PARTICULAR SPECIFICATIONS

1. GENERAL

Unless otherwise specified, CPWD specifications 2019 volume I & II with up to date correction slips. Any additional item of work if taken up subsequently shall also conform to the relevant CPWD specifications mentioned above. If should there be any difference between description of items as given in the schedule of quantities, nomenclature and specifications for individual items of work (special conditions) and I.S. Codes, work shall be got done in the following order of precedence:

I) Description of items as given in Schedules of quantities.
ii) Special conditions and particular specifications.
iii) CPWD Specifications.
iv) I.S. Codes.
v) Decision of Engineer-in-Charge.

1.1 Wherever any reference to any Indian Standard Specifications of BIS or other International standards of ASTM / BS / EN occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued there-to or revisions thereof, if any, up to the date of receipt of tenders.

1.2 The contractor shall work according to the programme of work as approved by the Engineer-in-charge, for which purpose, the contractor shall submit a programme of the work within 15 days from the stipulated date of start of the work based on computer software such as MS Project/ Primavera etc. and shall update the same every fortnight.

The contractor shall submit monthly progress report of the work in a computerized form. The progress report shall contain the following, apart from whatever else may be required as specified:

(i) Project information, giving the broad features of the contract of the work under the contract, and the broad structural or other details.

(ii) Introduction, giving a brief scope of the work under the contract, and the broad structural or other details.

(iii) Construction schedule of the various components of the work through a bar chart for the next three quarters (or as may be specified), showing the milestones, targeted tasks and up to date progress.

(iv) Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative up to the month, with reasons for deviations, if any, in a tabular format.

(v) Plant and machinery statement, indicating those deployed in the work, and their working status.

(vi) Man-power statement, indicating individually the names of all the staff deployed in the work, along with their designations.

(vii) Financial statement, indicating the broad details of all the running account payments received up to date, such as gross value of work done, advances taken, recoveries effected, amounts withheld, net payments, details of cheque payments received, etc.

(viii) A statement showing the extra and substituted items submitted by the contractor, and the payments received against them, items pending for sanction/decision by the Department, broad details of the Bank Guarantees, indicating clearly their

validity periods, broad details of the insurance policies taken by the contractor, if any, the advances received and adjusted.

(ix) Progress photographs, in colour, of the various items/components of the work done up to date, to indicate visually the actual progress of the work.

(x) Quality assurance and quality control tests conducted during the month, with the results thereof.

(xi) Videography at various stages of construction right from the day of start of work to date of completion/occupation, covering all major events, inspections, visits by dignitaries etc.

1.3 The contractor shall take instructions from the Engineer-in-charge for stacking of materials at site. No excavated earth or building materials shall be stacked on areas where the buildings, roads, services or compound walls are to be constructed.

1.4 Unless otherwise provided in the Schedule of quantities, the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building and nothing shall be payable to him on this account.

1.5 ~~The working drawings appearing at para 8.1(iii) of conditions of contract in the form CPWD-7, shall mean to include both architectural and structural drawings respectively. The structural and architectural drawings shall be properly correlated before executing the work. In case of any difference noticed between architectural and structural drawings, final decision, in writing of the Engineer-in-charge shall be obtained by the contractor before proceeding further.~~

1.6 Some restrictions may be imposed by the security staff etc. on the working and for movement of labour, materials etc. The contractor shall be bound to follow all such restriction / instructions including issue of identity cards to all persons authorized by him to do work / visit the work site and nothing shall be payable on this account.

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

1.8 The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor (s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose off the materials being used or removed, so as not to interfere with the operations of other contractors, or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of Engineer-in-Charge. The contractor shall be responsible for any damage due to hindrance caused by him.

1.9 Cast iron pipes and fittings without ear shall be used. However, pipes and fittings with ears may be accepted without any extra payment. In such cases, clamps are not required and no extra payment shall be made for fixing the pipes in a different manner.

1.10 Any cement slurry added over base surface for bond or for continuation of concreting, for protecting reinforcement bars, its cost shall be deemed to have been included in the

respective items, unless specified otherwise and nothing extra shall be payable nor extra cement shall be considered in the cement consumption on this account.

1.11 Stacking of materials and excavated earth including its disposal shall be done as per the directions of the Engineer-in-Charge. Double handling of materials or excavated earth if required at any stage shall have to be done by the contractor at his own cost.

1.12 No claim for idle establishment & labour, machinery & equipment, tools & plants and the like, for any reason whatsoever, shall be admissible during the execution of work as well as after its completion.

1.13 Only Star headed Stainless Steel screws shall be used unless otherwise specified.

1.14 **Work shall be carried out in professional manner with finished product serving the intended purpose with specified strength, durability and aesthetics.**

1.15 Work activities shall be executed in well thought out sequences such that consequent activities not adversely affecting previously done work. Nothing extra shall be payable to protect the works already done.

1.16 The contractor shall prepare all the needed shop drawings well in advance and get them approved before placing the order and execution of the item.

1.17 The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting, and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer - in -Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications.

1.18 The contractor shall not store /dump construction material or debris on metalled road.

1.19 The contractor shall get prior approval from Engineer-in-charge for the area where the construction material or debris can be stored beyond the metalled road. This area shall not cause any obstruction to the free flow of traffic / inconvenience to the pedestrians. It should be ensured by the contractor that no accidents occur on account of such permissible storage.

1.20. The contractor shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot / area using CGI sheets or plastic and / or other similar material to ensure that no construction material dust fly outside the plot area.

1.21 The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purposes / or are carrying construction material like cement, sand and other allied material are fully covered. The contractor shall take every necessary precaution that the vehicles are properly cleaned and dust free to ensure that enroute their destination, the dust, sand or any other particles are not released in air / contaminate air.

1.22 The contractor shall provide mask to every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.

1.23 The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and debris relatable to dust emission.

1.24 The contractor shall ensure that C&D waste is transported to the C & D waste site only and due record shall be maintained by the contractor.

1.25 The contractor shall compulsorily use of wet jet in grinding and stone cutting.

1.26 The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010 or amended thereafter.

1.27 The contractor shall carry out on-Road-Inspection for black smoke generating machinery. The contractor shall use cleaner fuel.

1.28 The contractor shall ensure that all DG sets, comply latest emission norms notified by MoEF.

1.29 The contractor shall use vehicles having pollution under control certificate. The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20 kmph. Speed bumps shall be used to ensure speed reduction. In cases where speed reduction cannot effectively reduce fugitive dust, the contractor shall divert traffic to nearby paved areas.

1.30 The contractor shall ensure that the construction material is covered by tarpaulin. The contractor shall take all other precaution to ensure that no dust particles are permitted to pollute air quality as a result of such storage.

1.31 The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects.

1.32 The agency is permitted for erect the site office, store yard and ground water extraction facility temporarily near the place of construction free of cost only after getting specific approval of Engineer in-charge. Contractor shall remove such structures on completion of work.

1.33 Entry to the campus may be restricted from particular entrance gate and agency has to follow security rules of the campus & nothing extra shall be payable on this account.

1.34 ~~The contractor shall make the barricading with CGI sheet of minimum 4.0 metre height of site before commencement of work for which nothing extra shall be paid on this account.~~

1.35 The contractor shall make necessary arrangement to follow the guidelines / instruction issued by the concerned government authority for controlling and containing the spread of COVID-19 and nothing shall be paid extra in this regard.

1.36 The contractor will be responsible for approval of local bodies, (if required) vetting of structural design and drawings from IIT, NITs and any Govt. Engineering College. Necessary required documents and fee payable will be provided by the department. Nothing extra will be paid on this account.

1.37 ~~The contractor shall make the barricading with M.S. Profile sheet of minimum 4 metre height all round of site before commencement of work as per direction of Engineer – in Charge. The contractor should visit the site and see thoroughly the required length of barricading. The cost of barricading should be included while quoting the rate in tender and nothing extra shall be paid to contractor for barricading.~~

1.38 If it is required during construction to cut a tree or more trees than contractor is liable to take necessary permissions from Govt. Deptt. and expenditure incurred for taking permissions etc. may be reimburse to contractor after submission of vouchers/ bills.

1.39 ***Contractor shall provide the local body / TNCP approval (if required) from Authorities and also submit Fire safety certificate (if required) after completion of project. nothing extra shall be paid except Fees paid to Govt. Department / Local Bodies.***

2. SPECIAL CONDITIONS

1.0 The contractor will have to work according to the programme of work, decided by the Engineer-in-charge for which purpose the contractor should submit a tentative program of the work within one month from the date of start of the work. The contractor shall also construct a sample unit, complete in all respects within time specified by the Engineer-in-charge and this sample unit shall be got approved from the Engineer-in-charge before mass construction is taken up. No extra claim whatsoever beyond the payment due at agreement rates will be entertained from the Contractor on this account.

2.0 The contractor shall take instructions from the Engineer in charge for stacking of materials in any place. No excavated earth or building material shall be stacked on areas where other buildings, roads, services or compound walls are to be constructed.

3.0 If, as per Client deptt., the huts for labour are not to be erected at the site of work, the contractors are required to provide such accommodation as is acceptable to local bodies and nothing extra shall be paid on this account.

4.0 ~~The work on items of internal finishing must be started as soon as the structure of two floors is completed.~~

5.0 Unless otherwise provided in the Schedule of quantities the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depth of the building and nothing extra shall be payable to him on this account.

6.0 ~~The work shall be carried out in accordance with the Architectural drawings and structural drawings. The structural and architectural drawings shall have to be properly correlated before executing the work. In case of any difference noticed between architectural and structural drawings, final decision, in writing, of the Engineer-in-charge shall be obtained by the contractor. In case of any discrepancy in the item given in the schedule of quantities appended with the tender and architectural drawings related to the relevant items, the former shall prevail unless and otherwise given in writing by the Engineer in charge~~. Samples shall be prepared before starting particular items of work for prior approval of the Engineer in charge and nothing extra shall be payable on this account.

7.0 All the material to be used on works shall bear ISI certification mark unless otherwise the make is specified in the item or special conditions appended with this tender document. In case ISI mark materials or the materials mentioned in the tender documents are not available, as per opinion of Engineer-in-charge, which shall be final and binding, the material to be used shall conform to CPWD specifications applicable in this tender or IS Code. In such cases Engineer-in-charge shall satisfy himself about the quality of such materials and give his approval in writing. Only articles classified as first quality by the manufacturers shall be used unless otherwise specified. All material not having ISI mark shall be tested as per relevant ISI specification. The Engineer in charge may relax the condition regarding testing if the quantity of the materials required for the work is small. In all cases of use of ISI marked materials proper proof of procurement of materials from authentic manufacturers shall be provided by the contractor to the entire satisfaction of Engineer in charge.

8.0 All materials equivalent to the one specified should be got approved by the Engineer- in- Charge before using the said materials in the work.

9.0 Specifications for steel centering, shuttering and form work shall be generally followed as per para 5.2 and its sub-paras of CPWD Specifications except at few inevitable places.

10.0 The contractor shall be responsible for the protection of sanitary and water supply fittings and fixtures against pilferage and breakage during that period of installation and thereafter until the building is handed over.

11.0 Any damage to work resulting from rains or from any other cause until the work is taken over by the Department after completion of work shall be made good by the contractor, at his own cost.

12.0 Some restrictions may be imposed by the security staff etc. on the working and for movement of labour, materials etc. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account.

13.0 The contractor shall comply with the provision of any Government acts which relate to the work and to the regulations and laws of any local authorities. The contractor shall give all notices required by the said acts, laws etc. and pay all fees payable to such authorities and allow for those contingencies, cost of restorations etc.
Water and sewerage charges for execution of the work shall be payable by the Contractor directly to the local bodies under intimation to the Department. In case such charges are not paid by the contractor, the same shall recovered from the Bill for remittance or if already remitted to the local bodies.

14.0 Tendered rates are inclusive of all taxes and levies payable under the respective States.

14.1 Rates quoted shall be inclusive of the Royalty / GST etc. or any other taxes leviable by the State Governments on the transfer of property in goods involved in the execution of works contract and nothing extra will be payable on that account.

15.0 Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to bye-laws and specifications of the municipal body/corporation where CPWD specifications are not applicable. The work of water supply, internal sanitary installations, drainage etc. shall be carried out as per local Municipal Corporation or such local body bye-laws. The contractor shall get the materials (fixtures/fittings) tested by the Municipal body/Corporation authorities wherever required at his own cost and after completion of work shall produce necessary completion certificates from such authorities.

15.1 The contractor shall comply with proper and legal orders and directions of the local or public authority or municipality and abide by the rules and regulations and pay all fees and charges which he may be liable.

The contractor shall give a performance test of the entire installation(s) as per standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

The tenderer should not quote unnecessary conditions contradicting the general conditions and particular specifications given in this tender, as such conditions apart from being not agreed to, can lead to rejection of the tender.

16.0 BRIEF WORDING OF ITEMS:
16.1 For the purpose of recording measurements and preparing running account bills, the underlined portions of the nomenclature of items included in the Schedule of Quantities shall be adopted as the abbreviated nomenclature of the particular item. The abbreviated nomenclature shall be taken to cover all the materials and operations as per the complete nomenclature of the relevant item in the agreement

and relevant specifications. In the case of items for which abbreviated nomenclature is not indicated in the Schedule of Quantities, the full nomenclature shall be reproduced while recording measurements and preparing the bills.
Also following abbreviations may be adopted.

(A)	P/L for	:	Providing and Laying
(B)	P/F for	:	Providing and Fixing.
(C)	C.C. for	:	Cement Concrete.
(D)	C.M. for	:	Cement Mortar.

16.2 In case of extra/substituted items of work for which brief wording is not provided in the agreement, the full nomenclature of the item shall be reproduced in the measurement books and bill forms of running bills.

16.3 The full nomenclature of the items shall be adopted in preparing abstract of final bill in the measurement books and also in the forms for final bills.

16.4 The tenderer should not quote unnecessary conditions contradicting the general conditions and particular specifications given in this tender, and such conditions apart from being not agreed to, can lead to rejections of the tender.

17.0 ~~The components of materials, labour and P.O.L. as indicated in para 3 of the sub-clause 10 (CC) have been predetermined as below:~~

~~a)~~	~~Materials~~	~~75 percent.~~
~~b)~~	~~Labour~~	~~25 percent~~
~~c)~~	~~D.P.G.L.~~	~~Nil percent~~
	~~Total~~	~~100 percent~~

19.0 ~~**GUARANTEE FOR WATER PROOFING TREATMENT**~~

~~**Five years guarantee** in prescribed Performa attached must be given by the contractor for the water proofing treatment. In addition, 10% (ten percent) of the cost of these items would be retained as guarantee to watch the performance of the work executed. However, half of this amount (withheld) would be released after five monsoon seasons after the date of completion of the work, if the performance of the waterproofing works is satisfactory. The remaining withheld amount shall be released after completion of Five monsoon seasons after the date of completion of work, if~~

~~performance of the waterproofing work is satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days and, if not attended to, the same shall be got done by other agency at the risk and cost of the contractor. In any case the guaranteeing firms during the guarantee period should inspect and examine the treatment once in every year and make good any defect observed. However, the security deposit can be released in full, if bank guarantee of equivalent amount for five (05) years is produced and deposited with the department.~~

~~20 The tank fittings and accessories shall conform to the local by-laws and specifications. The contractor shall engage licensed plumber for the work and get the work materials tested by the local authorities wherever required at his own cost. The work of water supply, internal sanitary installations and drainage etc. shall be carried out as per local municipal corporation or such local body by-laws and contractor shall produce necessary completion certificate from such authorities after completion of the work. Nothing extra shall be paid to the contractor for this.~~

~~21 The steel windows & ventilators shall be factory made and ISI marked.~~

22 TESTING OF MATERIALS

22.1 The contractor shall procure all the materials in advance so that there is sufficient time for testing and approving of the material and clearance of the same before use in work.

