-base by providing close graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density,& having CBR 30% minimum, complete as per clause 401 as per direction of Engineer-in-Charge	Cum	895.00			
17		Providing and fixing Cast iron jali of required size as per Architects choice including fixing, cleaning surface. Including material, fabrication and supply as per direction of Engineer-in-Charge	Sqm	151.00			
18		Providing and fixing 10x10x10 cm **Red Rajula cobble stone** block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20mm thick base mortar 1:4 (1 cement : 4 coarse sand) with joints 10mm wide filled with same mortar including ruled pointing etc. complete as per direction of Engineer-in-Charge	Sqm	453.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
19		Supply and laying of grey colored Anti line grass pavers with M40 Grade concrete suitable for fire tender loads of size 300mmX300mmX 120mm for gardening purpose as per direction of Engineer-In-Charge.	Sqm	459.00			
20		Providing and fixing Stone **roman mossaic** tiles on finished floor surface of size 300 mm x 300 mm x 7 mm in all colour, design , fixing in customize design as per direction of Engineer-in-Charge. The mosaic tiles to be fixed on the floor surface with the help of approved adhesive applied at the rate of 2.5 kg per sqm and grouting of the same. The rate is inclusive of all operation, material and required pattern approved by Engineer-in-Charge:	Sqm	120.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
21		Providing and laying river washed Granite slab 25mm thk flooring/wall in required design and patterns, in linear as well as curvilinear portions all complete as per the architectural drawings with 25 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with cement slurry admixed with pigment of matching shade including wastage,rubbing, cutting, curing and polishing etc all complete as specified and as directed by the Engineer-in-Charge : Colour Jet Black, Cherry Red, Steel grey, Elite Brown, Cat Eye or equivalent as per direction of Engineer-In-Charge	Sqm	321			
22		Providing and fixing 10x10x10 cm **Kota cobble stone** block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20mm thick base mortar 1:4 (1 cement : 4 coarse sand) with joints 10mm wide filled with same mortar including ruled pointing etc. complete as per direction of Engineer-in-Charge	Sqm	476.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
23		Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length,30cm height and 15/12.5 cm thick of M25 grade concrete as per approved design and including excavation for fixing in proper line and level,filling the joint with C:M 1:3 (1cement:3fine sand) etc complete including corner, quadrants, angles, radius, dropper kerbs in all shapes. (Brands: Vyara, Alcock,pavit/equivalent)	Rmt	554.00			
24		Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-Charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-Charge).	Cum	1.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
25		Providing and fixing 10x10x10 cm **light grey limestone cobble stone** flooring hand cut and chisel dressed on top, for paving in floors, drains etc. with lacquer finish (Acrylic highly glossy) laid over 20mm thick base mortar 1:4 (1 cement : 4 coarse sand) with joints 10mm wide filled with same mortar including ruled pointing etc. complete as per direction of Engineer-in-Charge	Sqm	750.00			
26		Providing and fixing 10x10x10 cm **Multi-colored Granite cobble stone** flooring & edging hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20mm thick base mortar 1:4 (1 cement : 4 coarse sand) with joints 10mm wide filled with same mortar including ruled pointing etc. complete as per direction of Engineer-in-Charge	Sqm	2356.00			
27		Providing and fixing Corten Steel Sheets (weathered sheets) for DIU model heritage market entrance arch paneling of thickness 6 mm A grade material for exterior cladding including material, fabrication and supply as per direction of Engineer-in-Charge	Sqm	45.00			
28		Providing and laying 40mm thick marble slab inlaid in the model and cut according to	Sqm	7.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		shape and polished (I.E. Terrazo) to granolithic finish with under layer 30mm thick cement concrete 1:2:4 (1-cement;2-coarse sand;4-graded stone aggregate 10mm and down gauge) and top layer 10mm thick with white, black or white and black marble chips of required sizes from 1mm t 4mm nominal size laid in cement marble powder mix 3:1 (3-cement ;1-Marble powder by weight) in proportion of 4:7 (4-cement;7-marble chips by volume) (c) Medium shade pigment with approx. 50% white cement an 50% ordinary cement (in top layer only)					
29	_	Removing dry or oil bound distemper by a washing and scraping and sand papering the wall surface smooth including necessary repairs to scratches complete.	Sqm	2359.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
30	_	a) **Zampa City Wall** Cleaning the sand stone surface and removing dirt, dust, bird dropping, grease, oil, algae, fungus, monkey beats, vegetable growth etc., including providing, applying and washing the surface with liquid Ammonia Chemical of 5% solution and other chemical cleaning agent as approved by Archaeological Survey of India/ Engineer-in-Charge, of approved brand and manufacturer, with the help of required scrubbers and also cleaning with machine operated water jet mixed with desired quantity of fine silica where ever required, without causing any scratching/ damage to the stone surface and finally washing the surface with clean water with the help of pressure jet machine, complete in all respect, including taking all precautions to safeguard ventilators, windows, doors etc. by suitable covering so as to avoid any damage to the building/structure including b) Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40 mm dia M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S.	Sqm	1888.00			

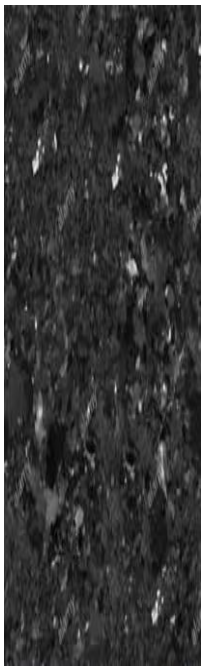
S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		tubes, M.S. tube challies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after .The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc. complete as per directions and approval of Engineer-in-Charge .The elevational area of the scaffolding shall be measured for payment purpose .The payment will be made once irrespective of duration of scaffolding all as per direction of Engineer-in-charge					
31	_	**Market precinct & Navaratri Chowk** Cleaning the sand stone surface and removing dirt, dust, bird dropping, grease, oil, algae, fungus, monkey beats, vegetable growth etc., including providing, applying and washing the surface with of liquid Ammonia Chemical of 5% solution and other chemical cleaning agent as approved by Archaeological Survey of India/ Engineer-in-Charge, of approved brand and manufacturer, with the	Sqm	1054.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		help of required scrubbers and also cleaning with machine operated water jet mixed with desired quantity of fine silica where ever required, without causing any scratching/ damage to the stone surface and finally washing the surface with clean water with the help of pressure jet machine, complete in all respect, including taking all precautions to safeguard ventilators, windows, doors etc. by suitable covering so as to avoid any damage to the building/structure, all as per direction of Engineer-in-charge (The rate is inclusive of all materials & labours involved (except scaffolding).					
32		Providing and laying White Stone Bela masonry block in course in superstructure with stone of approved quality in lime mortar 1:1.5 (1 Lime putty : 1.5 Fine sand) including packing the joints etc, complete	Cum	26.00			
33		Providing and laying 20mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two leveled and finished even and smooth in (iii) cement mortar 1:3 (1 Cement: 3 fine sand)	Sqm	56.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
34		Providing and fixing 25mm thick **Grey Rajula stone slab** hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20mm thick base mortar 1:4 (1 cement : 4 coarse sand) with joints 10mm wide filled with same mortar including ruled pointing etc. complete as per direction of Engineer-in-Charge	Sqm	24.00			
35		Providing canvas cloth having width of 72 inch (1.83 m approx) and size as per the architectural drawings. High quality cotton fabric as per the grade GC 18 including super durability and resistance to fire & water of required colour and shade as per the Engineer-In-Charge.	One Rmt	36.00			
36		Providing and supplying aluminium extruded tubular and other aluminium sections as per the architectural drawings and approved shop drawings, the aluminium quality as per grade 6063 T5 or T6 as per BS 1474,including super durable powder coating of 60-80 microns conforming to AAMA 2604 of required colour and shade as approved by the Engineer-in-Charge (The item includes cost of material such as cleats, sleeves, screws etc. necessary for fabrication of extruded aluminium frame work.	Kg	752.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		Nothing extra shall be paid on this account). The weight of aluminium extruded section shall be taken for purpose of payment.					
37		Providing and fixing Radiata Pine wood with Chemical treated full length new members like joists, rafters, purlins, etc. including all fixtures and fastenings with oil finish etc. complete. Item to include all mouldings and chamfers to be made as per original design indicated by the Architects, Item to include using a larger section of wood to get the mouldings and chamfers as per original design, sample to be shown to the Architect for approval before fixing as per direction of Engineer-in-Charge(Actual roofing area will be measured). i) Supply of Wooden Rafter Beam 68mmx 140mm On wall, on both side In oil finihsed with All necessary fitting & fixture = 106 Rmt ii)Supply of wooden Main Rafter 58mm x 190mm @ 800mm C/C In Oil finsihed with all necessary fitting and fixture. = 653 Rmt iii) Supply of wooden Ridge Beam 68mm x 190mm In Oil finsihed with all necessary fitting and fixture. = 53 Rmt iv) Supply of Permaclad 20mm thick X 140mm width Cladding on Top of Main	Sqm	484.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		Rafer, In Oil Finished with all necessary Fitting & Fixture. = 4025 Rmt v) Supply of Wooden Purline 32mmx45mm @300mm C/C with all fitting & fixture. = 1894 Rmt vi) Supply of Glulam Eva board 20mmx 240mm, in Oil finished, with all necessary Fitting & Fixture. = 118 Rmt					
38		Providing & fixing on roof pressed clay tile of size 500 X 210 mm (Mangalore tile) of 20 mm nominal thickness and of approved size and as per approved pattern on steel frame work complete (steel frame work to be paid separately).	Sqm	455.00			
39		Providing & laying on roof pressed clay tile ridge (Mangalore tile) of 20mm thickness and of approved pattern on steel frame work complete (steel frame work to be paid separately).	Sqm	21.00			
40		Supply and laying of Pongamia glabra (Karanj) plant of height 300-360 cm at least having the girth size of 15-20 cm. in big poly bags of size 25 x 25 cm i/c filling earth and manure as per direction of the Engineer-in-Charge	Each	18.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
41		Providing and fixing 1500 X 1500 X 40/100 mm thick tree grating suitably reinforced and manufactured with M30 Grade of concrete using vibro compaction process using FRP moulds so as to achieve shuttering finish on the five faces and gurmala finish on the top surface for long use and to prevent damages per the direction of the Engineer-in-Charge	Each	15.00			
42		Providing wide range of shrubs having necessary properties like well-watered, well drained and suitable for outdoor purposes as per direction of Engineer-in-Charge	Each	20.00			
43		Providing and laying gang saw cut 18 mm thick, river washed pre moulded and pre polished machine cut granite stone of required size and shape of approved shade, colour and texture laid over 20mm thick base of cement mortar 1:4 (1cement : 4 coarse sand) bedding of average 1" thickness, floated with thick and neat cement paste with consumption of cement @4.4kg/ sqm and 2 kg /sqm for joints mixed with approved pigment to match the shade of the stone including dressing, rubbing, curing, cleaning etc. complete at all levels and heights. complete as per direction of	Sqm	54.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		Engineer-in-Charge					
44		Providing and laying grassing selectin-1 Lawn / Grass over the soil filling for sloping grass mounds as per direction of Engineer-in-Charge	Sqm	13.00			
45		Providing and installing signage of size 1000mmx1500mmx75mm, with sturdy metal frame and matte finish aluminium sheet in dark grey colour around entire frame as per approved drawing, and pictures and text printed on surface in white colour as per direction of Engineer-in-Charge	Each	1.00			
46		Providing and fixing Garden wooden bench with back and arm rest, designed as per modern appearance accommodating 3-4 people requires low maintenance as per Architects choice including fixing, cleaning surfaces and including cost of loading -unloading and placing with crane. (Brands Arya Precast, TDW or equivalent) as per direction of Engineer-in-Charge	Each	6.00			
47		Providing and laying Precast Concrete grey rectangular Saucer Drain size of 600*300*100 with 0.4% water absorption as per direction of Engineer-in-Charge	Sqm	44.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
48		Providing and installing signage of size 2400mmx2100mmx100mm, with sturdy metal frame and matte finish aluminium sheet in dark grey colour around entire frame, and pictures and text printed on surface in white colour as per direction of Engineer-in-Charge	Each	1.00			
49		Providing and installing the prefabricated public toilet made of stainless steel platform & closet (Indian/western), having toilet vacant status display, coin/switch based automated entry, manual exit, automated interior light & exhaust fan, wash basins, health faucet & cloth hanger, voice assistance system, self-cleaning, washing mechanism, manual flush option, water low indication, power backup facility, sensor for water & electricity conservation, GPRS based remote monitoring control facility through mobile app or web and revenue through coil collection and advertisements including Transportation, Commissioning, Taxes, Insurance & Warranty.	Each	5.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
50		Providing and laying of Hot applied Thermoplastic compound 2.5 mm thick including Reflectorising Glass Beads @ 250 gms per sqm area, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC : 35 & finished surface to be level, uniform and free from streaks and holes. (As per Government letter No.SOR 102003/94/S-1/ Dated.20-7-2004)	Sqm	16.00			
51	_	Providing and installing artistic sculpture to be installed in a circular platform of 5m diameter in the centre of a vehicular intersection at the entry or historic DIU walled city. The maximum height of the sculpture shall be 4m and shall represent the amalgamation of kathiawadi and portuguese architecture in Diu. The materials used for the sculpture shall be non-corrosive and easy to clean. No imagery of any person, living or dead, shall be included in the design of the sculpture. The design of the sculpture shall be submitted to and approved by the Urban designer as per the direction of Engineer- in-charge.	Each	1.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
52		Providing and fixing Cast Iron bollard of 200x200x915 mm clear height from finished level as single cast UV resistant stabilise colour pigment, colour as per Architects choice including fixing, cleaning surfaces and complete	Each	19.00			
53		Providing and fixing 25 mm outer dia pipe Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer-In-Charge	Rmt	28.00			
54		Providing and fixing 75 mm outer dia pipe 10 Kg/m2, PE 100 HDPE pipes confirming to IS 4984-1995, including all fittings, This includes jointing of pipes & fittings , trenching, refilling & testing of joints complete as per direction of Engineer-In-Charge	Rmt	120.00			
55		Providing and fixing 20 mm pop up sprinkler system including support pipe as per the requirement approved by Engineer-In-Charge.(Rainbird/equivalent)	No	4.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
56		Providing and fixing 25 mm nominal bore gun metal gate valve with C.I. wheel of approved quality (screwed end)	No	2.00			
57		Providing laying (to level or slopes) and jointing reinforced concrete light duty non pressure pipes I.S Class NP2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete (B) 150mm	Rmt	8.00			
58		Providing and Constructing brick masonry chamber for underground Inspection chamber and bends with bricks having crushing strength not less than 35kg Cm2 in C.M 1:5 C.I Cover with frame (Light duty) 455mm X 610mm internal dimensions total weight of cover with frame to be not less than 38kg.(Wt. of cover 23kg) and Wt of frame 15 kg) (R.C.C. top slab with 1:2:4 mix (1 cement : 2- coarse sand: 4 - graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc., complete (iii) inside dimensions 600mm X 600mm and 450 mm deep for pipe lines with three or more inlets.	Nos	1.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
59	_	Excavation for Storm Water Drain foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff with all lead for all kinds of soil	Cum	1416.00			
60	_	Providing and laying in position Ready Mixed M25 Grade concrete for reinforced cement concrete work , using cement content as per approved Design Mix manufactured in fully automatic batching plant and transported to site of work in transit mixer for a lead upto 10Kms having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying, excluding the cost of centering shuttering finishing and reinforcement including cost of admixtures in recommended proportions as per IS: 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability, including placing of PVC sleeves during casting as per direction of the EIC. Without Fly Ash (Min cement level as per latest IS 456 shall be maintained) (Cement level 450 kg)	Cum	341.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
61		Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4 M. and removal of the same for in situ reinforced concrete and plain concrete work in. (A) Foundations Footings Bases of Columns and wall of any thickness etc complete	Sqm	3430.00			
62	_	Providing TMT Bar Fe 500/500D reinforcement for R.C.C. work including bending, binding with GI wires and placing in position complete upto floor two level	Kg	27178.00			
63	_	Filling for Storm Water Drain in foundation and plinth with morrum or selected soil in layers of 20cm, thickness including watering, ramming and consolidating etc., complete	Cum	417.00			
64	_	Providing and laying plain cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6-hand broken stone aggregates 40 mm nominal size) for Storm Water Drain and curing complete excluding cost of formwork in (A) Foundation and Plinth	Cum	135.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
65	_	Providing anticorrosive treatment to HYSD bars with FUSION BONDED EPOXY COATING (FBEC) confirming to IS13620:1993 for Storm Water Drain at approved plant including testing of coating as per relevant IS, before bringing the coated bars on site including To & Fro transportation of bars for sending at plant site etc. complete, for HYSD bars : (B) Above 12 mm and upto (and including) 20 mm dia (The rate should be including working in tidal conditions)	MT	28.00			
66		Supply, delivery and fixing of Precast R.C.C. horizontal grating with frame of size 500x450 mm accurately for Storm Water Drain designed molds and are suitably reinforced to enable the covers to take load of 20 MT for Heavy Duty as per direction of Engineer-in-Charge	Each	46.00			
67	_	Providing protective coating of water repellent siloxane (transparent in color) through brush or spray until complete impregnation over completely cleaned and dried stone or plastered surface to reduce the absorption of water as per direction of Engineer-in-Charge	Sqm	240.00			
68	_	Careful removal of existing deteriorated/ damaged/	Sqm	583.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		weathered lime plaster without damaging the surface below it as per direction of Engineer-in-Charge					
69	_	Steel-rod stitching in cracked wall, stone patties, beam, and lintels. Providing and fixing stainless steel rods of 90 cms length of which 15 cm on either side or cold bending at 90 degrees. The stainless steel clamps to be fixed perpendicular to the crack by drilling in wall and fixing wit cement and epoxy mixture in such a way that the entire length of the rod is in complete contact of the stone and the bend ends are fully inserted in the cracked wall. Use 316 grade stainless steel charge per hole, steel rod charges are counted per kg. Holes with 6 mm , 8 mm, 10 mm, 12 mm dia. as per requirement of position as per direction of Engineer-in-Charge	Each	24.00			
70	_	Providing and inserting 12 mm dia Aluminium/ galvanized iron injection nipples along crack lines in masonry work, including I) drilling holes of required diameter up to depths from 40mm to 80mm or half the thickness of member (whichever is less), at required spacing but not exceeding the thickness of member or 300 mm ii) Making	Each	65.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		grooves of size 12mm x 12mm along the crack line. iii) Making the crack dust free by blowing compressed air and then washing with water. iv) Sealing the distance between the injection nipples with approved putty (Polymer modified lime mortar /polyester putty/epoxy putty) etc. and allow it to cure. v) If limeitious grout material proposed to be used, washing and saturating the cracked surface with water by pumping from top most nipple and down wards complete as per the direction of Engineer-in-Charge(The rate shall include all material, labour and all operations above. The cost of grout material shall be paid separately on the basis of actual quantity consumed.					
71	_	Providing and grouting pre-packed ready to use grout made up of natural hydraulic lime with the addition of natural pozzolona filler, specially designed for use in restoration of old brick/stone masonry. The grout material shall have low (less than 1.5%) water soluble salt content, Elastic modulus not less than 5 Gpa and minimum compressive strength of 18 N/sqmm at 28 days. Mix the product by introducing 3/4 of the required water (which is 7-8 litres of 25 kg or as per manufactures specification)	Kg	650.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		into the mixer. Add continuously the product and the remaining water until perfect mixer having a fluid consistency is achieved. Inject the same with gravity or mechanized equipment with pressure not more than 2 kg/sqcm as per site conditions by means of injection technique. The item shall include all cost of materials, machinery and labour etc. complete in all respect. (The payment shall be made on the basis of actual weight of approved grout injected into the cracks /voids as per direction of Engineer-in-Charge					
72	_	Raking out the joints of country/Nankshahi brick, scooping out dead and decayed mortar very slowly and carefully with scooping rods, then washing complete with hand spray pump. Preparing the surface for plastering including disposal of rubbish with all lead as per direction of Engineer-in-Charge	Sqm	65.00			
73	_	Providing 30-40mm lime plaster in two coats with 20mm base coat in lime mortar 1:1:1 (1 lime : 1Surkhi :1 Coarse Sand) and top coat in lime mortar 1:1:1 (1 lime : 1 Surkhi :1 Fine Sand) as per direction of Engineer-in-Charge	Sqm	519.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
74	_	Plastering of the dome in lime mortar 1:2:1(1 Lime:2 coarse sand:1 surkhi) up to 20mm thickness as per direction of Engineer-in-Charge	Sqm	65.00			
75	_	Providing and fixing limestone (Plastic Repairs) work for ornamental features, like urns, domes, parapets, chajjahs, fenials, cornices, lintels etc including dressing of stones, grooving, jointing, making keys overlaps etc, and fixing with (1:2) 10% pozzolonic lime mortar, anchoring with SS/timber dowels wherever fixed with lime mortar (1:1), pointing with lime mortar etc complete as per direction of Engineer-in-Charge	Sqm	65.00			
76	_	Providing 10mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two leveled and finished even and smooth in (iii) cement mortar 1:4 (1Cement, 4 sand)	Sqm	24.00			
77	_	Applying two coats of Birla (White cement based) or Asian (arcylic lapy-putty) or equivalent & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered	Sqm	24.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		smooth.					
78	_	Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give a required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials. etc complete	Sqm	471.00			
79	_	Ruled / Flush pointing on Red sand stone masonry surface with lime, surkhi and marble dust mortar in the ratio of 1:1.5:1/2 {One lime: 1.5 surkhi (50% red and 50% light yellow surkhi) : 1/2 marble dust}. (The rate is inclusive of all materials, scaffolding & labours involved).	Sqm	583.00			
80	_	Providing and applying of Verona Vapour Permeable, water based Mature Lime wash finish of interior and exterior grade used for conservation and restoration of historical building, formulated by Mature Lime Putty with fillers by OIKOS India, After the cleaning of surface and removing any loose or flaking material, applied two coat of Verona Mature Lime wash finish by OIKOS India on one coat of Lime Based primer by OIKOS India of approved color and shade to achieve desired finish excluding the cost of	Sqm	583.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		surface preparation and scaffolding, apply by brush, roller and appropriate tools, as per manufacturer's specification, all completes with the direction of Engineer-in-Charge					
81	_	Providing and fixing the MS Vegetable Racks with high strength, durability and optimum resistance to corrosion along with non toxix finish for Hyper markets including bolts and nuts, painting as per drawing and as per direction of Engineer-in-Charge	Kg	14823.00			
82		Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40 mm dia M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after .The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc.	Sqm	1005.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		complete as per directions and approval of Engineer-in-charge .The elevational area of the scaffolding shall be measured for payment purpose .The payment will be made once irrespective of duration of scaffolding.					
83		Propping and supporting the structural elements and its adjoining areas with tubular steel props (adjustable or as required), bracings, steel runners etc. to relieve the structural member of the required load coming over it as per the pattern given by the contractor - Providing and fixing of tubular Steel prop of up to 4 MT capacity and up to 3.2 m heights as per directions of Engineer-In-Charge.	Each	320.00			
84		Propping and supporting the structural elements and its adjoining areas with tubular steel props (adjustable or as required), bracings, steel runners etc. to relieve the structural member of the required load coming over it as per the pattern given by the contractor - Providing and fixing of adjustable span ESO+SI (2.35-3.40) as per directions of Engineer-In-charge.	Each	40.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
85		Post Top Light (45W): Supply ,installation ,commissioning & testing of Die-cast and sheet aluminun (UNI EN 1706).Refractive lens mod. 02 - road and mixed areas - classes CE-S. To access the optical and wiring compartment, unscrew the two screws on upper frame and rotate the bottom frame. During installation, follow the instructions for the correct orientation on the support. Lamp Source LED 5MacAdam L90B50,CRI 70,lumens for the light Real Lumen - 4500Lm,color temperature is 3000K,Mounting Accessories, Gel Connectors, Post Top,IP Protection IP66	Nos	39.00			
86	_	ARCHITECTURAL POST TOP POLE :JM.06.18.010/ DW, Supply, Installation ,Commissioning of WINDSOR /GHM 3.5M height Pole made of mild steel pipe sections 114mm dia. & 76mm dia. Decorative Cast iron Base design with the company/brand logo engraved in the cast iron mould, starting with dia 260mm for 130mm height, followed by a ring of 260 dia gradually tapering to a flat round surface of dia 170mm for 366mm height again followed by a ring dia 210mm and gradual tapering upto a	Nos	39.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		dia 92mm as approved by the concerned Engineer the total height of decorative cast iron base is 700mm and weight-32kgs.Decorative Top ring (weight-3kgs.) made of cast iron as well. All cast iron parts weight mentioned are with +/5% tolerance. Entire pole shall be made to provide pleasing aesthetics as approved					
87		Post Top Light (73W): Supply ,installation ,commissioning & testing of Die-cast and sheet aluminun (UNI EN 1706).Refractive lens mod. 02 - road and mixed areas - classes CE-S.To access the optical and wiring compartment, unscrew the two screws on upper frame and rotate the bottom frame. During installation, follow the instructions for the correct orientation on the support lumens for the light Real Lumen -7300Lm,Beam angle Type II (NLG 20) color temperature is 3000K, Mounting Accessories, Gel Connectors, Post Top, IP Protection IP66	Nos	13.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
88	_	Supply, Installation, Commissioning of 9M height Twin arm Pole Made of hot dip galvanised mild steel pipe sections 140mm dia.,114mm dia.,& Heka Design Bracket which is made of hot dip galvanised mild steel pipe sections 89mm dia.(vertical) ,60mm dia.(horizontal) & 42mm dia.(Gradually bent), to get 1200mm arm length - towards road side & 750mm arm length - towards pathway side & pleasing aesthetics. . Decorative Base(Heka) made of cast iron with Approx dia. of 325mm & 380mm(H) & with Approx weight of 20Kgs. Decorative Ring (140mm /114mm , weight- 5kgs.) made of cast iron. Top ring & Pole top are fabricated from hot dip galvanised steel to get pleasing aesthetics. Entire pole & bracket shall be made to provide pleasing aesthetics as approved by Concerned Engineer in-charge. After Fabrication, Entire Pole is hot dip galvanized(60 microns Minimum) for the effective corrosion resistance . The hot dip Galvanised pole should be provided with an inbuilt junction box to fix 32A connectors and 6A MCB, at the bottom - the inbuilt box should have a flush door of suitable size. The decorative pedestal to be mounted on a suitable size steel plate. This	Nos	5.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		mounting steel plate along with foundation bolts of suitable size to be used for ensuring firm grouting into the specially designed RCC foundation. wind pressure calculation as per IS 875(part-3) & structural calculation report as per EN40 should be submitted to verify the pole design. Pole & it's parts are painted in 3 layer coating(coating thickness-100 microns minimum) in which 1st layer with etch primer, 2nd layer with epoxy primer & 3rd final layer with PU paint - customised colour Metallic Grey.					
89		Supply ,Installation ,Commissioning of 9M height single arm Pole Made of hot dip galvanised mild steel pipe sections 140mm dia.,114mm dia.,& Heka Design Bracket which is made of hot dip galvanised mild steel pipe sections 89mm dia.(vertical) ,60mm dia.(horizontal) & 42mm dia.(Gradually bent), to get 1200mm arm length - towrads road side & 750mm arm length - towards pathway side & pleasing aesthetics. . Decorative Base(Heka) made of cast iron with Approx dia. of 325mm & 380mm(H) & with Approx weight of 20Kgs. Decorative Ring(140mm/114mm , weight- 5kgs.) made of cast iron. Top ring & Pole top are	Nos	3.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		fabricated from hot dip galvanised steel to get pleasing aesthetics. Entire pole & bracket shall be made to provide pleasing aesthetics as approved by Concerned Engineer in-charge. After Fabrication, Entire Pole is hot dip galvanized (60 microns Minimum) for the effective corrosion resistance. The hot dip Galvanised pole should be provided with an inbuilt junction box to fix 32A connectors and 6A MCB, at the bottom - the inbuilt box should have a flush door of suitable size. The decorative pedestal to be mounted on a suitable size steel plate. This mounting steel plate along with foundation bolts of suitable size to be used for ensuring firm grouting into the specially designed RCC foundation. wind pressure calculation as per IS 875(part-3) & structural calculation report as per EN40 should be submitted to verify the pole design. Pole & it's parts are painted in 3 layer coating(coating thickness-100 microns minimum) in which 1st layer with etch primer, 2nd layer with epoxy primer & 3rd final layer with PU paint - customised colour Metallic Grey.					