22.2 The contractor's rates for the items involving the use of materials shall be deemed to cover the cost of samples. The cost of packaging, sealing, transportation, loading, unloading etc. shall be borne by the contractor. Testing charges shall be borne by the ~~department only when the samples satisfy the provisions specified and conform to the requirements of the relevant specifications. If the results show that the samples do not satisfy the relevant specifications, the testing charges shall be borne by the~~ contractor.

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

22.4 Other agencies will also be executing simultaneously the works like electrification, horticulture or external services and other building works for the same project alongwith this work in particular. The contractor shall afford necessary facilities for the same. No claim in this respect shall be entertained. The contractor shall leave such necessary holes, opening etc. for laying/burying in the work, pipes, cables, conduits, clamps, boxes and hooks for fan clamps etc. as may be required for electric, sanitary, air conditioning, fire-fighting, P.A. system, telephone system, C.C.T.V. system etc. and nothing shall be paid for the same. Conduits for electrical wiring/cables will be laid in such a way that they leave enough space for concreting and do not adversely affect the structural members. Nothing extra over the agreement rate shall be paid for the same

22.5 Any cement slurry if added over base surface (or for continuation of concreting) for bond, its cost shall be deemed to have been included in the respective items, unless otherwise, explicitly stated and nothing extra shall be payable nor extra cement considered in the cement consumption on this account.

23. **The Contractor has to take care of all safety measures required during execution of work for protection of his own labour as well as the residence residing there in the campus. In case of any accident happens in the campus during execution, due to lack of safety measures or any other reason what so ever, the agency is fully responsible and all the expenses on this account shall be bear by the contractor and nothing extra on this account shall be paid to the contractor and CPWD will not be responsible at all.**

3. ADDITIONAL CONDITIONS

1. The contractor shall assume all liability, financial or otherwise in connection with his contract and shall protect and indemnify the Engineer-in-Charge from any and all damages and claims that may arise on any account. The contractor shall indemnify the Department against all claims in respect of patent rights, royalties, damages to adjacent buildings, roads or members of public in course of execution of work or any other reason whatsoever and shall himself defend all actions arising from such claims and shall keep the department saved harmless and indemnified in all respect from such actions, costs and expenses.

2. The nomenclature of the item given in the schedule of quantities gives in general the work content but is not exhaustive i.e. does not mention all the incidental works required to be carried out for complete execution of the item of work. There may be several incidental works, which are not mentioned in the nomenclature of each item but will be necessary to complete the item in all respect. All these incidental works which are not mentioned in item nomenclature but are necessary to complete the item shall be deemed to have been included in the rates quoted for various items in the schedule of quantities by the tenderer. No adjustment of rates shall be made for any variation in quantum of incidental works with respect to drawings and/or instructions of the Engineer-in-Charge, as deviation in any such elements of work which are incidental to the items of work or are necessary to complete such items in all respects. Nothing extra shall be payable on this account.

3. All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for contractor, watch and ward, temporary structure for plants and machineries, water storage tanks, installation and consumption charges of electricity/telephone/water, liaison works, protection works during execution or any other activity which is necessary for execution of work in the opinion of Engineer-in-Charge, shall be deemed to be included in rates quoted for various items in the schedule of quantities, by the contractor. Nothing extra shall be payable on these accounts.

4. The rates quoted for various items in the schedule of quantities shall include cost of preliminary works like setting out the lines, alignment of various services, establishing temporary bench marks, reference points etc. as per the drawings and directions of the Engineer-in-Charge. It shall also include making adjustments in layout, if required as per site conditions and as directed by the Engineer-in-Charge. Nothing extra shall be payable on this account.

5. Unless otherwise provided in the Schedule of Quantities, the rates tendered by the contractor shall be inclusive and shall apply to all heights, lifts, leads and depths and nothing extra shall be payable.

6. The contractors are advised to inspect and examine the site and its surroundings and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, labour etc. they require, if any, weather conditions at site, general ground / subsoil conditions etc. or any other circumstances which may affect or influence their tenders. No claim, whatsoever, shall be entertained from the contractor, on the plea that the information supplied by the department is insufficient or is at variance with the actual site conditions.

7. The contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of bodies, tribunals having any jurisdiction or authority which in any manner affect those engaged or employed and anything related to carrying out the work. All the bye-laws laid down by Municipal Corporation / local body and any other local bodies while executing the work shall be adhered to. All taxes / levies payable to local bodies shall be borne by the contractor. The contractor shall arrange to give all notices required by any authority and to pay to such authority all the fees that may have to be paid for execution of the work. All traffic restrictions notified by the local authorities shall also be adhered to by the contractor. He shall protect and indemnify the Department and its officials & employees against any claim or liability arising out of violations of any such laws, ordinances, orders, decree, whether by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts.

8. All care shall be taken by the contractor, as not to damage any other adjacent existing property or other services permanent or temporary, running in the plot. If any damage is carried, the same shall be made good by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. Also the contractor shall use such methodology and equipment so as to cause minimum environmental pollution of any kind during construction to have minimum construction time and minimum hindrance to users in the plot and to the occupants in the campus etc. Nothing extra shall be payable on this account.

9. The contractor shall maintain in good condition all work till the completion of entire work allotted to him. The contractor is to be held responsible for and to make good all injuries, damages and repairs, rendered necessary by fire, rain, traffic, floods or other causes. Engineer-in-Charge shall not be held responsible for any claims for injuries to person/workmen or for structural damage to existing property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or of any other of his authorized representatives in his employment during the execution of the work. The compensation, if any shall be paid directly to the department/authority / persons concerned, by the contractor at his own cost.

10. Arrangement of temporary water and electricity and telephone connection required, by him, shall be made by the contractor at his own cost and also necessary permissions directly from relevant departments shall be obtained by him under intimation to the Department. Also, all initial and running charges, and security deposit, if any, in this regard shall be borne by him. The contractor shall abide by all the rules/ bye laws applicable in this regard and he shall be solely responsible for any penalty on account of violation of any of the rules / bye-laws in this regard.

11. The contractor shall be responsible for maintenance and watch and ward of the complete installation and meter and shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The contractor shall indemnify the department against any claim arising out of pilferage / theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after the clearance is obtained from the local authorities from whom temporary electrical / water / telephone connection have been obtained by the contractor.

12 The department 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 stand-by water and 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.

13 All incidental charges of any kind including cartage, storage, wastage and safe custody of material etc. shall be borne by the contractor and no claim whatsoever shall be entertained on this account.

14 The contractor shall make available, on request from the Department, for record, copies of challan, cash memos, receipts and other and certificates, if any, vouchers towards the quantity and quality of various materials procured and the same shall be kept in record. These shall also provide information on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing, test certificates from manufacturers for the product for each consignment delivered at site, shelf life, if any, for the department to ensure that the material have been procured from the approved source and of the approved quality, as directed by the Engineer-in-Charge.

15. The contractor shall depute Site Engineer & skilled workers as required for the work. Necessary protective and safety equipment shall be provided to them by the contractor at his own cost and used at site.

16. The contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc. under various labour laws and other regulations applicable to the works, at site office.

17. The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignment, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost to the entire satisfaction of the Engineer-in-Charge.

18. The approval by the Engineer-in-Charge of the setting out of the alignment of services / pipe lines by the contractor shall not relieve the contractor of any of his responsibilities and obligation to rectify the error/ defect, if any, which may be found at any stage during the progress of the work or after the completion of the work.

19. The contractor shall prepare an integrated programme chart for the execution of work, showing clearly all activities from the start to completion, and submit the same for approval of the Engineer-in-Charge, within fifteen days of the award of the contract. The submission for approval by the Engineer-in-charge shall not absolve or relieve the contractor of any of his duties or responsibilities under the contract to complete the whole work within the prescribed / stipulated time for the contract. This is without prejudice to the right of the Engineer-in-Charge to take action against contractor as per terms and conditions of the agreement.

20. The contractor shall at his own risk and cost make all arrangements and shall provide all such facilities the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for testing and for analysis as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in-Charge. Nothing extra shall be payable for the above and including cost of materials to be tested.

21. The contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case he or his authorized representative is not present or does not associate him, the result of such tests and consequences thereon shall be binding on the contractor. The contractor or his authorized representative shall remain in contact with the Engineer – in – Charge or his authorized representative associated for all such operations. No extra payment or claim whatsoever shall be entertained on this account.

22. The Contractor at his own expense shall supply all materials, Labour for preparing and testing samples as required by the Engineer-in-Charge. The testing shall be carried out in the presence of the representative of the Engineer- in- Charge. All material shall be got tested in an independent laboratory as approved by the Engineer-in-Charge.

23. The contractor shall construct suitable Godowns / sheds as per specification of work for storing the materials safe against damage due to sun, rain, dampness, fire, theft etc. He shall also employ necessary watch and establishment for the purpose.

24. The day- to-day receipts and issue accounts of cement shall be maintained by Agency and make it available for inspection of higher CPWD authority.

25. EXISTING SERVICES:

Existing drains, pipes, cables, overhead wires, sewer lines, water lines and similar services encountered, if any, in the course of the execution of the work shall be protected / maintained against the damage by the contractor at his own expense. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. Also, the contractor shall not have any claim of any kind in case of any delay on account of the removal of trees or shifting, directing, raising, removing telegraph, telephone or electric lines (over head or underground) water and sewer lines and other structures etc., if any which may come in the way of work. Nothing extra shall be payable on these accounts. Also, any loss of time on this account, shall have to be made up by generating additional resources etc.

26. SECURITY & TRAFFIC ARRANGEMENTS

In event of any restriction being imposed by the Security Staff of CPWD or the client Department, OR traffic or any other authority having control over the project, on the working or movement of labour, materials, the contractor shall strictly follow all such restrictions or instructions issued regarding the same and nothing extra shall be payable to the contractor on account of such restrictions or instructions. The loss of time on this account if any, shall have to be made up by generating additional resources etc.

General security restrictions are given as under:
The movement of trucks and vehicles shall be regulated in accordance with rules and regulations as approved by competent authorities.

The contractor shall inform in advance, if required, the truck registration numbers ownership of the trucks, names and addresses of the drivers for necessary action by the security agency.

As and when there will be security requirements, certain additional restrictions can be imposed as per the requirement of the situation.

No claim whatsoever will be entertained by the department on account of any restriction that can be imposed as per the requirement of the situation.

The contractor shall ensure the stability of the excavation so that the surrounding ground and all adjoining structures and plants will be safe against settlement, subsidence, and damage and that there is no risk of injury to any personnel.

28. PREVENTION OF NUISANCE AND POLLUTION:
The Contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants or other client Department campuses and to the public in general and to prevent any damage to such properties and any pollution. He shall make good at his own cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever caused due to the execution of the work or by traffic brought thereon by the contractor. All waste or superfluous materials shall be cleaned away by the contractor without any reservations entirely to the satisfaction of the Engineer in charge.

29 Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints not specifically stated here, shall be entertained from the contractor. Therefore, the contractors are advised to visit site and get firsthand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.

30 No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. However, reasonable quantity may be permitted for storage, subject to the compliance of all rules / instructions issued by the relevant authorities and as per the direction of Engineer -in-Charge in this regard.

31 No Waiving of Legal Rights and Powers:
The Engineer-in-Charge shall not be precluded or stopped from taking any measurements, and framing of estimates or detaining any certificates made either before or after the completion and acceptance of the work and payment, from showing the true amount and character of the works performed and materials furnished by the contractor and from showing that any such measurements, estimates or certificates untrue or incorrectly made and that Engineer-in-charge shall not be precluded or stopped from recovering from the contractor such damages as it may be sustained by reasons of his failure to comply with the terms and conditions of the contract.

32 The contractor shall take into account the element of wastage/wastages those are likely to be there in all elements of the work and quote his price, taking that into account. The contractor shall study all the items from the point of view of wastage / wastages, which are likely to take place.

33 The contractor shall ensure that at no point of time there should be any hindrance to the other construction activities giving on in the campus. Therefore, he shall sequence his construction activity in different stretches accordingly. Nothing extra shall be payable on this account.

4. SPECIAL CONDITIONS (REPAIR WORK)

1. The Special Repair work has to be carried out in a multi-storied building (occupied residential building / an occupied non -residential building) with occupants and the contractors shall quote his rates after studying site conditions.

1.1 They are advised to inspect and examine the site and its surroundings and satisfy themselves with the nature of the site, the means of access to the site, the constraints of accommodation and want of space, they require, if any or any other circumstances which may affect or influence their tenders as the work is to be carried out in occupied buildings.

2. All bye-laws lay down by BMC and any other local bodies while executing the work shall be adhered to. All taxes / levies payable to BMC and other local bodies shall be borne by the contractor. All traffic restrictions notified by local authorities shall be adhered to. Nothing extra on this account shall be payable on these accounts.

3 Being a repair work all precautions, as not to damage the property, shall be taken by the contractor. If any damage is done to any structure etc., the same shall be made good by the contractor at his own cost and to the entire satisfaction of Engineer -in-Charge.

4 SCAFFOLDING SYSTEM:
All the scaffolding work required for the execution of work, either internal or external shall be provided by the contractor, nothing extra shall be payable on this account. It shall be provided strictly with double scaffolding system with all the accessories etc., with adjustable suitable working platforms to access the area to be repaired safely and with ease for surface preparation, application of repairs, inspection etc. It shall be able to take all incidental loads. It should also cater to the safety features for workmen. It shall be stiffened with bracings, runners, connection with the building etc. It shall be ensured that no damage is caused to the building due to scaffolding. Inadvertent damages caused, if any, shall be made good by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge.

5 PROTECTIVE FABRIC SCREENS:
Protective Fabric screening shall be provided by the contractor with PVC sheet, hessian cloth etc. covering full height of the structure. Nothing extra shall be payable on this account. It shall be provided by properly stitching the screen, having adequate lappings on sides to prevent any rubbish from falling outside while demolishing, dismantling, guniting, plastering etc. and to protect passers -by from the falling debris. Screen material shall be fixed by suitable means to the frames of scaffolding etc. and it is to be ensured that sagging of screen does not hinder the repair process.

The contractor shall maintain the protective screen in acceptable working conditions for the entire duration of the repair work as required by the Engineer-in-Charge. All the windows, ventilators, RCC jalis and openings shall be suitably covered and protected, in advance so as not to cause any damage while doing the repair work. If any damage is caused or glass panes are broken, these shall be made good by the contractor at his own cost and to the entire satisfaction of Engineer-in-Charge.

6. TEMPORARY BARRICADING:

Proper temporary barricading and safety net on ground shall be carried out by the contractor to physically define the boundaries of the site of repair / construction activity, for restricted entry of only those involved with the work and to prevent any accidents, but with minimum inconvenience to the residents / occupants. Nothing extra shall be payable on this account.

7 FALSE WORK:

The false work required to be carried out to facilitate repair work shall be provided by the contractor and nothing extra shall be payable on this account. Before structural repair is carried out, the structural member to be repaired should be relieved of stresses and strains and for this the self-load and imposed load over the structural members being repaired should be suitably transferred to the false work and adjoining existing structural members safely taking into account the capacity of the false work and also of the adjoining structural members. Also sequence of fixing and removal of false work including safe load transfer should be pre - decided and followed.

False work shall be strong enough to withstand all the dead and live loads and forces / impacts caused by dismantling, chipping, ramming, vibration of concrete and other incidental loads imposed over it including that of working platform, workers and personnel etc. during and after repair work. It shall be made sufficiently rigid by using adequate ties and braces etc. De-shuttering and removal of false work should be done after the lapse of specified time and re-propping done, if required, after de -shuttering, as approved by the Engineer-in-Charge.

False work shall be carried out using steel tubular sections with extension pieces or with steel built up sections to ensure relief to structural members from stresses. No timber ballies etc. shall be used.

The columns to be repaired shall be supported for full height of the building, to relieve its axial load through its adjoining intersecting beams and / or slabs etc. all floor levels. This shall be done even if only one storey length out of many storey lengths of the same column has been identified for structural repairs. The loads relieved are required to be transferred directly through props and supports on to the building foundation system or to the firm ground. Under no circumstances, the column load above this storey should be transferred by transfer through adjoining upper or lower intersecting beams alone.

The beams to be repaired shall be relieved of stresses and strains by suitably supporting the RCC slabs which are contributing load to that beam. To avoid over stressing of any existing flexural members receiving the transferred load of the distressed beam, the steel props and supports shall be taken and continued to the firm ground. For upper storeyes the steel props shall be taken at least two storeyes below or as directed by the Engineer-in-Charge.

The RCC slabs to be repaired shall be relieved from stresses by prop and support and simultaneously care to be taken to avoid its collapse during the repair process. However, supports should preferably be, not spare than 1.2 m X 1.2m. To avoid over stressing of existing flexural members receiving load of the distressed RCC slab, the steel props and supports provided shall be taken and continued to the firm ground or at least two slabs below or as directed by the Engineer-in-Charge.

8 All warning boards and displays, such as REPAIR WORK IN PROGRESS, KEEP AWAY FROM BUILDING, NO PARKING etc. along with sufficient supervisory staff on ground shall be provided by the contractor, wherever required. Nothing extra shall be payable on this account.

9 Water and electricity shall be arranged by the contractor at his own cost. Nothing extra shall be payable on this account.

10 The site of work shall be always kept neat and clean due to constraints of working space in and around buildings. To avoid nuisance to the occupants, all building rubbish / unserviceable materials shall be periodically removed from the premises to the approved municipal grounds and all necessary permissions in this regard have to be obtained by the contractor from the Municipal Authorities. Nothing extra shall be payable on this account.

11 Since the work is to be carried out in the occupied buildings, proper sequencing as regards dismantling of sanitary pipes, GI pipes, toilets etc. shall be done so as to cause minimum in-convenience to the occupants besides taking care of the constraint of keeping the system functional during repairs by making temporary arrangements, as required. Nothing extra shall be payable on this account.

12. The area of dismantling / guniting / re-plastering / repairing as per relevant items etc. given in the tender may have to be got done in patches, at different heights / levels also, for which nothing extra shall be payable.

13. Lifting of materials such as cement, sand, wooden planks etc. through the building lifts is prohibited. No mixing or offloading etc. of mortar / cement concrete etc. over the open terrace / flooring shall be permitted. Arrangements as deemed fit shall be made by the contractor for mixing / lifting / offloading all materials etc. at no extra cost.

14 PRODUCT DELIVERY, STORAGE AND HANDLING:

14.1 The contractor shall construct storage space for Chemicals and other materials to ensure that the storage conditions are as recommended by the manufactures.

14.2 All the materials shall be procured and delivered in sealed containers with labels legible and intact.

14.3 All the chemicals (polymers, rusticide, epoxy, water proofing compound etc.) shall be procured in convenient packs, say 20 litres (Kgs.) capacity packing only or as approved by the Engineer-in-Charge, and not in bigger capacity containers, say 200 litre (Kgs.) drums.

14.4 All required material shall be got approved, procured and deposited with the departmental supervisory staff. The materials will be kept in joint custody of the contractor and the department. The watch and ward of such material shall, however, remain to be the responsibility of the contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day to Day account of receipt, issue and balance will be regulated by the Department and proper account shall be maintained at site of work in the prescribed form as per standard practice.

14.5 All the chemicals shall be procured by the contractor directly from the manufacturer or their authorized dealers and copies of challans / cash memos towards the quantity of various chemicals procured shall be made available by the contractor to the Deptt. and the same shall be kept in record. The Name of manufacture, manufacturer's product identification, manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container.

14.6 The contractor shall submit for the chemicals procured, manufacturer's and / or authorized dealer's certificate regarding supplying and verifying conformance to the material specification, as specified.

14.7 All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.

14.8 Empty containers of the chemicals should not be removed from site till the completion of work and shall be removed only with the written approval of the Engineer-in-Charge.

14.9 All arrangement for measuring, dosing and mixing of material / chemicals at site has to be made by the contractor. Nothing extra shall be payable on this account.

14.10 Contractor shall suitably advise his site Engineer and all the workers as regard safe handling of chemicals. Necessary protective and safety equipment in form of hand gloves, goggles etc. shall be provided by the contractor at no extra cost and also used at site.

14.11 All incidental charges of any kind including cartage, storage and wastage and safe custody of material etc. shall be borne by the contractor and no claim, whatsoever, shall be entertained on this account.

~~15.0 VARIATION IN CONSUMPTION OF EMULSIFIED ACRYLIC POLYMER.~~

~~15.1 The theoretical consumption of the emulsified Acrylic polymer shall be as per the item description, for any variation between the actual consumption of acrylic polymer and theoretical consumption. Whether the variation is on higher side or lower side, the cost of polymer shall be recovered from the contractor @ Rs. 180 Per kg.~~

16.0 CREDIT FOR DISMANTLED MATERIAL:

16.1 The contractor shall take away all the serviceable and unserviceable dismantled material, by way of purchase, on as is where is basis. The credit to the department will be affected corresponding to the quantities being paid under the respective dismantling items.

17. Rate of double scaffolding, protective fabric screen and safety net is included in the item. Nothing extra shall be payable on this account.

5. PARTICULAR SPECIFICATIONS FOR REPAIR WORK

1.0 Adequate care should be taken by the contractor while dismantling, chiselling, demolishing work, drilling etc. that impact/ vibrations are minimum for considerations of structural safety and also for in-convenience caused to the users of the building. Rates shall cover cost of all inputs of material, labour, T&P etc. involved all the operations in the work.

2.0 Dismantling and repair work of any type like plaster, flooring, concrete, RCC, Brick work, GI / CI pipes, water proofing etc. shall be for all heights and all levels unless specifically mentioned in the item and no claim for extra cost shall be entertained on this account.

3.0 Sequence of strengthening work shall be as under:

(a) Strengthening of beams of first floor and columns from top of grade beams / foundations up to middle of second floor.

(b) Strengthening of beams of second floor and column from middle of second floor to middle of third floor.

(c) Strengthening of beams of fourth floor and terrace beams and columns from middle of the fourth floor up to terrace level.

(d) Strengthening of beams of third floor and columns from middle of third floor to middle of fourth floor.

Gunited Repaired Structural members shall be allowed to attain atleast 7 days strength before any load is transferred to that member.

4.0 For removal of all type of loose / delaminated / damaged / weak cement plaster from the surface of masonry or concrete, a cut normal to the surface all along the boundaries, in regular shape, shall be made not to exceed plaster thickness. Then plaster shall be removed completely to expose the parent masonry or concrete surface so as not to have any traces of such plaster left. For brick work, the joints have be properly raked and cleaned as per CPWD Specifications.

5.0 CHIPPING / DISMANTLING OF UNSOUND / WEAK CONCRETE:

5.1 The Chipping of unsound work / concrete / delaminated layer of guinting etc. shall be done by chipping(after properly supporting the member with false works) , in regular shape, with sides parallel or normal to the direction of the reinforcement. The chipping shall be done minimum 50 mm beyond the perimeter of the spall. For a single spall, the repair area should have a minimum width of 100 mm in any direction. If a number of spalls are closely located to each other, these should be included in a single area marked for repair. The cut shall be made normal to the surface of member. The minimum depth of cut should be 12 mm.

5.2 Adequate care is to be taken not to cut the reinforcement steel and a cover meter could be used to estimate the depth of cover, for which nothing extra shall be paid.

5.3 Chipping should be done up to the required depth as decided by the Engineer-in- Charge to produce sound concrete surface to a near uniform depth for the repair areas.

5.4 Dimensions of area chipped off for RCC slabs, beams, columns etc. shall be measured in centimeters after the chipping / dismantling operation is completed. The area of the chipped / exposed RCC surface shall be measured in sq. m correct to second place of decimal.

For the RCC members to be completely dismantled, pre-measurement of the dimensions of RCC member to be dismantled shall be recorded before taking up the dismantling operation and volume of concrete dismantled shall be worked out in cubic metre correct to second place of decimal

5.5 Removal of concrete should begin at the interior of the repair areas and progress towards the boundaries. All edges and cavities shall be square shouldered.

6. CUTTING OF EXISTING REINFORCEMENT:

6.1 The existing reinforcement bars to be cut shall be identified and approved for cutting by the Engineer-in -Charge.

6.2 The reinforcement shall be carefully cut without causing excessive vibrations or damaging the structure and the recovered reinforcement should be straightened, cleaned of concrete by wire brush scrapped and stacked properly with in a lead of 50 metre as directed by the Engineer-in-Charge.

7.0 CLEANING OF EXISTING REINFORCEMENT AND PASSIVATING ITS SURFACE:

7.1 Before re -casting / jacketing of members or repairs by plastering to member with polymer modified mortar, the reinforcement has to be cleaned properly, as specified.

7.2 The rust has to be removed from the surface of the reinforcement manually using chisels, wire brush, emery paper etc. and then by sand blasting wherever possible and as directed by Engineer-in-Charge at no extra cost, till the steel surface is cleared of all rust that could be removed manually or mechanically.

7.3 Then rusticide or Alkaline chemical rust remover, as approved by the Engineer-in Charge shall be applied with brush over the reinforcement surface thoroughly along the full length of rusted reinforcement. After 24 hours of its application the surface shall be cleaned with wire brush and all loose particles removed. It should then be washed clean, with water, thoroughly and allowed to dry.

7.4 Rates shall include cost of all materials, labour, T&P etc. involved in all the operations.

8.0 ADDITIONAL REINFORCEMENT BARS:

For introducing additional reinforcement bars for new structural connections or supplementing additional steel area to the existing RCC member, the cross sectional area (diameter and no. of bars) and length required shall be approved by the Engineer-in-Charge. Also, the depth of embedment of reinforcement bar shall be approved by the Engineer-in-Charge. The holes of specified diameter and depth have to be power drilled in RCC. The drilled hole in dry state has to be cleaned with round brush and by blowing air through a tube inserted in the hole and connected to hand operated blower.

Then epoxy is to be injected from foil pack with help of epoxy dispenser and epoxy cartridge holder and disposable PVC mixing nozzle inserted inside the drilled hole to fill it from bottom of hole and upwards. Then the reinforcement bar is to be inserted and allowed to remain undisturbed for minimum 24 hours and allow epoxy adhesive to be air cured.

Rates shall include cost of all inputs of material, labour and T&P etc. involved in all the operations except the cost of reinforcement.

9.0 SHEAR KEYS:

Shear keys to be provided for structural connection of applied repair material with the substrate / parent surface for transfer of forces occurring at the interface, shall also be provided in similar manner as in para 8.0 above. The shear key bars cut and bend to the required shape shall be embedded in parent concrete to a minimum depth of 50 mm. Rates shall include cost of all materials, labour and T & P etc. involved in all the operations.

10.0 CLEANING OF EXPOSED RCC / CONCRETE SURFACE, INSERTING NIPPLES AND INJECTION GROUTING

10.1 The final chipped off concrete surface and exposed reinforcement, if any, of the affected structural member should be cleaned off all loose and foreign materials by free air blast and then with water and allow it to dry.

10.2 For the honey combed portion of the concrete or cracked concrete, drill holes at least 18 mm in diameter and depth up to 50 mm or half the member thickness whichever is less, at the required spacing, as directed by the Engineer-in-Charge.

10.3 For cracked surface, open up cracks by making V notch or groove of size 12 mm X 12 mm as directed by the Engineer-in-Charge.

10.4 Remove coarse debris and dust in opened up cracks and drilled holes by blowing air with hand operated blow out pump. Concrete surface required to be grouted shall be free from all loose and unsound material. The prepared surface should be clear of dust which could obstruct free flow of grout material and also impede its bonding with concrete surface. Saturate the concrete in vicinity of crack / honey combed concrete surface with water (but without excess water) only if the cementitious / polymer admixed grout is to be injected.

10.5 Insert 12 mm diameter specified injection nipples in holes drilled along cracked lines or in honey combed area of concrete and fix them by sealing on its sides with or polymer modified mortar, as directed by the Engineer-in-charge.

10.6 Seal the crack or the honey combed surface between the nipples by means of epoxy mortar or polymer modified mortar, as approved by the Engineer-in-charge. The polymer used shall be of approved grade and polymer modified mortar shall be applied as per specifications mentioned separately for polymer modified mortar. The polymer modified mortar shall be moist cured for 3 days and allowed to gain strength before actual grouting commences.

10.7 To inject grout in nipples, the cementitious grout shall be prepared from cement (OPC –43 grade), sand (sharp, washed well graded generally conforming to Zone IV of IS: 383) and water conforming of IS: 456 mixed in specified proportions as directed by the Engineer-in-Charge.

10.8 The emulsified acrylic polymer shall be as specified and shall conform to Manufacturer's specification. The physical and mechanical properties of polymers shall conform to manufacturer's specification. One test shall be carried out mandatory for every lot of acrylic polymers supplied at site, before use in the work.

10.9 The grouting equipment shall be capable of supplying mixing, stirring and pumping grout to the satisfaction of Engineer-in-charge. It shall have capacity to inject grout at a pressure up to 7 kg / sq. cm measured at grout connections. It shall be capable of mixing and pumping the cement sand grout 1:2(1 cement: 2 sand) with water cement ratio ranging from 0.5 to 1.0

10.10 Wherever epoxy is to be used, the surface of the concrete shall be dried with air blast, before grouting or applying epoxy.

10.11 The cementitious grout in proportion as directed by the Engineer-in-Charge shall be prepared. It should be lump free of creamy consistency, thoroughly blended and shall be continuously stirred to keep the cement particles in suspension to retain uniform consistency till grout is injected.

10.12 In case of vertical cracks the injection shall be started at the lowest nipple and continued until the injected grout begins to flow out at the next higher nipple. The first nipple shall then be closed and injection continued from second until grout flows out at the third and so on. The process shall be repeated until the whole surface is treated. As soon as the system is cured, the nipples shall be suitably cut.

10.13 In case of honey combed concrete, each grout hole shall be grouted individually. The sequence of injection shall be as per the directions of the Engineer-in-Charge.

10.14 The measurement of grout material shall be on the basis of only the weight of cement consumed in kg.

10.15 Pre measurements of the quantities of such grouting materials brought at site and balance quantities remaining at the end of grouting application shall be recorded separately, which will determine the quantity of grout material actually injected. Adequate care is to be taken by the contractor as not to waste the grout. The quantity which can be consumed immediately within the prescribed time only shall be prepared in batches.

10.16 The quantity of grout material wasted, discarded, hardened shall not qualify for payment and shall be recorded for deduction at the end of each operation.

11 BONDING COAT:

Bonding coat is required to be applied for adhesion of applied repair concrete or mortar to the parent concrete. For this, the surface should be thoroughly cleaned by brushes and by blowing air from hand operated pump. The surface shall then be saturated with water (but without excess water).

The components of bonding coat shall be weighing batched and mixed in specific proportions, in a clean container, as directed by the Engineer-in-Charge. They should then be blended to a uniform and homogeneous mixture, lump free and of creamy consistency.

The specified bond coat should be applied by stiff nylon bristle brush. The bonding material should be worked well onto the concrete surface of the parent concrete including reinforcement surface ensuring that no pinholes are visible. The polymer modified bonding cement slurry shall be applied to a thickness not more than 2 mm. A second coat shall be applied within 15 to 20 minutes of application of the first coat at right angles to the first coat to ensure complete

coverage and absence of pin holes. (Area of exposed RCC unit shall be measured in sq.m correct to two decimal places for the purpose of payment).