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
90		Recessed Inground Column Up Light-(RG1-19.5W) Supply ,installation ,commissioning & testing of Floor recessed for outdoor use. For uplighting. Electronic components are in a sealed internal compartment, completely separate from the compartment where the connection terminals are located. The unit will withstand a static weight of 1,800 Kg and the occasional transit of slow-moving vehicles. Includes flush mounting box. Suitable for installation in marine environments. Includes 2 cable outlets to facilitate chain mounting. Adjustable light source. Structure material: Stainless steel AISI316, Aluminium. Structure finish: Polished, Black. Diffuser material: Glass. Diffuser finish: Transparent. UV protection. Ta max: 50ºC.wattage is 19.5W,CRI 80,Real Lumen - 1636Lm,Colour Temp-3000K,ip protection IP67,brand of Ledsc4 Lighting, product code of GEA Power Led Pro Uplight recessed 55-9968-CA-CL.GEA Power Led Pro Uplight recessed Light source: LED CREE Output (W): 16WTotal power consumption (W): 19.5Color temperature: Neutral white -	Nos	4.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		4000KCRI: 80Real Lumen: 1636Qty Leds: 6Lm/Real W: 84Life Time: 50.000h L90B10Bin / Grup: 5A3 o 5D2MacAdam steps: 2UGR: 9.7Photobiological risk: RG2 IP65/IP67 **IK10 10º**					
91		Recessed Inground Column Up Light- Floor recessed for outdoor use. For uplighting. Electronic components are in a sealed internal compartment, completely separate from the compartment where the connection terminals are located. The unit will withstand a static weight of 1,800 Kg and the occasional transit of slow-moving vehicles. Includes flush mounting box. Suitable for installation in marine environments. Includes 2 cable outlets to facilitate chain mounting. Adjustable light source. Structure material: Stainless steel AISI316, Aluminium. Structure finish: Polished, Black. Diffuser material: Glass. Diffuser finish: Transparent. UV protection. Ta max: 50ºC..wattage is 19.5W,CRI 80,Real Lumen - 1636Lm,Colour Temp-3000K,ip protection IP67,brand of Ledsc4 Lighting, product code of GEA Power Led Pro Uplight recessed 55-9968-CA-CL.GEA Power Led Pro	Nos	10.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		Uplight recessed Light source: LED CREE Output (W): 16WTotal power consumption (W): 19.5Color temperature: Neutral white - 4000KCRI: 80 Real Lumen: 1636Qty Leds: 6Lm/Real W: 84Life Time: 50.000h L90B10Bin / Grup: 5A3 o 5D2MacAdam steps: 2UGR: 9.7Photobiological risk: RG2 IP65/IP67 **IK10 29º**					
92		Recessed In ground Column Up Light- (RG4-43.6W) Supply ,installation ,commissioning & testing of Floor recessed. For up lighting. Electronic components are in a sealed internal compartment, completely separate from the compartment where the connection terminals are located. The unit will withstand a static weight of 1,800 Kg and the occasional transit of slow moving vehicles. Includes flush-mounting box. Suitable for installation in marine environments. Includes 2 cable outlets to facilitate chain mounting. Cable meters included: 2.5. Adjustable light source. Structure material: Stainless steel AISI316, High purity aluminium. Structure finish: Polished, Black. Diffuser material: Glass. Diffuser finish: Tempered. UV protection.	Nos	26.00			

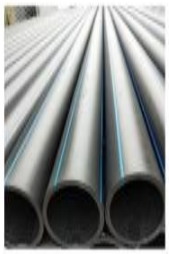
S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
93	 	Recessed In-ground Diffused Light-(RG2-0.5W) Supply, installation, commissioning & testing of Material -Polyester (UV stabilized), techno polymers/polymer concrete. 2mm wider load body protects the top body against impact from surrounding pavers. R13 highest non - lip glass. Citizen 7-led module, 0.5W. Hand casted into resin without air encapsulation. a) JOBE LIGHTING - Beck stone NATURE - One Block Design were in LED Module is Embedded in Synthetic Resign with NO Air Bubbles Inside, No Weak Rubber Links which protects against Condensation, Corrosion & Vandalism. Protective Polymer Concrete Base Layer with Drive Over Capacity. Custom Designed Rough Surface Paver of Dim : 4 x 4 x 2 3/8 " (97 x 97 x 60 mm) TRANSLUCENT FROSTED BODY, Color: 6500K, Input 9-15 V DC, Citizen LED Incandescent white, Power Consumption: 0.5W, Connection: 25cm /10 in direct burial cable, Class 3, IP68 Rated. b) CONNECTOR SET 88991000: Beck stone Connector Set along 5 min Installation process with 2x heat-shrinkable solder-sleeve 1x heat-shrinkable endcap	Nos	172.00			

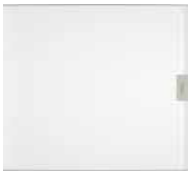
S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		requires heat-gun for Installation with electronic heat-gun like STEINEL HL 2010 E and STEINEL reflector nozzles 14mm #7461 and 39mm #07051.					
94		LED DRIVER 88451500: LED Power Supply 12 VDC, 60W Rated Current 3.3A; Universal AC input /Full range (up to 305VAC);Built-in active PFC function; Protections: Short circuit / Over current / Over voltage / Over temperature; Cooling by free air convection; IP67 design for indoor or outdoor installations; Class 2 power unit; Suitable for LED lighting and moving sign applications; Compliance to worldwide safety regulations for lighting; Unrecognized; CE; Suitable for dry / damp / wet locations; Dim: 175x65x40mm (7x2.6x1.6 inches); Input/output Cable 30cm/1ft 18AWG 3C/2C . Ip65 Rated Junction Box Needs To Be Procured Locally (Not Included In Price)	Nos	1.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
95	_	ELECTRONIC HEAT GUN : 88992002Electronic Heat Gun 230VAC Variable Temperature Electronic Heat Gun: 120 F - 1100 F Powerful heat gun with variable temperature and electronic the Mts of couple control for flexible use and maximum reliability. Heating element ensures long life and even heat. 2000W at 230VAC Beck stone connector kit reflector nozzles for Beck stone heat-shrinkable connectors	Nos	1.00			
96		Tree Up light - (SF & SF2)-13.1W Supply, installation, commissioning & testing of LED Spotlight for indoor and outdoor use. For down lighting.. Includes a goniometer to precisely adjust the angle of the luminaire. Includes drainage holes on the front of the head to avoid water accumulation and maximize the light's useful life. Structure with double body design to prevent heat generated by the LED affecting the useful life of the driver. Includes visor. Adjustable light source. Structure material: Aluminium. Structure finish: Urban grey. Diffuser material: Glass. Diffuser finish: Transparent. UV protection. Output (W): 11.5W Total power consumption (W): 13.1 Color temperature: LED warm-white 3000K,CRI: 80,	Nos	20.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		Photo biological risk: RG1, Real Lumen: 1142,Lm/Real W: 87,Life Time: 50.000h L80B20,IP65 IK07 33º					
97		Supply, installation, commissioning & testing of Pole Mounted Multisport Light- PT1 (36.1W) : For down lighting. Includes flush mounting box. Includes zoom system to regulate the angle of the beam without the use of tools. Includes 2 cable outlets to facilitate chain mounting. Adjustable light source. Structure material: Aluminium. Structure finish: Brown. Blades finishes: NA. Diffuser material: Glass. Diffuser finish: Transparent. UV protection. Real Lumen - 3712Lm,91Lm/Temperature 3000K, wattage is 36.1W,Brand Ledsc4 Lighting, product code JUNCUS Streetlight 60-E057-J6-CL	Nos	4.00			
98		Supply and laying of 4C X 25sqmm XLPE AL armored cable (PVC/XLPE ARMOURED Cables with ALUMINIUM Conductor 650/1100 V. grade confirming to IS : 7098 (Part-1) 1988)Supply and laying of 4 core 25 sqmm LT XLPE PVC insulated U.G armored Aluminium cable including cost, conveyance, all taxes and labour charges etc., complete and with cable route	Mts	130.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		indicators. (Polycab / KEC / KEI / RGB / UNIFLEX / FINOLEX).Supply of 25 Sqmm 4 Core XLPE insulated, 1100V grade armored alluminium cable as per specification confirming to IS:7098 (Part - I)					
99		Supply and laying of 4C X 16 sqmm XLPE AL armoured cable (PVC/XLPE ARMOURED Cables with ALUMINIUM Conductor 650/1100 V. grade confirming to IS : 7098 (Part-1) 1988)Supply and laying of 4 core 16 sqmm LT XLPE PVC insulated U.G armoured Aluminium cable including cost, conveyance, all taxes and labour charges etc., complete and with cable route indicators.	Mts	420.00			
100		Supply and laying of 4C X 6 sqmm PVC insulated U.G armoured copper cable including cost, conveyance, all taxes and labour charges etc., complete and with cable route indicators. (Polycab / KEC / KEI / RGB / UNIFLEX / FINOLEX).4C X 6sq.mm PVC copper cable (PVC / XLPE ARMOURED Cables with COPPER Conductor 1100 V. Grade confirming to IS : 7098 (Pt-1) 1988)	Mts	1420.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
101		Supply and laying of pvc conduit pipes outside diameter of 75mm for the 4Core 25sqmm ,4Core 16sqmm,4Core 6sqmm cables passes through the pathway	Mts	1330.00			
102		Supply and Laying of Cable Gland for 4C X 25sqmm, 4C X 16sqmm and 4C X 6sqmm(CU) XLPE AL armoured cable ,Supply and Fixing of single compression brass cable glands for 4 core XLPE armoured cable from 25 Sqmm with brass washers complete. Make (Comet / Electromac)	Lump sum	-			
103		Supply and fixing of ALUMINIUM LUGS FOR 4C X 25 Sqmm and 4C X 16 Sqmm Cable ,Supply and fixing of crimping type aluminium lugs confirming to I.S specifications for cable of 25 sqmm including nuts and bolts with connections.	Lump sum	-			
104		Supply and fixing of Copper Lugs FOR 4C X 6 mm sq CABLE, Supply and fixing of crimping type aluminium lugs confirming to I.S specifications for cable of 6 sqmm including nuts and bolts with connections.	Lump sum	-			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
105		80A 3P 30kA MCCB,TMD (Fixed Thermal Magnetic) Release,Type: EasyPact EZC,Red Color LED Indicator 22.5 mm, Voltage: 220V AC,Yellow Color LED Indicator 22.5 mm, Voltage: 220V AC,AC3: 80A AC1: 110A 3P Power Contactor,Coil: AC ,Aux. contact: 1NO+1NC,3 Phase Multi Function meter (4x1 line Display),75/5A 5VA Tape Wound Acc. Cl: 1 Current Transformer, ID: 30mm,6A 1P 10kA C-Curve MCB,Type: xC60,Digital timer with 15 functions and 8 Time ranges,32A 3P 10kA C-Curve MCB,Type: xC60	Nos	2.00			
106		TPN 32Amps 10ka MCB of Cat no DHMGDFPF006-032	Nos	10.00			
107		Supply , installing and testing TPN Metalica Distribution Board for lighting with 4way model number of DHDNTHODAW06,HSN Code - 8537,IP65	Nos	3.00			
108		Providing independent earthing by excavating a trench to a depth of 2.1 M in soils, using 16mm dia copper pipe of 3 Mtrs length with necessary accessories with hume pipe. Including of supply and labour charges complete	Nos	2.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
109		Providing and making Cable Chambers in brick work with heavy duty cover are arranged at the curve edge of the roads for cable pulling purpose having the dimensions of 300mm X 300mm including of labour charges	Nos	28.00			
110		Supply and fixing of the two 6/16amps socket and 6/16amps switch for the external utility purpose	Nos	2.00			
111	_	Termination, removal by dismantling LED light poles, removal of poles along the road with removal of Junction boxes including technician and labour charges and placing the serviceable material at suitable place as per the direction of engineer incharge .	No	20.00			
112	_	Removal of Existing High-Mast pole	Nos	1.00			
113		Supply ,Installation ,Commissioning & Testing of Recessed Inground Column Up Light-GEA Power Led Uplight recessed Light source: LED LUMILEDS Output (W): 9WTotal power consumption (W): 11WColor temperature: Warm White - 3000KCRI: 85Real Lumen: 796Nominal Lumen: 873Qty Leds: 9Lm/Real W: 72Life Time: 50.000h L70B30Bin / Grup: POMacAdam steps: 3	Nos	22.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		STEPSUGR: 11.0Photobiological risk: RG0 IP67 IK10 16º,model number of 55-9665-CA-CL. including electrical wiremen charge to fix the light					
114		Supply ,Installation ,Commissioning & Testing of LED strip for indoor use. For uplighting. Aluminium profile and silicone diffuser included. Structure material: Aluminium. Structurefinish: Matt. Diffuser material: Polycarbonate. Diffuser finish: Transparentº.ION Led strip Light source: LED HONGLITRONICOutput (W): 28WColor temperature: Warm White - 3000KCRI: 80Real Lumen: 1878Qty Leds: 120Lm/Real W: 67Life Time: 50.000h L70B30Bin / Grup: Y3 o Y5MacAdam steps: 3UGR: 25.7Photobiological risk: RG0 IP68 (1m) IK08 120º including electrician charges	Mts	81.00			
115		Surface Mounted Downlight - Supply, Installation, Commissioning & Testing of Stylish adjustable projector range. Naturally beautiful and unique contemporary family, ODESSA packs a punch with an abundance of options and accessories. Die-cast aluminium housing pre-treated before powder coating ensuring high corrosion resistance. Single cable entry.	Nos	36.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
		Through wiring on request for OD-50011, OD-50012. Stainless steel fasteners in grade 316wattage of 11Watts LED,CRI 80,Real Lumen - 816Lm,color temperature of 3000K,beam angle is 47°,IP protection is IP66,Brand of Ligman Lighting,Product code is ODESSA 1 OD-50002. including electrician charges to fix the one light					
116		KELVIN BRAND HDPE PIPE IS:4984:1995, 50mm diameter HDPE pipe for cable laying under the groung including Electrical Helper Charges	Mts	740.00			
117		supplying and installing TPN 6- 32Amps 10ka MCB of Cat no DHMJDFPF006	Nos	6.00			
118		TPN Metalica Distribution Board for lighting with 8way model number of DHDNTHODAW04,HSN Code - 8537,IP65 including Erection or fixing of the Lighting Panel charges	Nos	2.00			
119		Supply and laying of 1.5 Sqmm 3 Core PVC insulated, 1100V grade armoured copper cable as per specification confirming to IS:7098 (Part - I) Makes: KEC / FINOLEX / Unicab / Havells / KEI / Polycab including Labour charges for laying	Mts	100.00			

S. No	Reference Image	Description of Item	Unit	Quantity	Rate (in INR)		Amount (in INR)
					in fig	in words	
120		Supply and Fixing of single compression brass cable glands for 4core PVC armoured Copper cable from 6 Sqmm with brass washers complete, Make (Comet / Electromac) including Cable lugging Charges	Lump sum	-			
121		Supply and fixing of crimping type aluminium lugs confirming to I.S specifications for cable of 6 sqmm including nuts and bolts with connections including Cable Lugging Charges	Lump sum	-			
				TOTAL :			

Note: Contractor must ensure to quote rate of each item specified in Schedule of Quantity considering Five Year Defect and Maintenance Liability period

The rates quoted by the Contractor shall be deemed to be inclusive of the GST, commercial tax and other levies, duties, cess, toll, taxes of Central and State Governments, local bodies and authorities.

SCHEDULE 'D'

Extra schedule for specific requirements / documents for the work, if any. **NIL**

SCHEDULE 'E'

Reference to General Conditions of Contract: As per the Form no. CPWD-8 and General Contract Conditions - 2019 Published by CPWD which is available on CPWD website at https://cpwd.gov.in/Publication/GCC_Construction_2019.pdf and for maintenance https://cpwd.gov.in/Publication/GCC_Maintenance_2019.pdf

Name of work: - **"Conservation & Façade Restoration of Heritage Precincts, Diu (Zampa Precinct & Market Precinct) and Upgradation of fruits and vegetable market with Defect and Maintenance Liability period for Five Years Under "SMART CITY MISSION" at Diu, U.T. Administration of Dadra and Nagar Haveli and Daman & Diu, Government of India"**

(i)	Estimated cost of work	: -	**INR. 7,07,88,187/-**
(ii)	Earnest money	: -	**INR. 14,15, 800 /-** to be returned after receipt of Performance Guarantee
(iii)	Performance Guarantee	: -	**5% of Contract Value.**
(iv)	Security deposit	: -	2.5 % of contract value

SCHEDULE 'F'

General Rules & Directions: -

Officer inviting tender:		Chief Executive Officer, DSCL,, Diu
Definitions:		
2 (v)	Engineer-in-Charge	Chief Technical Officer (CTO)
2 (viii)	Accepting Authority	Chief Technical Officer, DSCL
2 (x)	Percentage on cost of materials and labour to cover all overheads and profits.	15%
2 (xi)	Standard schedule of Rates	SOR of R & B 2015-16 of Junagadh, and Rate Analysis based on S.O.R/ Market Rate.
2 (xii)	Department	Diu Smart city Limited
9 (ii)	Standard CPWD contract form	CPWD Form 8 and General Contract Conditions 2019 published by CPWD & Corrected up to the date of bidding.

Clause 1:

(i) Time allowed for submission of Performance Guarantee from the date of issue of letter of Acceptance.	15 days
(ii) Maximum allowable extension with late fee @ 0.1% per day of the Performance Guarantee beyond the period provided in (i) above.	15 days

Clause 2:

Authority for fixing compensation under clause 2.	Chief Technical Officer (CTO)**, DSCL, Diu**

Clause 5:

Table of Mile Stones

S. No.	Description of Milestone (Physical)	Time Allowed in days (from date of start)	Amount to be with-held in case of non-achievement of
1.	1/8 of the whole work	1/4 of the whole work	In the event of non-achieving the necessary progress as assessed from the running payments, 1% of tendered value of work will be withheld for failure of each mile stone.
2.	3/8 of the whole work	1/2 of the whole work	
3.	3/4 of the whole work	3/4 of the whole work	
4.	Full	Full	

Time allowed for execution of work:

- Period of Completion of Construction: 12 Months (01 Year) including monsoon
- Defect and Maintenance Liability Period : 60 Months (05 years)

Authority to decide:	
1. Extension of time 2. Rescheduling of mile stones 3. Shifting of date of start in-case of delay in handing over of the site	Chief Technical Officer (CTO), DSCL, Diu

PROFORMA OF SCHEDULES Clause 5 Schedule of handing over of site

Part	Portion of site	Description	Time Period for handing over reckoned from date of issue of letter of intent.
Part A	Portion without any hindrance	Site is Free from hindrance and work can be started immediately	
Part B	Portions with encumbrances		
Part C	Portions dependent on work of other agencies		

Clause 7 :

Gross work to be done together with net payment / adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment.	**INR 36.00 Lakhs of Contract Price To be decided by Engineer- in- Charge.**

Clause 7 A:

Whether clause 7A shall be applicable	Yes

Clause 10A:

List of testing equipment to be provided by the contractor at site lab.	**As per CPWD Specification-2019 Volume-I & II and relevant IS Codes.** Testing equipment's required at site 1. Cube testing machine 2. Set of cube moulds for concrete 3. Slump Testing Cone 4. Weighing balance (scientific & Conventional) 5. Set of sieves 6. Vernier calipers 7. Total station and Auto level 8.Calibrated Glass Jars 9.Automatic Ovens

Clause 10 – B(ii):

Whether clause 10-B(ii) shall be applicable	**Not Applicable**

Clause 10C:

Component of labor expressed as percent of value of work	**Not Applicable**

Clause 10 CA:- **Not applicable**

S.No.	Materials covered under this clause	Nearest Materials (other than cement*, reinforcement bars, the structural steel and POL) for which All India Wholesale Price Index to be followed:	Base price and its corresponding period of all the materials covered under clause 10CA **
1	Not Applicable		

Clause 10CC: Not Applicable

Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column ..... months Schedule of component of other Materials, Labour, POL etc. for price escalation	-	**If the time limit is more than 12 months**
Component of civil (Except materials covered under clause 10 CA)/ Electrical construction % value of work	Xm	
Component of labour expressed as percent of total value of work.	Y	
Component of POL expressed as percent of total value of work. Note: Xm…..% should be equal to (100)-(materials covered under clause 10CA i.e. Cement, Steel and other material specified in clause 10CA + Component of Labour + Component of P.O.L)	Z = NIL	
Note : Xm .... % should be equal to 100) - (materials covered under clause 10CA i.e. Cement, Steel, POL and other material specified in clause 10CA + Component of Labour)		

Clause 11:

Specifications to be followed for execution of work.	CPWD Specification for works-2019 Vol I &II with up to date correction slips till last date of submission of tender and as detailed in nomenclature of items.

Clause 12:

Clause 12: Authority to decide deviation upto 1.5 times of tendered amount	CTO, DSCL
Clause 12.2&12.3: Deviation Limit beyond which clauses12.2 & 12.3 shall apply for building work	**As per 12.5**
Clause 12.5: (i) Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for Super structure and foundation work …… (except items mentioned in earth work subhead in SoR and related items) (ii) Deviation Limit for items mentioned in earth work subhead of SoR and related items ….....	**30%** **100%**

Clause 16:

Competent Authority for deciding reduced rates.	Chief Technical Officer, DSCL ,Diu

Clause 18:

List of mandatory machinery, tools & plants to be deployed by the contractor at site.		
1.	Truck/Tipper/Transit Mixer	2
2.	Mixer	3
3.	Excavator	1
4.	Tractor	1
5.	Vibratory Roller	1
6.	Needle Vibrator	2
7.	Site Laboratory with all equipment	1
8.	Steel cutting and bending machine	1
9.	Wood cutting machine	3
10.	Electronic weighing machine	1
11.	65 KVA DG Set	1
12	Lime Mill (chakki) with slaking tank	1

Clause 19 C, D, G & K:

Clause 19C	Authority to decide penalty for each default	Chief Technical Officer (CTO),, DSCL, DIU
Clause 19 D		
Clause 19 G		
Clause 19 K		

Clause 25:

Constitution of Dispute Redressal Committee (DRC) Chariman: Member: Member:	(a) For total claims more than Rs. 25.00 lakh. As per manual provision (b) For total claims up to Rs. 25.00 lakh. As per manual provision

Clause 32:

Requirement of Technical Representative (s) and Recovery Rates

Sl. No	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical / Technical Representative)	Minimum Experience (In years)	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32	
						Figures (in INR.)	Words
1	Graduate Engineer	Civil Engineer	Project Manager/	5 (and having experience of one similar nature of work	1	25000/- per Month	Twenty Five Thousand per Month Only
2	Heritage Expert	Conservation Architect	Deputy Project Manager	5	1	25,000/- per Month/per person	Twenty Five Thousand per Month Only
3	Graduate Engineer	Civil	Billing Engineer/ planning engineer	2	1	15000/- per Month	. Fifteen Thousand per Month Only
4	Graduate Engineer	Electrical	Site engineer	3	1	20,000/- per Month	Twenty Thousand per Month Only

5	Diploma Engineer	Civil	Quality/ site engineer	5	1	15,000/- per Month	Fifteen Thousand per Month Only

Clause 38

(i)	(a) Schedule/statement for determining the theoretical quantity of cement & bitumen on the on basis Junagadh District SOR 2015-2016 /Market rate	
(ii)	Variations permissible on theoretical quantities:	
a)	Cement for works with estimated cost put to tender not more than Rs. 25 lakhs	3% plus/minus
	for works with estimated cost put to tender more than Rs 25 lakh	2% plus/minus
b)	Bitumen for all works.	Not Applicable
c)	Steel Reinforcement and structural steel sections for each diameter, section and category.	2% plus/minus
d)	All other materials.	Nil

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

Sl. No	Description of Item	Rates in figures and words at which recovery shall be made from the Contractor.	
		Excess beyond permissible variation	Less use beyond the permissible variation
1	**Cement**	**Nil**	**Rs.** 4,756/- (Rupees Four thousand Seven Hundred Fifty six only) Per MT
2	**Reinforcement Bars (TMT)** **(a) Primary Producer** **(b) Secondary Producer**	 **Nil** **Nil**	Rs. 42,000/- (Rupees Forty Two Thousand only) Per MT

PERFORMANCE GUARANTEE

(i) The contractor shall submit an irrevocable Performance Guarantee of 5% (Five percent) of the tendered amount in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in-Charge up to a maximum period as specified in schedule 'F' on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-Charge This guarantee shall be in the form of Cash (in case guarantee amount is less than Rs. 10,000/-) or Deposit at Call receipt of any scheduled bank/Banker's Cheque of any scheduled bank/Demand Draft of any scheduled bank/Pay Order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Government Securities or Fixed Deposit Receipts or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the form annexed hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to the Government as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Government to make good the deficit.

(ii) 50% of said Performance Guarantee Amount or 20 Lakhs whichever is less shall have to deposit in the shape of Fixed Deposit Receipt (FDR) and the remaining amount shall be submitted in the form of an irrevocable bank guarantee bond of any scheduled bank or the State Bank of India in the prescribed form given in this document.

(iii) The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time for completion of work. After recording of the completion certificate for the work by the competent authority, the performance guarantee shall be returned to the contractor, without any interest. However, in case of contracts involving maintenance of building and services/any other work after construction of same building and services/other work, then 50% of Performance Guarantee shall be retained as Security Deposit. The same shall be returned year wise proportionately.

(iv) The Engineer-in-Charge shall not make a claim under the performance guarantee except for amounts to which the Chief Executive Officer, DSCL, Diu, is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

(a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-Charge may claim the full amount of the Performance Guarantee.

(b) Failure by the contractor to pay Chief Executive Officer, DSCL, Diu, any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-Charge

(v) In the event of the contract being determined or rescinded under provision of any of the Clause/Condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the Chief Executive Officer, DSCL, Diu.

Form of Performance Security (Guarantee)

Bank Guarantee Bond

In consideration of the President of India (hereinafter called "The Government") having offered to accept the terms and conditions of the proposed agreement between……..and ……..…… (hereinafter called "the said Contractor(s)") for the work…… (hereinafter called "the said agreement") having agreed to production of an irrevocable Bank Guarantee for Rs. ……. (Rupees …… only) as a security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

1. We, ……. (hereinafter referred to as "the Bank") hereby undertake to pay to the Government an amount not exceeding Rs. …….. (Rupees……. Only) on demand by the Government.

2. We, …….(indicate the name of the Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from the Government stating that the amount claimed as required to meet the recoveries due or likely to be due from the said contractor(s). 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 Rs. …….. (Rupees …….only)

3. We, the said bank further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding 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 thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We, ……. (indicate the name of the Bank) 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 the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in- Charge on behalf of the Government certified that the terms and conditions of the said agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. We, ……. (indicate the name of the Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor(s) or by any such matter or thing whatsoever 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 Contractor(s).

7. We, ……. (Indicate the name of the Bank) lastly undertake not to revoke this guarantee except with the previous consent of the Government in writing.

8. This guarantee shall be valid up to ……unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. …… (Rupees ……..) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the ……..day of ……for…….(indicate the name of the Bank)

ADDITIONAL CONDITIONS

1. The contractors are advised to inspect and examine the site and its surroundings and satisfy himself with the nature and extent of site and work, the hydrological and climatic conditions the means of access to the site, the constraints of space for stacking material/machinery, labour etc. he requires, if any, weather conditions at site, general ground/subsoil conditions etc. or any other circumstances which may affect or influence their bid. No claim, whatsoever, shall be entertained from the bidder, on the plea that the information supplied by the Owner Is insufficient or is at variance to the actual site conditions.

2. The work shall be carried out as per CPWD specifications for works-2019 Vol. I & II with up to date correction slips unless otherwise specified in the nomenclature of individual item or in the specifications and special conditions, where specifications are silent, the decision of Engineer-in-Charge shall be final and binding on contractors.

3. The rates for different items of work shall apply for all heights and depths, leads and lifts unless otherwise specified in the agreement or specifications applicable to the agreement.

4. Any damage done by the contractor to any existing work during the course of execution of the work shall be made good by him at his own cost.

5. The contractor should preserve and protect the construction already carried out by him during the entire course of work as well as during rainy season from flood. Any such damage to works will be rectified by contractor at his risk and cost.

6. Articles manufactured by the reputed firms and approved by Engineer-in-Charge shall only be used. Only articles classified, as 'first quality' by the manufacturer shall be used unless otherwise specified. In case articles bearing ISI certification are not available in the market, quality of samples brought by the contractor shall be judged by standards laid down in the relevant CPWD specifications. For the items not covered by CPWD specifications relevant BIS standards shall apply. The sample of materials to be brought to site for use in work shall be got approved from the Engineer-in-Charge before actual execution of work.

7. The contractor shall submit a detailed programme of work within 15 days of the date of issue of letter of intent. Detailed programme should include all the mile stone, cash flow, material procurement, manpower deployment. Program must show clearly the critical path to complete the project in time. The Engineer-in-Charge can modify the programme and the contractor shall have to work accordingly. During review of work progress, Engineer-In-Charge can ask to modify the programme. Contractor shall resubmit the modified programme in 2 days.

8. The quantities of each item shall not be exceeded beyond the agreement quantities without prior permission of Engineer-in-Charge

9. Statutory deductions on account of GST, income tax and surcharge as applicable shall be made from the gross amount of the bill.

10. The contractor shall make his own arrangements for obtaining electric connection, if required and make necessary payments directly to the department concerned.

11. The Employer shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connection at all and no claim whatsoever on this account shall be entertained from the contractor. Also contingency arrangement of standby water & electric supply shall be made by the contractor for smooth progress of the work on account of power failure or disconnection for any reason whatsoever it may be. No claim of any kind whatsoever shall be entertained on this account from the contractor. Nothing extra shall be payable on this account.

12. All types of mortars to be used in the work shall be mixed in the mechanical mixer and hand mixing shall not be permitted.

13. The contractor shall make his own arrangement for getting the permission to ply the trucks from the traffic police.

14. Some restrictions may be imposed by the security staff etc. on the working and or movement of labor and materials, etc., the contractor shall be bound to follow all such restrictions / instructions and nothing shall be payable on this account

15. The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards. He shall be responsible for all damages and accidents caused due to negligence on his part. No hindrance shall be caused to traffic during the execution of the work by storing materials on the road if any

16. Testing of Materials: In case there is any discrepancy in the frequency of testing as given in the list of mandatory test and that in the individual sub-head of work as per the CPWD specifications for works-2019 Vol-I & II and relevant IS-Code with upto date correction slips, the higher of the two frequencies shall be followed and nothing extra shall be payable to the contractor on this account. Contractor shall carryout all required test pre and post construction including NDT for cement, steel, etc., or any other item related to construction without claiming any extra cost what so ever from the employer in this regard. Samples of all fittings and fixture to be provided shall be got approved from the Engineer-in-Charge before use in the work.

17. The rate for all items of work, shall unless otherwise clearly specified include cost of all labour, material, equipments, technical man powers, transportation and other inputs, etc. involved in the execution of the items. All Items to be executed in line with the drawings provided in the tender. Rates to be quoted taking in account tender drawings and details as well as 5 year defect and maintenance liability period. No extra payment shall be entertained against such items.

18. The order of preference in case of any discrepancy may be read as the following.

    a. Description of Schedule of quantities.

    b. Particular Specifications and Special conditions, if any.

c. Drawings

d. Contract clauses of General conditions of contract for Central P.W.D works 2019

e. CPWD Specifications.

f. Indian Standard Specifications / BIS.

g. Sound engineering practice

Any reference made to any Indian Standard Specifications in these documents, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up to last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian Standards applicable to the work at site

19. Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and their payment, housing, feeding and transport

20. The contractor shall make his own arrangement of water for construction and drinking purpose as well for electricity and its distribution at his own cost. The department will render only assistance to the contractor for making application to authorized Electric supply agency, if required. All the fees and charges including consumption charges shall be borne by the contractor. The water should be as per CPWD specifications, 2019.

21. The garbage generated at site due to construction activities shall be removed from the site immediately & shall be disposed off by the contractor to the approved dumping site identified by the Engineer-in-Charge The surplus soil/earth shall be disposed of as per the directions of Engineer-in-Charge separately.

22. The contractor shall clean the site thoroughly of scaffolding materials, rubbish, equipments left out of his work and dress the site around the building to the complete satisfaction of the Engineer-in-Charge before the work is treated as completed.

23. Relation with Public Authorities: The contractor shall comply with all obligations arising out of legal orders and directions that may be given to him from time to time, by any local or public authorities and shall pay out of his own money, all charges becoming payable to such authorities. He shall co-ordinate his activities during execution, with all agencies including PWD, Design Consultants, and Construction management consultants, agencies like Electricity department, DMC (Diu Municipal Corporation) etc., and their representatives without any dispute.

24. Foreign Exchange Requirement: It should be clearly understood that no foreign exchange sanction would be made available for either purchase of equipments, plants, machinery's, material of any kind or any other thing, required for execution of the work. It should also be clearly understood that no request for importing equipments, materials, plants, etc. that may be required in carrying out the work shall be entertained

25. The labor welfare cess/ fund and TDS at gross work done as applicable shall be deducted

26. Maintenance of Register of Tests- All the registers of tests carried out at Construction Site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge

27. Maintenance of Material at Site (MAS) Register- All the MAS Registers shall be maintained by Contractor which shall be issued to the contractor by Engineer-in-Charge

28. Contractor shall be responsible for safe custody of all the test registers

29. Avoidance to damage of roads: The Contractor shall ensure that no damage to roads and bridges on the route to the sites occurs due to his traffic. He shall ensure minimum possible hindrance to the traffic movements on public roads and bridges due to his materials, plant, temporary works etc. No materials shall be stacked on public roads and thoroughfares.