Pre-fabricated shuttering shall then be erected immediately. Fresh concrete / mortar shall be placed /applied while the bond coat is still tacky and well within pot - life / setting period. If adhesive cures to the extent of losing its tack or has set before concrete / mortar is placed / applied, the same shall be removed or slightly abraded and another coat of adhesive / bond coat shall have to be applied by the contractor at his own cost.

Freshly placed concrete shall be thoroughly consolidated to ensure full bonding of the fresh concrete with the parent concrete. If there is a failure of bond of fresh concrete / plaster with parent concrete surface and it sounds hollow on tapping, the repair work shall be dismantled and redone by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. CPWD Specifications for manufacture and placing and curing of concrete shall, in general, be followed unless specified otherwise.

12 POLYMER MODIFIED MORTAR:

Polymer modified mortar shall have uniform consistency and texture and prepared by weigh batching cement, sand, polymer and water. Polymer shall conform to the manufacturer's specifications. The requisite number of test specimens of mortar shall be cast and tested. One test for the polymer modified mortar shall have to be mandatory carried out for every 500 sq m of plaster or part thereof, in general. Polymer modified cement mortar with cement sand proportion 1:3 by weight shall have following properties:

i. Minimum compressive strength after 28 days at 27 degree C: 20 N / sq.mm
ii. Minimum flexural strength after 28 days at 27 degree C : 6.0 N / sq.mm

The plaster with polymer modified mortar is to be done in coats, each coat not exceeding 10 mm thickness, if required thickness is more than 12 mm. The second coat shall be applied in fairly rapid succession within 15 to 20 minutes of application of the first coat. The surface shall be moist cured for 3 days followed by air curing at ambient temperature; Steam curing shall not be permitted.
Pre measurement of dimensions of plaster patches shall be measured correct to a centimeter and area worked out in sq.m correct to two decimal places.

13.0 FLOORING, SKIRTING, VENEERING, DADO, TREADS & RISERS OF STEPS, JAMBS, SILLS & SOFFITS

1.1 Nothing extra shall be payable for using combination of marble, granite and kota in the required pattern at various locations unless otherwise specified.

1.2 Flooring in toilets, verandah, kitchen, courtyard and at other places if required shall be laid to the required slope/gradient as per the directions of the Engineer-in-Charge and nothing extra shall be paid on account of the same.

1.3 The pattern, spacing and locations of joints shall be as per drawings and direction of the Engineer-in-Charge and nothing extra shall be paid on account of the same.

14 CLEANLINESS OF SITE

The Contractor shall not stack building material / malba / muck/ rubbish on the land or road of the local development authority or on the land owned by the others, as the case may be. So, the muck, rubbish etc. shall be removed periodically as directed by the Engineer-in-Charge, from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the Contractor. Nothing extra shall be payable on this account. In case, the Contractor is found stacking the building material / malba as stated above, the Contractor shall be liable to pay the stacking charges / penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The Engineer –in-Charge shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the Contractor including amount of the Security Deposit and performance guarantee in respect of this contract agreement.

15 INSPECTION OF WORK

In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by the senior officers of CPWD in addition of the Engineer-in-Charge and his authorized representative. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-Charge or other officers as stated above to visit the works shall have been given to the Contractor, either himself be present to receive the orders and instructions or have a responsible Site Engineer duly accredited in writing, to be present for that purpose Senior Officers of CPWD Authorities shall be inspecting the on-going work at site at any time with or without prior intimation.

16.0 Stainless Steel Railing/Handrails:

16.1 GENERAL

The contractor shall apply all materials, labour, tools, ladders, scaffolding and other equipment necessary for the completion and protection of all stainless steel work.

16.2 MATERIAL

All stainless steel pipes and plates shall conform to AISI 304 in 18/8 composition. 18 will be chromium and 8 will be Nickel and carbon content will be 0.03 maximum and the relevant clauses associated with this grade of steel to be followed.

16.3 SURFACE FINISH

Surface finish of all the stainless steel materials will be in 240 grit satin finish / matt finish.

16.4 ACCESSORIES

Fixing will be done by stainless steel expansion bolts of approved size and make as per Engineer-in-charge and welding to be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus floric acid solution treatment by which the chances of corrosion will be eliminated and any burn out makes on the metal will also be eliminated.

16.5 COATING MASS

All stainless steel material will have to be coated by a solution of Inox to avoid finger in prints and avoidance of settlement of environment / atmospheric dust.

16.6 MEASUREMENT

All the stainless steel finished parts shall be weighed correct to a gram and paid on weight basis.

16.7 RATE

The rate shall include the cost of all the materials, machinery and labour involved in all the operations described above including cartage, lifts and all taxes as applicable.

Any incidental additional requirements for execution of this item to the satisfaction of Engineer-in-Charge shall also be treated as included in the item and shown in attached drawing and nothing extra will be paid for such extra work.

Installation drawings for approval of the Engineer-in-charge-in-Charge and no work shall be performed until the approval of these drawings is obtained.

16.8 CO-OPERATION WITH OTHER CONTRACTORS/SPECIALIZED AGENCIES / SUB- CONTRACTORS

16.8.1 The Contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants of the adjacent properties and to the public in general. The Contractor shall take all care, as not to damage any other adjacent property or other services running adjacent to the plot. If any damage is done, the same shall be made good by the Contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The Contractor shall use such methodology and equipment for execution of the work, so as to cause minimum environmental pollution of any kind during construction. Further, the Contractor shall take all precautions to abide by the environmental related restrictions imposed by Madhya Pradesh Pollution control board, Govt. of Madhya Pradesh.

Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints, inadequate availability of skilled, semi-skilled or unskilled workers in the near vicinity, non-availability of construction machinery spare parts and any other constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Tenderers are advised to visit site and get first-hand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.

16.8.2 The Contractor shall cooperate with and provide the facilities to the sub-Contractors and other agencies working at site for smooth execution of the work. The contractor shall indemnify the **client / user department against any claim(s) arising out of such disputes**

16.8.3. The Contractor shall:

(i) Allow use of scaffolding, toilets, sheds etc.
(ii) Properly co-ordinate their work with the work of other Contractors.
(iii) Provide control lines and benchmarks to his Sub-Contractors and the other Contractors.
(iv) Provide electricity and water at mutually agreed rates.
(v) Provide hoist and crane facilities for lifting material at mutually agreed rates.
(vi) Co-ordinate with other Contractors for leaving inserts, making chases, alignment of services etc. at site.
(vii) Adjust work schedule and site activities in consultation with the Engineer-in-Charge and other Contractors to suit the overall schedule completion.
(viii) Resolve the disputes with other Contractors/ sub-contractors amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator.

16.8.4 The work should be planned in a systematic manner so as to ensure proper co-ordination of various disciplines viz. sanitary & water supply, drainage, rain water harvesting, electrical, fire-fighting, information technology, communication & electronics and any other services.

16.8.5 Other agencies will also simultaneously execute and install the works of sub-station / generating sets, air-conditioning, lifts, etc. for the work and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be supplied free of cost by the department unless otherwise specifically mentioned) and the contractor shall fix the same at time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.

16.8.6 The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-In-Charge and shall as far as possible arrange his work and shall place and dispose off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and in a proper co -ordination manner and shall perform it in proper sequence to the complete satisfaction of others.

17.0 CONSUMPTION OF PIG LEAD AND IT'S VARIATION FOR SCI SANITARY PIPES AND FITTINGS AS PER IS:3989

In order to ensure that adequate lead is poured properly into the joints and to control waste in use of lead for caulking of joints of SCI pipes and fittings, at the beginning of the work three or four sample joints shall be made and the quantum of lead per joint approved by the Engineer in charge. The actual consumption of lead should be within variation of 5% of the approved sample job. This variation includes allowances of wastage also. If the actual consumption of pig lead is less than the required consumption worked out on the above basis, the recovery on account of less use of lead shall be made from the contractor at market rate to be determined by the Engineer-in-charge, whose decision in the matter shall be final & binding.

18.0 FIXING OF SCI/CI PIPE

The SCI/CI pipes and G.I. pipes, wherever necessary, shall be fixed to RCC columns, beams etc. with rawl plugs, or appropriate fasteners as approved by Engineer-in-Charge, and nothing extra shall be payable on this account. GI pipes shall be wherever made to pass through wall / concrete then it shall be done using protective sleeves alround the pipes to protect it from damage, nothing extra shall be payable on this account.

6. PARTICULAR SPECIFICATION FOR ROAD WORKS

A-1 BITUMINOUS WORK

A-1 1 The contractor shall have to necessarily deploy self propelled mechanical paver with suitable screeds capable of spreading, tamping and finishing the mix true to the specified lines, grades and cross sections of the road. The paver finisher shall have the following essential features.

a) Loading hoppers and suitable distributing mechanism.
b) All drives having hydrostatic drive / control.
c) The machine shall have a hydraulically extendable screed for appropriate width requirement.
d) The screed shall have tamping and vibrating arrangement for initial compaction to the layer as it is spread without rutting or otherwise marring the surface. It shall have adjustable amplitude and variable frequency.
e) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.
f) The paver shall be fitted with automatic leveling and profile control within the specified tolerances.
g) The screed shall have the internal heating arrangement.
h) The pave shall be capable of laying either 2.5 to 4.0 m width or 4.0 to 7.0 m width as stipulated in the contract.
i) The paver shall be so designed as to eliminate skidding / slippage of the tyres during operation.

A-1 1.2 The contractor shall have to necessarily deploy the road rollers, for BM & SDBC for their compaction as per relevant MORTH specifications for road & Bridge work specifications Section 500 and clause 504 & 508 above with relevant IRC & IS Codes along with section 900 for quality control as described below: -

(i) For initial Rolling: -	80 to 100 KN static weight smooth wheel roller (3 wheels or tandem)
(ii) For intermediate Rolling: -	Vibratory roller of 80 to 100 KN static weight or pneumatic tyred roller of 150 to 250 KN weight with minimum 7 wheels and minimum tyre pressure of 0.7 Mpa.
(iii) For final Rolling: -	60 to 80 KN tandem roller. The joints and edges shall be rolled with 80 to 100 KN static roller.

A-1 1.3 Mix shall be prepared in approved hot mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality with thoroughly coated aggregate. Hot mix plant shall be preferable of batch mix type with electronic load sensor device. The requirement of clause related to hot mix plant of relevant MORTH specification shall be strictly adhered to.

A-1 1.4 The job mix shall be got designed by the contractor from approved laboratory or as directed by Engineer-in-charge and its cost shall be borne by the contractor if any. The mix shall be designed in such a proportion that laboratory density of 2.2 gm/cum for

Bituminous Macadam, 2.30 gm / cum for Semi Dense Bituminous concrete is achieved. The contractor shall follow the instructions contained in clause for BM & clause 500 for MORTH specifications strictly and provide all necessary details as specified therein.

A-1 2 TACK COAT

The work shall consist of application of single coat of low viscosity liquid bituminous material to an existing road surface preparatory to another bituminous construction over it. The binder used for tack coat shall be bituminous of suitable grade as specified in nomenclature of item.

A-1 2.1 The emulsified bitumen for tack coat on road shall be medium setting (MS) type conforming to IS : 8887-1995. The bitumen emulsion shall be brought at site in one lot in sealed drums and shall be got verified and checked by the representative of Engineer-in-Charge before its use. The work shall be done strictly in accordance with clause and sub-clauses thereto of MORTH specification for Roads and Bridges work (Vth revision).

A-1 3 BITUMINOUS MACADAM

The work shall consist of construction, in single course of compacted crushed stone aggregates mixed with bituminous binder, to serve as base / binder course, laid immediately after mixing, on a previously prepared base in accordance with the requirement as per the specification as laid down in clause 504 and sub-clause thereto of updated MORTH specification for Road and Bridge works (Vth revision) and as directed by Engineer-in-charge.

A-1 3.1 MATERIAL

A-1 3.1.1 BITUMEN

Bitumen shall be VG-30conforming to IS 73 conforming to IRC : SP 153 as indicated in bill of quantity to grade and quantity as specified in nomenclature of the item.

A-1 3.1.2 AGGREGATE

Aggregate shall consist of crushed hard, durable, free from durt, clay organic material stone aggregate conforming to grading specifications as laid in paras 500 of MORTH specification Vth revision. No natural aggregate or sand shall be allowed.

A-1 3.2 RATE

The contract unit for the Bituminous Macadam shall be payment in full for carrying out all the required operations including full compensation for all components listed in clause 504 of MORTH specification Vth revision. The rate shall cover the provision of bitumen in the mix design @ 3.50% (Three decimal Five Zero per Cent) of weight of total mix with provision that variation of quantity on minus side shall be recovered @ market rate per MT of bitumen. However, no extra payment would be admissible for use of bitumen if the variation is on higher side i.e. beyond of weight of total mix.

A-1 4 SEMI DENSE BITUMINOUS CONCRETE

The work shall consist of constructing a single layer of specified compacted thickness of semi dense bituminous concrete consisting of crushed stone aggregates mixed with bituminous binder, to serve as wearing course, laid immediately after mixing on a

previously prepared base in accordance with the requirement of specification as laid down in clause 508 and sub-clause thereto of MORTH specifications for Roads & Bridges works (Vth revision) or as directed by Engineer-in-charge.

A-1 4.1 MATERIAL

A-1 4.1.1 BITUMEN

Bitumen be VG-30 Conforming to IS 73 shall conform to grade and quantity as specified in nomenclature of the item.

A-1 4.1.2 AGGREGATE

Aggregate shall consist of crushed stone aggregate conforming to IRC: SI : 53 at indicated in bills of quantities conforming to grading specifications as laid in sub clause 500-8 to 500-19 of MORTH specification for Roads & Bridges works (Vth revision). No natural aggregate or sand shall be allowed.

A-1 4.1.3 FILLER

Filler shall consist of hydrated lime of grade & specification conforming to clause of MORTH specifications (Vth revision).

A-1 4.2 RATE

The contract unit for the Semi Dense Bituminous concrete shall be payment in full all for carrying out all the required operations including full compensation for components listed in clause of MORTH specification (Vth revision). The rate shall cover the provision of bitumen in the mix design @ 5.0% (Five decimal zero per cent) of weight of total mix with provision that variation of quantity on minus side shall be recovered @ Market rate at that time of execution of work per MT of bitumen. However no extra payment would be admissible for use of bitumen if the variation is on higher side i.e. beyond 5.0% of weight of total mix.

A-2 CONDITION FOR PROCUREMENT AND ACCOUNTING OF BITUMEN :-

A-2 1 The contractor shall procure bitumen of required grade as specified conforming to IS : 73- 1992 with up to date amendments and other relevant codes from the manufactures of repute like Indian Oil Corporation Ltd., Hindustan Petroleum, Govt of India and holding license to use ISI certificate mark for their products.

A-3 MODE OF PROCUREMENT :-

A-3 1 Bitumen / Bitumen emulsion for tack coat shall be brought at site in sealed drums only bearing following marking (legible).

i) Name of Manufactures.
ii) Gross Wt., Net Wt. and Tare Weight.
iii) Month and year of Manufacture.
iv) Use before.....(date)
v) Type and Grade.

vi) Batch number.
vii) 'ISI' certification and Standard Mark.
viii) Name of contractor / supplier.
ix) Serial No. & Total nos. of drums in each batch.

A-3 2 For providing bituminous surface like BM, SDBC, etc. the bitumen shall be procured either in sealed drums or in bulk and stored at the hot mix plant site. The drums / container shall bear the marking as mentioned in Para A-2. 1 above.

A-3 3 The contractor will produce original challan / voucher for purchase of bitumen and emulsion from IOC/HPCL./BP/HINCOL as a proof of having purchased the material form manufacturer. The voucher / challan shall be returned to the contractor after verification and making necessary endorsement.