30. Barricading

    a. The site is to be barricaded on all sites with 3m high GS sheets as appropriate

    b. The detailed design of barricading of considering height of barricade, wind load etc. should be prepared by contractor. The design calculation and working drawing will be provided by the contractor & approved by Engineer- in- Charge. The G.S sheet barricading will be designed above the wall area on the iron frame embedded properly in concrete block.

    c. Access gate of adequate sized opening in barricading should be provided to allow smooth flow of contractor's machinery, trucks, trailers etc.

    d. Contractor shall take measures to maintain the integrity of the barricade and will maintain safe work condition at site.

    e. Contractor shall write DSCL, name and logo at suitable interval over a primary coat of red oxide zinc chromate primer and paint as directed by Engineer-in-Charge

    f. After successful completion of work, all the barricading will be dismantled / removed by contractor and it will be the property of contractor.

    g. The work of barricading mentioned as above shall be executed by the agency at his own cost and nothing shall be paid on this account.

31. Discoveries: Anything of geological or archaeological or other interest or articles of value or antiquity discovered on the Site shall be the absolute property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them without damages, thefts etc. In carrying out the Engineers instructions to dealing with such articles if the contractor incurs extra costs or suffers delays, the Engineer shall determine after due consultation with the Employer and the Contractor amounts of such costs and extension of time in accordance with the corresponding clauses of the contract.

32. Refund of security deposit regarding specialized items of work

a. For some of the specialized items of work such as waterproofing works, etc. that are entrusted to specialized firms or registered contractors who associate specialized agencies, the contractor/firm executing the work should be asked to give a specific guarantee that they shall be responsible for removal of any defects cropping up in these works executed by them during the guarantee period. The form of the guarantee to be executed by the contractors will be discussed with Engineer-In-Charge.

b. It has further been decided that 2.5% of the security deducted from the bills of the contractors shall be refunded to him after expiry of Defect and maintenance liability period in accordance with the terms of the contract in this behalf.

33. Settlement of Disputes: If the Contractor believes that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the Dispute Review Expert (also referred to as adjudicator) within 14 days of the notification of the Engineer's such decision. Procedure for Disputes resolution:

a. The Dispute Review Expert shall give a decision in writing within 28 days of receipt of a notification of a dispute.

b. Dispute Review Expert shall be paid daily at the rate specified in the Contract Data together with reimbursable expenses of the types specified in the Contract Data and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Dispute Review Expert written decision. If neither party refers the dispute to arbitration within the next 28 days, the Dispute Review Expert decision will be final and binding.

c. Any disputes arising out of this Agreement shall be amicably settled by the authorized representatives of the Parties, failing any such disputes shall be resolved by Arbitration in accordance with the Arbitration and Conciliation Act, 1996, as amended by one or more arbitrators appointed in accordance with the said Act. This Clause shall survive the termination of this Agreement [Language of Arbitration shall be English]. The venue of the Arbitration proceedings shall be in Diu District, India. The Parties jointly and severally undertake that the implementation and completion of the Project shall not be affected during the dispute(s) or the settlement of dispute(s) period.

34. Cost control

A. Variations

a. The Engineer shall make any variation of form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:

- Increase or decrease the quantity of any work included in the contract,
- Omit any such work,
- Change the character or quality or kind of any such work,
- Execute additional work of any kind necessary for the completion of the Works or
- Change any specified sequence or timing of construction of any part of work.

No such variation shall in any way vitiate or invalidate the contract, but the effects, if any, of all such variations shall be valued in accordance with the following sub clauses. Provided that where the issue of an instruction to vary the Works is necessitated by some default or breach of contract by contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.

b. The Contractor shall not make any such variation without an instruction of the Engineer. No instruction is required for quantities varying from those provided for the items in the contract bill of quantities.

B. Valuation of Variations:

a. The basis for the valuation of variations for addition to the contract price shall be as follows in the same order of priority.

b. Contract unit rates for individual items shall apply to varied quantities where there is a quantity variation.

c. In case of other types of variations following procedure shall apply.

- If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as a basis for valuation so far as may be reasonable. If this fails
- Suitable rates or prices shall be agreed upon between the Engineer and the Contractor after due consultations among the Employer, the Engineer and the Contractor. These shall be based on
- The material costs, the labour costs, the cost of use of all plant, machinery and equipment, the cost of all temporary and incidental works, the overheads and the Contractors profit.
- The overheads shall be taken at 5 % of the sum of material costs, the labour costs, the cost of use of all plant, machinery and equipment, the cost of all temporary and incidental works.
- The Contractors profit shall be taken at 10 % of the sum of material costs, the labour costs, the cost of use of all plant, machinery and equipment, the cost of all temporary and incidental works, the overheads.

d. In the event of disagreement, the Engineer shall fix such rates and prices as are, in his opinion appropriate and shall notify the Contractor accordingly with a copy to the Employer.

e. The Engineer-in-Charge shall determine provisional rates and prices to enable on account payments to be included in the Interim Payment Certificates, until rates and prices are agreed as final by the Employer, the Contractor and the Engineer.

f. The Engineer-in-Charge shall have the power to vary the rates or prices of all such items contained in the contract, if the nature or amount of any varied work relative to the nature or amount of the whole of the Work or part thereof, is such that, in the opinion of the Engineer-in-Charge, the rate or price contained in the contract, by reason of such varied work, is inappropriate or inapplicable. Then after due consultation with the Employer and the Contractor, the Engineer shall vary the rates or prices of such items of work.

g. The Contractor shall not be entitled to additional payment for costs, which could have been avoided by giving early warning.

h. If, on the issue of the Taking Over Certificate for the Whole of the Work, it is found that as a result of: A. all varied works and B. Day works and C. adjustment of price in accordance with the price escalation clauses of this contract, but not from any other cause, there have been additions to or deductions from the contract price which taken together are in excess of 15% of the Effective Contract Price (Contract Price +Day works allowance) then and in such event there shall be added to or deducted from the Contract sum such further sum as may be agreed between the Engineer and the Contractor after due consultation with the Employer and the Contractor by the Engineer. These further sums shall be decided considering

- Contractors general site and overhead costs and
- Amount by which the additions or deductions from the contract price shall be in excess of 15 % of the Effective Contract Price.

In case of disagreement in determination of the further sum, the Engineer shall determine this amount and his determination shall be binding on the Contractor and the Employer.

35. Defect & Maintenance Liability Period: The Defect &Maintenance Liability Period for the Work shall be of the Five years (5) years from the date of completion of Construction work The above mentioned period shall supersede the defect liability period provided in the Clause 17 of General condition of Contract (GCC) and shall be applicable for the Work with reference to the provisions of clause 17 of GCC and Article 6 of the Integrity Agreement as per the GCC and as per **Clause 5.4 of Section I**.

36. All the materials during the Defect and Maintenance Liability period shall be readily available at the site. The replacement of the materials shall be taken place within 48 hours by the notice of Engineer-in-Charge if not penalty will be applicable on the Contractor.

37. Co-ordination with other Contractor/ Works being executed:

The Heritage Precinct Contractor (Contractor who is executing the scope as defined in this tender) shall be working at site in close coordination with the Contractor who is executing

the Urban Street and Utilities Project for effective integration of Utilities as per the directions of Engineer-In-Charge.

The Heritage Precinct contractor is bound to accommodate such changes in work program and modify the same suitably.

SPECIAL CONDITIONS

1. SITE TO BE CLEAN: The contractor undertakes to have the site clean, free from rubbish to the satisfaction of the Engineer-in-Charge all surplus materials, rubbish, etc. will be removed to the place fixed by the Engineer-in-Charge and nothing extra will be paid. Contractor shall divert/ remove/ maintain/ repair all the existing services like water supply, drainage, storm water, electric etc. at his own cost which will affect the construction activity up to end of the project. During excavation of any kind of activity, if any existing lines of any type come in a way throughout construction area, it is contractor responsibility to divert/repair/replace/provide new lines if required contractor has to take necessary approval from any authority for the same. No extra cost will be given for the same.

2. INCONVENIENCE TO'S ACTIVITIES: The contractor shall not deposit materials on any site which will seriously inconvenience to any of the activities. The Engineer-in-Charge may require the contractor to remove any materials which are considered by him to be dangerous or inconvenient to the construction activities and get them removed at the contractor's cost.

3. EMPLOYMENT OF LICENSED ELECTRICAL FOREMAN (FOR ELECTRICAL WORK ONLY): The contractor should employ a licensed electrical foreman to supervise the Electrical works

4. CONDITIONS RELATING TO THE EXECUTION OF ADDITIONAL WORK: No deviation from specification stipulated in the contract of additional items shall be carried out by the contractor unless the rates of the substituted, altered or additional item have been approved in writing by the competent authority, failing which will not be bound to entertain any claim on this account.

5. INSPECTION OF WORKS AND RECOMMENDATION BY CONSULTANT

    a. ***Materials, its sample approval, its procurement and storage***: The Contractor should make his own arrangement to obtain all materials required for the work, except otherwise stated. All materials shall, so far as procurable, be of the respective kinds described in the Schedule of Items/Quantities and/or specifications and in accordance with the Architect's and Engineer In-charge instructions, and the Contractor shall upon the request of the Architect furnish him with all invoices, accounts, receipts and other vouchers to prove that the materials comply therewith. The Contractor shall at his own cost arrange for and/or carry out any test of any materials which the Architects may require. The Contractor shall submit, samples of all the finishing materials, to the Architects/ Consultants, for approval, as directed by the Architects/Consultants much in advance, so as to avoid any complications regarding availability. Also, whenever samples are to be prepared for approval the same shall be prepared immediately on receipt of the drawings and got approved by the Architect. Approval of the samples of various materials given by the Engineer-in-Charge and Architects shall not absolve the Contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The Contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-Charge and Architects. No collection of material shall be made before it is

approved by the Engineer-in-Charge and Architects. The Architect shall, during the progress of the works, have to order in writing from time to time the removal from the works, within a period specified in the order, of any materials which in his opinion are not in accordance with the specifications or his instructions, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the drawings, specifications or instructions; and the Contractor shall forthwith carry out such order at his own cost. In case of default on the part of the Contractor to carry out such order, the Employer shall have the power to employ and pay other persons to carry out the same; and all expenses consequent thereon, or incidental thereto, as certified by the Architect shall be borne by the Contractor, or may be deducted by the Employer from any moneys due, or that may become due, to the Contractor. Inspect and approve, if found appropriate, samples (loose & installed) to be prepared as per the list already prepared during starting of work and subsequent to approval of same, give clearance for commencement of construction works at site.

b. Undertake frequent visits for periodic inspection of the site to examine the work being executed and to provide clarification and guidance to the contractor in respect to the design, specifications, workmanship and overall performance of the work and inform the contractor under intimation to DSCL, about defects, deficiencies and nonconformities with respect to the specifications and drawings. The architect will ensure that the contractor has complied with all the instructions in his subsequent visit. Any query related to drawing may be solved by architect/ consultant in co-ordination with PIU & contractor

c. Consultant will check that the work is done satisfactorily and the contractor has complied with all the remarks, comments, defects or deficiencies suggested by the team of architect/structural engineers of the consultant. For any noncompliance, PIU may recommend for retention of the total bill or part thereof. The work not complied with by contractor to the satisfaction of the consultant; retention kept will be subject to forfeiture. The contractor shall not be eligible to get any compensation for such retention or any benefit of extension of time limit.

6. RETENTION OF MONEY FOR NOT FOLLOWING SAFETY MEASURES: Retention @ 1% of the work done of RA bill will be kept if it is observed that the contractor has not taken sufficient safety precaution. The retention of money is subjected to be forfeit if the contractor is found not to comply / intentionally not taking safety precaution after such notice / retention.

7. RATES INCLUDING COST OF CEMENT AND REINFORCEMENT STEEL: Cement and Reinforcement Steel will be supplied by the contractor at site. Rates to be quoted by the contractor shall be inclusive of the cost of cement, reinforcement and structural steel. The structural steel rate shall in inclusive of all forms of steel sections, channels, boxes etc. as applicable to the project.

8. TAXES: The rates shall also be firm and not subject to exchange variations, labor conditions, fluctuations in railway freights or any conditions whatsoever. It shall also include all taxes/duty or other levy levied by the Central or State Governments or local authorities, etc.,.

No claim in respect to the variation in taxes shall be considered for payment, by the Employer, as an extra amount till the work is completed.

9. CONTRACTOR TO PROVIDE SITE OFFICE: (within 15 days after getting work order otherwise Rs. 10,000/- Per day penalty will imposed as penalty over and above L.D. Contractor shall provide a permanent site office (Masonry & RCC structure) and portable stores (Metal / Wood / PVC) at the location suggested by the Architect in the area identified by DSCL. The site office shall be utilized exclusively for the Engineer- In- Charge staff. Site office shall be fully furnished with AC, computer, internet, printer, fax, telephone, furniture, refrigerator, cooler and such necessary facilities. The site office shall room and conference facility with allied utilities like toilets, pantry etc. Intermediate shifting of portable structures (such as stores) may be required during any stage of project, hence contractor is abided to do so without any cost or time factor. Contractor should maintain the site office till the project tenure and hand it over to PIU without claiming any extra cost. Following utility services shall be provided for PIU staff / Engineer-In-Charge with water supply, drainage, electricity and housekeeping services etc. free of cost up to finalization of the project within 15 days after getting work-order.

    a. Site office with conference room and toilet block

    b. Office furniture:- tables, revolving chairs, visitor chairs, Cupboards, rack, drawing stands, water cooler with RO plant, laptops / computers with latest configuration and version, printer with scanner and all type of office stationary.

    c. Computer operator cum clerk

    d. Peon

    e. Internet connection with running services till the end of the project.

    f. Fax machine with connection and running services till the end of the project.

    g. AC & pedestal fan

    h. Security Guard for 24 hrs.

10. NO PERMANENT STRUCTURES TO BE CONSTRUCTED WITHIN AREA IDENTIFIED BY DSCL: Contractor will not be permitted to construct any pucca structure (except site office) for any purpose in the area identified by DSCL for what so ever reason.

11. PRE-BID MEETING: Bidders to submit their queries at least 3 days before the scheduled pre-bid meeting to PIU.

12. CONTRACTOR TO ARRANGE WATER & POWER BY OWN: The contractor shall have to make own arrangement for the water & power required for the construction purpose.

13. CONTRACTOR'S RESPONSIBILITY TO FILL DAILY, WEEKLY, MONTHLY PROGRESS REPORT & CONCRETE POUR CARD ON DAY TO DAY BASIS: (Format shall be provided by the Engineer-In-Charge).

a. Daily Progress Report stating the information of work done of all items categorized labor strength, cement and steel consumption on day to day basis.

b. Concrete Pour Card as per standard engineering practice should be filled by contractor and after having signature of engineer in-charges, contractor may proceed for concreting

c. Cube testing register also to be maintained at site.

d. Contractor will have to submit filled and duly signed (Signed by Engineer-in-Charge from side & from Contractor side) Daily Progress Reports on immediate next day & Concrete Pour Card before casting of any RCC elements. Contractor will be solely responsible and if failing to do so shall be liable for penalty which will be solely upon discrete on of Engineer-in-Charge which shall be deducted from RA Bill.

14. CONTRACTOR'S RESPONSIBILITY TO GET APPROVAL ON MATERIAL SAMPLE / MOCK UP / SAMPLE ROOM: Contractor shall have to get approval from Engineer-In-Charge and Architect on loose samples (i.e. flooring material, stone, light fixtures etc.) prior to starting of any works. Loose samples approval is required for the product conformity, specification and shade selection. A sample room, as per the layout proposed by Architect and specifications recommended by Architect, shall be prepared and up to date maintained in lock and key arrangement till completion of work awarded under the specific tender. Sample room approval is required for workmanship, fast process in repetitive work and save time for repetitive activity. Contractor will be solely responsible if failing to do so and shall be liable for penalty, which will be solely upon discretion of Engineer-in-Charge, which shall be deducted from RA Bill. If contractor cannot show sample room within two months, firm shall be panelized by.

15. MACHINERY TO DEPLOY ON SITE: Contractor shall have to deploy (Must owned or hired) machinery/ equipment as indicated in the tender on site within 1 month from date of award of work. The machinery shall be of good working condition and relevant certificates shall be submitted. The Contractor has to take necessary approval prior to shift / remove such machineries from Engineer – in – Charge.

16. During execution of work, any quantity shall be increased more than 30% than rate will be applicable as per SOR rate and where SOR rate is not available than estimated rate will be applicable. Contractor cannot misinterpret the meaning of word written in tender.

17. Agency has to submit day to day computerized consumption statement of cement/Lime when using batching plant with cement/Lime purchase bill and challan of weigh-bridge

18. Bidders shall require referring detail specification as well as BOQ for complete understanding for through work. In case any additional clarification required, agency shall be put up discrepancy and ambiguity in writing to prior to pre-bid meeting. After award of work, not a single argument for discrepancy and ambiguity was accepted. For the same case, Contractor to execute the work as per the instruction given by EIC and Architect

19. Contractor is responsible to find out suitable site location (Non Objectionable Place) required for disposal of surplus excavated earth and/ or debris etc. with prior permission from competent authority.

20. The contractor has to establish his own dedicated testing laboratory fully equipped and shall have to deploy a qualified quality Control Engineer (Minimum Qualification as B.E. with 7 years' experience of Q.C. / lab operation.

21. All the bylaws of labor, labor arrangement, insurance, safety, as per the central Govt. and state Govt. shall be strictly followed.

22. The compensation for any accident, causality etc. shall be the full responsibility of the contractor and shall be as per the law governing for the same.

23. No sub- letting of the work is permitted, unless a written permission is obtained from the,CTO, DSCL

24. No deviation from the approved list of makes shall be permitted. In case, certain items of equivalent is mentioned, the same shall be got approved from CTO, DSCL, before ordering.

25. On instructions from Engineer-in-Charge /CTO, DSCL , the material, finished product, construction item, shall be immediately removed from the site within 72Hrs of written instruction without any compensation of whatsoever nature.

26. All the drawings supplied by the consultant/Client to the contractor shall be carefully studied by the contractor before implementation and any discrepancy /changes /suggestions shall be brought to the notice of consultant for clearance.

27. Bid document is not submitted with duly signed by contractor, shall not allowed for the bid selection.

28. The execution of the work may entail working in the monsoon also. The contractor must maintain labor force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No special/ extra rate will be considered for such work in monsoon. The contractor's rate shall be considered inclusive of cost of dewatering required if any and no extra rate shall be payable on this account.

29. Contractor to provide necessary certificate where ever it is asked for in the items of BOQ or in specifications or elsewhere in the tender or as per requirement of EIC or Architect.

30. The contractor has to make his own arrangement for labor colony.

31. "The Contractor shall prepare on site, cobblestone flooring sample of size 3m x 3m, comprising the sizes, colours and specification of cobbles as required by the Architect/Engineer-In Charge. If required by the Architect/Engineer-In Charge, an additional sample shall also be provided, comprising the sizes, colours and specification of cobbles. The Contractor shall allow for the required time for approval of the sample and plan this process well in advance so as to not delay the time of project execution neither claim Extension and Delays due to the same."

32. “Contractor shall submit shop drawing of Vendor Racks to Architect/ Engineer-In Charge for approval prior to fabricating any pieces. If required by the Architect/ Engineer-In Charge, the Contractor shall prepare a sample, complete in all respects, and present onsite for review by Architect and Client. The Contractor shall allow for the required time for approval of the sample and plan this process well in advance so as to not delay the time of project execution neither claim Extension and Delays due to the same."

33. **SPECIAL CONDITIONS FOR PROCUREMENT OF CEMENT**

a. The contractor shall procure OPC cement in work from reputed manufacturers of cement having a production capacity not less than one million tonnes or more per annum, such as ACC, Ultra Tech, Siddhi, Sanghi Cement, Birla Jute & cement corporation of India etc., as approved by Ministry of Industry, Government of India and holding license to use ISI certification mark for their product. The tenderers may also submit a list of names of cement manufacturers which he proposes to use in the work. The tender accepting authority reserves rights to accept or reject name (s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer fully or partially.

b. The supply of cement shall be taken in 50 kg. bags bearing manufacturer’s name and ISI marking. Samples of cement arranged by the contractors shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS codes. In case of test results indicate that the cement arranged by the contractor does not conform to the relevant BIS Codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within a week’s time of written order from the Engineer-in-Charge to do so.

c. The cement shall be brought at site in and store in water proof cement godown of the adequate capacity and shall be constructed by the contractor at site of work for which no extra payment shall be made

d. Double lock provision shall be made to the door of cement godown. The keys of one lock shall remain with Employer, Diu, or his authorized representative and the keys of the other lock shall remain with the contractor. The contractors shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge at any time.

e. The cement shall be got tested by the Engineer-in-Charge and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing Labourites. The cost of tests shall be borne by the contractor / department in the manner indicated below:

    i. By the contractor, if the result shows that the cement does not conform to relevant BIS code.

    ii. By the department, if the result shows that the cement conforms to relevant BIS codes.

f. The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of CPWD GCC 2019. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 38 of CPWD GCC 2019 and shall be governed by conditions laid therein. In case of cement consumption is less than theoretical consumption including permissible variation; recovery at the rate show prescribed shall be made. In case of excess consumption no adjustment need to be made.

g. Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of Engineer-in-Charge

h. The damaged cement shall be removed from the site immediately by the contactor on receipt of a notice in writing form the Engineer-in-Charge If he does not do so within three days of receipt of such notice, the Engineer-in-Charge shall get it removed at the cost of the contractor.

34. SPECIAL CONDITION FOR PROCUREMENT OF STEEL: The contractor shall procure TMT bars of Fe500-D grade (the grade to be procured is to be specified) from primary producers such as SAIL or TISCO or RINL or JINDAL or JSW Steel Ltd. as approved by the Ministry of Steel. In case of non-availability of steel form primary producers the NIT approving authority may permit use of TMT reinforcement bars procured from secondary producers. In such cases following action is to be taken by NIT approving authority

a. The grade of the steel Fe500-D grade to be procured is to be specified as per BIS 1786-2008.
b. The secondary producers must have valid BIS license to produce HSD bars conforming to IS 1786: 2008. In addition to BIS license, the secondary producer must have valid license form either of the firms Tempcore, ThermexEvcon Turbo & Turbo Quench to produce TMT Bars.
c. The TMT bars procured form primary producers shall conform to manufacture's specifications.
d. The TMT bars procured form secondary producers shall conform to the specifications as laid by Tempcore, Thermex, Evcon Turbo & Turbo Quench as the case may be.
e. TMT bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786 : 2008 pertaining to Fe500-D grade of steel as specified in the tender of steel as specified in the tender
f. All TMT Bars to be duly factory coated against corrosion in coastal environments.

The contractor shall have to obtain and furnish test certificates to the Engineer-in-Charge in respect of all supplies of steel brought by him to the site of work.

Sample shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not conform to the specifications as defined above para (d) & (e) above, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time after the written orders from the Engineer-in-Charge to do so.

The steel reinforcement bars shall be brought to the site in bulk supply of 10 tonnes or more, or as decided by the Engineer-in-Charge

The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.

For checking nominal mass tensile strength bend test, re-bend test etc. specimen of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below.

The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories. The cost of test shall be borne by the contractor.

The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by conditions laid therein. In case the consumption is less than theoretical consumption including permissible variations recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment need to be made.

The steel brought to site and steel remaining unused shall not be removed form site without the written permission of the Engineer-in-Charge

In case contractor is permitted to use TMT reinforcement bars procured form secondary producers then:

The rate of providing & laying TMT reinforcement bars as quoted by the contractor in the tender shall also be reduced by Rs.2.25 per kg.

The steel brought to site and steel remaining unused shall not be removed form site without the written permission of the Engineer-in-Charge

35. Safety Precautions for Scaffolding

a. A competent third part certified person is allowed for scaffolding job.

b. Cold work permit is required.

c. Employees shall be used chin straps, leather gloves and safety harness full time.

d. Tools and spanners shall be secured with body.

e. Area shall be barricaded and signs board to be displayed.

f. Non-sparking tools shall be used in hazardous area.

g. Materials, clamps shall not drop or through.

h. Leather bags shall be used for shifting.

i. While erection and modifications, red tag shall be display on height equal to eye level.

j. If height exceeding the ratio, additional tie-in with nearby existing structure shall be given.

k. Job shall be suspended in case of heavy wind more than 65kmph and rain.

l. Dismantling start from top.

m. Scaffolding tag shall be renewed after one week and checklist shall be maintained.

n. Ladder shall be raised at least one meter above landing platform and should be secure at three locations.

o. Loose materials, clamps shall not be kept unattended on working platform.

p. Risk Assessment is required If Wind speed is More than 50kmph.

q. Gin Wheel (pulley & rope) Should be use for light material lifting.

r. Care shall be taken while along the moat area and Standard Operating Porcedure shall be approved by Engineer – In-Charge

SECTION IV

TECHNICAL SPECIFICATIONS

1. Site Documents

The following site documents shall mainly be maintained by the Contractor at site:

i. Copy of contract documents and drawings.

ii. Computerized bill format.

iii. Site Order Book.

iv. Material testing registers / Quality Inspection Reports.

v. Measurement books on computerized format.

vi. Progress bar chart.

vii. Sample approval register.

viii. Hindrance Register.

ix. Work Diary.

x. Deviation/variation order registers.

xi. Cement consumption register.

xii. Reinforcement registers.

xiii. Concrete cube test register.

xiv. Slump test register.

xv. Silt content and sand bulkage register.

xvi. Request for Work Inspection

xvii. Joint Measurement book

xviii. Daily Labour report

xix. Quality Check list

GENERAL

1. SPECIAL STRUCTURES

A. Structures like retaining walls, wing walls, chimneys, overhead reservoirs/ tanks and other elevated structures, where elevations/ heights above a defined datum level have not been specified and identification of floors cannot be done as in case of building. Level, at 1.2 m above the ground level shall be the floor 1 level as well as plinth level. Level at a height of 3.5 m above floor 1 level will be reckoned as floor 2 level and level at a height of 3.5 m above the floor 2 level will be floor 3 level and so on, where the total height above floor 1 level is not a whole number multiple of 3.5 metre. Top most floor level shall be the next in sequence to the floor level below even if the difference in height between the two upper most floor levels is less than 3.5 metres

2. FOUNDATION AND PLINTH

The work in foundation and plinth shall include:

A. For buildings: All works upto 1.2 metre above ground level or upto floor 1 level whichever is lower

B. For abutments, piers and well steining: all works upto 1.2 m above the bed level:

C. For retaining wall, wing walls, compound walls, chimneys, overhead reservoirs/ tanks and other elevated structures: All works upto 1.2 metre above the ground level.

D. For reservoirs/ tanks (other than overhead reservoirs/ tanks): All works upto 1.2 metre above the ground level:

E. For basements: All works upto 1.2 m above ground level or upto floor 1 level whichever is lower.

Note: Specific provision shall be made in the estimate for such situations where the foundation level is more than 3 (three) metre depth from the plinth for all types of structures mentioned above.

3. MEASUREMENTS

A. In booking dimensions, the order shall be consistent and in the sequence of length, width and height or depth or thickness.

B. Rounding off: Rounding off where required shall be done in accordance with IS: 2-1960. The number of significant places rounded in the rounded off value should be as specified.

4. MATERIALS

A. Samples of all materials to be used on the work shall be got approved by the contractor from the Engineer-in- Charge well in time. The approved samples duly authenticated and sealed shall be kept in the custody of the Engineer-in-Charge till the completion of the work. All

materials to be provided by the contractor shall be brand new and as per the samples approved by the Engineer-in-Charge

B. Materials obtained by the contractor from the sources approved by the Department shall be subjected to the Mandatory tests. Where such materials do not conform to the relevant specifications, the matter shall be taken up by the Engineer-in-Charge for appropriate action against the defaulters. In all such cases, necessary documents in original and proof of payment relating to the procurement of materials shall be made available by the contractor to the Engineer-in-Charge

C. Samples, whether submitted for approval to govern bulk supplies or required for testing before use and also the sample of materials bearing 'Standard mark,' if required for testing, shall be provided free of cost by the contractor. All other incidental expenditure to be incurred for testing of samples e.g. packaging, sealing transportation, loading, unloading etc. including testing charges shall be borne by the contractor.

D. The materials, supplied by the Department shall be deemed to be complying with the specifications.

E. Materials stored at site, depending upon the individual characteristics, shall be protected from atmospheric effects due to rain, sun, wind and moisture to avoid deterioration.

F. Materials like timber, paints etc. shall be stored in such a way that there may not be any possibility of fire hazards. Inflammable materials and explosives shall be stored in accordance with the relevant rules and regulations or as approved by Engineer-in-Charge in writing so as to ensure desired safety during storage.

G. The unit weight of materials unless otherwise specified shall be reckoned as given in IS: 1911-1967.

5. SAFETY IN CONSTRUCTION

A. The contractor shall employ only such methods of construction, tools and plant as are appropriate for the type of work or as approved by Engineer-in-Charge in writing.

B. The contractor shall take all precautions and measures to ensure safety of works and workmen and shall be fully responsible for the same. Safety pertaining to construction works such as excavation, centering and shuttering, trenching, blasting, demolition, electric connections, scaffolds, ladders, working platforms ,working at heights, gangway, mixing of bituminous materials, electric and gas welding, use of hoisting and construction machinery shall be governed by CPWD safety code, relevant safety codes and the direction of Engineer-in-Charge

6. STACKING AND STORAGE OF MATERIAL

6.1. CEMENT & LIME

6.1.1. In case cement is received in bags.

6.1.1.1. Cement shall be stored at the work site in a building or a shed which is dry, leak-proof and as moisture proof as possible. The building or shed for storage should have minimum number of windows and close fitting doors and these should be kept closed as far as possible.

6.1.1.2. Cement shall be stored and stacked in bags and shall be kept free from the possibility of any dampness or moisture coming in contact with them. Cement bags shall be stacked off the floor on wooden planks in such a way as to keep about 150 mm to 200 mm clear above the floor. The floor may comprise of lean cement concrete or two layers of dry bricks laid on well consolidated earth. A space of 600 mm minimum shall be left all-round between the exterior walls and the stacks In the stacks the cement bags shall be kept close together to reduce circulation of air as much as possible. Owing to pressure on the bottom layer of bags sometimes 'warehouse pack' is developed in these bags. This can be removed easily by rolling the bags when the cement is taken out for use. Lumbed bags, if any should be removed and disposed off.