A-3 4 Bitumen of specified grade shall be brought to plant site in one lot for theoretical requirement upto 100 tonnes and in lots of 100 tonnes or more for theoretical requirement of more than 100 tonnes. The day to day receipt and issue accounts of bitumen shall be maintained by the junior Engineer - in - Charge and signed daily by the contractor or his authorized agent on the following proforma :-

PROFORMA FOR THE BITUMEN REGISTER RECEIPT

Date of receipt	Qty received	Progressive total	Date of issue	Qty issued	Total issued	Balance in hand	Contractor's Initial	JEs Initial
1	2	3	4	5	6	7	8	9

Item of work for which issued	Approx. qty of work done by each day	Theoretical requirement of bitumen for work done on each day	Remarks of AE/AEE	Remarks of Ex. Engineer
10	11	12	13	14

A-3 5 When bitumen is issued / brought in drums, the same shall be stacked in fenced enclosures to be provided by the contractor at his own cost, as directed by the Engineer - in -charge on one side of the roadway. The contractor shall be responsible for the watch & ward and safety of bitumen. The contractor shall facilitate the inspection of bitumen stockyard by the Engineer - in -charge or his representative at any time.

A-3 6 Material shall be kept in the joint custody of the contractor and the representative of the Engineer-in-charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission

obtained from the Engineer-in-charge. No heating of bitumen in drums for any purpose what so ever shall be allowed.

A-4 **SAMPLING AND TESTING**

The contractor shall have to obtain and furnish test certificate issued by manufacturer to the Engineer-in-charge in respect of bitumen procured by him. The samples shall be collected at discretion of Engineer-in-charge and got tested as per provisions of IS : 73/MORTH/CPWD specification from the laboratories approved by him.

A-5 The contractor shall supply free of charge, the bitumen required for testing. The cost of specimen sampling and testing shall be borne by contractor.

A-6 In case the test result indicate that the bitumen procured by the contractor does not conform to the relevant BIS codes / specification, the same lot shall rejected and shall be removed from the site of work by the contractor at his own cost within a week's time of written order from Engineer-in-charge to do so.

A-7 The bitumen content in bituminous mix shall be checked by conducting the bitumen extraction test conforming to IRCII at regular interval on the completion of work, the actual consumption of bitumen shall be worked out based on such test results. The theoretical consumption shall be worked out based on the design mix formula and the actual consumption (based on extraction test as well as MAS account) if found less than theoretical one, the recovery shall be made from contractor for less use of bitumen. However, nothing extra shall be paid if actual consumption so worked out is higher than theoretical consumption. This is without prejudice to action under relevant clause of the agreement.

Bitumen brought to site / Hot Mix plant and bitumen remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-charge.

Note : Nothing extra shall be paid for cartage of bitumen to the site of work.

7.

- All the tippers carrying bituminous mix from Hot Mix Plant should accompany the computerized print out of job mix from automated Hot Mix Plant including measurement certificate from weigh-bridge duty certified by a responsible person at plant. This record shall be preserved by the field unit along with all documents and registers. Contractor shall also be responsible for recording weight of bituminous mix brought at site by each tipper in registers and entry of same shall be checked by JE (100%) and authenticated by AE.
- Mix shall be prepared in hot mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality with thoroughly coated aggregate. Hot Mix Plant shall be preferable of batch mix type with electronic load sensor device. The contractor

shall have to mention the details of Hot Mix Plant from where he intends to bring the bituminous mix. The plant including all material to be used in the bituminous mix shall be open to inspection by Engineer in Charge or his authorized representative, whenever required.

- The contractor shall have to necessarily deploy self-propelled paver with electronic sensor having suitable hydraulically operated screeds capable of spreading, tamping and finishing the mix true to the specified lines, grades and cross sections of the road. The paver finisher shall have the following essential features:
    - Loading hoppers and suitable distributing mechanism.
    - All drives having hydrostatic drive / control. The machine shall have a hydraulically extendable screed for appropriate width requirement.
    - The screed shall have tamping and vibrating arrangement for initial compaction to the layer as it is spread without rutting or otherwise marring the surface. It shall have adjustable amplitude and variable frequency.
    - The paver shall be equipped with necessary control mechanism so as to ensure the finished surface is free from surface blemishes.
    - The paver shall be fitted with an electronic sensing device for automatic leveling and profile control within the specified tolerances.
    - The screed shall have the internal heating arrangement.
    - The paver shall be capable of laying 2.5 to 4.0 m width in service road and 4.0 to 7.0 m width on main carriageway as per site requirement.
    - The paver shall be so designed as to eliminate skidding/ slippage of the tyres during operation.
    - The contractor shall have to necessarily deploy the road rollers, for B, & SDBC for their compaction as per CPWD specifications.
- GUARANTEE BOND:
    - Five (05)years Guarantee bond in prescribed performa attached at Annexure III herewith shall be submitted by the contractor which shall also be signed by the contractor to meet their liability / liabilities under the guarantee bond. However, the sole responsibility about efficiency of bitumen road work shall rest with the building contractor. Five percent (5.0%) of the cost of bitumen road work shall be retained as security deposit and the amount also withheld would be released after five (05) years from the date of completion of the entire work under the agreement, if, the performance of the work done is found satisfactory. If, any defect is noticed during the guarantee period, it shall be rectified by the contractor within seven days of receipt of mention of defects in the work. If the defect pointed out are not attended to within the specified period, the same will be got done from another agency at risk and cost of the contractor.

8.0 CONDITION FOR CEMENT :-

8.1 The Contractor shall procure 43 grade Ordinary Portland cement (conforming to IS : 8112) or Portland slag cement (conforming to IS : 455) or Portland Pozzolana Cement (PPC) (Fly ash based) – conforming to IS : 1489 (Part-I) as required in the work, from reputed manufactures of cement such as ACC, Ultratech, Vikram, Shree Cement, Birla Gold, Ambuja & J.K. Cement or from any other reputed cement Manufacturer having a production capacity not less than one million tonnes per annum as approved by ADG for that sub region.

The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacture(s) which the contractor 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 manufacturer, given by the tenderer, fully or partially.

Supply of cement shall be taken in 50 Kg bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got issue in accordance with provisions of relevant BIS codes. In case test results indicate that the cement arranged by the Contractor does not conform to the relevant BIS codes, the same shall stand rejected and 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.

If Portland Pozzolana cement or Portland slag cement is used, suitable modification in de-shuttering time etc. shall be done, if need be, as per specifications and standards and as directed by Engineer – in – charge and nothing extra shall be payable on this account.

No extra payment / deduction shall be made from the payment to the contractor for using any of the above type of cement.

8.2 The cement shall be brought at site in bulk supply of approximately 50 tonnes or as decided by the Engineer - in - charge.

8.3 For each grade / type, cement bags shall be stored in two separate godowns, one for tested cement and the other for fresh cement (under testing) constructed by the contractor at site of work as per sketch shown in General conditions of contract for CPWD works 2023 with weather proof roofs and walls, for which no extra payment shall be made. The size of the cement godown is indicated in the sketch for guidance only. The actual size of godown shall be as per site requirements and as per the direction of the Engineer in charge and nothing extra shall be paid for the same. The decision of the Engineer-in-charge regarding the capacity required/needed will be final. However, the capacity of each godown shall not be less than 100 tonnes. Each godown shall be provided with a single door with two locks. The keys of one lock shall remain with CPWD Engineer-in-charge or his authorized representative and that of other lock with the contractor at the site of work so that the cement is issued from godown according to the daily requirement with the knowledge of both the parties. The account

of daily receipt and issue of cement shall be maintained in a register in the prescribed Proforma and signed daily by the contractor or his authorized agent in token of its correctness.

8.4 The cement shall be got tested by 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 laboratories. The cost of tests shall be borne by the contractor ~~/ Department in the manner indicated below :-~~

~~**(a) By the contractor, if the results show that the cement does not conform to relevant BIS codes.**~~

~~**(b) By the Department, if the results show that the cement conforms to relevant BIS codes.**~~

8.4.1 All other charges of sampling, packing and transportation of sample shall also be borne by the Contractor.

8.5 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained separately for each type of cement, as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause 38 of the contract and shall be governed by conditions laid therein. However, for consumption lesser beyond permissible theoretical variation recovery shall be made in accordance with conditions of contract at Schedule A to F (**CPWD-7),** without prejudice to action for acceptance of work/item at reduced rate or rejection as the case may be. In case of excess consumption, no adjustment shall be made.

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

9.0 CONDITIONS FOR REINFORCEMENT STEEL :-

The CPWD/Contractor shall procure Low Alloy Steel Reinforcement bars of minimum Fe-550D from:

1. The steel manufacturer such as SAIL, TATA STEEL, RINL, JINDAL STEEL & POWER LTD AND JSW Steel Ltd. or their authorized dealers having valid BIS license for IS:1786:2008 (Amendment -1 November 2012)

2. The steel manufacturers or their authorized dealers (as per following selection criteria) having valid BIS license for IS:1786:2008 (Amendment -1 November 2012)

The procured steel should have following qualities: -

i. Excellent ductility, bend ability and elongation of finished product due to possible refining technology.
ii. Consumption of steel should be accurate as per design.
iii. Steel should have no brittleness problem in finished product.
iv. Steel should carry the quality of corrosion and earthquake resistance.
v. Quality steel with achievement of proper level of sulphur and phosphorus as per IS: 1786:2008.

~~3 The modified guidelines for procurement of steel issued vide No. CSQ / SE (TAS) / EE(TAD) / Steel /2021/50-H dated 17.02.2021 are given below:-~~

3.1 ~~For reinforced cement concrete or pre-stressed concrete works, the reinforcement bars shall consist of the following grades conforming to IS 1786 : 2008 (Indian Standard Specification for high strength deformed steel bars and wires for concrete reinforcement) : Fe 415, Fe 415D, Fe415S, Fe500S and Fe550D~~.

3.2 The contractor shall obtain manufacturer's certificate stating the process of manufacture, chemical composition and test sheet giving result of each mechanical test applicable to the material purchased and submit it to the Engineer-in-charge. Each test certificate shall indicate the number of the cast to which it applies corresponding to the number or identification mark to be found on the material.

3.3 The Engineer-in-charge shall get each consignment tested for both chemical composition and physical properties (including bend and re-bend test) as specified in IS : 1786 from NABL accredited laboratory or any Government laboratory.

3.4 Reinforcement bar is one of the most important building materials. Its quality directly affects the life span, resistance to earthquake and durability of the structure. In order to ensure consistent quality of rebars, the reinforcement shall be of reputed brands like SAIL, RINL, Tata, JSW, JSPL or any other equivalent make as approved by the NIT approving authority. **The contractor shall procure ~~IS marked~~ Low Alloy Steel Reinforcement bars of minimum Fe-550D ~~or more~~ grade from the approved steel manufactures who are main producers (as per the list of approved makes furnishing part of this document) or their authorized dealers having valid BIS license for IS:1786-2008 and further conforming to the OM No. CSQ/SE(TAS)/Steel/2024/264-H dated 21.08.2024, so agency have to quote their rates accordingly.**

4 Competent authority shall approve the steel manufacturers.

5 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.

6 Samples 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 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.

7 The steel reinforcement bars shall be brought to the site in bulk supply of ten tonnes or more as decided by the Engineer-in-charge.

8 The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent 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.

9 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 at frequency not less than that specified below:

Size of bar	For consignment below 100 tonnes	For consignment above 100 tonnes
Under 10mm dia bars	One sample for each 25 tonnes or par thereof.	One sample for each 40 tonnes or part thereof.
10mm to 16mm dia bars	One sample for each 35 tonnes or part thereof.	One sample for each 45 tonnes or part thereof.
Over 16mm dia bars	One sample for each 45 tonnes or part thereof.	One sample for each 50 tonnes or part thereof.

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

11 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 procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. In case the consumption is less than theoretical consumption including permissible variations leading to under designing of the structural. The work shall be summarily rejected, otherwise recovery at the rate so prescribed shall be made after ensuring structural soundness and stability. In case of excess consumption, no adjustment needs to be made.

12 The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

13 The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be used in the work. All consignment received at the work site shall be inspected by the Site staff along with the

relevant documents before acceptance. The contractor shall obtain Original Vouchers and Test Certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and test certificates shall be defaced by the Site staff and kept on record in the site office.

14 Reinforcement including authorized spacer bars and laps shall be measured in length of different diameters as actually (not more than as specified in the drawings) used in the work nearest to a centimeter. Wastage and unauthorized overlaps shall not be measured.

15 The standard sectional weights referred to as in Table 5.4 in para 5.3.4 in CPWD Specifications will be considered for conversion of length of various sizes of M.S. Bars, Steel Bars and T.M.T. bars into Standard Weight.

16 Records of actual Sectional weights shall also be kept dia-wise and lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as Derived Actual Weight. However, for the stipulated issue of steel reinforcement up to and including 10mm diameter bars, the actual weight of steel issued shall be modified to take into account the variation between the actual and the standard coefficients and the contractors' accounts will be debited by the cost of modified quantity.

17 (a) If the Derived Weight as in sub-para above is less than the Standard Weight as in Sub-para above then the Derived Actual Weight shall be taken for payment provided, if it is within the following tolerances specified in IS1786-2008, otherwise whole lot will be rejected.

Tolerances on Nominal Mass

Nominal Size in mm	Tolerance on Nominal mass Percent		
	Batch	Individual Sample*	Individual sample for coil**
a) Upto and including 10	±7	-8	±8
b) Over 10 upto and Including 16	±5	-6	±6
c) Over 16	±3	-4	±4

* For individual sample plus tolerance is not specified.

* ** For coils batch tolerance is not specified.

b) If the Derived Actual Weight is found more than the Standard Weight, the Standard Weight as per in sub-para above shall be taken for payment. In such case nothing

extra shall be paid for the difference between the Derived Actual Weight and the Standard Weight.

18) The following procedure should be followed in case of removal of rejected/sub-standard materials from the site of work.

a. Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the site order book under the signature of the AE/AEE giving approximate quantity of such materials.

b. As soon as the material is removed, a certificate to that effect may be recorded by the AE/AEE against the original entry, giving the date of removal a mode of removal i.e. whether by truck, carts or by manual labour. If removal is by truck, the registration number of the truck should be recorded.

c. When it is not possible for the AE/AEE to be present at the site of work at the time of actual removal of the rejected/sub-standard materials from the site the required certificate should be recorded by the Junior Engineer and the AE/AEE should countersign the certificate recorded by the Junior Engineer.

19) Cement should be kept in godowns under double locks and keys and its consumption account invariably maintained, whether the cement is supplied departmentally or arranged by the contractor. A register should be maintained at the site for this purpose. This register should contain the columns as shown in Annexure- 30 of SOP to work manual 2024.

The pages of the register should be machined numbered and each page initialed by the EE. The cement godown and the register are required to be checked by the AE/EE in-charge of the work as per following schedule.

i) At least weekly or fortnightly, respectively in case of works at the Headquarters of AE/EE.

ii) Whenever they visit the site of work in case of works located outside the Sub-Divisional/Divisional Head Quarters.

20) In case contractor is permitted to use reinforcement steel other than above mentioned make as in 9.1 then:

(i) Base price of reinforcement steel is as stipulated under schedule 'F' shall be reduced by Rs. 3500/- MT. However, for operation of provisions of clause 10CA in such case, the indices for structural steel of secondary producers will be considered same as for primary producers.

(ii) The rate quoted by contractor of relevant item in tender of reinforcement steel work shall be reduced by Rs. 4.00 per kg.