6.1.1.3. The height of stack shall not be more than 10 bags to prevent the possibility of lumping up under pressure. The width of the stack shall be not more than four bags length or 3 metres. In stacks more than 8 bags high, the cement bags shall be arranged alternately length-wise and cross -wise so as to tie the stacks together and minimize the danger of topping over. Cement bags shall be stacked in a manner to facilitate their removal and use in the order in which they are received; a lable showing date of receipt of cement shall be put on each stack to know the age of cement.

6.1.1.4. For extra safety during the monsoon, or when it is expected to store for an unusually long period, the stack shall be completely enclosed by a water proofing membrane such as polyethylene, which shall close on the top of the stack. Care shall be taken to see that the waterproofing membrane is not damaged any time during use.

6.1.1.5. Cement in gunny bags, paper bags and polyethylene bags shall be stored separately.

6.1.2. In case cement is received in drums

These shall be stored on plane level ground, as far as possible near the concrete mixing place. After taking out the required quantity of cement, the lid of the drum shall be securely tied to prevent ingress of moisture.

6.1.3. In case cement is received in silos

The silos shall be placed near the concrete batching plant. Proper access shall be provided for the replacement of silos.

6.1.4. Different types of cements shall be stacked and stored separately.

6.1.5. Lime

Unslaked lime shall be stored In a place inaccessible to water and because of the fire hazard, shall be segregated from the consumable material

6.2. BRICKS / BELA STONES

6.2.1. Bricks shall be stacked in regular tiers as and when they are unloaded to minimize breakage and defacement. These shall not be dumped at site.

6.2.2. Bricks stacks shall be placed close to the site of work so that least effort is required to unload and transport the bricks again by loading on pallets or in barrows. Building bricks shall be loaded or unloaded a pair at a time unless palletized. Unloading of building bricks or handling in any other way likely to damage the corners or edges or other parts of bricks shall not be permitted.

6.2.3. Bricks shall be stacked on dry firm ground. For proper inspection of quality and ease in counting the stacks shall be 50 bricks long, 10 bricks high and not more than 4 bricks in width, the bricks being placed on edge, two at a time along the width of the stack. Clear distance between adjacent stacks shall not be less than 0.8 m. Bricks of each truck load shall be put in one stack.

6.2.4. Bricks of different types, such as clay bricks, clay fly ash bricks, fly ash lime bricks, sand lime (calcium silicate) bricks, Bela stone, auto-clave bricks etc. shall be stacked separately. Bricks of different classification and size consideration (such as, conventional and modular) shall be stacked separately. Also bricks of different types, such as, solid, hollow and perforated shall be stacked separately.

6.3. FLOOR, WALL AND ROOF TILES

6.3.1. Floor, wall and clay roof tiles of different types, such as, cement concrete tiles (plain, coloured and terrazzo) and ceramic tiles (glazed and unglazed) shall be stacked on regular platform as far as possible under cover in proper layers and in tiers and they shall not be dumped in heaps. In the stack, the tiles shall be so placed that the mould surface of one faces that of another. Height of the stack shall not be more than one metre. During unloading, these shall be handled carefully so as to avoid breakage.

6.3.2. Tiles of different quality, size and thickness shall be stacked separately to facilitate easy removal for use in work. Tiles when supplied by manufacturers packed in wooden crates, shall be stored in crates. The crates shall be opened one at a time as and when required for use.

6.3.3. Ceramic tiles and clay roof tiles are generally supplied in cartons which shall be handled with care. It is preferable to transport these at the site on platform trolleys.

6.4. AGGREGATES

6.4.1. Aggregates shall be stored at site on a hard dry and level patch of ground. If such a surface is not available, a platform of planks or old corrugated iron sheets, or a floor of bricks, or a thin layer of lean concrete shall be made so as to prevent contamination with clay, dust, vegetable and other foreign matter.

6.4.2. Stacks of fine and coarse aggregates shall be kept in separate stock piles sufficiently removed from each other to prevent the material at the edges of the piles from getting intermixed. On a large job, it is desirable to construct dividing walls to give each type of aggregates its own compartment. Fine aggregates shall be stacked in a place where loss due to the effect of wind is minimum.

6.4.3. Unless specified otherwise or necessitated by site conditions stacking of the aggregates should be carried out in regular stacks.

6.5. STEEL

6.5.1. For each classification of steel, separate areas shall be earmarked. It is desirable that ends of bars and sections of each class be painted in distinct separate colours.

6.5.2. Steel reinforcement shall ordinarily be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. It is desirable to coat reinforcement with cement wash before stacking to prevent scaling and rusting.

6.5.3. Bars of different classification, sizes and lengths shall be stored separately to facilitate issues in such sizes and lengths so as to minimize wastage in cutting from standard lengths.

6.5.4. In case of long storage, reinforcement bars shall be stacked above ground level by at least 150 mm. Also in coastal areas or in case of long storage a coat of cement wash shall be given to prevent scaling and rusting.

6.5.5. Structural steel of different classification, sizes and lengths shall be stored separately. It shall be stored above ground level by at least 150 mm upon platforms, skids or any other suitable supports to avoid distortion of sections. In coastal areas or in case of long storage suitable protective coating of primer paint shall be given to prevent scaling and rusting.

6.6. WATER

Wherever water is to be stored for construction purposes this shall be done in proper storage tanks to prevent any organic impurities getting mixed up with it.

6.7. OTHER MATERIALS

Small articles like nails, screws, nuts and bolts, door and window fittings, polishing stones, protective clothing, spare parts of machinery, linings, packing, water supply and sanitary fittings, electrical fittings, insulation board, etc, shall be kept in suitable and properly protected store rooms. Valuable small material such as, copper pipes and fittings shall be kept under lock and key.

6.8. MEASUREMENTS

Length, breadth and height of stacks shall be measured correct to a cm. The quantity shall be Worked out in cubic metre correct to two place of decimal. The volume of stacks shall be reduced by percentages as shown against each for looseness in stacking to arrive at the net quantity for payment.

No reduction shall be made in respect of articles or materials for which mode of payment is by length or weight or number

6.9. EARTH

6.9.1. In loose stacks such as cart loads, lorry loads, etc. – 20%

6.9.2. In fills consolidated by light mechanical machinery – 10%

6.9.3. In fills consolidated by heavy mechanical machinery but not under OMC (Optimum Moisture Content) – 5%

6.9.4. In fills consolidated by heavy mechanical machinery at OMC – Nil

6.9.5. Consolidated fills in confined situation such as under floors. etc. – Nil

6.9.6. Moorum, building rubbish Lime and sand – Nil

6.9.7. Stone metal, 40 mm nominal size and above – 7.5%

6.9.8. Coarse aggregate/ stone metal below 40 mm nominal size – Nil

6.9.9. Soling stone/ Boulder 100 mm and above – 15%

6.9.10. Excavated rocks – 50%

7. FELLING TREES

7.1. Felling

While clearing jungle, growth trees above 30 cm girth (measured at a height of one metre above ground level) to be cut, shall be approved by the Engineer-in-Charge and then marked at site. Felling trees shall include taking out roots upto 60 cm below ground level or 30 cm below formation level or 15 cm below sub-grade level, whichever is lower.

All excavation below general ground level arising out of the removal of trees, stumps etc. shall be filled with suitable material in 20 cm layers and compacted thoroughly so that the surfaces at these points conform to the surrounding area. The trunks and branches of trees shall be cleared of limbs and tops and cut into suitable pieces as directed by the Engineer-in-Charge

7.1.1. Stacking and Disposal

Wood, branches, twigs of trees and other useful material shall be the property of the Government. The serviceable materials shall be stacked in the manner as directed by the Engineer-in-Charge upto a lead of 50m.

All unserviceable material, which in the opinion of Engineer-in-Charge cannot be used or auctioned shall be removed from the area and disposed off as per the directions of the Engineer-in-Charge Care shall be taken to see that unsuitable waste materials are disposed off in such a manner that there is no likelihood of these getting mixed up with the materials meant for construction.

7.1.2. Measurements

Cutting of trees above 30 cm in girth (measured at a height of one metre above level) shall be measured in numbers according to the sizes given below:

a) Beyond 30 cm girth, upto and including 60cm girth.

b) Beyond 60 cm girth, upto and including 120 cm girth.

c) Beyond 120 cm girth, upto and including 240 cm girth.

d) Above 240 cm girth.

7.2 Clearance of Grass

Clearing and grubbing operation involving only the clearance of grass shall be measured and paid for separately and shall include removal of rubbish and disposing outside the periphery of the area under clearance**.**

7.2.1 Measurements

The length and breadth shall be measured correct to the nearest cm and area worked out in square metres correct to two places of decimal.

8. DISMANTLING AND DEMOLISHING

8.1. TERMINOLOGY

(i) Deconstruction – Means a selective demolition in which salvage, reuse and recycling of demolished structure is maximized. The term ‘Dismantling’ implies carefully separating the parts without damage and removing. This may consist of dismantling one or more parts of the building as specified or shown on the drawings.

(ii) Demolition: The term ‘Demolition’ implies breaking up. This shall consist of demolishing whole or part of work either manually or using mechanical force (various equipment) or by implosion using explosion, including all relevant items as specified or shown on the drawings.

8.2. PRECAUTION

8.2.1. All materials obtained from dismantling or demolition shall be the property of the Government unless otherwise specified and shall be kept in safe custody until they are handed over to the Engineer-in-Charge/ authorized representative.

8.2.2. The demolition shall always be well planned before hand and shall generally be done in reverse order of the one in which the structure was constructed. The operations shall be got

approved from the Engineer-in-Charge before starting the work. Due care shall be taken to maintain the safety measures prescribed in **IS 4130 and construction and demolition waste management rules 2016** shall be followed.

8.2.3. Necessary propping, shoring and or under pinning shall be provided to ensure the safety of the adjoining work or property before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining work or property. Wherever specified, temporary enclosures or partitions and necessary scaffolding with suitable double scaffolding and proper cloth covering shall also be provided, as directed by the Engineer-in-Charge It shall be ensured that no dust is generated while demolishing. Demolition Rules – 2016 shall be followed.

8.2.4. Necessary steps shall be taken to keep noise and dust nuisance to the minimum. All work needs to be done under the direction of Engineer-in-Charge Helmets, goggle, safety jackets, safety belts, dust masks, ear plug etc., should be used whenever required and as directed by the Engineer-in-Charge The demolition work shall be proceeded with in such a way that it causes the least damage and nuisance to the adjoining building and the public. Barricading shall be provided as per NGT guidelines.

8.2.5. Dismantling shall be done in a systematic manner. All materials which are likely to be damaged by dropping from a height or by demolishing roofs, masonry etc. shall be carefully removed first. Chisels and cutters may be used carefully as directed. The dismantled articles shall be removed manually or otherwise, lowered to the ground (and not thrown) and then properly stacked as directed by the Engineer-in-Charge

8.2.6. Where existing fixing is done by nails, screws, bolts, rivets, etc., dismantling shall be done by taking out the fixing with proper tools and not by tearing or ripping off.

8.2.7. Any serviceable material, obtained during dismantling or demolition, shall be separated out and stacked properly as directed by the Engineer-in-Charge within all leads and lift. All unserviceable materials, rubbish etc. shall be disposed off at authorized locations by urban local bodies as directed by the Engineer-in-Charge

8.2.8. The contractor shall maintain/disconnect existing services, whether temporary or permanent, wherever required by the Engineer-in-Charge

8.2.9. No demolition work should be carried out at night especially when the building or structure to be demolished is in an inhabited area

8.2.10. Appropriate screens shall be placed where necessary to prevent injuries due to falling pieces.

8.2.11. Water spray shall be used to reduce dust while tearing down plaster from brick work.

8.2.12. Safety belts shall be used by labourers while working at higher level to prevent falling from the structure. Wherever, possible mechanized working platform shall be used

8.2.13. First-aid equipment shall be made available at all demolition works of any magnitude.

8.3. MEASUREMENTS

All work shall be measured net in the decimal system, as fixed in its place, subject to the following limits, unless otherwise stated hereinafter.

A. Dimensions shall be measured correct to a cm.

B. Areas shall be worked out in sqm correct to two places of decimal.

C. Cubical contents shall be worked out to the nearest 0.01 cum.

8.3.1. Flooring and Pavings

Dismantling of floors (except concrete and brick floors) shall be measured in square metres. Concrete and bricks paving shall be measured as per **8.3.2**

8.3.2. Concrete and Brick Roofs and Suspended Floors

Demolition of floors and roofs of concrete or brick shall be measured in cubic metres. Beams cantilevers or other subsidiary supports of similar materials, shall be included in the item. In measuring thickness of roofs provided with water proofing treatments with bitumen felts, the thickness of water proofing treatment shall be ignored.

8.3.3. Reinforced Concrete , Brick Work and Jali

Reinforced concrete structures, reinforced brick roofs, Jalisand walls shall be measured in cubic meters and if reinforcement is required to be salvaged, it shall be so stated. Where reinforcement is required to be separated, scraped and cleaned, the work shall be measured separately in quintal of salvaged steel.

8.3.4. 15 TO 40MM DIA G.I. PIPE

Dismantling 15 to 40mm dia G.I. pipe including stacking of dismantled pipes (with all leads & lifts) as per direction of Engineer-in-Charge The pipe dismantling is done from tap point to main line. The 15mm dia is to be dismantled first and thereafter the dismantling/taking out the pipe shall proceed towards bigger dia pipe at the last. The pipe is removed from its joints/sockets/T-section gently with pipe wrench/tool so that the old pipe is not get damaged and the same can be reused where required. The old dismantle pipe will be stacked dia wise and connected fittings are also to be stored properly for reuse.

8.3.4.1. **Measurement & Rate**

The measurements and payment of Dismantling G.I. pipe shall be made on meter

8.4. SURFACE BRUSHING

Preparing surface by brushing with wire brushes for removing caked mud etc.,sweeping with brooms and finally fanning the cleared surface with gunney bags to remove all loose dirt etc.,

8.4.1. MEASUREMENTS

All work shall be measured net in the decimal system, as fixed in its place, subject to the following limits, unless otherwise stated hereinafter.

A. Dimensions shall be measured correct to a cm.

B. Areas shall be worked out in sqm correct to two places of decimal.

9. EXCAVATION IN ALL KINDS OF SOILS

9.1. All excavation operations manually or by mechanical means shall include excavation and 'getting out' the excavated materials. In case of excavation for trenches, basements, water tanks etc. 'getting out' shall include throwing the excavated materials at a distance of at least one metre or half the depth of excavation, whichever is more, clear off the edge of excavation. In all other cases 'getting out' shall include depositing the excavated materials as specified. The subsequent disposal of the excavated material shall be either stated as a separate item or included with the items of excavation stating lead.

9.1.1. During the excavation the natural drainage of the area shall be maintained. Excavation shall be done from top to bottom. Undermining or undercutting shall not be done.

9.1.2. In firm soils, the sides of the trenches shall be kept vertical upto a depth of 2 metres from the bottom. For greater depths, the excavation profiles shall be widened by allowing steps of 50 cms on either side after every 2 metres from the bottom. Alternatively, the excavation can be done so as to give slope of 1:4 (1 horizontal: 4 vertical). Where the soil is soft, loose or slushy, the width of steps shall be suitably increased or sides sloped or the soil shored up as directed by the Engineer-in- Charge. It shall be the responsibility of the contractor to take complete instructions in writing from the Engineer-in-Charge regarding the stepping, sloping or shoring to be done for excavation deeper than 2 metres.

9.1.3. The excavation shall be done true to levels, slope, shape and pattern indicated by the Engineer-in-Charge Only the excavation shown on the drawings with additional allowances for centering and shuttering or as required by the Engineer-in-Charge shall be measured and recorded for payment

9.1.4. In case of excavation for foundation in trenches or over areas, the bed of excavation shall be to the correct level or slope and consolidated by watering and ramming. If the excavation for foundation is done to a depth greater than that shown in the drawings or as required by the Engineer-in -Charge, the excess depth shall be made good by the contractor at his own cost with the concrete of the mix used for levelling/ bed concrete for foundations. Soft/defective spots at the bed of the foundations shall be dug out and filled with concrete (to be paid separately) as directed by the Engineer-in-Charge

9.1.5. In all other cases where the excavation is taken deeper by the contractor, it shall be brought to the required level by the contractor at his own cost by filling with earth duly watered, consolidated and rammed.

9.1.6. In case the excavation is done wider than that shown on the drawings or as required by the Engineer-in-Charge, filling wherever required on this account shall be done by the contractor at his own cost.

9.1.7. Only the excavation shown on the drawings or as required by the Engineer-in-Charge shall be measured and recorded for payment except in case of hard rock, where blasting operations have been resorted to, excavation shall be measured to the actual levels, provided the Engineer-in-Charge is satisfied that the contractor has not gone deeper than what was unavoidable.

9.1.8. The excavation shall be done manually or by mechanical means as desired by Engineer-in-Charge considering feasibility, urgency of work, availability of labour /mechanical equipment's and other factors involved Contractor shall ensure every safety measures for the workers. Neither any deduction will be made nor will any extra payment be made on this account.

9.2. EARTH WORK BY MECHANICAL MEANS

Earth work by mechanical means involves careful planning keeping in view site conditions i.e. type of soil, nature of excavation, distances through which excavated soil is to be transported and working space available for employing these machines. The earth moving equipment should be accordingly selected.

The earth moving equipment consists of excavating and transporting equipment. Excavating equipment's may be further classified as excavators and tractor based equipment's.

9.3. FILLING

9.3.1. MOORUM

9.3.1.1. Moorum shall be obtained from pits of weathered disintegrated rocks. It should preferably contain silicious material and natural mixture of clay of calcarious origin. The size of moorum shall not be more than 20 mm.

9.3.1.2. The earth used for filling shall be free from all roots, grass, shrubs, rank vegetation, brushwood, tress, sapling and rubbish.

9.3.1.3. The granular surface to be primed shall be swept clean by brooms or mechanical sweepers and made free from dust. All loose material and other foreign material shall be removed completely.

9.3.1.4. Filling with excavated earth shall be done in regular horizontal layers each not exceeding 20 cm in depth. All lumps and clods exceeding 8 cm in any direction shall be broken. Each layer shall be watered and consolidated with steel rammer or ½ tonne roller. Where specified, every third and top must layer shall also be consolidated with power roller of minimum 8 tonnes. Wherever depth of filling exceeds 1.5 metre vibratory power roller shall be used to consolidate the filing unless otherwise directed by Engineer-in-Charge The top and sides of filling shall be neatly dressed. The contractor shall make good all subsidence and shrinkage in earth fillings, embankments, traverses etc. during execution and till the completion of work unless otherwise specified.

9.3.1.5. **MEASUREMENTS**

The length and breadth of excavation or filling shall be measured with a steel tape correct to the nearest cm. The depth of cutting or height of filling shall be measured, correct to 5 mm, by recording levels before the start of the work and after the completion of the work. The cubical contents shall be worked out to the nearest two places of decimal in cubic metres

9.3.2. GRANULAR SUB–BASE

9.3.2.1. This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of these Specifications. The material shall be laid in one or more layers as sub-base or lower sub-base and upper sub-base (termed as sub-base here in after) as necessary according to lines, grades and cross-sections shown on the drawings or as directed by the Engineer-in-Charge

9.3.2.2. **MATERIALS**

i. The material to be used for the work shall be natural sand, crushed gravel, crushed stone, crushed slag or combination thereof depending upon the grading required. Use of materials like brick metal, Kankar and crushed concrete shall be permitted in the lower sub-base. The material shall be free from organic or other deleterious constituents and shall conform to the grading given in table-1 and physical requirement given in table-2 Gradings III and IV shall preferably be used in lower sub-base. Grading V and VI shall be used as a sub-base-cum-drainage layer. The grading to be adopted for a project shall be as specified in the Contract. Where the sub-base is laid in two layers as upper sub-base and lower sub-base, the thickness of each layer shall not be less than 150 mm.

ii. If the water absorption of the aggregate determined as per IS : 2386 (Part 3); if this value is greater than 2 per cent, the aggregate shall be tested for Wet Aggregate Impact Value (AIV) (IS: 5640). Soft aggregates like Kankar, Brick ballast and laterite shall also be tested for Wet AIV (IS: 5640).

TABLE -1: GRADING FOR GRANULAR SUB-BASE MATERIALS

IS Sieve Designation	**Percent by Weight Passing the IS Sieve**					
	Grading I	**Grading II**	**Grading III**	**Grading IV**	**Grading V**	**Grading VI**
75.0 mm	100	-	-	-	100	-
53.00 mm	80-100	100	100	100	80-100	100
26.5 mm	55-90	70-100	55-75	50-80	55-90	75-100
9.50 mm	35-65	50-80	-	-	35-65	55-75
4.75 mm	25-55	40-65	10-30	15-35	25-50	30-55
2.36 mm	20-40	30-50	-	-	10-20	10-25
0.85 mm	-	-	-	-	2-10	-
0.425 mm	10-15	10-15	-	-	0-5	0-8
0.075 mm	<5	<5	<5	<5	-	0-3

TABLE -2: PHYSICAL REQUIREMENTS FOR MATERIALS FOR GRANULAR SUB-BASE

Aggregate Impact Value (AIV)	IS:2386 (Part 4) or IS:5640	40 Maximum
Liquid Limit	IS:2720 (Part 5)	Maximum 25
Plasticity Index	IS:2720 (Part 5)	Maximum 6
CBR at 98% dry density (at IS:2720-Part 8)	IS:2720 (Part 5)	Minimum 30 unless otherwise specified in the Contract

9.3.2.3. **Construction Operations**

i. Preparation of Sub-Grade:

A. The surface of the sub grade to receive the Granular Sub-base shall be prepared to the specified lines and crossfall (Camber) as necessary and made free of dust and other extraneous materials. Any ruts or soft yielding places shall be corrected in an approved manner and rolled with 80 – 100 kN smooth wheeled roller until firm surface is obtained if necessary by sprinkling water. Weak places shall be strengthened, corrugations removed and depressions and pot holes made good with suitable materials, before spreading the aggregate for GSB.

B. Where the existing surface over which the sub base of GSB is to be laid is black topped, to ensure effective internal drainage, furrows 50 mm x 50 mm (depth of furrows increased to reach bottom of bituminous layer where necessary) at one metre intervals shall be cut in the existing bituminous surface at 45 degrees to the central line of the carriageway at one metre intervals in the existing road before the GSB is laid.

ii. Spreading and compacting:

A. The sub-base material of grading specified in the Contract and water shall be mixed mechanically by a suitable mixer equipped with provision for controlled addition of water and mechanical mixing. So as to ensure homogenous and uniform mix. The required water content shall be determined in accordance with IS:2720 (Part 8). The mix shall be spread on the prepared sub-grade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation, or other means as approved by the Engineer-in-Charge

B. Moisture content of the mix shall be checked in accordance with IS:2720 (Part 2) and suitably adjusted so that, at the time of compaction, it is from 1 to 2 per cent below the optimum moisture content (OMC). Immediately after spreading the mix, rolling shall be done by an approved roller. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 200 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall or on super elevation. For carriageway having crossfall on both sides, rolling shall commence at the edges and progress towards the crown.

C. Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and crossfall (camber) shall be checked and any high spots

or depressions, which become apparent, corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour.

D. Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density for the material determined as per IS : 2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

iii. Measurements

Granular sub-base shall be measured as finished work in position in cubic metres. The length and breadth shall be measured to the nearest centimetre. The depth of consolidated layer shall be computed to nearest half centimetre by taking average of depths at the centre and at 30 cm from the left and right edges at a cross section taken at 100 metre interval or less as decided by the Engineer-in-Charge by making small pits. The consolidated cubical contents shall be calculated in cubic metres correct to two places of decimal. The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

10. MORTARS

10.1. MATERIALS

10.1.1. Water

Water used for mixing and curing shall be clean and free from injurious quantities of alkalies, acids, oils, salts, sugar, organic materials, vegetable growth or other substance that may be deleterious to bricks, stone, concrete or steel. potable water is generally considered satisfactory for mixing. The Ph value of water shall be not less than 6. The following concentrations represent the maximum permissible values: (of deleterious materials in water).

The physical and chemical properties of ground water shall be tested along with soil investigation and if the water is not found conforming to the requirements of IS 456-2000, the tender documents shall clearly specify that the contractor has to arrange good quality water for construction indicating the source.

10.1.1.1. Water found satisfactory for mixing is also suitable for curing. However, water used for curing shall not produce any objectionable stain or unsightly deposit on the surface.

10.1.1.2. Water found satisfactory for mixing is also suitable for curing. However, water used for curing shall not produce any objectionable stain or unsightly deposit on the surface.

10.1.1.3. Sea water shall not be used for mixing or curing

10.1.1.4. Water from each source shall be tested before the commencement of the work and thereafter once in every three months till the completion of the work. In case of ground water, testing shall also be done for different points of drawdown. Water from each

source shall be got tested during the dry season before monsoon and again after monsoon

10.1.2. Cement

10.1.2.1. The cement used shall be any of the following grade and the type selected should be appropriate for the intended use.

a. 33 grade ordinary Portland cement conforming to IS 269**-2013.**

b. 43 grade ordinary Portland cement conforming to IS 8112**-2013.**

c. 53 grade ordinary Portland cement conforming to IS 12269**-2013.**

d. Rapid hardening Portland cement conforming to IS 8041**-1990, Reaffirm Apr 2014**

e. Portland slag cement conforming to IS 455-**1989, Reaffirm Apr 2014.**

f. Portland Pozzolana cement (flyash based) conforming to IS 1489 (Part 1**)-1991, Reaffirm Apr 2014.**

g. Portland Pozzolona cement (calcined clay based) conforming to IS 1489 (part 2**)-1991, Reaffirm Apr 2014.**

h. Hydrophobic **Portland** cement conforming to IS 8043**-1991, Reaffirm Apr 2014.**

i. Low heat Portland cement conforming to IS 12600-1989, **Reaffirm Apr 2014.**

j. Sulphate resisting Portland cement conforming to IS 12330**-1988, Reaffirm Apr 2014.**

k. White cement conforming to IS 8042-**1989, Reaffirm Apr 2014.**

Different types of cement shall not be mixed together. In case more than one type of cement is used in any work, a record shall be kept showing the location and the types of cement used.

10.1.2.2. **Compressive Strength :** Compressive strength requirement of each type of cement for various grades when tested in accordance with IS 4031 (part 6) shall be as under:

Sample	Strength in N/mm^^{2} not less than for		
Age at testing	Gr. 33	Gr.43	Gr. 53
72 + 1 hr	16	23	27

168 + 2 hrs	22	33	37
672 + 4 hrs	33	43	53

10.1.3. Fine Aggregate

10.1.3.1. Aggregate most of which passes through 4.75 mm IS sieve is known as fine aggregate. Fine aggregate shall consist of natural sand, crushed stone sand, crushed gravel sand stone dust or marble dust, fly ash and broken brick (Burnt clay) . It shall be hard, durable, chemically inert, clean and free from adherent coatings, organic matter etc. and shall not contain any appreciable amount of clay balls or pellets and harmful impurities e.g. iron pyrites, alkalies, salts, coal, mica, shale or similar laminated materials in such form or in such quantities as to cause corrosion of metal or affect adversely the hardening, the strength, the durability or the appearance of mortar, plaster or concrete. The sum of the percentages of all deleterious material shall not exceed 5%. Fine aggregate must be checked for organic impurities such as decayed vegetation humps, coal dust etc. in accordance with the procedure prescribed in Appendix 'A' of Chapter 3 of CPWD Specifications (Vol 1) 2019.

10.1.3.2. ***Silt Content :*** The maximum quantity of silt in sand as determined by the method prescribed in Appendix 'C' of Chapter 3 (CPWD Specification – Vol 1, 2109) shall not exceed 8%. Fine aggregate containing more than allowable percentage of silt shall be washed as many times as directed by Engineer-in-Charge so as to bring the silt content within allowable limits for which nothing extra shall be paid.

10.1.3.3. ***Grading :*** On the basis of particle size, fine aggregate is graded in to four zones. The grading when determined in accordance with the procedure prescribed in Appendix 'B' of Chapter 3 CPWD Specifications Vol 1 2019 shall be within the limits. Where the grading falls outside the limits of any particular grading zone of sieves, other than 600 micron IS sieve, by a total amount not exceeding 5 per cent, it shall be regarded as falling within that grading zone.

10.2. PREPARTATION OF MORTARS AND ITS GRADE

10.2.1. Grade of Masonry Mortar

The grade of masonry mortar will be defined by its compressive strength in N/mm^2 at the age of 28 days as determined by the standard procedure detailed in IS 2250.

For proportioning the ingredients by volume, the conversion of weight into volume shall be made on the following basis:

a) Burnt Clay Pozzolana	860 Kg/cum

b) Coarse Sand (dry)	1280 kg/cum
c) Fine sand (dry)	1600 kg/ cum
d) Fly Ash	590 kg/ cum

10.2.2. Cement Mortar

This shall be prepared by mixing cement and sand with or without the addition of pozzolana in specified proportions as per Appendix 'F' of Chapter 4 of CPWD Specification (Vol 1) 2019.

10.2.2.1. **Proportioning:** Proportioning on weight basis shall be preferred taking into account specific gravity of sand and moisture content . Boxes of suitable size shall be prepared to facilitate proportioning on weight basis. Cement bag weighting 50 kg shall be taken as 0.035 cubic metre. Other ingredients in specified proportion shall be measured using boxes of size 40 x 35 x 25 cm. Sand shall be measured on the basis of its dry volume in the case of volumetric proportioning.

10.2.2.2. **Mixing:** The mixing of mortar shall be done in mechanical mixers operated manually or by power as decided by Engineer-in-Charge The Engineer-in-Charge may, however, permit hand mixing at his discretion taking into account the nature, magnitude and location of the work and practicability of the use of mechanical mixers or where item involving small quantities are to be done or if in his opinion the use of mechanical mixer is not feasible. In cases, where mechanical mixers are not to be used, The contractor shall take permission of the Engineer-in-Charge in writing before the commencement of the work.

i. Mechanical Mixing: Cement and sand in the specified proportions shall be mixed dry thoroughly in a mixer. Water shall then be added gradually and wet mixing continued for at least three minutes. only the required quantity of water shall be added which will produce mortar of workable consistency but not stiff paste. Only the quantity of mortar, which can be used within 30 minutes of its mixing shall be prepared at a time. Mixer shall be cleaned with water each time before suspending the work.

ii. Hand Mixing: The measured quantity of sand shall be leveled on a clean masonry platform and cement bags emptied on top. The cement and sand shall be thoroughly mixed dry by being turned over and over, backwards and forwards, several times till the mixture is of a uniform colour. The quantity of dry mix which can be used within 30 minutes shall then be mixed in a masonry trough with just sufficient quantity of water to bring the mortar to a stiff paste of necessary working consistency.

10.2.2.3. **Precautions**: mortar shall be used as soon as possible after mixing and before it begins to set, and in any case within half hour, after the water is added to the dry mixture.

11. CONCRETE WORK

11.1. MATERIAL

Water, cement, fine aggregate or sand, surkhi, and fly ash shall be as specified in Chapter 10.0 Mortar.

11.1.1. Coarse Aggregate

11.1.1.1. **General:** Aggregate most of which is retained on 4.75 mm IS Sieve and contains only as much fine material as is permitted in IS 383 for various sizes and grading is known as coarse aggregate. Coarse aggregate shall be specified as stone aggregate, gravel or brick aggregate and it shall be obtained from approved/ authorized sources.

A. **Stone Aggregate**: It shall consist of naturally occurring (uncrushed, crushed or broken) stones.It shall be hard, strong, dense, durable and clean. It shall be free from veins, adherent coating, injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious substances. It shall be roughly cubical in shape. Flaky and elongated pieces shall be avoided. **Aggregates from other than natural resources shall comply with the requirements of IS 383.**

B. **Gravel**: It shall consist of naturally occurring (uncrushed, crushed or broken) river bed shingle or pit gravel. It shall be sound, hard and clean. It shall be free from flat particles of shale or similar laminated material, powdered clay, silt, loam, adherent coating, alkali, vegetable matter and other deleterious substances. Pit gravel shall be washed if it contains soil materials adhering to it. These shall conform to IS 383 unless otherwise specified.

C. **Brick Aggregate**: Brick aggregate shall be obtained by breaking well burnt or over burnt dense brick/ brick bats. They shall be homogeneous in texture, roughly cubical in shape and clean. They shall be free from unburnt clay particles. Soluble salt, silt, adherent coating of soil, vegetable matter and other deleterious substances. Such aggregate should not contain more than one percent of sulphates and should not absorb more than 10% of their own mass of water, when used in cement concrete. It shall conform to IS 306 unless otherwise specified.

D. **Light weight aggregate** such as sintered fly ash aggregate may also be used provided the Engineer-in-Charge is satisfied with the data on the proportion of concrete made with them.

11.1.1.2. **Stacking:** Aggregate shall be stacked on a hard, dry and level patch of ground. When stack piling, the aggregate shall not form pyramids resulting in segregation of different sized materials. It shall be stacked separately according to nominal size of coarse aggregates. Stacking shall be done in regular stacks, of height not exceeding 100 cm.

11.1.1.3. **Testing:** Coarse aggregate shall be tested for the followings (as per IS 2386)

i. Determination of particle size and shape (Appendix 'A' of Chapter 4 of CPWD Vol-I)

ii. Estimation of organic impurities (as per IS 2386 - Part II)

iii. Surface moisture (Appendix 'B' of Chapter 4 of CPWD Vol-I 2019)

iv. Determination of 10% fine value (Appendix 'C' of Chapter 4 of CPWD Vol-I 2019)

11.1.1.4. **Measurements:** The aggregates shall be measured in stacks and paid for after making a deduction of 7.5% of the gross measurements of stacks in respect of aggregates of nominal size 40 mm and above. No deduction from the gross measurements of the stacks is to be made in respect of aggregate of nominal size below 40 mm.

11.1.1.5. **Chemical Admixtures** When required, admixtures of approved quality shall be mixed with concrete, as specified. The admixtures shall conform to IS 9103

11.2. CEMENT CONCRETE

11.2.1. Grades of Cement Concrete

The concrete shall be in grade designated as under:

Group	**Grade Designation**	**Specified characteristic compressive strength of 150 mm Cube at 28 Days in N/mm^2**
(1)	(2)	(3)
Ordinary Concrete	**M10**	**10**
	M15	15
	M20	20
Standard Concrete	M25	25
	M30	30
	M35	35
	M40	40
	M45	45
	M50	50
	M55	55
	M60	60
High Strength	M65	65

Concrete	M70	70
	M75	75
	M80	80
	M85	85
	M90	90
	M95	95
	M100	100

Notes :

1. In the designation of concrete mix M refers to the mix and the number to the specified compressive strength of 150 mm size cube at 28 days, expressed in N/mm^2

2. For concrete of compressive strength greater than **M60,** design parameters given in the standard may not be applicable and the values may be obtained from specialized literatures and experimental results.

3. The characteristic strength is defined as the strength of material below which not more than 5 percent of the test results are expected to fall.

11.2.2. Mixing: Concrete shall be mixed in mechanical batch type concrete mixers conforming to IS 1791 having two blades and fitted with power loader (lifting hopper type). Half bag mixers and mixers without lifting hoppers shall not be used for mixing concrete. In exceptional circumstances, such as mechanical breakdown of mixer, work in remote areas or power breakdown and when the quantity of concrete work is very small, hand mixing may be done with the specific prior permission of the Engineer-in-Charge in writing subject to adding 10% extra cement. When hand mixing is permitted, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency. Before mixing the brick aggregate shall be well soaked with water for a minimum period of two hours and stone aggregate or gravel shall be washed with water to remove, dirt, dust and other foreign materials. For guidance, the mixing time may be 11/2 to 2 minutes, for hydrophobic cement it may be taken as 21/2 to 3 minutes.

11.2.2.1. **Mixing Efficiency:** The mixer shall be tested under normal working conditions in accordance with the method specified in IS 4643 with a view to check its ability to mix the ingredients to obtain concrete having uniformity within the prescribed limits. The uniformity of mixed concrete shall be evaluated by finding the percentage variation in quantity (mass in water) of cement, fine aggregate and coarse aggregate in a freshly mixed batch of concrete.

The percentage variation between the quantities of cement, fine aggregate and coarse aggregates (as found by weighing in water) in the two halves of a batch and average of the two halve of the batch shall not be more than the following limits:

Cement 8%

Fine aggregate 6%

Coarse aggregate 5%

11.2.3. Measurements

Dimensions of length, breadth and thickness shall be measured correct to nearest cm. except for the thickness of slab and partition which shall be measured to nearest 5 mm. Areas shall be worked out to nearest 0.01 sq.m and the cubic contents of consolidated concrete shall be worked out to nearest 0.01 cum. Any work done in excess over the specified dimension or sections shown in the drawing shall be ignored.

Concrete work executed in the following conditions shall be measured separately:

(a) Work in or under water

(b) Work in liquid mud

(c) Work in or under foul positions

12. REINFORCED CEMENT CONCRETE WORK

Reinforced cement concrete work may be cast-in-situ or Precast as may be directed by Engineer-in-Charge according to the nature of work. Reinforced cement concrete work shall comprise of the following which may be paid separately or collectively as per the description of the item of work.

(a) Form work (Centering and Shuttering)

(b) Reinforcement

(c) Concreting: (1– Cast-in-situ), (2 – Precast)

12.1. Materials

Water, cement, fine and coarse aggregate shall be as specified under respective clauses of Mortars and concrete work as applicable.

General

i. IS 456- 2000 Code of Practice for Plain and Reinforced Concrete (as amended up to date) shall be followed in regard to Concrete Mix Proportion and its production as under :

   a. The concrete mix design shall be done as “Design Mix Concrete” as prescribed in clause-9 of IS 456 mentioned above.

b. Concrete shall be manufactured in accordance with clause 10 of above mentioned IS 456

ii. covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified Concrete Technologist to be available during manufacture of concrete for certification of quality of concrete.

iii. Minimum M -25 grade of concrete shall be used in all structural elements made with RCC both in load bearing and framed structure.

iv. The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of fly ash mixed concrete or concrete using fly ash blended cements (PPCs) are not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC.

v. To control higher rate of carbonation in early ages of concrete both in fly ash admixed as well as PPC based concrete, water/binder ratio shall be kept as low as possible, which shall be closely monitored during concrete manufacture.

vi. If necessitated due to low water/binder ratio, required workability shall be achieved by use of

vii. chloride free chemical admixtures conforming to IS 9103. The compatibility of chemical admixtures and super plasticizers with each set OPC, fly ash and /or PPC received from different sources shall be ensured by trials.

viii. In environment subjected to aggressive chloride or sulphate attach in particular, use of fly ash

ix. admixed or PPC based concrete is recommended. In cases, where structural concrete is

x. exposed to excessive magnesium sulphate, fly ash substitution/content shall be limited to 18%

xi. by weight. Special type of cement with low C3A content may also be alternatively used.

xii. Durability criteria like minimum binder content and maximum water /binder ratio also need to be given due consideration in such environment.

xiii. Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot & arid regions, the minimum curing period shall be 14 days or its equivalent.

12.2. Steel for Reinforcement

The steel used for reinforcement shall be any of the following types

(a) Mild steel and medium tensile bars conforming to IS 432 (Part I)

(b) High strength deformed steel bars conforming to IS 1786

(c) Hard drawn steel wire fabric conforming to IS 1566

(d) Structural steel conforming to Grade A of IS 2062

(e) Thermo-mechanically treated (TMT) Bars.

Elongation percent on gauge length is 5.65 √A where A is the cross sectional area of the test piece.

Mild steel is not recommend for the use in structures located in earthquake zone subjected to severe damage and for structures subjected to dynamic loading (other than wind loading) such as railway and highway bridges.

Welding of reinforcement bars covered in this specification shall be done in accordance with the requirements of IS 2751.

Nominal mass/weight : The tolerance on mass/ weight for round and square bars shall be the percentage given in below Table of the mass/ weight calculated on the basis that the masses of the bar/ wire of nominal diameter and of density 7.85 kg/ cm^3 or 0.00785 kg/mm^3.

Tolerance on Nominal Mass

Nominal size in mm	*Tolerance on the Nominal Mass per cent*		
	Batch	*Individual sample +*	*Individual sample for coil (x)*
(a) Upto and including 10	±7	-8	±8
(b) Over 10, upto and including 16	±5	-6	±6
Over 16	±3	-4	±4

+ for individual sample plus tolerance is not specified
(x) for coil batch tolerance is not applicable
Tolerance shall be determined in accordance with method given in IS 1786.

High strength deformed bars & wires shall conform to IS 1786. The physical properties for all sizes of steel bars are mentioned in below Table.

Sl. No	*Property*	*Fe 415*	*Fe 415 D*	*Fe 500 D*	*Fe 550 D*
(i)	0.2 Per cent Proof stress/ yield stress, Min, N/mm^2	415.0	415.0	500.0	550.0
(ii)	Elongation, per cent, Min. on gauge length 5.65 √A, where A is the corss-sectional area of the test piece.	14.5	18.0	16.0	14.5

(iii)	Tensile strength, Min	10 Per cent more than the actual 0.2 per cent proof stress/ yield stress but not less than 485.0 N/mm^2	12 Per cent more than the actual 0.2 percent proof stress/yield stress but not less than 500.0 N/mm^2	10 Per cent more than the actual 0.2 per cent proof stress/ yield stress but not less than 565.0 N/mm^2	8 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 600.0 N/mm^2
(iv)	Total elongation at maximum force, percent, Min on gauge length 5.65 √A, where A is the cross-sectional area of the test piece.	-	5	5	5

Tests: Selection and preparation of Test sample. All the tests pieces shall be selected by the Engineer- in-Charge or his authorized representative either-

(a) From cutting of bars Or

(b) If he so desires, from any bar after it has been cut to the required or specified size and the test piece taken from and any part of it.

In neither case, the test pieces shall be detached from the bar or coil except in the presence of the Engineer-in-Charge or his authorized representative.

The test pieces obtained in accordance with as above shall be full sections of the bars as rolled and subsequently cold worked and shall be subjected to physical tests without any further modifications. No deduction in size by machining or otherwise shall be permissible. No test piece shall be enacted or otherwise subject to heat treatment. Any straightening which a test piece may require shall be done cold.

Tensile Test: 0.2% proof stress and percentage elongation – this shall be done as per IS 1608, read in conjunction with IS 226. RE- test: This shall be done as per IS 1786.

Rebend test: This shall be done as per IS 1786.

Chemical composition of reinforcement bars shall be as per below table as follows:-

Constituent	*Maximum Per cent*			
	Fe 415	*Fe 415 D*	*Fe 500 D*	*Fe 550 D*
Carbon	0.30	0.25	0.25	0.25
Sulphur	0.060	0.045	0.040	0.040
Phosphorus	0.060	0.045	0.040	0.040

Sulphur and Phosphorus	0.110	0.085	0.075	0.075

Thermo Mechanically treated reinforcement bars:

a. There is no BIS code for TMT bars. The available code BIS 1786 pertains to HSD Bars. Therefore there should be no stipulation that TMT bars should conform to relevant BIS code.

b. The TMT bars are being produced under valid licence from either of the firms namely Tempcore, Thermex Evcon Turbo & Turbo Quench. These firms have acquired patents and are giving licences to various producers to produce TMT Bars.

c. The TMT bars shall conform to IS 1786 pertaining to Fe 415 D or Fe 500 D or Fe grade of steel as specified.

d. In design and construction of reinforced concrete building in seismic zone III and above, steel reinforcement of Grade Fe 415 D shall be used. However, high strength deformed steel bars, produced by thermo mechanical treatment process of grade Fe 415, Fe 500 and Fe 550 having elongation more than 14.5. % and conform to other requirements of Fe 415 D, Fe 500 D and Fe 550 D respectively of IS 1786 may also be used for reinforcement. In future, latest provision of IS 456 and IS 13920 or any other relevant code as modified from time to time shall be applicable.

12.2.1. Stacking and Storage

Steel for reinforcement shall be stored in such a way as to prevent distorting and corrosion. Care shall be taken to protect the reinforcement from exposure to saline atmosphere during storage, fabrication and use. It may be achieved by treating the surface of reinforcement with cement wash or by suitable methods. Bars of different classifications, sizes and lengths shall be stored separately to facilitate issue in such sizes and lengths to cause minimum wastage in cutting from standard length.

Identification

Care shall also be taken to properly identify these bars at site. The staff shall be specially trained for looking for identification marks on these bars given by the manufacturers which are generally given colour code. It will be advisable to see that only one type/grade of bars are brought to site and used in the project after conducting tests for each lot.

12.3 FORM WORK (CENTRING & SHUTTERING)

Form Work

Form work shall include all temporary or permanent forms or moulds required for forming the concrete which is cast-in-situ, together with all temporary construction required for their support.

Design & Tolerance in Construction

Form work shall be designed and constructed to the shapes, lines and dimensions shown on the drawings with the tolerance given below.

(a)	Deviation from specified dimension of cross section of columns and beams	**+10 mm** **-5 mm**
(b)	Deviation from dimensions of footings	
	(i) Dimension in Plan	(+ 50 mm (**-10 mm**
	(ii) Eccentricity in plan	0.02 times the width of the footing in the direction of deviation but not more than 50 mm.
	(iii) Thickness	**+50mm** **Or** **± 0.05 times the specified thickness Whichever is less**

(**Note**- These tolerance apply to concrete dimensions only, and not to positioning of vertical steel or dowels).

General Requirement

It shall be strong enough to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it during and after casting of concrete. It shall be made sufficiently rigid by using adequate number of ties and braces, screw jacks or hard board wedges where required shall be provided to make up any settlement in the form work either before or during the placing of concrete.

Form shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other sections, care shall be taken to see that no piece is keyed into the concrete.

Material for Form Work

Propping and Centering: All propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel.

a. ***Centering/Staging :*** Staging should be as designed with required extension pieces as approved by Engineer-in-Charge to ensure proper slopes, as per design for slabs/ beams etc. and as per levels as shown in drawing. All the staging to be either of Tubular steel structure with adequate bracings as approved or made of built up structural sections made form rolled structural steel sections.

   i. In case of structures with two or more floors, the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the top most floor already cast.

   ii. Form work and concreting of upper floor shall not be done until concrete of lower

floor has set at least for 14 days.

Shuttering: Shuttering used shall be of sufficient stiffness to avoid excessive deflection and joints shall be tightly butted to avoid leakage of slurry. If required, rubberized lining of material as approved by the Engineer-in-Charge shall be provided in the joints. Steel shuttering used or concreting should be sufficiently stiffened. The steel shuttering should also be properly repaired before use and properly cleaned to avoid stains, honey combing, seepage of slurry through joints etc.

(a) *Runner Joists:* RSJ, MS Channel or any other suitable section of the required size shall be used as runners.

(b) Assembly of beam head over props. Beam head is an adopter that fits snugly on the head plates of props to provide wider support under beam bottoms.

(c) Only steel shuttering shall be used, except for unavoidable portions and very small works for which 12 mm thick water proofing ply of approved quality may be used.

Form work shall be properly designed for self-weight, weight of reinforcement, weight of fresh concrete, and in addition, the various live loads likely to be imposed during the construction process (such as workmen, materials and equipment). In case the height of centering exceeds 3.50 metres, the prop may be provided in multi-stages.

Walls : The form faces have to be kept at fixed distance apart and an arrangement of wall ties with spacer tubes or bolts is considered best.. The two shutters of the wall are to be kept in place by appropriate ties, braces and studs,

Removal of Form work (Stripping Time) : In normal circumstance and where various types of cements are used, forms, may generally be removed after the expiry of the following periods:

Type of Form work	*Minimum period Before Striking Form work for OPC 33 grade*	*Minimum period Before Striking Form work for OPC 43 grade*	*Minimum period Before Striking Form work for PPC*
(a) Vertical form work to columns, walls, beams	16-24 h	16-24 h	24-36 h

Type of Form work	*Minimum period Before Striking Form work for OPC 33 grade*	*Minimum period Before Striking Form work for OPC 43 grade*	*Minimum period Before Striking Form work for PPC*
(b) Soffit form work to slabs (Props to be refixed immediately after removal of formwork)	3 days	3 days	4 days
(c) Soffit form work to beams (Props to be refixed immediately after removal of formwork	7 days	7 days	10 days

(d)	Props to slabs: (1) Spanning upto 4.5m (2) Spanning over 4.5m	7 days 14 days	7 days 14 days	10 days 20 days
(e)	Props to beams and arches: (1) Spanning upto 6m (2) Spanning over 6m	14 days 21 days	14 days 21 days	20 days 30 days

Note 1: For other types of cement, the stripping time recommended for ordinary Portland cement may be suitably modified. Generally If Portland Pozzolana or low heat cement or OPC with direct addition of fly ash has been used for concrete, the stripping time will be 10/7 of the period stated for OPC with 43 grade cement above.

Note 2: The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slabs, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

Note 3: For rapid hardening cement, 3/7 of above periods for OPC 33 grade will be sufficient in all cases except for vertical side of slabs, beams and columns which should be retained for at least 24 hours.

Note 4: In case of cantilever slabs and beams, the centering shall remain till structures for counter acting or bearing down have been erected and have attained sufficient strength.

Note 5: Proper precautions should be taken to allow for the decrease in the rate of hardening that occurs with all types of cement in cold weather and accordingly stripping time shall be increased.

Note 6: Work damaged through premature or careless removal of forms shall be reconstructed within 24 hrs.

12.3.1 Surface Treatment

12.3.1.1 ***Oiling the Surface:*** Shuttering gives much longer service life if the surfaces are coated with suitable mould oil which acts both as a parting agent and also gives surface protections.

A typical mould oil is heavy mineral oil or purified cylinder oil containing not less than 5% pentachlorophenol conforming to IS 716 well mixed to a viscosity of 70-80 centipoises.

After 3-4 uses and also in cases when shuttering has been stored for a long time, it should be recoated with mould oil before the next use.

The second categories of shuttering oils / leavening agents are Polymer based water soluble Compounds. They are available as concentrates and when used diluted with water in the ratio of 1:20 or as per manufacturer specifications. The diluted solution is applied by brush applications on the shuttering both of steel as well as ply wood. The solution is applied after every use.

12.3.1.2 The design of form work shall conform to sound Engineering practices and relevant IS codes.

12.3.2 Inspection of Form Work

The completed form work shall be inspected and approved by the Engineer-in-Charge before the reinforcement bars are placed in position.

Proper form work should be adopted for concreting so as to avoid honey combing, blow holes, grout loss, stains or discoloration of concrete etc. Proper and accurate alignment and profile of finished concrete surface will be ensured by proper designing and erection of form work which will be approved by Engineer-in-Charge

Shuttering surface before concreting should be free from any defect/ deposits and full cleaned so as to give perfectly straight smooth concrete surface. Shuttering surface should be therefore checked for any damage to its surface and excessive roughness before use.

12.3.2.1 ***Erection of Form Work (Centering and shuttering):*** Following points shall be borne in mind while checking during erection.

a. Any member which is to remain in position after the general dismantling is done, should be clearly marked.

b. Material used should be checked to ensure that, wrong items/ rejects are not used.

c. If there are any excavations nearby which may influence the safety of form works, corrective and strengthening action must be taken.

d. The bearing soil must be sound and well prepared and the sole plates shall bear well on the ground.
   i. Sole plates shall be properly seated on their bearing pads or sleepers.
   ii. The bearing plates of steel props shall not be distorted.
   iii. The steel parts on the bearing members shall have adequate bearing areas.

e. Safety measures to prevent impact of traffic, scour due to water etc. should be taken. Adequate precautionary measures shall be taken to prevent accidental impacts etc.

f. Bracing, struts and ties shall be installed along with the progress of form work to ensure strength and stability of form work at intermediate stage. Steel sections (especially deep sections) shall be adequately restrained against tilting, overturning and form work should be restrained against horizontal loads. All the securing devices and bracing shall be tightened.

g. The stacked materials shall be placed as catered for, in the design.

h. When adjustable steel props are used. They should:
   i. Be undamaged and not visibly bent.
   ii. Have the steel pins provided by the manufacturers for use.
   iii. Be restrained laterally near each end.
   iv. Have means for centralizing beams placed in the forkheads.

i. Screw adjustment of adjustable props shall not be over extended.

j. Double wedges shall be provided for adjustment of the form to the required position

wherever any settlement/ elastic shorting of props occurs. Wedges should be used only at the bottom end of single prop. Wedges should not be too steep and one of the pair should be tightened/ clamped down after adjustment to prevent shifting.

k. No member shall be eccentric All provisions of the design and/or drawings shall be complied with.
l. Cantilever supports shall be adequate.
m. Props shall be directly under one another in multistage constructions as far as possible.
n. Guy ropes or stays shall be tensioned properly.
o. There shall be adequate provision for the movements and operation of vibrators and other construction plant and equipment.
p. Required camber shall be provided over long spans.
q. Supports shall be adequate, and in plumb within the specified tolerances.
r. Upon vertical member.
s. The number of nuts and bolts shall be adequate.

12.4 REINFORCEMENTS

12.4.1 General Requirements

Steel conforming to para 5.1.3 for reinforcement shall be clear and free from loose mill scales, dust, loose rust, coats of paints, oil or other coating which may destroy or reduce bond. It shall be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. Prior to assembly of reinforcement on no account any oily substance shall be used for removing the rust.

12.4.1.1 ***Assembly of Reinforcement :*** Bars shall be bent correctly and accurately to the size and shape as shown in the detailed drawing or as directed by Engineer- in-Charge. Preferably bars of full length shall be used. Necessary cutting and straightening is also included. Overlapping of bars, where necessary shall be done as directed by the Engineer-in-Charge The overlapping bars shall not touch each other and these shall be kept apart with concrete between them by 25mm or 1^{1}/ times the maximum size of the coarse aggregate whichever is greater. But where this is not possible, the overlapping bars shall be bound together at intervals not exceeding twice the dia. of such bars with two strands annealed steel wire of 0.90 mm to 1.6 mm twisted tight. The overlaps/ splices shall be staggered as per directions of the Engineer-in-Charge But in no case the overlapping shall be provided in more than 50% of cross sectional area at one section.

12.4.1.2 ***Bonds and Hooks Forming End Anchorages:*** Reinforcement shall be bent and fixed in accordance with procedure specified in IS 2502, code of practice of bending and fixing of bars for concrete reinforcement. The details of bends and hooks are shown below for guidance.

12.4.1.2.1 U-Type Hook

In case of mild steel plain bars standard U type hook shall be provided by bending ends of rod into semicircular hooks having clear diameter equal to four times the diameter of the bar.

Note: In case of work in seismic zone, the size of hooks at the end of the rod shall be eight times the diameter of bar or as given in the structural drawings.

12.4.1.2.2 Bends

Bend forming anchorage to a M.S. plain bar shall be bent with and internal radius equal to two times the diameter of the bar with a minimum length beyond the bend equal to four times the diameter of the bar.

12.4.1.3 ***Anchoring Bars in Tension :*** Deformed bars may be used without end anchorages provided, development length equipment is satisfied. Hooks should normally be provided for plain bars in tension. Development length of bars will be determined as per IS: 456.

12.4.1.4 ***Anchoring Bars in Compression :*** The anchorage length of straight bar in compression shall be equal to the 'Development length' of bars in compression as specified in IS: 456. The projected length of hooks, bend and straight lengths beyond bend, if provided for a bar in compression, shall be considered for development length.

12.4.1.5 ***Binders, stirrups, links etc. :*** In case of binders, stirrups, links etc. the straight portion beyond the curve at the end shall be not less than eight times **the** nominal size of bar.

12.4.2 Welding of Bars

Wherever facility for electric **arc** welding **or gas pressure welding** is available, welding of bars shall be done in lieu of overlap. The location and type of welding shall be got approved by the Engineer-in-Charge Welding shall be as per IS 2751 and 9417.

12.4.3 Placing in Position

12.4.3.1 Fabricated reinforcement bars shall be placed in position as shown in the drawings or as directed by the Engineer -in -charge. The bars crossing one another shall be tied together at every intersection with two strands of annealed steel wire 0.9 to 1.6 mm thickness twisted tight to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during deposition of concrete.

Tack welding in crossing bars shall also be permitted in lieu of binding with steel wire if approved by Engineer-in-Charge

12.4.3.2 The bars shall be kept in correct position by the following methods:

12.4.3.2.1 In case of beam and slab construction pre-cast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4x4 cm section and of thickness equal to the specified cover shall be placed between the bars and shuttering, so as to secure and maintain the requisite cover of concrete over reinforcements.

12.4.3.2.2 In case of cantilevered and doubly reinforced beams of slabs, the vertical distance between the horizontal bars shall be maintained by introducing chairs, spacers or support bars of steel at 1.0 mere or at shorter spacing to avoid sagging.

12.4.3.2.3 In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them: or with clock of cement mortar 1:2 (1 cement: 2 coarse sand) of required size suitable tied to the reinforcement to ensure that they are in correct position during concreting.

12.4.3.2.4 In case of other R.C.C. structure such as arches, domes, shells, storage tanks etc. a combination of cover blocks, spacers and templates shall be used as directed by Engineer-in-Charge

12.4.3.3 ***Tolerance on Placing of Reinforcement*:** Unless otherwise specified by the Engineer-in- Charge, reinforcement shall be placed within the following tolerances:

Tolerance in spacing

12.4.3.3.1 For effective depth, 200 mm or less +10 mm
12.4.3.3.2 For effective depth, more than 200 mm + 15 mm

12.4.3.4 ***Bending at Construction Joints*** **:** Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position care should be taken to ensure that at no time the radius of the bend is less than 4 bar diameters for plain mild steel or 6 bar diameter for deformed bars. Care shall also be taken when bending back bars to ensure that the concrete around the bar is not damaged.

12.4.3.5 ***Cover :*** The minimum nominal cover to meet durability requirements shall be as under:-

Exposure	*Nominal Concrete cover in mm not less than*
Mild	20
Moderate	30
Severe	45
Very severe	50
Extreme	75

Notes : 1. For main reinforcement upto 12 mm diameter bar for mild exposure the nominal cover may be reduced by 5 mm.

2. Unless specified otherwise, actual concrete cover should not deviate from the required nominal cover by + 10 mm.

3. For exposure condition ‘severe’ and ‘very severe’ reduction of 5 mm may be made, where concrete grade is M35 and above.

4. Nominal cover to meet specified period of fire resistance shall not be less than as given in Table 16A of IS 456.

12.4.4 Measurement

Reinforcement including authorized spacer bars and lappages shall be measured in length of different diameter, as actually (not more than as specified in the drawings.) used in the work nearest to a centimeter and their weight calculated on the basis of standard weight. In case actual unit weight of the bars is less than standard unit weight, but within variation, in such cases weight of reinforcement shall be calculated on the basis of actual unit weight. Wastage and unauthorized overlaps shall not be paid for. Annealed steel wire required for binding or tack welding shall not be measured, its cost being included in the rate of reinforcement.

Where tack welding is used in lieu of binding, such welds shall not be measured. Chairs separators etc. shall be provided as directed by the Engineer-in-Charge and measured separately and paid for.

12.5 CONCRETING

12.5.1 The concrete shall be as specified under chapter 4 (CPWD Specification Volume 1 21019) concrete work. The proportion by volume or by the weight of ingredients shall be as specified.

12.5.2 Consistency

The concrete which will flow sluggishly into the forms and around the reinforcement without any segregation of coarse aggregate from the mortar shall be used. The consistency shall depend on whether the concrete is vibrated on or hand tamped, it shall be determined by slump test as prescribed in sub-head "concrete" under workability – requirement.

12.5.3 Placing of Concrete

12.5.3.1 Concreting shall be commenced only after Engineer-in-Charge has inspected the centering, shuttering and reinforcement as placed and passed the same. Shuttering shall be clean and free from all shavings, saw dust, pieces of wood, or other foreign material and surfaces shall be treated as prescribed in 12.3.1.

12.5.3.2 In case of concreting of slab and beams, wooden plank or cat walks of chequerred MS plated or bamboo chalies or any other suitable material supported directly on the centering by means of wooden blocks or lugs shall be provided to convey the concrete to the place of deposition without disturbing the reinforcement in any way. Labour shall not be allowed to walk over the reinforcement.

12.5.3.3 In case of columns and wall, it is desirable to place concrete without construction joints. The progress of concreting in the vertical direction, shall be restricted to one metre per hour.

12.5.3.4 The concrete shall be deposited in its final position in a manner to preclude segregation of ingredients. In deep trenches and footings concrete shall be placed through chutes or as directed by the Engineer-in-Charge In case of columns and walls, the shuttering shall be so adjusted that the vertical drop of concrete is not more than 1.5 metres at a time.

12.5.3.5 During cold weather, concreting shall not be done when the temperature falls below 4.5^0C. The concrete placed shall be protected against frost by suitable covering. Concrete damaged by frost shall be removed and work redone.

12.5.3.6 During hot weather precaution shall be taken to see that the temperature of wet concrete does not exceed 38ºC. No concrete shall be laid within half an hour of the closing time of the day, unless permitted by the Engineer-in-Charge

12.5.3.7 It is necessary that the time between mixing and placing of concrete shall not exceed 30 minutes so that the initial setting process is not interfered with.

12.5.4 Compaction

It shall be as specified in sub-head of Concrete Work of this specification.

12.5.4.1 Concrete shall be compacted into dense mass immediately after placing by means of mechanical vibrators designed for continuous operations complying with IS 2505, IS 2506, IS 2514 and IS 4656. The Engineer- in- Charge may however relax this condition

at his discretion for certain items depending on the thickness of the members and feasibility of vibrating the same and permit hand compaction instead. Hand compaction shall be done with the help of tamping rods so that concrete is thoroughly compacted and completely worked around the reinforcement, embedded fixtures, and into corners of the form. The layers of concrete shall be so placed that the bottom layer does not finally set before the top layer is placed. The vibrators shall maintain the whole of concrete under treatment in an adequate state of agitation; such that de-aeration and effective compaction is attained at a rate commensurate with the supply of concrete from the mixers. The vibration shall continue during the whole period occupied by placing of concrete, the vibrators being adjusted so that the centre of vibrations approximates to the centre of the mass being compacted at the time of placing.