8.0(A) Special condition for structural steel (Tee, Angle, Channel, Structural Tubes and plates & R.S. Joist)

8.1(A) The contractor shall procure Structural steel (Tee, Angle, Channel, Structural Tubes and plates & R.S. joist) from primary producers (SAIL, Tata Steel Ltd, RINL, Jindal Steel & Power Ltd. and JSW steel Ltd.).

In case of non-availability of structural steel from primary producers the NIT approving authority may permit use of structural steel procured from steel producers having valid BIS license confirming to IS -2062-2006

8.2(A) Samples shall be taken and got tested by the Engineer-in-charge confirming to relevant BIS code. In case the test results indicate that the structural steel arranged by the contractor does not conform to the specification, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week's time or written orders from the Engineer-in-charge to do so.

8.3(A) The structural steel 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.

8.4(A) The contractor shall supply free of charge the structural steel sample required for testing including its transportation to testing laboratories. The cost of test shall be borne by the ~~department if it confirms to relevant BIS code else the testing charges shall be borne by the~~ contractor.

8.5(A) The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

~~8.6(A) In case contractor is permitted to use structural steel other than above mentioned make as in 9.1(A) then:~~

~~**(1) Base Price of Structural Steel as stipulated under Schedule 'F' shall be reduced by Rs. 6700/-MT However, for operation of provision of clause 10CA in such case the indices for structural steel will be considered same as indicated in Indices issued by DG.CPWD for primary producer.**~~

~~**(2) The quoted rate of relevant item of tender of structural steel work shall be reduced by Rs. 8.00 per Kg.**~~

8.7(A) If the actual weight of structural steel to be used in the work differs from standard weight, the following procedure shall be followed for arriving at the quantity for payment.

(a) If the actual weight is more than standard weight only standard weight shall be considered for payment.

(b) If the actual weight is less than standard weight but within the permissible vitiation, only actual weight shall be considered for payment.

9.0 REINFORCED CEMENT CONCRETE WORK

9.1 DESIGN MIX CONCRETE

9.1.1 The RCC work shall be done with Design Mix Concrete unless otherwise specified. In the nomenclature of items wherever letter M has been indicated, the same shall imply for the Design Mix Concrete. For the nominal mix in RCC, CPWD Specifications shall be followed. The Design Mix Concrete will be designed based on the principles given in IS: 456-2000. The contractor shall design mixes for each grade of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. In case of use of admixture and or white cement, the mix shall be designed with these ingredients as well.

9.1.2 The concrete mix design will be carried out by the contractor through one of the following laboratories / Test houses and ready-mix concrete shall conform to accepted design mix. a) MANIT, Bhopal. b) Govt. Engineering College, Sagar. c) I.I.T., Delhi. d) ~~Govt. Engineering College, Raipur.~~ e) National Council for Cement & Building Materials, Ballabhgarh, Haryana, f) G.S.I.T.S., Indore g) MITS, Gwalior h) Govt. Engineering College, Jabalpur.

9.1.3 In the event of all the above laboratories being unable to carry out the requisite design / testing the contractor shall have to get the same done from any other laboratory with prior approval of the Engineer-in-Charge.

9.1.4 The contractor shall submit the mix design report from any of above approved laboratories for approval of Engineer-in-Charge **within time given by Engineer-in-Charge** from the date of issue of letter of acceptance of the tender.

9.1.5 In case of white Portland cement and the likely use of admixtures where CC/RCC is done with concrete pumps in concrete with ordinary Portland/white Portland cement, the contractor shall design and test the concrete mix by using trial mixes with white cement and /or admixtures also, for which nothing extra shall be payable.

9.1.6 Each time when there is change of source or characteristic properties of the ingredients used in the concrete mix during the work, a revised mix design shall be done and approval obtained from the approved Laboratory or as per the direction of the Engineer-in-Charge. Preferably only single source of cement shall be kept for the work. In case contractor decides to use more than one source of approved cement brand then for each brand separate design mix shall be done and got approved by Engineer-in-charge.

9.1.7 The Mix shall be designed to produce the grade of concrete having required workability and characteristic strength not less than as specified.

9.1.8 The mix design for a specified grade of concrete shall be done for a target mean compressive strength $T_{ck} = F_{ck} + 1.65 S$

Where,
F_{ck} = Characteristic compressive strength at 28 days.
S= Standard deviation

The standard deviation for each grade of concrete shall be calculated separately.
The degree of quality control for this work is "Good" for which the standard deviation (s) obtained for different grades of concrete shall be as follows: -

Grade of Concrete	For "Good" quality of control
M 20	4.0
M 25	4.0
M 30	5.0
M 35	5.0
M 40	5.0

9.1.9 Out of the six specimens of each set, three shall be tested at seven days and remaining three at 28 days. The preliminary tests at seven days are intended only to indicate the strength likely to be attained at 28 days. All cost of mix designing and testing connected therewith including charges payable to laboratory shall be borne by the Contractor.

9.1.10 The samples of cement, aggregate (fine & coarse) to be sent to the laboratories shall be sealed in the presence of the Engineer- in -Charge and shall have his signature and cost of packaging, sealing, transportation, loading, unloading, cost of samples and the testing charges for Mix design in all cases shall be borne by the contractor.

9.1.11 Notwithstanding the approval granted by Engineer-in-Charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, transportation and placement etc.

9.1.12 The Engineer-in-Charge reserves the right to exercise control over the ingredients, water and admixtures, purchased, stored and to be used in the concrete including conducting of tests for checking quality of materials fit or unfit for use in production of mix.

9.1.13. The Contractor shall submit the test data of the material used for concrete mix-design in the laboratories, so the material being used at site can be compared with those data / size etc.

9.1.14 In case of change of parameters of ingredients (fine aggregate, cement, coarse aggregate) fresh concrete mix-design to be done as mentioned above and got approved from the Engineer-in-Charge before execution.

9.1.15 The contractor shall make arrangement to install a mini laboratory at site for accelerated testing of design mix concrete as per IS : 9013. The department reserves right to take samples of design mix concrete from the mass production of the concrete for testing and compare with the laboratory's results.

9.1.16 Nothing shall be paid extra for installation and cost of batching plant and other arrangement for making necessary test of design mix concrete.

9.1.17 The item of design mix cement concrete shall be inclusive of all the ingredients including admixtures if required, labour, machinery T & P etc. (except shuttering

which will be measured & paid for separately) required for a design mix concrete of required strength and workability. **The rate quoted by the agency shall be net & nothing extra shall be payable on account of change in quantities of concrete ingredients like aggregates and admixtures as per the approved mix design.**

9.1.18 Concrete shall be handled from the place of mixing to the place of final deposit / placement by methods, which prevent segregation, or loss of any ingredients and contamination.

9.1.19 Where concrete is conveyed by chutes, the chute shall be made of metal or fitted with metal lining. The approval of the Engineer-in-charge shall be obtained for the use of chutes in excess of 3 metres length and in such cases the concrete shall be remixed if so required by the Engineer-in-Charge or closed bottom buckets shall be used. If concrete is placed by pumping, the conduit shall be primed properly. Once pumping is started, it shall not be interrupted as far as possible. Concrete shall not be dropped into place from a height more than 1.5m.

9.1.20 Concreting of any portion of the work shall be done in presence of the representative of the Engineer-in-Charge and shall be done only after approval of the Engineer-in-Charge.

9.1.21 Concreting shall be carried out continuously between constructions joints shown on the drawings or as agreed by the Engineer-in-Charge. The contractor shall closely follow the sequence of concreting where it is specified in the drawings. If concreting is interrupted before reaching the predetermined joint an approved construction joint shall be provided. Construction joints shall be minimized as far as possible. These shall be set at right angles to the general direction of the member. The surface film of the first placed concrete should preferably be removed while the concrete is still green to expose the aggregate and leave a sound irregular surface. However, care shall be taken not to disturb the concrete already laid.

9.1.22 **Admixtures:** Wherever required, admixtures of approved quality only shall be mixed with concrete as specified. The admixtures shall conform to IS: 9103. The chloride content in the admixture shall satisfy the requirements of BS: 5075. The total amount of chlorides in the admixture mixed concrete shall also satisfy the requirements of IS 456-2000.

9.1.23 Use of ready mixed concrete (RMC) may also be permitted, with prior approval of Engineer –in – Charge, without any extra payment. Separate account of design mix concrete and RMC shall however be kept. The ready mixed concrete shall conform to the requirement of durability, workability and strength as laid down for design mix concrete.

9.2 Use of Fly Ash and Fly Ash Blended Cements in RCC Structures: -

9.2.1. General

9.2.1.1 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: -

9.2.1.1.1 The concrete mix design shall be done as "Design Mix Concrete" as prescribed in clause – 9 of IS 456 mentioned above.

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

9.2.1.2 Minimum M25 grade of concrete shall be used in all structural elements made with RCC both in load bearing and framed structure.

9.2.1.3 The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of flyash mixed concrete or concrete using flyash blended cements (PPCs) should not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC. Fly ash when used in the production of concrete shall be strictly in conformity with IS: 3812 (Para 1 & 10).

9.2.1.4 To control higher rate of carbonation in early ages of concrete both in flyash 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. If necessitated due to low water / binder ratio, required workability shall be achieved by use of chloride free chemical admixtures conforming to IS: 9103. The compatibility of chemical admixtures and supper plasticizers with each set OPC, fly ash and / or PPC received from different sources shall be ensured by trials.

9.2.1.5 In environment subjected to aggressive chloride or sulphate attack in particular, use of flyash admixed or PPC based concrete is recommended. In cases, where structural concrete is exposed to excessive magnesium sulphate, flyash substitution / content shall be limited to 18% by weight. Special type of cement with low C3A content may also be alternatively used. Durability criteria like minimum binder content and maximum water / binder ratio also need to be given due consideration in such environment.

9.2.1.6 Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot and arid regions, the minimum curing period shall be 14 days or its equivalent.

9.2.2. Use of Flyash Admixed Cement Concrete (FACC) in RCC Structures: -

There shall be no bar on use of FACC in RCC structures subject to following additional conditions: -

9.2.2.1 Flyash shall have its chemical characteristics and physical requirements etc. conforming to IS: 3812 (Part-10) and shall be duly certified.

9.2.2.2 To ensure uniform blending of flyash with cement in conformity with IS: 456, a specific facility needs to be created at site with complete computerized automated process control to achieve design quality or with similar facility from Ready Mix concrete (RMC) plants.

9.2.2.3 As per IS: 1489 (Part-I), Maximum 35% of OPC by mass is permitted to be substituted with flyash conforming to IS: 3812 (Part-I) and same is reiterated.
9.2.2.4 Separate storage for dry flyash shall be provided. Storage bins or silos shall be weather proof and permit a free flow and efficient discharge of flysh. The filter or dust control system provided in the bins or silos shall be of sufficient size to allow delivery of flyash maintained at specified pressure to prevent undue emission of flyash dust, which may interfere weighing accuracy.

9.2.3. Use of Fly Ash Blended Cements in Cement Concrete (PPCC) in RCC structures

9.2.3.1 Subject to General Guidelines detailed out as above, PPC manufactured conforming to IS: 1489 (Part-I) shall be treated at par with OPC for manufacture of Design Mix Concrete for structural use in RCC.
9.2.3.2 Till the time, BIS makes it mandatory to print the %age of flyash on each bag of cement, the certificate from the PPC manufacturer indicating the same shall be insisted upon before allowing use of such cements in works.

9.2.3.3 While using PPC for structural concrete work, no further admixing of fly ash shall be permitted.

10.0 PARTICULAR SPECIFICATIONS FOR AAC BLOCK MASONRY:

10.1 The AAC Blocks shall be procured from approved manufacturers and it shall conform to IS 2185-Part3 1984.

10.2 The blocks shall be stored at site in stacks on a level dry surface.

10.3 The AAC blocks shall of grade I having density between 651 to 750 Kg per cum as per table I of IS 2185 Part 3 1984.

10.4 The thickness of joints in the masonry shall not exceed 10 mm and shall be of uniform thickness.

10.5 Maximum height of wall built on any day shall not be more than 1.2 metre (i.e. 6 layers).

10.6 The joints in the masonry shall be recessed and no flush pointing shall be done.

10.7 A slip membrane with PVC sheet of minimum thickness 400 micron, shall be introduced as per the recommendation of blocks manufacturer before laying the first course on the plinth beam.

10.8 The blocks shall not be soaked in water and instead they shall be dipped in water and taken out immediately to have only moist surface.

10.9 The vertical joints of the masonry shall be broken to have a minimum overlap of 100 mm.

10.10 Bed joint 2 Nos 6mm dia reinforcement bars may be placed in the joints after every 3rd course as per the nomenclature of item, to have good lateral stability.

10.11 It shall be ensured that the lintels are rest at either end of window opening only on full block and not on half or part blocks reinforcement shall be placed in the sill course of window openings in two successive horizontal joints and extend the same at least to 600 mm on either side of the jamb surface.

10.12 At a RCC column interface an MS anchor ("L" shape), of size 50x4 mm, 300 mm long out of which 100 mm length of L fixed on column using minimum two SS screws with PVC sleeves and 200 mm side of L embedded in masonry, be placed and fixed with screws at every 4th course so as to anchor the wall with RCC column for better lateral stability. The anchor shall be got approved from Engineer-in-Charge.

10.13 Curing of the masonry shall be done only by spraying water and no flooding shall be done by water jets / buckets.

10.14 The chases in the wall surface for electrical conduits shall be done only by means of electrically operated saw to cut two parallel lines and the portion between the cuts shall be chiseled carefully. The depth of vertical chases should be limited to 1/3 rd of wall thickness and horizontal chases should not be more than 1/6th of wall thickness. The chases have to be properly packed with cement mortar 1:4 (1 cement : 4 sand) between pipes and chases.

10.15 The blocks shall be cut using a carpenter saw to have half blocks or any other suitable size block to close the masonry course or to break the vertical joint from the bottom course. Hammer or a mason's trowel shall not be used to cut the blocks.

10.16 GI wire mesh shall be fixed on all column wall and beams- wall junctions before taking up the plaster work.

10.17 The rates of the item for AAC blocks, includes all the elements described above, except at para 10.16 above.

11.0 SPECIFICATIONS FOR FLY ASH BRICKS - All fly ash bricks as brought to the site shall conform to the strength & durability parameters as prescribed in the tender and CPWD specifications.

12.0 The contractor shall submit 'Method Statement' for the approval soon after the award of work. 'Method Statement' is a statement by which the construction procedures for important activities of construction are stated, checked and approved. Method Statement shall have description of the item with elaborate procedures in steps to implement the same. The specification of the materials involved their testing and acceptance criteria, equipment to be used, precautions to be taken, mode of measurements etc.

13.0 TESTING OF MATERIALS.

13.1 The contractor shall arrange carrying out of all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge and shall bear all charges in connection therewith including fee for testing ~~except testing charges for cement. For cement the same shall be governed by para Sl. no. 7.4 of particular specifications and special conditions of NIT~~. In all cases cost of samples and to & fro carriage shall be borne by the contractor. Contractor shall establish a laboratory at site of work at his own cost. The laboratory shall be equipped with all necessary equipment as per requirement of specification or as per direction of Engineer-in-Charge. A list of laboratory equipment to be maintained by the contractor is enclosed at para Sl. No. 16 of Particular Specifications and special conditions of NIT. Establishing the laboratory at site shall not absolve the contractor from fulfilling the criteria of getting the test done in independent approved

laboratories as per GCC 2023 modified up to previous day of last date of submission of bid. The decision of the Engineer-in-Charge of allowing any test in the site laboratory shall be final.

13.2 Even ISI marked materials may be subjected to quality test at the discretion of the Engineer-in-charge besides testing of other materials as per the specifications described for the item/material. Whenever ISI marked materials are brought to the site of work the contractor shall, if required by the Engineer-in-charge, furnish manufacturer test certificate or test certificate from approved testing laboratory to establish that the material procured by the contractor for incorporation in the work satisfy the provisions if IS codes relevant to the material and/or the work done.