12.5.4.2 Concrete shall be judged to be properly compacted, when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. When this condition has been attained, the vibrator shall be stopped in case of vibrating tables and external vibrators. Needle vibrators shall be withdrawn slowly so as to prevent formation of loose pockets in case of internal vibration. In case both internal and external vibrators are being used, the internal vibrator shall be first withdrawn slowly after which the external vibrators shall be stopped so that no loose pocket is left in the body of the concrete. The specific instructions of the makers of the particular type of vibrator used shall be strictly complied with. Shaking of reinforcement for the purpose of compaction should be avoided. Compaction shall be completed before the initial setting starts, i.e. with 30 minutes of addition of water to the dry mixture.

12.5.5 Construction joints

12.5.5.1 Joints are a common source of weakness and, therefore, it is desirable to avoid them. If this is not possible, their number shall be minimized. Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be as directed by Engineer-in-Charge

12.5.5.2 In case of columns the joints shall be horizontal and 10 to 15 cm below the bottom of the beam running into the column head. The portion of the column between the stepping off level and the top of the slab shall be concreted with the beam.

12.5.5.3 When stopping the concrete on a vertical plane in slabs and beams, and approved stop board (see Fig. 26C) shall be placed with necessary slots for reinforcement bars or any other obstruction to pass the bars freely without bending. The construction joints shall be keyed by providing a triangular or trapezoidal fillet nailed on the stop board. Inclined or feather joints shall not be permitted. Any concrete flowing through the joints of stop board shall be removed soon after the initial set. When concrete is stopped on a horizontal plane, the surface shall be roughened and cleaned after the initial set.

12.5.5.4 When the work has to be resumed, the joint shall be thoroughly cleaned with wire brush and loose particles removed. A coat of neat cement slurry at the rate of 2.75 kg of cement per square metre shall then be applied on the roughened surface before fresh concrete is laid.

12.5.6 Expansion Joints

Expansion joints shall be provided as shown in the structural drawings as directed by Engineer-in-Charge, for the purpose of general guidance. However it is recommended that structures exceeding 45 m in length shall be divided by one or more expansion joints. The filling of these joints with bitumen filler, bitumen felt or any such material and provision of copper plate, etc. shall be paid for separately in running metre. The measurement shall be taken two places of decimal stating the depth and width of joint.

12.5.7 Curing

After the concrete has begun to harden i.e. about 1 to 2 hours after its laying, it shall be protected from quick drying by covering with moist gunny bags, sand, canvass Hessian or any other material approved by the Engineer-in-Charge After 24 hours of laying of concrete, the surface shall be cured by ponding with water for a minimum period of 7 days from the date of placing of concrete in case of OPC and at least 10 days where mineral admixtures or blended cements are used. The period of curing shall not be less than 10 days for concrete exposed to dry and hot weather condition.

12.5.8 Rectification of Surface defects of Minor nature

Immediately on removal of forms, the R.C.C. work shall be examined by the Engineer-in-Charge, before any defects are made good.

(a) The work that has sagged or contains honey combing to an extent detrimental to structural safety or architectural concept shall be rejected as given in para 12.5.10.5 for visual inspection test.

(b) Surface defects of minor nature may be accepted. On acceptance of such a work by the Engineer-in-Charge, the same shall be rectified as follows:

1. Surface defects which require repair when forms are removed, usually consist of bulged due to movement of forms, ridges at form joints, honey-combed areas, damage resulting from the stripping of forms and bolt holes, bulges and ridges are removed by careful chipping or tooling and the surface is then rubbed with a grinding stone. Honey-combed and other defective areas must be chipped out, the edges being cut as straight as possible and perpendicularly to the surface, or preferably slightly under cut to provide a key at the edge of the patch.

2. Shallow patches are first treated with a coat of thin grout composed of one part of cement and one part of fine sand and then filled with mortar similar to that used in the concrete. The mortar is placed in layers not more than 10mm thick and each layer is given a scratch finish to secure bond with the succeeding layer. The last layer is finished to match the surrounding concrete by floating, rubbing or tooling on formed surfaces by pressing the form material against the patch while the mortar is still plastic.

3. Large and deep patches require filling up with concrete held in place by forms. Such patches are reinforced and carefully dowelled to the hardened concrete.

4. Holes left by bolts are filled with mortar carefully packed into places in small amounts. The mortar is mixed as dry as possible, with just enough water so that it will be tightly compacted when forced into place.

5. Tiered holes extending right through the concrete may be filled with mortar with a pressure gun similar to the gun used for greasing motor cars.

6. Normally, patches appear darker than the surrounding concrete, possibly owing to the presence on their surface of less cement laitance. Where uniform surface colour is important, this defect shall be remedied by adding 10 to 20 percent of white Portland cement to the patching mortar, the exact quantity being determined by trial.

7. The same amount of care to cure the materials in the patches should be taken as with the whole structure. Curing must be started as soon as possible, after the patch is finished to prevent early drying. Damp Hessian may be used but in some locations it may be difficult to hold it in place. A membrane curing compound in these cases will be most convenient.

(c) Whenever required, The exposed surface of R.C.C. work shall be plastered with cement mortar 1:3 (1 cement : 3 fine sand) of thickness not exceeding 6 mm to give smooth and even surface true to line and form. Any RCC surface which remains permanently exposed to view in the completed structure, shall be considered exposed surfaced for the purpose of this specification.

(d) The surface which is to receive plaster or where it is to be joined with brick masonry wall, shall be properly roughened immediately after the shuttering is removed, taking care to remove the laitance completely without disturbing the concrete. The roughening shall be done by hacking. Before the surface is plastered, it shall be cleaned and wetted so as to give bond between concrete and plaster.

(e) RCC work shall be done carefully so that the thickness of plaster required for finishing the surface is not more than 6 mm.

(f) The surface of RCC slab on which the cement concrete or mosaic floor is to be laid shall be roughened with brushes while the concrete is green. This shall be done without disturbing the concrete.

12.5.9 Strength of Concrete

The compressive strength on the work tests for different mixed shall be as given in Table below:

Concrete Mix (Nominal Mix on Volume basis)	*Compressive Strength in (Kg/ sq cm)*	
	7 days'	*28 days'*
1:1:2	210	315
1:1.5:3	175	265
1:2:4	140	210

12.5.10 Testing of Concrete

12.5.10.1 Regular mandatory tests on the workability of the fresh concrete shall be done to achieve the specified compressive strength of concrete. These will be of two types

12.5.10.1.1 Mandatory Lab, Test

12.5.10.1.2 Mandatory Field Test

Results of Mandatory Field Test will prevail over mandatory Lab. Test.

12.5.10.2 **Cube Test for Compressive Strength of Concrete - Mandatory Lab Test *:*** Mandatory tests shall be carried out as prescribed in Appendix A of Chapter 5 (CPWD Specification Volume 1 2019).

12.5.10.3 **Additional Test** *:* Additional test, if required, shall be carried out as prescribed in Appendix B of Chapter 5 (CPWD Specification Volume 1 2019).

12.5.10.4 **Slump Test*:*** This test shall be carried out as prescribed in sub-head 4 of concrete.

12.5.10.5 ***Visual Inspection Test*:** The concrete will be inspected after removal of the form work as described in para 12.5.8 the question of carrying out mandatory test or other tests described in Appendix A and B (CPWD Specification Volume 1 2019) will arise only after satisfactory report of visual inspection.

The concrete is liable to be rejected if:

(i) It is porous or honeycombed as per para 12.5.8 (a).
(ii) Its placing has been interrupted without providing a proper construction joint.
(iii) The reinforcement has been displaced beyond tolerance specified or construction tolerances have not been met.

However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the Engineer-in-Charge at the risk and cost of the contractor.

12.5.11 Standard of Acceptance – for Nominal Mix

12.5.11.1 ***Mandatory Lab. Test:*** For concrete sampled and tested as prescribed in Appendix A of Chapter 5, the following requirement shall apply.

12.5.11.2 Out of six sample cubes, three cubes shall be tested at 7 days and remaining three cubes at 28 days.

12.5.11.3 7 days' Tests

Sampling: The average of the strength of three specimen shall be accepted as the compressive strength of the concrete provided the variation in strength of individual specimen is not more than ± 15% of the average. Difference between the maximum

and minimum strength should not exceed 30% of average strength of three specimens. If the difference between maximum and minimum strength exceeds 30% of the average strength, then 28 days' test shall have to be carried out.

Strength: If the actual average strength of sample accepted in para 'sampling' above is equal to or higher than specified strength upto ±15% then strength of the concrete shall be considered in order.

In case the actual average strength of sample accepted in the above para is lower than the specified or higher by more than 15% then 28 days' test shall have to be carried out to determine the compressive strength of concrete cubes.

12.5.11.4 28 days' Test

12.5.11.4.1 The average of the strength of three specimen be accepted as the compressive strength of the concrete provided the strength of any individual cube shall neither be less than 70% nor higher than 130% of the specified strength.

12.5.11.4.2 If the actual average strength of accepted sample exceeds specified strength by more than 30% the Engineer-in-Charge, if he so desires, may further investigate the matter. However, if the strength of any individual cube exceeds more than 30% of specified strength, it will be restricted to 130% only for computation of strength.

12.5.11.4.3 If the actual average strength of accepted sample is equal to or higher than specified strength upto 30% then strength of the concrete shall be considered in order and the concrete shall be accepted at full rates.

12.5.11.4.4 If the actual average strength of accepted sample is less than specified strength but not less than 70% of the specified strength, the concrete may be accepted at reduced rate at the discretion of Engineer-in-Charge

12.5.11.4.5 If the actual average strength of accepted sample is less than 70% of specified strength, the Engineer-in-Charge shall reject the defective portion of work represented by sample and nothing shall be paid for the rejected work. Remedial measures necessary to retain the structure shall be taken at the risk and cost of contractor. If, however the Engineer-in-Charge so desires, he may order additional tests (See Appendix B of Chapter 5) to be carried out to ascertain if the structure can be retained. All the charges in connection with these additional tests shall be borne by the contractor.

12.5.12 Measurements

Dimensions shall be measured nearest to a cm except for the thickness of slab which shall be measured correct to 0.5 cm. The areas shall be worked out nearest to 0.01 Sq. mt. The cubical contents shall be worked out to nearest 0.01 cubic metre.

13. RULED / FLUSH POINTING ON WHITE SAND STONE MASONRY

Pointing shall be as per existing pattern or as decided by the Engineer-in-Charge A sample patch shall be prepared for pointing and got approved from the Engineer-in-Charge The further work shall be taken up only after the approval of the sample work by the Engineer-In-Charge. The work executed should match exactly to the sample patch.

13.1. SCAFFOLDING

For all exposed Red Sand stone work independent double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong tied together with horizontal pieces over which scaffolding planks shall be fixed. For all other work in building, single scaffolding shall be permitted. In such cases, the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not to be allowed in pillars/columns having width less than one metre, or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering. The scaffolding material will be stacked at designated place decided by the Engineer-in-Charge and shall be removed after execution of the work and nothing extra shall be payable on this account.

The scaffolding plan shall be got approved from Engineer-in-Charge before start of work.

13.2. Preparation of surface

The purpose of surface preparation is to remove all kinds of loose material, debris, leaves, paper etc. from the surface where raking of the joints is to be carried out for re-plastering or re-pointing the stone masonry as the case may be.

The surface should be cleaned with brooms to remove of any loose material like dirt and dust. Now, the surface should be cleaned by using high pressure Jet machines having dual benefit of removal of the loose material and softening of the mortar in the stone masonry. Every effort should be made to avoid dust nuisance.

13.3. Mortar

Mortar mix as specified in DSR item 3.19 shall be used with slight variation to the contents of Surkhi. It should be lime, Surkhi (15% dark red and 85% light yellow or as approved by the Engineer-In-Charge) and marble dust in the proportion of 1:1.5:0.5.

13.4. Application and Finishing

The surface should be thoroughly cleaned and wet before application of the mortar. It should be ensured that adjoining stones should also be made wet so that the mortar dries slowly. If required, tarpaulin shall be used to make the surface shady during sunny weather. The mortar shall be pressed into the raked-out joints carefully with a pointing trowel, either flush, sunkor raised, according to the type of pointing required. The pointing lines shall be truly horizontal and vertical

except where the joints are slanting in the existing heritage structural masonry. Lines of joints from different directions should meet neatly at the junctions instead of crossing beyond.

The mortar shall not be spread over the corner, edges or surface of the masonry. The pointing shall then be finished with the proper tool, in the manner described below:

13.4.1. Flush Pointing: The mortar shall be pressed into the joints and shall be finished off flush and level with the edges of Red Sand stone masonry, so as to give a smooth appearance. The edges shall be neatly trimmed with a trowel and straight edge.

13.4.2. Ruled Pointing: The joints shall be initially formed as for flush pointing and then while the mortar is still green, a groove of shape and size as per existing pattern or as shown in drawings or as instructed by the Engineer-in-Charge, shall be formed by running a forming tool, straight along the centre line of the joints. This operation shall be continued till a smooth and hard surface is obtained. The vertical joints shall also be finished in a similar way. The vertical lines shall make true right angles at their junctions or to the existing pattern of the heritage building true with the horizontal lines and shall not project beyond the same.

13.4.3. Cut or Weather Struck Pointing: The mortar as specified above shall first be pressed into the joints. The top of the horizontal joints shall then be neatly pressed back about 3 mm or as directed by the Engineer-in-Charge, with the pointing tool so that the joints are sloping from top to bottom. The vertical joints shall be ruled pointed. The junctions of vertical joints with the horizontal joints shall be at true right angles or to the shape of the existing heritage building structure.

13.5. CURING: The pointing shall be kept wet for seven days. Treated area should preferably be covered/ wrapped with hessian cloth, which is kept wet for the entire curing period. During this period, it shall be suitably protected from direct sun and all damages.

13.6. MEASUREMENTS: Length and breadth of the area of stone work treated shall be measured correct to a cm and its area shall be calculated in square metres up to two places of decimal.

14. REMOVAL OF DISTEMPER AND CHEMICAL CLEANING

All loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease, dirt etc. Removing dry or oil bound distemper by a washing and scraping and sand papering the wall surface smooth including necessary repairs to scratches complete.

The chemical cleaning should first be tested on a small area to establish the amount of cleaning required and feasibility of the system and optimal strength and combination of various components. The test area should be so selected that it represents the requisite soiling or staining. The occupants of the building should be forewarned. Sufficient provision for safe scaffolding, plant, clean water supply, safe storage of the materials and removal of debris be made at site before commencement of the chemical cleaning. Glass, painted and polished surfaces should be protected by applying peelable plastic compound, polythene sheets or hardboard sealed at the edges.

The washing should start by mixing requisite quantity of Ammonia chemical not more than 5% concentration or Teepol or any other chemical approved by ASI and/or Engineer-in-Charge mixed with fine sand/silica. The pressure of the Machine should be maintained so that misting (which uses little water) is achieved. The spray should be applied at an angle so that it removes the stains easily. Right Angled jets destroy the surface, hence, better to avoid. The jet should be applied till the requisite cleaning is not obtained.

After Chemical cleaning the surface should be rinsed with clean water. Efforts should be made to remove all the chemicals to avoid damage to the masonry. Any splashes on doors, windows, polished etc. shall be made good by the agency at own cost and nothing extra shall be payable on this account.

14.1. MEASUREMENTS

Length and breadth of the surface of stone masonry cleaned shall be measured correct to a cm and its area shall be calculated in square metres up to two places of decimal. No deduction is to be made for any openings in the range of 0.5 Sqm and nothing extra shall be payable for providing protective films on doors, windows etc.

No deduction shall be made for the jali work as well.

Nothing extra shall be paid for ornamental work of any nature up to a radius of 3.00 Metre

15. PROPPING AND CENTERING

15.1. All propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel

15.1.1. ***Centering/Staging :*** Staging should be as designed with required extension pieces as approved by Engineer-in-Charge to ensure proper slopes, as per design for slabs/ beams etc. and as per levels as shown in drawing. All the staging to be either of Tubular steel structure with adequate bracings as approved or made of built up structural sections made form rolled structural steel sections.

15.1.2. **Guidelines for Multistage Certering:** The proper handling the situation of multistage centering in buildings or where height of casting of concrete is higher than normal height of 3.5 M or where higher loadings are coming during casting of concrete or large span structures and in situations of casting of some special structures like Domes, Vaults etc. In all situations, centering/scaffolding/staging for casting of these structures should be properly designed by a qualified and experienced person/agency having past experience in design of false work (centering) for concrete structures and should be proof checked by similar experienced person/ agency and it should be properly approved and issued to contractor by Engineer-in-Charge The provisions of clause 7 of IS:14687 may be referred for design of false work (centering). A method statement for erection and dismantling of the centering/scaffolding/staging and process of concreting shall be prepared by contractor and submitted to Engineer-in-Charge for approval and the work shall be commenced only after approval of method statement by Engineer-in-Charge The provisions of clause 9 of IS:14687 may be referred for erection of false work (centering), safet precautions and other site

operations, pertaining to false work (centering). Experienced form watcher shall be engaged during erection, concreting and dismantling for early detection of any movement or instability in the system. The field engineers shall ensure that CPWD specifications and provisions of BIS codes are strictly followed. A detailed programme of field safety inspection of centering/scaffolding/form work of such structures during different stages should be chalked out and strictly followed.

Provision of safety net, fall arresting system including other safety gears, for workers, working over these structures shall be made in contract and should be followed strictly.

16. RAKING OF JOINTS

16.1. Preparation of Surface:

The purpose of surface preparation is to remove all kinds of loose material, debris, leaves, paper etc. from the surface where raking of the joints is to be carried out for re-plastering or re-pointing the stone masonry as the case may be.

The surface should be cleaned with brooms to remove of any loose material like dirt and dust. Now, the surface should be cleaned by using high pressure Jet machines having dual benefit of removal of the loose material and softening of the mortar in the stone masonry. Every effort should be made to avoid dust nuisance.

16.2. Safety:

Contractor shall be advised to ensure that all workers should wear helmets, safety belts, proper shoes, tight clothes etc. while working at all heights including working on domes etc. Every effort should be made to avoid free falling of the material and necessary protection should be provided along the scaffolding (if any). Care shall be taken by the agency to avoid any damage to the heritage building. If any structural or aesthetic damage is caused to the building the same shall be made good by the agency at its own cost and nothing extra shall be paid for this.

16.3. Tools and Plants (T&P)

Agency will provide all the requisite tools and plants like hammer & chisel for manual raking and Power or Pneumatically driven mechanical mortar raking equipments of approved manufacturers' as per site conditions and as per directions of the Engineer-in-Charge The agency will take prior permission of the Engineer-in-Charge to use Power or pneumatically driven mechanical mortar rakers depending upon the noise level that can be approved in the area where work is to be carried out. The work should be carried out in most professional manner so that no interference is caused to the working of various offices/residences housed in or in the vicinity of the heritage building. Mechanical Jet Spray machines of requisite power shall be procured by the Agency and also shall make own arrangement of the water for the purpose.

To ensure efficient and effective functioning, all T&P must be checked on-site at regular intervals and work must not hold up for want of repairs of the T&P.

16.4. Skilled Site Personnel

Only skilled workers shall be employed by the contractor. They must possess knowledge of working in heritage structures and must have required special training and/or practical experience in executing such works. At least the supervisory staff and major workers should have requisite expertise in the field.

16.5. Scaffolding

Scaffolding shall be strong to withstand all dead, live and impact loads which are likely to come on them. Scaffolding shall be provided to allow easy approach to every part of the work.

16.5.1. Double Scaffolding: Where the joints in the masonry of heritage structures are to be exposed by raking, manual or mechanical, double scaffolding system (cup & lock type) shall be provided in the interior as well as exterior side of the building wherever it is feasible/ required to provide the scaffolding system.The scaffolding system shall be stiffened with bracings, runners, and connectors etc. to secure it to the structure. Size of the members shall be dependent upon the height at which raking of the joints is to be done.

16.6. Raking of Joints

Proper working space/platform shall be provided to the workers by providing scaffolding (if required) so that raking of the joints could be done easily. The surface where raking of joints is to be done,shall be clearly marked with chalk or any other material, so that it can be easily distinguished.

Raking with hand tools like hammer and chisel shall be resorted to in case the location is not easily accessible for mechanical equipments, sufficient power supply is not ensured or the area is too small to be economical for mechanical raking. Raking of joints should progress from one end to other first raking the one horizontal joint at a time to the requisite depth as decided by the Engineer-in-Charge Then next horizontal joint is taken up and so on. Once all horizontal joints are raked up vertical joints shall be raked from either ends.The raked joints are then cleaned by brushing and watering.

The debris/rubbish shall be collected in most professional manner and disposed of to the dumping ground with all lead or as per direction of the Engineer-in-Charge

The whole process shall be considered complete if approved from the Engineer-in-Charge

16.7. Measurements

Length and breadth shall be measured correct to a cm and its area shall be calculated in square metres up to two places of decimal.

For jambs, soffits, sills etc. for opening not exceeding 0.5 sqm each in area, ends of joists,

beams,posts, girders, steps etc. not exceeding 0.5 sqm each in area and opening not exceeding 3 sqm each deductions and additions shall be made in the following way, in case of raking on external face only.

(a) No deduction shall be made for ends of joists, beams, posts etc. and openings not exceeding 0.5Sqm each, and no addition shall be made for reveals, jambs, soffits, sills, etc. of these openings.

(b) Deductions for openings exceeding 0.5 sqm but not exceeding 3 sqm each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills, etc. for these openings.

(c) When both the faces of the wall are raked deduction shall be made for one face only.

(d) When only one face is raked deduction shall be made from one side of frame for doors, windows, etc. on which the width of the reveal is less than that on the other side, but no deduction shall be made from the other side.

(e) Where width of reveals on both faces of wall is equal, deduction of 50% of area of opening on each face shall be made from the raked area.

(f) For opening having door frame equal to or projecting beyond thickness of wall, full deduction for opening shall be made from each pointed face of wall.

In case of openings of area above 3 sqm each, deduction shall be made for the openings, but jambs, soffits and sills shall be measured.

17. FLOORING

17.1. Granite / Kota flooring

17.1.1. Granite / Kota Slabs

The slabs shall be of selected quality, hard, sound, dense and homogeneous in texture free from cracks, decay, weathering and flaws. They shall be hand or machine cut to the requisite thickness. They shall be of the colour indicated in the drawings or as instructed by the Engineer-in-Charge

Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free form chippings and giving plain surface.

17.1.2. Preparation of Surface

The joints shall be raked out to a depth of at least 15 mm in masonry walls. In case of concrete walls, the surface shall be hacked and roughened with wire brushes. The surface shall be cleaned thoroughly, washed with water and kept wet before laying is commenced. The floor shall be cut uniformly to the requisite depth so that the skirting face shall have the

projection from the finished face of wall as shown in drawings or as required by the Engineer-in-Charge In no case the skirting should project by more than thickness of stone.

17.1.3. Laying

The risers of steps, skirting and wall surface shall be in grey or white cement admixed with or without pigment to match the shade of the stone, as specified in the description of the item, with the line of the slab at such a distance from the wall that the average width of the gap shall be 12 mm and at no place the width shall be less than 10 mm, if necessary, the slabs shall be held in position by temporary M.S. hooks fixed into the wall at suitable intervals. The skirting or riser face shall be checked for plane and plumb and corrected. The joints shall thus be left to harden then the rear of the skirting or riser slab shall be packed with cement mortar 1:3 (1 cement: 3 coarse sand) or other mix as specified in the description of the item. The fixing hooks shall be removed after the mortar filling the gap has acquired sufficient strength.

The joints shall be as fine as possible but not more than 1 mm. The top line of skirting and risers shall be truly horizontal and joints truly vertical, except where otherwise indicated.

The risers and skirting slab shall be matched as shown in drawings or as instructed by the Engineer-in-Charge Except that the joints of the slabs shall be set in grey cement mixed with pigment to match the shade of the slabs.

17.1.4. Curing, Polishing and Finishing

The surface shall be left dry for air-curing for a duration of 12 to 18 hours depending on atmospheric temperature conditions. It shall then be cured by allowing water to stand in pools over it for a period of not less than 4 days. The grinding and polishing may be commenced not before 2 days from the time of completion of laying for manual grinding and not before 7 days for machine grinding. For polishing by machines, the surface shall be watered and ground evenly with machine fitted with special rapid cutting grit blocks (carborundum stone) of coarse grade (No. 60) till the marble chips are evenly exposed and the floor is smooth. After the first grinding, the surface shall be thoroughly washed to remove all grinding mud and covered with a grout of cement and colouring matter in same mix and proportion as the topping in order to fill any pin holes that appear. The surface shall be allowed to dry for 24 hours and wet cured for 4 days and then rubbed with machine fitted with fine grit blocks (No. 120). Curing shall be done by ponding of water between panels formed with fine sand. The surface is cleaned and repaired as before and allowed to cure again for 3 to 5 days. Finally the third grinding shall be done with machine fitted with mere fine grade grit blocks (No. 320) to get even and smooth surface without pin holes. The finished surface should show the marble chips evenly exposed.

Where use of machine for polishing is not feasible or possible, rubbing and polishing shall be done by hand, in the same manner as specified for machine polishing except that carborundum stone of coarse grade (No. 60) shall be used for the 1st rubbing, stone of medium grade (No. 80) for second rubbing and stone of fine grade (No. 120) for final rubbing polishing.

After the final polish either by machine or by hand, oxalic acid shall be dusted over the surface @ 33 gm per square metre sprinkled with water and rubbed hard with a nemdah block (Pad of Woollen rags). The following day, the floor shall be wiped with a moist rag and dried with a soft cloth and finished clean.

Curing shall be done by suitable means such as laying moist sawdust or ponding water.

17.1.5. Measurements

Length shall be measured along the finished face of riser or skirting, correct to a cm. Height shall be measured from the finished level of tread or floor, to the top (the underside of tread, in the case of steps) correct to 0.5 cm. The areas shall be calculated in square metre correct to two places of decimal. Dado and lining of pillars etc. shall be measured as 'Marble work in wall lining. If the thickness is upto 25 mm or as "Marble Work" in Jambs, walls, columns and other plain work' if the thickness is more.

17.2. Terrazo Tile Flooring

17.2.1. Terrazo Tiles

Terrazo tiles shall generally conform to IS 1237-Edition 2.3. Requirements and methods of testing of tiles are described in Appendix B. Unless otherwise specified, the tiles shall be supplied with initial grinding and grouting of wearing layer.

The size of tiles shall be as given in below table or as shown in the drawings or as required by the Engineer-in-Charge Half tiles for use with the full tiles shall be such as to make two half tiles when oined together, match with the dimensions of one full tile.

Length Nominal	*Breadth Nominal*	*Thickness not less than*
200 mm	200 mm	20 mm
250 mm	250 mm	22 mm
300 mm	300 mm	25 mm

17.2.2. Tolerance:

Tolerances on length and breadth shall be plus or minus one millimetre, and tolerance on thickness shall be plus 5 mm. The variation of dimensions in any one delivery of tiles shall not exceed 1 mm on length and breadth and 3 mm on thickness.

17.2.2.1. The tiles shall be manufactured in a factory under pressure process subjected to hydraulic pressure of not less than 140 kg per square centimetre and shall be given the initial grinding with machine and grouting of the wearing layer before delivery to site. The wearing layer shall be free from projections, depressions, cracks, holes, cavities and other blemishes. The edges of wearing layer may be rounded.

17.2.2.2. The proportion of cement to aggregate in the backing of tiles shall be not leaner than 1:3 by weight. Where colouring material is used in the wearing layer, it shall not exceed 10 per cent by weight of cement used in the mix.

17.2.2.3. The finished thickness of the upper layer shall not be less than 5 mm for size of marble chips ranging from the smallest upto 6 mm and also, not less than 5 mm for size of marble chips ranging from the smallest upto 12 mm, and not less than 6 mm for size of marble chips varying from the smallest upto 20 mm.

17.2.3. Laying

17.2.3.1. Base concrete or RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tiles shall be with cement mortar of specified proportion and in conformity with provisions in relevant para of chapter on 'Mortar'.

17.2.3.2. Cement mortar 1:4 (1 Cement : 4 coarse sand) bedding shall be used. Average thickness of the bedding mortar shall be 20 mm and the thickness at any place shall not be less than 10 mm.

17.2.3.3. Cement mortar bedding shall be spread, tamped and corrected to proper levels and allowed to harden for a day before the tiles are set. If cement mortar is laid in bedding the terrazo tiles, these shall be set immediately after laying the mortar. Over this bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 4.4 kg of cement per square metre over such an area as would accommodate about twenty tiles. Tiles shall be washed clean and shall be fixed in this grout one after another, each tile being gently tapped with a wooden mallet till it is properly bedded, and in level with the adjoining tiles. The joints shall be kept as thin as possible not exceeding 1 mm and in straight lines or to suit the required pattern. The joints shall be properly cleaned before filling with cement grout of matching colour.

17.2.3.4. The surface of the flooring during laying shall be frequently checked with a straight edge of length at least 2 metre, so as to obtain a true surface with the required slope.

17.2.3.5. Where full tiles or half tiles can not be fixed, tiles shall be cut (sawn) from full tiles to the required size and their edges rubbed smooth to ensure a straight and true joint.

17.2.3.6. Tiles which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster, skirting or dado. The junction between wall plaster and tile work shall be finished neatly and without waviness.

17.2.3.7. After the tiles have been laid, surplus cement grout that may have come out of the joints shall be cleared off.

17.2.4. Curing, Polishing and Finishing

17.2.4.1. The day after the tiles are laid all joints shall be cleaned of the grey cement grout with a wire brush or trowel to a depth of 5 mm and all dust and loose mortar removed and cleaned. Joints shall then be grouted with grey or white cement mixed with or without pigment to match the shape of the topping of the wearing layer of the tiles. The same cement slurry shall be applied to the entire surface of the tiles in a thin coat with a view to protect the surface from abrasive damage and fill the pin holes that may exist on the surface

17.2.4.2. The floor shall then be kept wet for a minimum period of 7 days. The surface shall thereafter be grounded evenly with machine fitted with coarse grade grit block (No. 60) . Water shall be used profusely during grinding. After grinding the surface shall be thoroughly washed to remove all grinding mud, cleaned and mopped. It shall then be covered with a thin coat of grey or white cement, mixed with or without pigment to match the colour of the topping of the wearing surface in order to fill any pin hole that appear. The surface shall be again cured. The second grinding shall then be carried out with machine fitted with fine grade grit block (No. 120).

17.2.4.3. The final grinding with machine fitted with the finest grade grit blocks (No. 320) shall be carried out the day after the second grinding described in the preceding para or before handing over the floor, as ordered by the Engineer-in-Charge

17.3. Rajula/Granite/ Limestone Cobble Stones

Cobble stones shall be free from flaws, injurious veins, cavities and similar imperfections that would impair its structural integrity and adversely affect its strength and appearance. Cobble stones shall be rectangular or square and of specified dimensions. The tolerance in length and breadth shall be ± 2 mm and thickness ± 1 mm. The bottom face may be rough but the top surface shall be fine dressed and joint faces shall be dressed back square with the top surface for at least 50 mm, without hollowness or spalling off. The dimensions of the blocks shall be as specified. The tolerances shall be allowed ± 5 mm for facing blocks. The edges of the blocks shall be dressed according to IS: 1129.

17.3.1. Dressing of stone: Every stone shall be cur to required size and fine chisel dressed to give a smooth and even surface on all sides to the full depth. A straight edge laid along the sides of the stone shall be fully in contact with it. Chisel dressing shall also be done on top surface to remove any waviness. The sides and top surface to granite slabs shall be machine rubbed or table rubbed with bourse sand before using. All angles and edges of slabs shall be true square and free form chippings.

17.3.2. The thickness of stone shall be 100 mm. The allowable tolerance shall be 2 mm. allowable.

17.3.3. **Bedding:** Bedding of Cobble stones shall eight be with cement mortar 1:4 (1 cement: 4 coarse sand) of average thickness 25 mm. thick as given in description of item. Minimum thickness at any place shall not be less than 10 mm.

17.3.4. **Laying:** The surface of sub grade shall be cleared wetted and mopped. Mortar of specified mix and thickness shall then be spread on an area sufficient to receive one granite slab, the stones shall be washed clean before laying. It shall be laid on top pressed and tapped gently to bring it in level with other slabs. It shall then be lifted and laid a side. The top surface of the mortar shall then be corrected by adding fresh mortar at hollows, or depressions. The mortar shall then be allowed to harden it over this surface cement slurry of honey like consistency at 4.4 Kg. Of cement per sq. meter. The edges of stones already paved shall be buttered with gray cement. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joints shall be as fine as possible: Surplus cement on the surface of the slabs shall be removed. The slab fixed in the floor adjoining the walls shall enter not less 10 mm. under the plaster skirting or dado. The junction between the walls and floors shall be finished neatly. The finished surface shall be true to level and slopes as directed.

17.3.5. **Curing:** The floor shall be cured for minimum period of seven days.

17.3.6. **Polishing and finishing**: Unevenness at the meeting edges of slab shall be removed by fine chiseling. Finishing etc. shall be done as per relevant specifications of item no. kotah stone flooring except that cement slurry with/or without pigments shall not be applied on the surface before each polishing.

17.3.7. **Mode measurements**

Cobble stone flooring with various kinds of granite shall measure in sq. meter. The length and breadth shall be measured between the finished face of skirting or dado or wall plaster. No deduction shall be made not extra shall be paid for any openings in the floor or area upto 0.05 sq. mt. Nothing extra shall be paid for laying stone at different levels in the same room. Treads and steps of stairs paved with granite stone slabs shall also be measured under flooring.

17.4. Cement Concrete Interlocking Grass Pavers

17.4.1. Base

Interlocking Grass pavers to be fixed on the bed 50 mm or specified otherwise thick of soil of approved specification and filling the joints with the soil of approved type and quality or as specified and as directed by Engineer-in-Charge Interlocking Grass Pavers

Factory made precast grass pavers of M-40 or otherwise specified grade to be used. Paver blocks to be of approved brand and manufacturer and of approved quality.

Minimum strength as prescribed by manufacturer and as per direction of Engineer-in-Charge for the grade specified to be tested as per method mentioned in specification of subhead cement concrete of CPWD

17.4.2. Measurement & Rates

Area provided with paver block to be measured in sqm. Correct up to two places of decimal. The rate includes the cost of the material, labour, tools etc. required in all the operations described above.

18. STRUCTURAL REPAIRS

18.1. Stitching of cracks

18.1.1. Materials and T&P: High tensile 316 grade stainless steel rods of required diameter with both ends cold bent at 90 degrees, epoxy grout/ putty of approved manufacturer, power driven tool for chase cutting and drilling, hand operated blow out pump etc. and all related accessories and materials.

18.1.2. Testing: The grout and reinforcing bars shall be tested to conform to the manufacturers' specifications. The power driven tools shall be test driven and their drills/ cutting bits shall be tested for effectiveness before taking up repair operation.

18.1.3. Procedure: Follow the guidelines for Safety, Quality Assurance, Environmental Protection, Product delivery, Personnel, Supervision, Storage and Handling, etc given in contract documents. Identify the Cracks and mark the area for cracks stitching. Remove plaster, if required, to identify and mark the cracked masonry area. Prop & support the structural member, if required, to relieve it of stress and strains. Drill the pilot holes in vault of required diameter at least 30 cm in depth and at least 15 cm on either side of the crack perpendicular to it at spacing 300 mm or as directed by Engineer-in-Charge Remove dust in drilled holes by blowing oil free compressed air, if available with air compressor, otherwise with hand operated blow out pump. All prepared surfaces shall be thoroughly inspected and got approved by the contractor from the Engineer-in-Charge Plug the drilled holes with epoxy grout/ putty approved manufacturer as per manufacturer's specifications. Holding the reinforcing bar perpendicular to the crack to be stitched, fix both bent parts of reinforcing bar in the holes filled with epoxy grout/ putty. Trowel back displaced grout so that inserted portion of reinforcing bar is properly anchored with the help of epoxy grout/ putty.

18.1.4. Measurements: For payment purposes, each reinforcing bar shall be measured.

18.2. INJECTING G.I. NOZZLES AND GROUTING WITH LIME BASED MORTAR

18.2.1. Materials and T&P:

12 mm diameter approved Aluminium/ Galvanized Iron nipples, chisel, hammer, power driven tool for chase cutting and drilling, hand operated blow out pump, sealing putty of polyester/epoxy/ polymer modified mortar etc. and all related accessories and materials.

18.2.2. Testing:

The sealing putty and nipples shall be tested to conform to the manufacturers' specifications. The power driven tools shall be test driven and their drills/ cutting bits shall be tested for effectiveness before taking up repair operation.

18.2.3. Procedure:

Follow the guidelines for Safety, Quality Assurance, Environmental Protection, Product delivery, Personnel, Supervision, Storage and Handling, etc given in contract documents. Identify the Cracks and mark the area for injection grouting.

Remove plaster, if required, to identify and mark the honey combed area.

Prop & support the structural member, if required, to relieve it of stress and strains.

Open up cracked surface by making 'V' notch or groove of size 12 mm x 12mm. Drilling holes of required diameter up to depth of 200mm or 1/3rd of the wall thickness (whichever is less), at required spacing but not exceeding the thickness of member or 300 mm whichever is less, or as directed by Engineer-in-Charge Remove coarse debris and dust in opened up cracks and drilled holes by blowing oil free compressed air, if available with air compressor, otherwise with hand operated blow out pump. Concrete surfaces required to be grouted shall be free from all loose and unsound materials by means of mechanical abrasion using stiff wire brushes, after removing all loose areas with chisel and hammer. Area shall be made free from any deleterious materials, such as oil dust dirt etc. by means of oil free jet of compressed air and then washing with water jet. All prepared surfaces shall be thoroughly inspected and got approved by the contractor from the Engineer-in-Charge

Insert 10/12mm dia. specified injection nipples in holes drilled along crack lines and fix them by sealing only its sides with epoxy or polymer modified mortar.

Seal the crack or the honey combed surface between the nipples by polymer modified mortar as may be approved by Engineer-in charge. The polymer used shall be of approved grade and applied as per manufacturers specifications.

18.2.4. Measurements

For payment purposes, nipples fixed shall be measured in number

18.3. Lime Grout of crack in masonry/concrete or strengthening of honeycombed/ weak lime concrete

18.3.1 Materials and T&P:

Grout: lime based or cement-lime based with requisite modifiers such as polymers, fine quartzite sand or micro silica as per design requirements mixed with shrinkage compensating agents or approved pre packed grouts

Hand/power operated grouting pressure pump/gun with pressure gauge. The grouting equipment shall be capable of supplying, mixing, stirring and pumping grout to the satisfaction of the Engineer-in-Charge the equipment shall have the capacity to inject grout at a pressure upto 7 kg per square centimeter measured at the grout connections.

Air compressor with all related accessories for carrying compressed air to the required location. Hand operated blow out pump may be allowed by Engineer-in-Charge for small crack depths/areas.

Calibrated Spring Balance (for accurately weighing different components of materials in required proportions), mechanical blender for mixing, spray equipment/brush for application of polymer modified/ bonding cement slurry

18.3.2 Testing:

The sealing putty and the nipples shall be tested to conform to the manufacturers specifications.

18.3.3 Procedure:

Follow the guidelines for Safety, Quality Assurance, Environmental Protection, Product delivery, Personnel, Supervision, Storage and Handling, etc given in contract documents.

Full quantity of manufactured material/ grout e.g. specified resin, hardener, polymer, cement, lime etc or approved pre packed grouts as may be required shall be received at site in factory sealed containers with labels legible/ good condition.

The grout pump and the pressure gauge shall be tested before taking up the repair operation. Identify the cracks and mark the area for injection grouting.

Surface Preparation: The appropriate propping/supporting, surface preparation and crack sealing from all nearby sides as per site requirements shall be completed, which may sequentially cover one or more of the following items of work:

Prop & support the structural member to relieve it of stress and strains.

Provide grouting nipples.

Blow the compressed air followed by washing with water through nipples located at the highest level and downwards to ensure removal of even fine dust particles from the cracked surface, which could obstruct the free flow of grout material and impede its bonding with cracked surface (and drying with air blast wherever epoxy injection grout is to be used).

Saturate the cracked surface in the vicinity of crack/honeycombed concrete/ stone masonry with water (but without excess water), only if the cementitious/ lime based/ cement-lime grout is to be injected. Otherwise, this step may be skipped.

Prepare the injection grout as under:

Grout of (lime based or cement-lime based with requisite modifiers such as polymers, fine quartzite sand or micro silica or approved pre packed grouts) as per design requirements mixed with shrinkage compensating agents in Masonry Work / lime concrete work as approved by Engineer-In-Charge.

Pre-packed super fluid, salt resistant lime based binder having ultra fines grout materials of approved manufacturer for filling the fine cracks in stone masonry and consolidating archways, vaulted roofs etc. as per specifications and site requirements as approved by Engineer-In-Charge.

Inject the approved & specified grout into the cracks by means of suitable gun or pump at a pressure of 2 to 4 kg./cm^2. In case of vertical cracks injection shall be started at the lowest nipple and continued until the injected grout begins to flow out at the next higher nipple. Whereas in other cases of horizontal locations, the injection shall be started from one nipple and continued until the injected grout begins to flow out at the other nipple.

The first nipple shall then be closed off and injection continued at the second until the grout flows out at the third. The process shall be repeated until the whole of the crack has been sealed. As soon as the system is cured, the nipples shall be cut.

In case of Honeycombed Area, each grout hole shall be grouted individually. Grouting pressures to be used in the work will vary with the conditions encountered and different areas and the pressure used shall be between 2 to 4 kg/cm^2. The sequence of injection shall be as per the direction of Engineer-in-Charge

18.3.4 Measurements:

The payment will be made on the basis of weight of pre-packed grouts/ approved grout actually consumed at site. Grout material wasted/ discarded/ hardened shall not count for payment and shall be recorded for deduction at the end of each operation.

18.4 Corrosion Cracks And Reinforcement Steel Exposed Of RCC Elements

Methodological polymer modified mortar structural repairs should be carried out at reinforcement corrosion affected areas in following manner

1. Carefully remove all loose plaster and de-bonded cover concrete. Core concrete should not be disturbed without structural consultant's consent.

2. Clean the exposed corroded reinforcement steel by mechanical wire brushing.

3. Apply rust remover / convertor to rusted reinforcement steel followed by passivator coat with necessary time interval in between.

4. Provide concrete penetrating corrosion inhibitor on concrete surface to treat corroded reinforcement steel embedded in sound concrete, if any

5. If diameter of reinforcement steel is reduced beyond permissible limits then provide supplementary reinforcement steel.

6. If core concrete exhibits hollow sound on tapping, then strengthen core concrete by injection grouting.

Finally build original concrete profile and maintain required concrete cover thickness by applying polymer modified mortar including bond coat at the interface.

19.0 LIME MORTAR

19.1 **Materials:** Materials shall comply with the specifications and standards as specified.

19.1.1 **Lime:** This specification lays down the general characteristics of lime to be used for the conservation work.

No readymade or factory made lime is to be used for any of the work.

The classification of lime to be used for various purposes is as follows:

Lime for making lime mortar: Class B lime: Feebly hydraulic lime

Lime for making lime plaster: Class C lime: Fat lime

19.2 Supply and Storage: The class B and Class C lime shall be supplied as quick lime. Lime supplied as quick lime or lump lime at the site should be in a sealed condition and subsequently stacked in a store or any other place which is dry and under cover well protected from rain. This is necessary because quick lime deteriorates quickly as it attracts moisture and carbon dioxide from atmosphere. For storing it should be piled up and covered with a blanket of lime dust to exclude moist air. Therefore it should be slaked as soon as possible in a pit called a '*Haudi'* specially constructed for this. It should be slaked for at least 10 days prior to its use for making lime mortar and plaster.

19.3 Rejection of Lime: The lump or quick lime having stone pieces, impurities and powdery shall be rejected.The Implementing agency at his own expense shall remove lime, which has been rejected by the Engineer, from the site of work within 3 days.

19.4 Lime slaking in tank*:* A tank or the *'Haudi'* lined with stone or brick and finished with cement large enough to permit, stirring and hoeing shall be prepared (generally tanks suitable for 5 quintals or 10 quintals of quick lime are used in practice). The tank shall be filled to half its depth with water.

Quick lime shall be gradually added till it fills the entire bottom to about half the depth of water. **(Never add water to lime).** While quick lime is being added it shall be constantly stirred and hoed so as to break up the lumps. No part of the lime shall be allowed to expose above water level. As the lime slakes with evolution of heat temperature begins to rise and more lime or water may be added

till the required temperature is reached and that temperature should be maintained by the addition of more lime or water till all the lime apparently has slaked, the stirring and hoeing shall be continued during the above process and for some period even after the slaking is apparently over. This whole act has to done with utmost precaution to the body by covering the eyes with glass goggles and wearing rubber boots.

19.5 Maturing: After the lime has cooled, more water shall be added if required and it shall be left undisturbed for not more than 7 days. The putty shall be allowed to mature but not allowed to dry out till it is used. Therefore the tank will need to be filled with water to allow the slaked lime to be constantly in submerged in water.

19.6 Surkhi: Surkhi is the powdered burnt bricks, brickbats and is used as an admixture to lime both for making lime mortar and lime plaster. Surkhi shall always be obtained from fully burnt or slightly under burnt, but never from over brunt bricks. Surkhi obtained from burnt loam shall not contain any un-burnt soil. Surkhi shall be perfectly clean, free from an admixture or any foreign element. Surkhi shall not contain soluble sulphate more than 0.5% for exposed work and work in damp situations and not more than 1.0% when used for works in dry and internal situations.

19.7 Stacking: Surkhi shall be stacked on masonry or wooden platform in regular stacks as of size2.0M x 2.0M x0.6M at the places as directed by the Engineer and shall be protected from dust, rains and dampness and shall be kept under adequate coverings provided by the implementing agency.

19.8 **Sand:** Sand used in the making of mortar should be fine sand, perfectly clean and sharp and preferably of a yellow and variegated colour. It should, if possible, be obtained from local pits

It is absolutely essential that it should possess the above mentioned qualities in order that a successful result may be obtained for the lime mortar. Fine grained, Dusty or dirty sand must not be allowed, and each fresh consignment should be carefully inspected in order to see that it corresponds with the sample approved in the first case. Many sands which would otherwise be of good quality contain lumps of foreign matter, or a quantity of dusty particles. Such sand may with the Engineers consent, be used after it has been thoroughly washed and sifted.

19.9 **Mortar mixes** -Lime Sand mortar and Lime surkhi plaster

19.9.1 Materials used**:** Lime: Lime B and Lime C class shall be used in the preparation of mortar

19.9.1.1 Surkhi Aggregates: It shall conform to Surkhi specification

19.9.1.2 Sand aggregate in lime mortar: *shall* confirm to sand specification

19.9.1.3 Water: For all mortars water used shall be free from mud, clay, and acidic, basic or organic impurities and shall be drinkable.

19.9.2 Proportion: The lime mortar shall be for lime in 1:1.5 (1 lime putty: 1.5 fine sand).

The lime surkhi mortar shall be in conformance to the DSR-2016 specification for lime in 1:1:1 (1 lime putty: 1 surkhi: 1 fine sand).

The proportion of mix for mortar shall also depend upon the percentage purity of lime with regard to its CaO content. In case the CaO content of lime is lower, the proportion of lime shall be suitably increased to compensate, for the lower CaO content of the lime used.

19.9.3 Preparation of mortar: Mortar mill (Lime *Chakki or Mill*) mixing: Slaked lime in the required quantity and fine aggregates in proportions (For lime mortar, 1:1:1 (1 lime putty: 1 surkhi: 1 fine sand) and (For lime mortar, 1:1.5(1 lime putty: 1.5 fine sand) shall be put along with limewater/water in the *chakki* spreading uniformly all along its circumference and ground with a stone *chakki* till a mortar of uniform colour and desired consistency is obtained. As grinding is done the mixture shall be continuously raked and turned over and over especially from corners and sides.

Mortar is to be ground to the required consistency depending on the mode of grinding i.e. bullock or tractor for 3 hrs and 1and half hour (at least) respectively. The prepared masala has to be then removed to a rectangular pit that would be used for storing of the masala with enough space to allow the masala to be mixed well for a short duration using feet before delivering it for application.

19.9.4 Strengthening of the mortar: The prepared lime mortar should be added with the admixture of *Lapti kapaani + methi+ gulgul ka paani,* which should be added only after being filtered properly. The filtered admixture will be thoroughly mixed with the lime mortar and then added with *rumimastagi ka paani* for extra strengthening of the mortar.

19.9.5 Storage of Mortar: Lime mortars prepared shall be used up as soon as possible after mixing 2 days for Class B limes from the time of making Putty or first grinding. Mortars from Class C limes can be used for periods longer than 3 days after the making of mortar provided they are protected from drying out. The mortar left over at the end of the working hour should be properly covered with moistened jute bags. When the mortar is used after a gap of two days it should be sprinkled with limewater and mixed well using feet covered with gumboot.

19.9.6 Rejection of Mortar: Mortar not found in accordance with the specifications above and unsuitable according to field and laboratory tests of lime mortar shall be rejected. The implementing agency at its own cost shall remove rejected mortar from the site of work within 3 days.

19.9.7 **Cutting and Cleaning cement/ lime pointing from masonry joints:** When modern lime or cement pointing has to be cut out from old joints and stone faces from the historic building in the complex, great care is to be taken such that the edges and surfaces of the brick/stone are not touched with chisel. When the cement pointing is hard and compact, a very small chisel is to be used and the centre of the cement joint is cut out, after which the sides of the joints where the cement adheres, are to be picked off with a steel tool, but without the use of a hammer

20. KERB STONE (PRECAST)

Precast Kerb slab casted with the cement concrete of M-25 or specified otherwise grade of size specified in item made of approved brand and manufacturer to be used.

Specification: CPWD specification- 2019 Vol- I to be followed.

21. CORTEN STEEL

Providing and fixing Corten Steel Sheets (weathered sheets) for DIU model panelling of thickness 6 mm A grade material for exterior cladding including material, fabrication and supply as per the design approved by the Architect and Engineer-in-Charge

22. THERMOPLASTIC PAINT

22.1. Painting Road/ Runways Markings

22.1.1. Materials

22.1.1.1. Special Road marking paint (Thermoplastic Paint) of approved brand and manufacture shall be used. The paint shall conform to IS 164. Ready mixed paint as received from the manufacturer shall be used without adding any admixture.

22.1.1.2. During work, if the consistency of the paint gets thick and thinning becomes necessary it shall be done by use of thinner of the approved brand of paint recommended by the manufacturer and with the approval of the Engineer-in-Charge

22.1.1.3. The paint shall be brought to the site of work by the contractor in original sealed containers. The material shall be brought in one lot in adequate quantity to suffice for the entire work. The Material shall be kept in the joint custody of the contractor and the Engineer-in-Charge The empty container shall not be removed from the site of work, till the work has been completed and permission obtained from the Engineer-in-Charge

22.1.2. Preparation of Surface

The surface shall be thoroughly cleaned and free from dust. All the dirt, scales, oil and grease shall be thoroughly removed before painting is started. The prepared surface shall be inspected and approved by the Engineer-in-Charge before painting is commenced.

22.1.3. Application

22.1.3.1. Before pouring into smaller containers for use, the paint shall be stirred thoroughly in its original container. The paint shall be continuously stirred in the smaller container while applying to Pavement surface so that its consistency is kept uniform.

22.1.3.2. The painting shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternatively in opposite direction, two or three times and then finally brushing lightly in a direction at right angle to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

22.1.3.3. Each coat shall be allowed to dry out thoroughly before the next coat is applied.

22.1.3.4. Earlier applied coat shall be cleaned off dust before the next coat is laid.

22.1.3.5. No left over paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed.

22.1.3.6. No hair marks from the brush or clogging of paint puddles shall be left on the work.

22.1.3.7. The surface shall ordinarily not be painted until it has dried up completely. Trial patches of paint shall be laid at intervals to check if drying is satisfactory.

22.1.3.8. The runway marking shall be done in accordance with the drawing unless otherwise instructed by the Engineer-in-Charge

22.1.4. Brushes and Containers

22.1.4.1. After work, the brushes shall be completely cleaned of paint by rinsing with turpentine. A brush in which paint has dried up is spoiled and shall on no account be reused for painting work. On no account kerosene oil shall be used for washing the brush.

22.1.4.2. When the paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth so that they are clean, and can be used again.

22.1.5. Measurement

Length and breadth shall be measured correct to a cm. Area shall be worked out in square metre, correct to two places of a decimal.

23. CPVC PIPES & FITTINGS

The pipes shall be CPVC (Chlorinated Poly Vinyl Chloride) material for hot & cold water supply piping system wth pipes as per CTs SDR -13.5 at a working pressure of 320 PSI at 23 deg C and 80 PSI at 82 deg.C, using solvent welded CPVC fittings i.e. Tees, Elbows, Couplees, Unions, Reducers, Brushing etc. including transition fittings (connection between CPVC & Metal pipes / GI) i.e. Brass adapters (both Male & Female threaded and all conforming to ASTM D-2846 with only CPVC solvent cement conforming to ASTM F-441, with clamps / structural metal supports as required /directed at site including cutting chases & fitting the same with cement concrete / cement mortar as required, including painting of the exposed pipes with one coat of desired shade of enamel paint. All termination points for installation of faucets shall have brass termination fittings. Installation shall be to the satisfaction of manufacturer & Project Manager. The material shall have to be gotten approved from Chief Fire Officer.

i. Joining Pipes & Fittings

a. Cutting:

Pipes shall be cut either with a wheel type plastic pipe cutting or hacksaw blade and care shall be taken to make a square cut which provides optimal bonding area within a joint.

b. Deburring / Beveling:

Burrs and fittings should be removed from the outside and inside of pipe with a pocket knife or file otherwise burrs and fittings may prevent proper contact between pipe and fittings during assembly.

c. Fitting preparation:

A clean dry rag/cloth should be used to wipe dirt and moisture from the fitting sockets and tubing end. The tubing should make contact with the socket wall 1/3 or 2/3 of the way into the fitting socket.

d. **Solvent Cement Application:**

Only CPVC solvent cement confirming to ASTM-F493 should be used for joining pipe with fittings. An even coat of solvent cement should be applied on the pipe end and a thin coat inside the fitting socket, otherwise too much of cement solvent can cause clogged water ways.

e. Assembly:

After applying the solvent cement on both pipe and fitting socket, pipe should be inserted into the fitting socket within 30 seconds, and rotating the pipe ¼ to ½ turn while inserting so as to ensure even distribution of solvent cement with the joint. The assemnbled system should be held for 10 seconds (approximately) inorder to allow the joint to set up.

An even bead of cement should be evident around the joint and if this bead is not continuous remake the joint to avoid potential leaks.

Set & Cure times:

Solvent cement set and cure times shall be strictly adhered to as per the below mentioned table.

Minimum Core prior to pressure testing at 150 PSI

Ambient Temperature during Core period	Pipe Size	
	½ " - 1"	1.¼" - 2"
Above 15 deg. C	1 Hr	2 Hrs
4-15 deg.C	2 Hrs	4 Hrs
Below 4 deg C	4 Hrs	8 Hrs

Special care shall be exercised when assembling flow guard systems in extremely low temperature (below 4°C) or extremely high temperature (above 45°C) In extremely hot

temperatures, make sure that both surfaces to be joined are till wet with cement solvent when putting them together.

f. Testing

Once an installation is completed and cored as per above mentioned recommendations, the system should be hydrostatically pressure tested at 150 psi (10 Bar) for one hour. During pressure testing, the system should be fitted with water and if a leak is found, the joint should be cut out and replacing the same with new one by using couplers.

24. REINFORCED CEMENT CONCRETE (RCC) HUME PIPES NP2 CLASS

i. All pipes shall be centrifugally spun RCC pipes NP2. Pipes shall be true and straight with uniform bore throughout. Cracked, warped pipes shall not be used on the work. All pipes shall be tested by the manufacturer and the Contractor shall produce, prior to use on site, a certificate to that effect from the manufacturer.
ii. The pipes shall be with or without reinforcement as required and of the class as specified. These shall conform to IS: 458-1971.
iii. 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.

24.1. Laying

RCC spun pipes shall be laid on cement concrete bed of cradles as specified and shown on the detailed drawings. The cradles may be precast and sufficiently cured to prevent cracks and breakage in handling. The invert of the cradles shall be left 12 mm below the invert level of the pipe and properly placed on the soil to prevent any disturbance. The pipe shall then be placed on the bed concrete or cradles and set for the line and gradient by means of sight rails and boning rods, etc. Cradles or concrete bed may be omitted, if directed by the Engineer-In-Charge.

24.2. Jointing

i) Semi flexible type collar joint.

ii) Hemp rope soaked in neat cement wash shall be passed round the joint and inserted in it by means of caulking tool. More skein of yarn shall be added and rammed home. Cement mortar with one part of cement and two part of sand and with minimum water content but on no account soft or sloppy, shall be carefully inserted, punched and caulked into the collar and more cement mortar added until the space of the collar has been filled completely with tightly caulked mortar. Provision of rubber sealing ring in the collar joint shall also be made. The joint shall then be finished off neatly outside the socket at an angle of 45 deg.

24.3. Curing:

The joint shall be cured for at least seven days. Refilling at joints will be permitted only on satisfactory completion of curing period.

24.4. Cement Concrete for Pipe Supports:

i) Unless otherwise directed by the Engineer-In-Charge cement concrete for bed, all round or in haunches shall be in the mix 1:4:8 (1cement : 4 coarse sand :8 graded stone aggregate 40 mm nominal size):

Description	Up to 1.4 m Depth (5')	Up to 3 m Depth (10')	Beyond 3 m Depth (10')
Pipes in open ground (no sub soil water)	all round	in haunches	all round
RCC/C.I pipes in sub soil water	all round	in haunches	in haunches
RCC/C.I pipes (in all Conditions)	all round	in haunches	in haunches
RCC/C.I pipes under Road or building	all round	all round	all round

ii) R C C pipes or CI pipes may be supported on brick masonry or precast RCC or in situ cradles. Cradles shall be as shown on the drawings.

iii) Pipes in loose soil or above ground shall be supported on brick or stone masonry pillars as shown on the drawings.

24.5. Measurement:

i) Excavation

Measurement for excavation of pipes trenches shall be made per linear meter.

ii) Trenches shall be measurement between outside walls of manholes at top and the depth shall be the average depth between the two ends to the nearest cm. The rate quoted shall be for a depth up to 1.5 meter or as given in the Bill of Quantities.

iii) Payment for trenches more than 1.5 m in depth shall be made for extra depth as given in the Bill of Quantities and above the rate for depth up to 1.5 m.

iv) RCC Hume pipes shall be measured for length of the pipe line per linear meter.

v) Length between manholes shall be recorded from inside of one manhole to inside of other manhole.

vi) Length between gully trap and manhole shall be recorded between socket of pipe near gully trap and inside of manhole.

25.0 RCC HORIZONTAL GRATING:

25.1 Road Gully Grating

Horizontal Gully Grating: The R.C.C. horizontal grating with frame of size 500x450 mm accurately designed molds and are suitably reinforced to enable the covers to take load of 20 MT for Heavy Duty as per direction of Engineer-in-Charge

It is same as of manhole covers. The gully grating cover shall be hinged to the frame to

Facilitate its opening for cleaning and repairs The weight of grating shall be minimum 75 Kg. In case of R.C.C. horizontal gully grating it shall be in cement concrete 1:1:2 (1 cement: 1 coarse sand: 2 graded stone aggregate 20 mm nominal size)

26.0 WOODEN ROOFING

Wooden roofing shall be for full length new members like Ridges,joists, rafters, purlins, cladding ,Glulam Eva board etc. including all fixtures and fastenings with oil finish etc. complete. Item to include all moldings and chamfers to be made as per original design indicated by the Architects, sample to be shown to the Architect for approval before fixing as per direction of Engineer-in-Charge

The top surfaced shall be covered with Mangalore and Ridge tiles.

I. Design, Manufacture and Supply of Solid Wood Structural members for the roof structure, conforming to Euro Strength Grade C22 or above, made out of Acetylated Timber with Dimensional Stability and having Class 1 durability with a warranted 50 years life for above ground applications, duly tested as per EN-335-1 & durability against biological attack (fungi) as per EN 350-1.

II. All timber elements to be made from FSC certified sustainable timber having cradle to cradle gold certification.

III. The timber roof structure to conform to Eurocode 5 guidelines for such applications.

IV. All fasteners and screws used shall be SS 316 whilst the brackets and fittings needed to fix the structural elements to each other or to the building shall be Powder Coated Galvanised Steel."

V. Vendor to provide complete design and manufacturing service followed by installation at site.

VI. Oil - Water-borne tintable wood oil with law VOC content that penetrates deep into the wood.(Refer attached pdf)

26.1 Measurement: Actual roofing area will be measured

27.0 PAINTING

27.1 Preparation of Surface

The surface shall be thoroughly cleaned and dusted off. All rust, dirt, scales, smoke splashes, mortar droppings and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer-in-Charge after inspection, before painting is commenced.

27.2 Application*:* The number of coats shall be as stipulated in the item. The Paint will be applied in the usual manner with brush, spray or roller. The Paint dries by evaporation of the water content and as soon as the water has evaporated the film gets hard and the next coat can be applied. The time of drying varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surfaces. The thinning of emulsion is to be done with water and not with turpentine. Thinning with water will be particularly required for the under coat which is applied on the absorbent surface. The quantity of water to be added shall be as per manufacturer's instructions The surface on finishing shall present a flat velvety smooth finish. If necessary more coats will be applied till the surface presents a uniform appearance.