13.3 Sub-standard Material/Work: In case any material/work is found substandard the same shall be rejected by the Engineer-in-Charge and the same shall be removed from the site of work within 48 hours, failing which the same shall be got removed by the Engineer-in-Charge at the risk and cost of the contractor without giving any further notice and time.

14.0 Specification of Aluminum Work

Aluminum work under SH: "aluminum work" of tender document shall be got executed from approved agency. The agency for the aluminum work shall be got approved from the Engineer - in - Charge, well before actual commencement of the item of work. Necessary performance certificates in respect of agencies proposed to be engaged shall be submitted within 30 days from the date of issue of acceptance letter to substantiate technical capability and experience of the agency for prior approval of the Project manager/ Zonal Chief Engineer.

Specifications for Aluminum Door, Window, Ventilator:

14.1 : Extent and Intent:

The work shall be carried out through an approved specialist contractor who shall furnish all materials, labour, accessories equipment tool & plant, incidental. Required for providing and installing anodized aluminum door, windows, claddings, louvers and other items as called for on the drawings. The drawings and specifications cover the major requirement only. The supplying of additional fastenings, accessory features and mentioned specifically herein but which are necessary to make a complete installation shall be a part of the contract.

14.2 : General:

Aluminum doors, windows etc. shall be of sizes, section detail as shown on the drawings. The details shown on the drawings indicate generally the sizes of the component's parts and general standards. These may be varied slightly to suit the standards adopted by the manufacture. Before proceeding with any manufacturing, the contractor shall prepare and submit complete manufacturing and installation drawings for approval of Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.

14.3 : Shop Drawings:

The contractor shall submit the shop drawings of doors, windows louvers cladding and other aluminum work, based on architectural drawings to Engineer-in-charge for his approval. The drawings shall show full size sections of door, window etc. thickness of metal (i.e. wall thickness) details of construction, sub frame / rough

ground profile anchoring details, hardware as well as connection of windows doors, and other metal work to adjacent work. Samples of all joints and methods of fastening and joining shall be submitted to the Engineer-in-Charge for approval well in advance of commencing the work.

14.4 : Samples:

Samples of doors, windows, louvers etc. shall be fabricated assembled and submitted to the Engineer-in-Charge for his approval. They shall be of sizes, types etc. as decided by Engineer-in-Charge. All samples shall be provided the cost of the contractor.

14.5 : Sections:

Aluminum doors and windows shall be fabricated from extruded section of profiles as detailed on drawings. The sections shall be extruded by the manufacturers approved by the Engineer-in-Charge. The aluminum extruded section shall conform to IS designation 63400-WP(HV9WP old designation) with chemical composition and technical properties as per IS: 733 and 1285. The permissible dimensional tolerance of the extruded sections shall be such as not to impair the proper and smooth function / operation and appearance of doors and windows.

14.6 : Fabrications:

Doors, window etc. shall be fabricated to sizes as shown at factory and shall be of section, sizes combinations and details as shown in the Architectural drawings, all doors, windows etc. shall have mechanical joints. The joints shall be designed to withstand a wind load of 150 kgs. per sqm. the design shall also ensure that the maximum deflection of any member shall be accurately machined and fitted to form hairline joints prior to assembly. The joint and accessories such as cleats brackets, etc. shall be of such materials as not to cause any bi-metallic action, the design of the joints and accessories shall be such that the accessories are fully concealed. The fabrication of doors, windows etc. shall be done in suitable sections to facilitate easy transportation, handing and installation. Adequate provision shall be made in the door and windows members for anchoring to support and fixing of hardware and other fixture as approved by the Engineer-in-Charge.

14.7 : Anodizing:

All aluminum sections shall be anodized as per IS: 7088 and to required colour as specified in the item as per IS: 1868 grading, after cutting the members to requisite sizes. Anodizing shall be to the specified grade with minimum average thickness of 15 microns when measured as per IS: 6012. The anodic coating shall be properly sealed by steams or by boiling in deionized water or cold sealing process as per IS: 1868 / IS: 6057. Polythene tape protection shall be applied on the anodized sections before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation. The sample will be tested in the approved laboratory and cost of samples; cost of testing shall be borne by the contractor.

14.8 Powder Coating:

The powder used for powder coating shall be polyester powder made by Berger or Jenson& Nicholson or equivalent. The thickness of powder coating shall not be less than 50 microns at any point measured with micrometer.

14.9 : Protection of Finish:

All aluminum members shall be wrapped with approved self-adhesive non-staining PVC tapes.

14.10 : Handling and Stacking:

14.10.1 Fabricated materials shall be carted in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care. On receipt of materials at site, they shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged pieces / parts. Materials found to be acceptable on inspections shall be repacked in crates and stored safely.

14.10.2 In the case of composite windows, and doors the different units are to be assembled first. The assembled composite units should be checked for line, level and plumb before final fixing is done. Unit may be serial numbered and identified as how to be assembled in their final location of situation so warrants.

14.10.3 Where aluminum comes into contact with masonry brick work / concrete / plaster or dissimilar metals, it shall be coated with approved insulation lacquer paint or plastic tape to ensure that electro chemical corrosion is avoided. Insulation materials shall be trimmed off to clear flush line on completion.

14.10.4 Silicon Sealant:

The peripheral gaps between plastered faces / RCC and aluminum sections shall be sealed both from inside and outside to make the windows watertight. Gaps up to 10mm between the peripheral aluminum member and masonry / RCC / Stone shall be sealed by inserting. Backer Rod manufactured by HT TROPLAST or Supreme Industries and by application of weather silicon / sealant of DOW corning / GE silicon make.

14.10.5 The contractor shall be responsible for assembling composite, bedding set straight plumb, level and for their satisfactory operation after fixing is complete.

14.11 : Installation:

14.11.1 Just prior to installation the doors, windows etc. shall be uncrated and stacked on edge on level bearers and supported evenly. The frame shall be fixed into position true to line and level using adequate number of expansion machine bolts, anchor fasteners of approved size and manufacture and in an approved manner. The holes in concrete / masonry members for housing anchor bolts shall be drilled with an electrical drill.

14.11.2 The doors windows assembled as shown on drawings shall be placed in correct final position in this opening and marks made on concrete members at jambs, sills and heads against the holes provided in frames for anchoring. The frame shall then be removed then the opening and laid aside. Neat holes with parattle sides of appropriate size shall then be drilled in the concrete members with an electric drill at the marking to house the expansion bolts. The expansion bolts shall then be inserted in the holes, struck with a light hammer till the nut is forced into the anchor shall. The frame shall then be placed in final position. In the opening and anchored to the support through cadmium plated machine screws of required sized threaded to expansion bolts. The frame shall be set in the opening by using wooden wedges at supports and be plumbed in position. the wedges shall invariably be placed at meeting points of glazing bars and frames.

14.11.3 : Neoprene Gaskets:

The E.P.D.M. gasket of suitable profile as manufactured by HANU INDUSTRIES; ANNAND LESCUYER make shall be provided at all required positions to make the glazing airtight. The contractor shall provide and install Neoprene Gaskets of approved size and profile at all locations as shown and as called for to render the doors windows etc. absolutely air tight and weather tight. The contractor shall submit samples of the gaskets for approval and procure after approval only.

14.11.4 : Fittings :

The contractor shall cut the floor properly with stone cutting machine to exact size and shape. The spindle of suitable length to accommodate the floor finish shall be used. The contractor shall give the guarantee duly supported by the company for proper functioning of floor springs at least for 10 years.

Hinges, stays handles, tower bolts, locks and other fittings shall be of quality and manufacturer as approved by the Engineer – in – Charge.

14.12 : Details of Test:

14.12.1 The various tests on aluminum sections shall be conducted in accordance with the relevant IS codes.

14.12.2 The minimum number of each unit of doors / windows shall be selected at random by Engineer-in-Charge as such that all the aluminum section shall be got tested.

S. No.	Details	No. of Tests
1.	Doors, Windows & Ventilators	5% of Nos. manufactured.

14.12.3 The sample of major member of each unit of doors / windows shall be selected at random by Engineer-in-Charge as such that all the aluminum section shall be got tested.

14.12.4 The cost of sample, carriage of the samples shall be borne by the contractor. **Testing charges shall be borne by the contractor.**

14.13 : **Acceptance Criterion:**

The aluminum sections shall conform to the provisions of the relevant items. For payment purpose only actual weight of sections shall be taken into account. If however, the sectional weight of any aluminum section is higher than the permissible variation then the weight payable shall be restricted to the weight of the section including permissible variation.

14.14 : **Measurement:**

Payment by weight shall be made for aluminum sections including beading only and all fixing angles cleats fittings and fixtures such as handles and hinges etc., shall not be included in the weight to be paid.

14.15 : **Rates:**

The rates of the items shall include the cost of all materials, labour and inputs required in all the above operations.

15.0 SAFETY MEASURES AT SITE

(A)

In order to ensure safe construction, following shall be adhered for strict compliance at the site: -

(i) The work site shall be properly barricaded.

(ii) Adequate signage indicating 'Work in Progress – Inconvenience caused is Regretted' or Diversion Signs shall be put on the sites conspicuously visible to the public even during night hours. These are extremely essential where works are carried out at public places in use by the public.

(iii) The construction malba at site shall be regularly removed on daily basis.

(iv) All field officials and the workers must be provided with safety helmets, safety shoes and safety belts.

(v) Proper MS pipe scaffoldings with work – platforms and easy-access ladders shall be provided at site to avoid accidents.

(vi) Necessary First-Aid kit shall be available at the site.

The above provisions shall be followed in addition to the provisions of General Condition of Contract.

(B)

The Contractor has to take care of all safety measures required during execution of work for protection of his own labour as well as the residence residing there in the campus. In case of any accident happens in the campus during execution, due to lack of safety measures or any other reason what so ever, the agency is fully responsible and all the expenses on this account shall be bear by the contractor and nothing extra on this account shall be paid to the contractor and CPWD will not be responsible at all.

(C.) ~~The barricading work of the building shall be done before execution of work; therefore, it is compulsory for each bidder to visit the site before quoting the rates as the cost of barricading is to be borne by Contractor / bidder and nothing extra on this account shall be paid. (Ref. Special Conditions P -71 Point No. 1.37)~~

ANNEXURE "A"

16.0 LIST OF EQUIPMENT FOR SITE LABORATORY TO BE MADE AVAILABLE BY THE CONTRACTOR AT HIS OWN COST (Refer Clause 10 A of Schedule 'F')

A. Laboratory testing instruments.

(1) Balances
   i. 7 Kg. to 10 Kg. capacity, semi-self indicating type – accuracy 10 gm.
   ii. 500 gm. Capacity, semi-self indicating type – accuracy 1 gm.
   iii. Pan balance – 5 Kg. capacity – accuracy 10 gms.

(2) Ovens–electrically operated, thermostatically controlled upto 110^0 C– sensitivity 1^0 C.

(3) Sieves : as per IS 460 – 1962.
   i. I.S. sieves – 450 mm internal dia, of sizes 100mm, 80 mm, 63 mm, 50mm, 40 mm, 25mm, 20 mm, 12.5 mm, 10 mm, 6.3mm, 4.75 mm, complete with lid and pan.
   ii. I.S. sieves - 200 mm internal dia (brass frame) consisting of 2.36 mm, 1.18 mm, 600 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns with lid and pan.

(4) Sieve shaker capable of 200 mm and 300 mm dia sieves, manually operated with timing switch assembly.

~~(5) Equipment for slump test- slump cone, steel plate, tamping rod, steel scale, scoop.~~

(6) Dial gauges, 25 mm travel – 0.01 mm / division least count – 2 Nos.

(7) 100 tones compression testing machine, electrical cum manually operated.

(8) Graduated measuring cylinders 200 ml capacity – 3 Nos.

(9) Enamel trays (for efflorescence test for bricks).
   i. 300 mm X 250 mm X 40 mm – 2 Nos.
   ii. Circular plates of 2850 mm dia – 4 Nos.

(10) Water testing kit – 1 No.

B. **Field testing instruments. (**Following instruments in sufficient quantity as directed by the Engineer- in- Charge shall be made available by the contractor. It shall be ensured that the instruments always remain in serviceable condition else the same will be replaced.

(1) Steel tapes – 3 m.
(2) Vernier Calipers.
(3) Micrometer screw 25 mm gauge.
(4) A good quality plumb bob.
(5) Spirit level, minimum 30 cms long with 3 bubbles for horizontal vertical.
(6) Wire gauge (circular type) disc.
(7) Foot rule.
(8) Long nylon thread.
(9) Rebound hammer for testing concrete

(10) Dynamic penetrometer.
(11) Magnifying glass
(12) Screw driver 30 cms long
(13) Ball pin hammer, 100 gms.
(14) Plastic bags for taking samples
(15) ~~Moisture meter for timber~~
(16) ~~Earth resistance tests~~
(17) ~~Meggar~~
(18) Depth Gauge
(19) Straight edge

C The contractor has to deploy necessary tools & plants in required numbers to ensure smooth & timely execution of work, at his own cost & risk as per the requirement of work at different stages. The decision of Engineer-in-Charge shall be final regarding use of particular T&P(s) at a particular time(s) & the contractor has to adhere to the same strictly. The following description & quantum of T&P is given for general guidance which is not mandatory. However, the successful contractor shall give a list of tools and plants which he proposes to deploy to ensure smooth and timely execution as per different milestone fixed and timely completion of work while submitting the programme and progress chart

I.	Double bucket trolley (Wringer trolley with wheels) with two buckets system of 25 litres each	As per requirement of work
II.	Wheel mounted dustbin closed trolley for disposal of garbage chutes.	--do--
III	Walk behind petrol driven sweeping machine with single broom and 0.70 m roller width.	--do--
IV	~~Dry Vacuum cleaner~~	~~--do--~~
V	~~Megar 500 watts~~	~~--do--~~
VI	Vibration compactor	--do--
~~VII~~	~~Aluminium ladder of different sizes~~	~~--do--~~

Other T & P as per direction of Engineer – in – Charge.

17.0 CONDITIONS OF CONTRACT SPECIFIC TO GREEN BUILDING PRACTICES

The contractor shall strictly adhere to the following conditions as part of his contractual obligations:

17.1 SITE

17.1.1 The contractor shall ensure that adequate measures are taken for the prevention of erosion of the top soil during the construction. The contractor shall prepare and implement the Erosion and Sedimentation Control Plan (ESCP) provided to him after approval by the Engineer- in- Charge as part of the larger Construction Management Plan (CMP). The contractor shall obtain the Erosion and Sedimentation Control Plan (ESCP) Guidelines if required from the Engineer in Charge and then prepare “working plan” for the following month’s activities as a CAD drawing showing the construction management, staging & ESCP. At no

time soil should be allowed to erode away from the site and sediments should be trapped where necessary.

The contractor shall ensure that all the top soil excavated during construction works is neatly stacked and is not mixed with other excavated earth. The contractor shall take the clearance of the Engineer in Charge before any excavation. Top soil should be stripped to a depth of 20 cm (centimeters) from the areas to be disturbed, for example proposed area for buildings, roads, paved areas, external services and area required for construction activities etc. It shall be stockpiled to a maximum height of 40 cm in designated areas, covered or stabilized with temporary seeding for erosion prevention and shall be reapplied to site during plantation of the proposed vegetation or as directed by the engineer in charge. Top soil shall be separated from subsoil, debris and stones larger than 50 mm (millimeter) diameter. The stored top soil may be used as finished grade for planting areas.

17.1.2 The Contractor should follow the construction plan as proposed by the Architect / Engineer in Charge to minimize the site disturbance such as soil pollution due to spilling. If required use of staging and spill prevention and control plan to restrict the Spilling of the contaminating material on site needs to be resorted. Protection of top soil erosion by collection storage and reapplication of top soil, constructing sediment, contour trenching, mulching etc., may also be directed by the engineer in charge.