27.3 Precautions

(a) Old brushes if they are to be used with emulsion Paints, should be completely dried of turpentine or oil Paints by washing in warm soap water. Brushes should be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the Paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing of surfaces treated with emulsion Paints shall not be done within 3 to 4 weeks of application.

Other details shall be as specified in 13.23 of CPWD Vol -1 2019 as far as they are applicable.

27.4 Painting on Old Surface

27.4.1 Preparation of Surface : This shall be done, generally as specified in 13.24.2.1 CPWD Vol - 1 2019 except that the surface before application of Paint shall be flattened well to get the proper flat velvety finish after painting.

27.4.2 Application*:*

The number of coats to be applied shall be as in description of item.

The application shall be as specified in 13.31.2.2 CPWD Volume 2 2019 except that thinning with water shall not normally be required.

27.4.3 Other details shall be as specified in 13.23 of CPWD Specification Volume 2 2019 as far as applicable.

28.0 E – TOILET

Providing and installing the prefabricated public toilet made of stainless steel platform & closet (Indian/western), in built water tank, having toilet vacant status display, coin/switch based automated entry, manual exit, automated interior light & exhaust fan, wash basins, health faucet & cloth hanger, voice assistance system, self-cleaning, washing mechanism, manual flush option, water low indication, power backup facility, sensor for water & electricity conservation, GPRS based remote monitoring control facility through mobile app or web and revenue through coin collection and advertisements including Transportation, Commissioning, Taxes, Insurance & Warranty.

ELECTRICAL ITEM SPECIFICATION

SUMMARY PAGE

1. DISTRIBUTION BOARD

Supplying, assembling, grouting, leveling, Connecting & testing D.B of specified make as per Standards IS 8623:

1.1. VTPN Distribution Board:

Supplying, assembling, grouting, leveling, Connecting & testing various types of three phase and neutral distribution boards of desired ways of specified make:

1.1.1. Workmanship:

1. All the D.B. should have adequate Capacity three phase busbar with main neutral links.
2. The D.B. should be provided with 2 separate insulated earth links.
3. The D.B. should be concealed type having sheet metal enclosure with double door unless or otherwise specified.
4. The D.B. should be Rust Free Powder coated.
5. The D.B. shall have bottom plates open able with IP 66.
6. The D.B. shall be provided with necessary cable end junction box.

1.1.2. Mode of measurement

The rate shall be for one unit of D.B.

1.2. TPN Distribution Board:

Supplying, assembling, grouting, leveling, Connecting & testing various types of three phase and neutral distribution boards of desired ways of specified make:

1.2.1. Workmanship:

All the D.B. should have separate neutral link per phase with main neutral link i.e. four neutral links of appropriate nos. of way.

1) The D.B. should be provided with 2 separate insulated earth links.

2) The D.B. should be concealed type having Thermoplastic enclosure with double door unless or otherwise specified.

3) The D.B. shall have bottom plates open able with IP 66.

4) The D.B. Shall be provided with necessary cable junction box

1.2.2. Mode of measurement

The rate shall be for one unit of D.B.

1.3. M.C.B.:

Supplying, Assembling, connecting & testing MCBs/ELCBs/Isolators of various rating in boards as specified in 1.1, 1.2, and 1.3.

1.3.1. Workmanship

All the MCBs/ELCBs/Isolators and other accessories should mount properly and make necessary terminations with proper lugging in the DB. Should check for any faulty connections and reconnect the same. Also check for the loading once complete installation of fixtures and other equipment's is completed.

1.3.2. Mode of measurement

As per item 2.1 but for MCBs/ELCBs/Isolators and accessories.

2. LIGHT FIXTURES

2.1. Supply, Installing, Testing, commissioning of Light fixtures of various types and of specified make

2.1.1. Workmanship

The fixture shall be installed on wall / ceiling as directed and as per manufacturer's instruction, with necessary accessories for surface, concealed, suspended from ceiling, bracket mounting etc. The job also includes connection of fixture with respective outlet point with heat resistant wires through heat resistance sleeve and PVC connector. The exhaust fan shall be installed complete with M.S. angle iron mounting frame/ ring, G.I. louvers, wire mesh and plug at the end of the cord including wiring & earthing etc. Proper earthing shall be provided to the fixtures

I. INSTALLATION OF EXTERNAL IN GROUND RECESSED LIGHTS

a) Inground recessed lights installation shall be carried out as per details shown in the drawing.

b) Make a concrete pit to suit the dimension of the plastic housing for buried light with proper drainage Always prepare 20-30cm of drainage gravel and check that it works. Pour a mug of water and check that it completely disappears within 30min. If it doesn't work refine the drainage system further.

c) The luminaire must not permanently get in contact with aggressive media that might corrode the housing of the luminaire

d) Dismantle luminaire from the recess plastic housing.

e) Position recess plastic housing into the floor and fix it using suitable fixing material.

f) 0.5 m of cable must be left in the installation housing for lifting the luminaire for maintenance and refixing

g) For the tightness of the luminaire it is important that the ground surface prepared later is either on the same level or slightly below top edge of the recess housing

h) Use appropriate cable with respect to the rating & gland size and fully tightened to avoid ingress of water.

i) The connection provided by the customer must be carried out in the corresponding protection class of the luminaire.

j) Never cover visible parts of the luminaires. Any part not protected by the recessing box, must not be in direct contact with the ground or in contact with aggressive chemical elements

k) Please ensure that the wires are connected to the right polarity [Phase, Neutral & Earth] and the luminaire must be earthed.

l) Insert the luminaire housing into the recess plastic housing, align it and tighten screws firmly.

m) Lock and unlock the screws following an alternative sequence, tightening all screws evenly.

2.1.2. Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a) All fixing accessories, Silicon gasket. Ballast condensers and control gear wherever applicable.

b) Earthing of fittings.

c) Per Unit for Supplying, assembling, installing, connecting, testing and commissioning of LED decorative lights.

II INSTALLATION OF EXTERNAL WALL WASHER LIGHTS:

I. Undo screw at wall box.

II. Remove mounting plate.

III. Lead mains supply cable through the cable entry of the mounting plate.

IV. Fix mounting plate onto the mounting surface with suitable fixing material.

V. It is absolutely essential to use the enclosure gasket. Make sure that gasket is in correct position; else the IP rating of the luminaire will be compromised.

VI. Use only flexible supply cables of suitable rating and diameter. Do not use hard cables or armored cables (Hard cable could affect the IP rating of the product)

VII. Please ensure that the wires are connected to the right polarity [Phase, Neutral & Earth] and the luminaire must be earthed (Class 1).

VIII. Insert luminaire into the mounting plate and fix securely with non-corrosive stainless-steel screws

IX. Lock and unlock the screws following an alternative sequence, tightening all screws evenly, ensuring 'O' ring in proper position while tightening.

2.1.3. Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a) All fixing accessories, Silicon gasket and control gear wherever applicable.

b) Earthing of fittings.

c) Per Unit for Supplying, assembling, installing, connecting, testing and commissioning of LED decorative lights.

III INSTALLATION OF EXTERNAL LIGHT FIXTURES:

i. Street lighting installation shall be carried out as per details shown in the drawing.
ii. The poles shall be erected in perfect plumb with concrete foundation at a location shown in the drawing. The foundation shall be designed to withstand the static load as well as wind velocity and bending moment of the pole and shall be approved by the client prior to execution.
iii. The junction box shall then be clamped to the erected pole as per details shown in the drawing.
iv. The luminaires shall also be installed on the pole and be electrically wired to the respective junction box.
v. The cable lay out shall follow the tentative route as shown in the drawing. In case of any constraint on the cable route the same shall be brought to notice of the client.
vi. The cable lay out shall be carried out in an underground manner and the said installation complete with electric connections.
vii. Earthing installation shall follow the details for the same shown in the drawing.

viii. The earthing station (coil type) and the earthing grid installation shall be carried out as per the specification for the said works given in section under title “Earthing” of this tender document.

ix. The brackets shall be made of 38 mm. NB MS class “B” pipe approx. 1.8 mtr. long bent at the center at an angle 120° C. with necessary holding brackets, hold fasts etc. with special reducer at the end to accommodate type of street light fitting to be fixed. Bracket shall have 1 coat of anti-corrosion paint before dispatch to site and 2 coats of approved make and shade of aluminum paint. This bracket shall also be provided with one M.S. water tight box complete with the connector, neutral link, rewireable fuse etc. See enclosed drawings of street light poles.

x. Installation of poles shall be done as per enclosed drawings of street light poles. The depth of pole to be buried in ground shall be 1/5th of the total pole length or as specified in drawing, whichever is more. Special care shall be taken in erecting poles so that these are not strained or damaged during erection and are firmly stayed till the foundation are secured. The pole shall be grouted inside ground pit (cross-section 600 x 600 mm.) with cement concrete 1:2:4. Before the placement of concrete around pole in the pit, necessary conduit pipes (not less than 25 mm. dia.) shall be placed for facilitating drawing of cables. Separate conduit shall be provided for incoming and outgoing cables. The cement concrete shall be protected from premature drying by curing for at least 7 days after pouring. All concrete surfaces from 150 mm. below ground level to top shall be finished smooth with cement mortar 1:4.

xi. This includes fixing of street light fittings complete with accessories and lamps at the end of the pole / bracket, connecting it with aluminum conductor, PVC insulated cable from water tight M.S. box, testing, commissioning. Third core shall be connected with earthing point of light fitting at one end and earthing point of marshalling box at the other end.

2.1.4 Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a) All fixing accessories, mounting bracket, ballast condensers and control gear wherever applicable.

i. Supplying and fixing Ball and socket joints wherever required.

ii. Earthing of fittings.

iii. Electrical connections to fittings/ from the junction box

Per Unit for Supplying, assembling, installing, connecting, testing and commissioning pole mounted street lights.

IV) INSTALLATION OF EXTERNAL POST TOP LIGHTS:

i. Post Top lights installation shall be carried out as per details shown in the drawing.

ii. A complete range of shielded & unshielded garden luminaire for lighting of squares, gardens and pathways in public and private areas.The LED technique offers durability and

optimal light output with low power consumption at the same time. Pole mounting heights from 3000 to 5000mm

iii. The luminaire must only be operated with the complete protective cover.

iv. Open the diffuser by turning in antic lock direction and insert lamp where ever turn type locking arrangement is provided.

v. It is absolutely essential to use the enclosure gasket if provided in correct position; else the IP rating of the luminaire will be compromised.

vi. Insert diffuser into position and turn it to lock.

vii. Undo screw at base of the luminaire.

viii. Use only flexible supply cables of suitable rating and diameter. Do not use hard cables or armored cables.

ix. Please ensure that the wires are connected to the right polarity [Phase, Neutral & Earth] and the luminaire must be earthed.

x. Place luminaire onto mounting pole and tighten all the grub screws evenly to ensure the luminaire is in correct alignment with the base pole. Don't over tighten.

xi. Lock and unlock the screws following an alternative sequence, tightening all screws even

2.1.5 Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a) All fixing accessories, Silicon gasket, ballast condensers and control gear wherever applicable.
b) Earthing of fittings.

Per Unit for Supplying, assembling, installing, connecting, testing and commissioning of Led post top light fixtures and poles.

V) INSTALLATION OF EXTERNAL SPYKE LIGHTS:

a) Light Source: LED. Varied wattage Options

b) Normal rated voltage for luminaire is 220-240V, 50Hz, single phase ac supply.

c) Do not open the front plate of light output opening of LED directly during installation.

d) Push luminaire with earth spike vertically into the soil until stability is achieved. If necessary compact soil around them.

e) The location of installation may be revised to suit the site conditions especially considering the expected water stagnation levels.

f) We recommend to drain the mounting area to ensure no water logging at all times, also considering durations of heavy downpour.

g) Use only flexible supply cables of suitable rating and diameter with the right IP rated. Do not use hard cables or armored cables

h) Loosen joint screw and adjust the slope angle of the light. Tighten joint screw when desired angle is achieved.

i) Please ensure that the wires are connected to the right polarity [Phase, Neutral & Earth] and the luminaire must be earthed.

j) After installation, the luminaire should first be cleaned.

k) Building dust, residues from pressure-sensitive adhesives, paint splatter and rust film must be completely removed.

l) Never use cleaning implements made of normal steel, steel brushes or steel wool because they cause extraneous rust to form.

m) Cleaning agents containing hydrochloric acid and chlorides should never be used.

n) We recommend cleaning the luminaires regularly.

o) Do not use high pressure cleaners

2.1.6 Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a) All fixing accessories, Silicon gasket. ballast condensers and control gear wherever applicable.

b) Earthing of fittings.

c) Per Unit for Supplying, assembling, installing, connecting, testing and commissioning of LED decorative lights.

VI) INSTALLATION OF EXTERNAL POLE MOUNTED MULTI SPOT LIGHTS:

a) Urban lighting system intended for use with LED light sources.

b) Wall installation with multiple support for 2, 3, 4 flood lights or spyke lights for the illumination.

c) Consisting of an optical compartment (iPro 192 mm), component holder compartment and adjustable bracket.

d) Optical compartment and rear cap in die-cast aluminum; transparent tempered sodium-calcium sealing glass, 4 mm thick, applied with silicon on the optical assembly.

e) Graduated scale and mechanical aiming lock

f) Luminaire ready for the pass through wiring with IP 66

g) All external screws used are in stainless steel

2.1.7 Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a. All fixing accessories, Silicon gasket., ballast condensers and control gear wherever applicable.

b. Earthing of fittings.

c. Per Unit for Supplying, assembling, installing, connecting, testing and commissioning of LED decorative lights.

VII) INSTALLATION OF FLEXIBLE LED STRIP:

a) Flexible LED strip
b) High luminous flux
c) Cut to the desired length and mount where ever required
d) Designed for highest efficiency in terms of more lumens per watt contributing to a greener world.
e) Easy mounting on many smooth surfaces with self-adhesive tape.
f) Sustainable LED technology offers durability and optimal light output with low power consumption.

2.1.5 Mode of measurement

The unit rate shall be considered for Supplying and fixing one fixture. The rate shall include following

a) All fixing accessories, control gear wherever applicable.

b) Earthing of fittings.

c) Per Unit for Supplying, assembling, installing, connecting, testing and commissioning of Led flexible strip.

NOTE:

A) The contractor shall also provide complete with all items including junction boxes, MCB's, anchor fasteners, screws, bolts, nuts, washers, cable glands and lugs etc. And carry out associated minor works for successful completion of works.

B) Any other items that are not indicated but form part of the execution shall be deemed to beincluded in the scope and vendor shall include the cost of such items in their offer

3.0 LV CABLES

Supply, Installation, Testing, Laying, Commissioning of following 1100 volt grade XLPE insulated PVC sheathed aluminum / Copper conductor armored cables as per specification in trenches, cable trays, ducts, over bed of sand, clamped to wall with suitable clamps including, saddles fixing bolts, connecting testing and commissioning with identification tags at every 10 mtr. & Both ends. with All the fixing accessories, excavation Back filling & Cable protection with Bricks as per the drawing (If required) as per the Standards IS 1255 (1983).

3.1 Workmanship

3.2 Installation

Cables can be laid through the pvc pipes throughout the wall as shown in the drawing

a) Cables shall be laid in the routes marked in the drawings. Where the route is not marked, the contractor shall mark it out on the drawings and also on the site and obtain the approval of the Architect/Consultant before laying the cable. Procurement of cables shall be on the basis of actual site measurements and the quantities shown in the schedule of work shall be regarded as a guide only.

b) The general arrangement of cable laying is shown on drawings. All cables shall be full runs from panel to panel without any joints or splices. Cables shall be identified at end termination indicating the feeder number and the Panel/Distribution board from where it is being laid. cable termination for conductors up to 4 sq.mm. may be insertion type and all higher sizes shall have tinned copper compression lugs. Cable termination shall have necessary brass glands. The end termination shall be insulated with a minimum of six half-lapped layers of PVC tape. Cable armoring shall be earthed at both ends.

c) In case of cables entering the buildings. It would be done duly only through pipes. The pipes shall be laid in slant position. So, that no rain water may enter the building. After the cables are tested. The pipes shall be sealed with M. seal & then tarpaulin, shall be wrapped around the cable for making the entry of water light.

d) All cables shall be provided with stainless steel/Aluminum cable identification tags at a maximum distance of 10 m

3.3 TESTING OF CABLES:

a) Before energizing, the insulation resistance of every circuit shall be measured from phase to ground. This requires 3 measurements if one side is grounded and 6 measurements for 3 phase circuits.

b) Where splices or terminations are required in circuits rated above 650 volts, measure insulation resistance of each length of cable before splicing and/or terminating. Repeat measurements after splices and/or terminations are complete.

DC high voltage test shall be made after installation on the following:

c) All 1100 volts grade cables in which straight through joints have been made.

d) All cables above 1100 V grade.

For record purpose test data shall include the measured values of leakage current versus time.

The DC high voltage test shall be performed as detailed below:

Cables shall be installed in final position with all the straight through joints complete. Terminations shall be kept unfinished so that motors, switchgear, transformer etc. are not subjected to test voltage.

The test voltage and duration shall be as per relevant codes and practices of Indian Standards Institution.

3.4 PROFORMA FOR TESTING CABLES:

a) Date of Test

b) Drum No. from which cable taken.

c) Cable from to

d) Length of run of this cable meter

3.4.1 INSULATION RESISTANCE TEST

i) Between core-1 to earth mega-ohm

ii) Between core-2 to earth mega-ohm

iii) Between core-3 to earth mega-ohm

iv) Between core-1 to core-2 mega-ohm

v) Between core-2 to core-3 mega-ohm

vi) Between core-3 to core-1 mega-ohm

vii) duration used: 1 kV

viii) High voltage test

Voltage Duration

a) Between core an earth.

b) Between individual cores

[This proforma shall be jointly signed by the CLIENT / CONSULTANT and the contractor in duplicate].

All test readings shall be recorded and shall form part of the completion documentation.

3.4.1.1 **MODE OF MEASUREMENT**

The cable shall be measured in per mt. Basis and the rates shall include;

1) Cables and clamps

2) Installation, Commissioning and testing

3) Cable marking and all the accessories for the cable if at all to be installed on walls.

Cable length shall be certified by Engineer-In-Charge from Clients side.

4.0 CABLE TERMINATION

Supplying & fixing heavy gauge compression type Brass glands & making joint with necessary crimping socket of long neck type connecting the same to various equipment like section pillar, switch, starter, motor etc. sizes of cables specified in BOQ CUPAL washers shall be provided for copper busbars to aluminum connection as per IS 1255 (1983):

4.1 Workmanship

Cable joints shall be done as per regular practice and check shall be carried out for loose connections and leakages. Insulation cutting shall be done properly taking care that no area of the conductor remains exposed. Crimping shall be done with the help of hydraulic tool.

4.2 TERMINATION AND JOINTING OF CABLES

4.2.1 USE OF GLANDS

All PVC cables up to 1.1 kV grade, armoured or Unarmoured shall be terminated at the equipment / junction box / isolators / push buttons / control accessories, etc. by means of suitable size single compression type cable glands. Armour of cable shall be connected to earth point. The contractor shall drill holes for fixing glands wherever necessary. Wherever threaded cable gland is to be screwed into threaded opening of different size, suitable galvanized threaded reducing bushing shall be used of approved type.

In case of termination of cables at the bottom of the panel over a cable trench having no access from the bottom, a close fit hole should be drilled in the bottom plate for all the cables in one line, then bottom plate should be split in two parts along the centre line of holes. After installation of bottom plate and cables with glands, it shall be sealed with cold sealing compound.

4.2.2 USE OF LUGS:

All cable leads shall be terminated at the equipment terminals, by means of crimped type solderless connectors unless the terminals at the equipment ends are suitable for direct jointing without lugs / sockets

The following is the recommended procedure for crimped joints and the same shall be followed:

a) Strip off the insulation of the cable and with every precaution, not in severe or damage any strand. All insulation's to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square.

b) The cable should be kept clean as far as possible before assembling it with the terminal / socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the aluminum conductors, the socket should be filled with corrosion inhibiting compound. This compound should also be applied over the stripped potion of the conductor and the palm surface of socket.

c) Make the crimped joint by suitable crimping tool.

d) If after crimping the conductor in socket / lug, some portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

4.2.3 DRESSING OF CABLE INSIDE THE EQUIPMENT:

After fixing of cable glands, the individual cores of cable shall be dressed and taken along the cable ways (if provided) or shall be fixed to the panels with polyethylene straps. Cable shall be dressed in such a manner that small loop of each core is available inside the panel.

4.2.4 IDENTIFICATION OF CABLES / WIRES / CORES:

Power cables shall be identified with red, yellow and blue PVC tapes. For trip circuits identification, additional red ferrules shall be used only in the particular cores of control cable at the termination points in the switchgear / control panels and control switches.

In case of control cables all cores shall be identified at both ends by their wire numbers by mean of PVC ferrules or self-sticking cable markers, wire numbers shall be as per schematic / connection drawing. For power circuit also, wire numbers shall be provided if required as per the drawings of switchgear manufacturer / supplier.

4.2.5 Mode of measurement

Rate shall be considered for 1 nos of joint.

5 EARTHING

5.1 Providing earthing stations for equipment earthing as shown and specified in IS: 3043 and drawing for equipment complete with

5.1.1 Chemical Earthing

5.1.2 Workmanship

Following activities shall be carried out for the earthing station

a) Excavation in hard morrum.

b) Laying Watering pipe.

c) Brick masonry with hinged covers.

d) Charcoal and Salt fill.

e) Keep minimum 2 mt. distance between two earth pits.

f) The pit should be minimum 4 mt. deep.

g) The earth resistance should not exceed 1 ohm.

h) All earth pits of same category shall be interlinked with strip.

Following points shall be followed strictly.

A) The plate \ pipe electrode, as far as practicable, shall be buried below permanent moisture level but in no case not less than 2.5 M below finished ground level.

B) The plate \pipe electrode shall be kept clear of the building foundation and in no case, it shall be nearer by less than 2 M from outer face of the respective building wall \ column.

C) The plate electrode shall be installed vertically and shall be surrounded with 150 mm. thick layers of Charcoal dust and Salt mixture.

D) 20 mm. dia. G.I. pipe for watering, shall run from top edge of the plate \ pipe electrode to the mid-level of block masonry chamber.

E) Top of the pipe shall be provided with G.I. funnel and screen for watering the earth \ ground through the pipe.

F) The funnel with screen over the G.I. pipe for watering to the earth shall be housed in a block masonry chamber as shown in the drawing.

G) The masonry chamber shall be provided with a Cast Iron hinged cover resting over the Cast Iron frame which shall be embedded in the block masonry.

H) Construction of the earthing station shall in general be as shown in the drawing and shall confirm to the requirement on earth electrodes mentioned in the latest edition of Indian Standard IS: 3043, Code of Practice for Earthing Installation.

K) Over lapping of earth conductors during straight through in joints, where required, shall be of minimum 75mm. long.

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

M) The connection between strip and plate shall be through stainless steel bolts and washers.

Following tests shall be carried out:

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

A) The following earth resistance values shall be measured with an approved earth meager and recorded.

1) Each earthing stations

2) Earthing system as a whole

3) Earth continuity conductor

B) Earth conductor resistance for each earthed equipment shall be measured which shall not exceed 3 Ohm in each case.

C) Measurements of earth resistance shall be carried out before earth connections are made between the earth and the object to be earthed.

D) All tests shall be carried out in presence of the Site Engineer.

5.1.3 **Mode of measurement**

Rate shall be considered for one unit of pit.

LIST OF APPROVED BRANDS (CIVIL WORK)

LIST OF APPROVED BRANDS (CIVIL WORK)		
S.No	**Item**	**Brands**
1	**Concrete Work: PCC or RCC**	
a	Cement (43 grade, 53 grade)	Ambuja, Ultra Tech, ACC, Siddhi, JK Laxmi, Binani, Jaypee, Birla super
b	TMT Reinforcement Bar Fe - 415 or Fe – 500, Fe-500D	Tata, SAIL, VIZAG, RINL, Jindal Confirming to IS – 1786:1985 (reaffirmed 2004) or IS 432 Part –I & II : 1982)
c	Sand	As per Mix design for concrete work or zone-II. For Masonry and plaster work zone – III
d	Concrete Additive, admixtures	Sika/ CICO/Pidilite/ Fosroc/Fairmate/ BASF
e	Lime	Locally available / Outside available
f	Stone aggregate	Locally available / Outside available
2	**Masonry Work**	
a	Brick Masonry	Having crushing strength not less than 35 Kg/ Sq. cm of Locally Available
b	White Bela Stone Masonry	Locally available / Outside available
3	**Tile Work**	
a	Marble Chip flooring	Locally available / Outside available
b	Cobble stone – Rajula, Lime stone and Granite	Locally available / Outside available
c	Grass Paver Block	Amdavad Enviro, Pavcon
d	Tile Adhesives & Grouting material	BAL, Laticrete, Kerakoll

LIST OF APPROVED BRANDS (CIVIL WORK)		
S.No	**Item**	**Brands**
e	Granite slab and Rajula stone slab	Locally available / Outside available
4	**Paint work**	
a	Fusion bond epoxy coating for HYSD bars	V-Bond, Perma
5	**Precast concrete Kerb stone**	Fuji Precast, Arya Precast
6	**Corten steel**	JMT Steel, Nextgen steel & Alloy, JSW,Tata Steel
7	**Fine silica**	Locally available / Outside available
8	**Cast iron bollards**	As per Architect specifications
9	**e-Toilets**	Eram Scientific, Intelligent Public Toilet
10	**Wood**	Ritikaa Wood or equivalent timber duly acetylated with Class 1 durability and 50 years warranty for durability in outdoor above ground application with FSC certification

LIST OF APPROVED BRANDS (ELECTRICAL WORK)

S No	Item description	Specified make
1	Rigid PVC Conduit	BEC, Precision. Presto Plast, AKG
2	Accessories for conduit	Same make as of pipe
3	Flexible Copper Wires	FRLS type: Avocab/ Finolex/Polycab
4	Switches & its accessories	CLIPSAL (OPAL)/ Legrand (Mosaic)
5	MCCB/MCB/ELMCB/Iso/ SPDs & Accessories	Schneider/ L&T /Legrand (Lexic)/ Siemens/GE/ABB/Hager
6	Distribution Boards	Schneider / L&T /Legrand (Lexic)/
7	PVC tape	Steel grip/ Anchor
8	LT Cables	Avocab/ RR Kabel/ Finolex/Polycab/ Anchor/, Havells/L&T
9	Glands : Double Compression type, Heavy duty and deep threading with rubber ring and double washers. (Sample to be approved)	HMI/ Comet
10	Cable Lugs	Dowels/ 3-D
11	Connectors	Elmex/ Connect-well
12	Light Fixtures	
	Post Top Light for Street Lighting	Neri Lighting, Rosa Lighting, Keselec Lighting
	Pole Mounted Multispot Light-For down lighting.	Ledsc4 Lighting, Ligman Lighting, Unilamp Lighting
	Street Lighting	Neri Lighting, Rosa Lighting, Keselec Lighting
	In ground uplighter	Ledsc4 Lighting, Litolux Lighting, Unilamp Lighting
	Recessed In ground Diffused Light	Jobe Lighting
	Recessed In ground Uplighter	Ledsc4 Lighting, Litolux Lighting, Meyer Lighting
	Tree spot lighting for Down light -	Ledsc4 Lighting, Litolux Lighting, vUnilamp

S No	Item description	Specified make
		Lighting
	Spot light for Cross light -	Ledsc4 Lighting, Litolux Lighting, Unilamp Lighting.
	Surface mounted Down lighter	Ligman Lighting, Litolux Lighting, Ledsc4 Lighting
	Surface mounted Uplighter	Ligman Lighting, Litolux Lighting, Ledsc4 Lighting
	LED strip and Grazer	Ledsc4 Lighting, Litolux Lighting, Crysta Lighting
13	Panel Fabricators (Metallic)	Only approved & registered system house of Schneider/ L&T/ CPRI Approved
14	Panel Fabricators (Thermoplastic)	Hensel/Spelsberg/Havell's/Legrand/Schneider, Siemens
15	Anchor Fasters	Hilti
16	Timer	Legrand / Schneider
17	Raceway	MK (Ega)/ Legrand
18	DWC Pipes	Rex/ Dutron
19	UPVC Raceway	Legrand/ MK

Make of various items offered by the tenderer shall clearly be marked in the above list. However the final choice of the selection of particular make solely lies with Client / Consultant which shall mutually be agreed upon before finalization of order. If these brand is not available equivalent brand may be accepted after due approval of CTO, DSCL.

LIST OF DRAWINGS FOR TENDER

S.No	Drawing Number	Drawing Tittle	Remarks
A	**Conservation & Façade Restoration of Heritage Precincts- Zampa Gate Precinct**		
1	DDX2.2.A01	Development of Zampa Precinct-Plan of Zampa Precinct	
2	DDX2.2.A02	Development of Zampa Precinct- Detail of Zampa Precinct	
3	DDX2.2.A03	Development of Zampa Precinct- Zampa Surface Finished Plan	
4	DDX2.2.A04	Development of Zampa Precinct- Detailing at Section A-A	
5	DDX2.2.A05	Development of Zampa Precinct- Detailing at Section B-B	
6	DDX2.2.A06	Development of Zampa Precinct- Detailing at Section C-C	
7	DDX2.2.A07	Development of Zampa Precinct- Details of Seating Plan	
8	DDD2.2.A08	Development of Zampa Precinct- Drain Network Plan	
9	DDX2.2.A09	Development of Zampa Precinct- Detailing of Proposed Drain & Kerb	
10	DDX2.2.A51	Development of Zampa Precinct- Layout of Lighting Network Sheet-1	
11	DDX2.2.A52	Development of Zampa Precinct- Layout of Lighting Network Sheet-2	
12	DDX2.2.A53	Development of Zampa Precinct- Layout of Lighting Network Sheet-3	
B	**Conservation & Façade Restoration of Heritage Precincts- Market Precinct and Upgradation of Fruits and Vegetable Market**		
1	DDA2.2.B01	Development of Market Precinct-Site Plan	
2	DDA2.2.B02	Development of Market Precinct-Surface Finishings	
3	DDA2.2.B03	Development of Market Precinct-Sections	
4	DDA2.2.B04	Development of Market Precinct-Elevations	
5	DDA2.2.B05	Development of Market Precinct-Sections	
6	DDA2.2.B06	Development of Market Precinct-Roof Details	

S.No	Drawing Number	Drawing Tittle	Remarks
7	DDA2.2.B07	Development of Market Precinct-Seating Details	
8	DDE2.1.B08	Development of Market Precinct-Lighting Network Layout	
9	DDA2.1.B09	Development of Market Precinct-Drain Network Layout	
10	DDA2.1.B10	Development of Market Precinct-Detail of Vendor Rack	

THE ABOVE MENTIONED DRAWINGS ARE GIVEN AS APPENDIX 1