17.1.3 No excavated earth shall be removed from the campus unless suggested otherwise by Engineer in Charge. All subsoil shall be reused in backfilling/landscape, etc as per the instructions of the Engineer in Charge. The surplus excavated earth shall be disposed of by the contractor as per the direction of the engineer in charge at his own cost for reuse. A certificate of reuse as required by the Engineer-in-Charge shall be submitted by the contractor.

17.1.4 The contractor shall not change the natural gradient of the ground unless specifically instructed by the Engineer in Charge. This shall cover all natural features like water bodies, drainage gullies, slopes, mounds, depressions, etc. Existing drainage patterns through or into any preservation area shall not be modified unless specifically directed by the Engineer-in-Charge.

17.1.5 The contractor shall not carry out any work which results in the blockage of natural drainage.

17.1.6 The contractor shall ensure that existing grades of soil shall be maintained around existing vegetation and lowering or raising the levels around the vegetation is not allowed unless specifically directed by the Engineer-in-Charge.

17.1.7 Contractor shall reduce pollution and land development impacts from automobiles use during construction.

17.1.8 Overloading of trucks is unlawful and creates the erosion and sedimentation problems, especially when loose materials like stone dust, excavated earth, sand etc. are moved. Proper covering shall be used by the contractor. Also, no overloading shall be permitted.

17.2 CONSTRUCTION PHASE AND WORKER FACILITIES

17.2.1 The contractor shall specify and limit construction activity in pre-planned/designated areas and shall start construction work after securing the approval for the same from the Engineer in Charge. This shall include areas of construction, storage of materials and material and personnel movement.

17.2.2 Preserve and Protect Landscape during Construction

a The contractor shall ensure that no trees, existing or otherwise, shall be harmed and damage to roots. These shall be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash and protected from oil, paint, and other materials detrimental to plant health. These activities shall be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not at all permitted.

b The contractor shall take steps to protect trees or saplings if any identified for preservation within the construction site using tree guards of approved specification.

c Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.

d The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. The zones of movement of heavy equipment, parking, or excessive foot traffic shall be separated from the fenced plant protection zones.

e The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.

17.2.3 Contractor shall be required to develop and implement a waste management plan, quantifying material diversion goals. He shall establish goals for diversion from disposal in landfills and incinerators, if required, and adopt a construction waste management plan to achieve these goals. A project wide policy of "Nothing leaves the Site" shall be followed. The Contractor's ingenuity is especially called

towards meeting this prerequisite/ credit (as per IGBC LEED India, New Construction v1.0 & GRIHA , MNRE) and may consider recycling cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation, designating a specific area(s) on the construction site for segregated or commingled collection of recyclable material, and track recycling efforts throughout the construction process, identifying construction haulers and recyclers to handle the designated materials at his cost. The diversion may include donation of materials to charitable organizations and salvage of materials on-site.

17.2.4 Contractor shall collect all construction waste generated on site. He may consider at segregating wastes based on their utility and examine means of sending such waste to manufacturing units which use them as raw material or other site which require it for specific purpose. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar etc.

17.2.5 The contractor shall provide potable water and other amenities for all workers as per the contract.

17.2.6 The contractor shall provide the minimum level of sanitation and safety facilities for the workers at site as described in CPWD General Conditions of contract. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water and latrines and urinals as per applicable provisions. Adequate toilet facilities shall be provided for the workmen within easy access of their place of work. The total no. to be provided shall not be less than 1per 30 employees in any one shift. Toilet facilities shall be provided from the start of building operations, connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant shall be provided and natural or artificial illumination shall also be provided.

17.2.7 The contractor shall ensure that air pollution due to dust/generators is kept to a minimum, preventing any adverse effects on the workers and other people in and around the site. The contractor shall ensure proper screening, covering stockpiles, covering brick and loads of dusty materials, wheel-washing facility, gravel pit, and water spraying. Contractor shall also ensure the following activities to prevent air pollution during construction:

- Clear vegetation only from areas where work will start right away
- Vegetate / mulch areas where vehicles do not ply.
- Apply gravel / landscaping rock to the areas where mulching / paving is impractical
- Identify roads on-site if applicable that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral types that make up the surface &

base and add surface gravel to reduce source of dust emission to limit amount of fine particles (smaller than 0.075mm) to 10 – 20%

- Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged.
- Water spraying shall be done on:

17.2.7.1 Any dusty materials before transferring, loading and unloading

17.2.7.2 Area where demolition work is being carried out

17.2.7.3 Any un-paved main haul road

17.2.7.4 Areas where excavation or earth moving activities are to be carried out

- The contractor shall ensure that the speed of vehicles within the site is limited to 10 km/hr.
- All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust / particulate emissions.
- Spills of dirt or dusty materials will be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean-up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained / cleaned up immediately before they can infiltrate into the soil / ground or runoff in nearby areas
- Provide hoardings of not less than 3m high along the site boundary, next to a road or other public area at his cost.
- Provide dust screens, sheeting or netting to scaffold along the perimeter of the building at his cost
- Cover stockpiles of dusty material with impervious sheeting at his cost.
- Cover dusty load on vehicles by impervious sheeting before they leave the site at his cost.

17.2.8 Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas. Consider employing cardboard balers, aluminium can

crushers, recycling chutes, and collection bins at individual workstations to further enhance the recycling program

17.2.9 The contractor shall ensure that no construction leachate (e.g. cement slurry etc.), is allowed to percolate into the ground. Adequate precautions will be taken to safeguard against this including reduction of wasteful curing processes, collection, basic filtering and reuse. The contractor shall follow requisite measures for collecting drainage water run-off from construction areas and material storage sites and diverting water flow away from such polluted areas. Temporary drainage channels, perimeter dike/swale, etc. shall be constructed to carry the pollutant-laden water directly to the treatment device or facility (municipal sewer line).

17.2.10 Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.

17.2.11 The contractor shall comply with the safety procedures, norms and guidelines (as applicable) as outlined in the document Part 7 Constructional practices and safety, latest version of National Building code of India, Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to causalities. A telephone may be provided to first-aid assistant with telephone numbers of the hospitals displayed. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.

17.2.12 The contractor shall ensure the following activities for construction workers safety, among other measures at his cost.

- Guarding all parts of dangerous machinery.
- Precautionary signs for working on machinery
- Maintaining hoists and lifts, lifting machines, chains, ropes, and other lifting tackles in good condition.
- Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.
- Ensuring that walking surfaces or boards at height are of sound construction and are provided with safety rails or belts.
- Provide protective equipment; helmets etc.
- Provide measures to prevent fires. Fire extinguishers and buckets of sand to be provided in the fire-prone area and elsewhere.
- Provide sufficient and suitable light for working during night time.

17.2.13 The storage of material shall be as per standard good practices as specified in Part 7, Section 2 - Storage, Stacking and Handling practices, latest version of NBC and shall be to the satisfaction of the Engineer in Charge to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. Watch and ward of the Contractor's materials shall be his own responsibility.

There should be a proper planning of the layout for stacking and storage of different materials, components and equipment with proper access and proper maneuverability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipment at different stages of construction shall be considered.

17.2.14 The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilization of these bins for any solid waste generated during the construction. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English with suitable symbols.

17.2.15 The contractor shall prepare and submit 'Spill prevention and control plans' before the start of construction, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material and hazardous wastes, and stating designation of personnel trained to prevent and control spills. Hazardous wastes include pesticides, paints, cleaners, and petroleum products.

17.2.15.1 Contractor shall collect & submit the relevant material certificates for materials if directed by the Engineer in charge with high recycled (both post-industrial and post-consumer) content, including materials like RMC mix with fly-ash, glass with recycled content, calcium silicate boards etc.

17.2.16 Contractor shall collect the relevant material certificates for rapidly renewable materials such as bamboo, wool, cotton insulation, agri-fiber, linoleum, wheat board, strawboard and cork etc.

17.2.17 Where possible, the contractor shall select materials / vendors, harvested and manufactured regionally, within a 800-km radius of the project site.

17.2.18 Contractor shall adopt an IAQ (Indoor Air Quality) management plan to protect the HVAC system during construction, control pollutant sources, and interrupt pathways for contamination. He shall sequence installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile, and gypsum wallboard. He shall also protect stored on-site or installed absorptive materials from moisture damage.

17.2.19 The contractor shall ensure that a flush out of all internal spaces is conducted prior to handover. his shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.

17.2.20 Contractor shall make efforts to reduce the quantity of indoor air contaminants that are odorous or potentially irritating harmful to the comfort and well-being of installer and building occupants. Contractor shall ensure that the VOC (Volatile Organic Compounds) content of paints, coatings and primers used must not exceed the VOC content limits mentioned below in case items of such paints

are/is available in schedule of quantities.

Paints

Non-flat - 150 g/L Flat (Mat) - 50, g/L Anti corrosive/ anti rust - 250 g/L

Coatings / Clear wood finishes

Varnish - 350 g/L Lacquer - 550 g/L Floor coatings - 100 g/L Stains - 250 g/L

Sealers

Waterproofing sealer - 250 g/L Sanding sealer - 275 g/L Other sealers - 200 g/L

17.2.21 The VOC (Volatile Organic Compounds) content of adhesives and sealants used if prescribed in the schedule of quantities must be less than VOC content limits mentioned: **Architectural Applications** VOC Limit (g/l less water) Indoor Carpet adhesives - 50 g/L, Carpet Pad Adhesives - 50 g/L, Wood Flooring Adhesive - 100 g/L, Rubber Floor Adhesives - 60 g/L, Sub Floor Adhesives – 50 g/L, Ceramic Tile Adhesives - 65 g/L, VCT and Asphalt Tile adhesives - 50 g/L, Dry Wall and Panel Adhesives - 50 g/L, Structural Glazing Adhesives - 100 g/L, Multipurpose Construction Adhesives – 70 g/L, Substrate Specific Application VOC Limit (g/l less water), Metal to Metal - 30 g/L, Plastic Foams - 50 g/L, Porous material (except wood) - 50 g/L, Wood - 30 g/L, Fiber Glass – 80 g/L

17.2.22 Wherever required, Contractor shall meet and carry out documentation of all activities on site, supplementation of information, and submittals in accordance with IGBC LEED India New Construction v1.0 or GRIHA program standards and guidelines. Towards meeting the aforementioned building environmental rating standard(s) expert assistance shall be provided to him up on request.

17.2.23 Water Use during Construction Contractor should spray curing water on concrete structure and shall not allow free flow of water. Concrete structures should be kept covered with thick cloth / gunny bags and water should be sprayed on them. Contractor shall do water pounding on all sunken slabs using cement and sand mortar.

17.2.24 The Contractor shall remove from site all rubbish and debris generated by the Works and keep Works clean and tidy throughout the Contract Period. All the serviceable and non- serviceable (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well formed heaps at properly selected places, keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The work of removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.

17.2.25 The contractor shall provide O & M Manuals wherever applicable.

17.2.26 The contractor shall make himself conversant with the Site Waste Management Program Manual and actively contribute to its compilation by estimating the nature and volume of waste generated by the process/installation in question.

17.2.27 MATERIALS & FIXTURES FOR THE PROJECT

a) Contractor will produce wherever feasible certificate regarding distance of the source of the relevant material.

b) Unless otherwise stated cement used at site for reinforced concrete, precast members, mortar, plaster, building blocks, etc. shall be PPC (Portland Puzzolana Cement). The PPC must meet the requirements of IS 1489 (Part I) as regards to fly ash content in cement The contractor shall obtain from the PPC manufacturer the certificate regarding fly ash content in the PPC in each batch of consignment.

c) The contractor has to comply as per MoEF issued notification 8.0.763(E) dated 14th Sept.1999 containing directive for greater fly ash utilization. Every construction agency engaged in the construction of buildings within a radius of 50 km radius of a Thermal Power Plant, have to use of 100% fly ash based bricks/blocks in their construction.

d) The contractor shall ensure that all paints, polishes, adhesives and sealants used both internally and externally, on any surface, shall be Low VOC products. The contractor shall get prior approval from the Engineer in Charge before the application of any such material.

e) All plumbing and sanitary fixtures installed shall be as per the prescription of the Engineer in Charge and shall adhere to the minimum LPM (litre per minute) and LPF (litre per flush) mentioned. The contractor shall employ 100% zero ODP (ozone depletion potential) insulation; HCFC (hydro-chlorofluorocarbon)/ and CFC (chlorofluorocarbon) free HVAC and refrigeration equipment and / halon-free fire suppression and fire extinguishing systems.

f) The contractor shall ensure that all composite wood products / agro-fibre products used for cabinet work, etc do not contain any added urea formaldehyde resin.

17.2.28 RESOURCES CONSUMED DURING CONSTRUCTION

a. The contractor shall ensure that the water and electricity is not wasted during construction. The Engineer in Charge can bring to the attention any such wastage and the contractor will have to ensure that such bad practices are corrected.

b. The contractor shall install necessary meters and measuring devices to record the consumption of water, electricity and diesel on a monthly basis for the entire tenure of the project.

c. The contractor shall ensure that all run-off water from the site, during construction is collected and reused to the maximum.

d. The contractor shall use treated recycled water of appropriate quality standards for construction, if available.

e. No lights shall be turned on during the period between 6:00 AM to 6:00 PM, without the permission of the Engineer in Charge.

17.2.29 CONSTRUCTION WASTE

Contractor shall ensure that wastage of construction material is within 3%.

a) All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type and measures employed to segregate the waste on site into inert, chemical, or hazardous wastes.

b) All construction debris shall be used for road preparation, back filling, etc, used if described in the schedule of quantities and as per the instructions of the Engineer in Charge, with necessary activities of sorting, crushing, etc.

c) No construction debris shall be taken away from the site, without the prior approval of the Engineer in Charge.

d) The contractor shall recycle the unused chemical/hazardous wastes such as oil, paint, batteries, and asbestos.

e) If and when construction debris is taken out of the site, after prior permissions from the Engineer in Charge, then the contractor shall ensure the safe disposal of all wastes and will only dispose of any such construction waste in approved dumping sites.

17.2.30 Documentation

a) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer in Charge on a monthly basis:

i) Water consumption in litre
ii) Electricity consumption in 'kwh' units
iii) Diesel consumption in litre
iv) Quantum of waste (volumetric/weight basis) generated at site and the segregated waste types divided into inert, chemical and hazardous wastes.
v) Digital photo documentation to demonstrate compliance of safety guidelines as specified here and in the Appendix on Safety Conditions.

b) The contractor shall, during the entire tenure of the construction phase, submit the following records to the Engineer in Charge on a fortnightly basis:

i) Quantities of material brought into the site, including the material issued to the contractor by the Engineer in charge.

ii) Quantities of construction debris (if at all) taken out of the site

iii) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication and block making works, etc as guided by the Engineer in Charge.

c) The contractor shall submit a document after construction of the buildings, a brief description along with photographic records to show that other areas have not been disturbed during construction. The document should also include brief explanation and photographic records to show erosion and sedimentation control measures adopted. (Document CAD drawing showing site plan details of existing vegetation, existing buildings, existing slopes and site drainage pattern, staging and spill prevention measures, erosion and sedimentation control measures and measures adopted for top soil preservation during construction

d) The contractor shall submit to the Engineer in Charge after construction of the buildings, a detailed as built quantification of the following:

i. Total materials used,
ii. Total top soil stacked and total reused
iii. Total earth excavated
iv. Total waste generated,
v. Total waste reused,
vi. Total water used,
vii. Total electricity, and
viii. Total diesel consumed.

e) The contractor shall submit to the Engineer in Charge, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil reservation and indicate areas where it will be reapplied after construction is complete.

f) The contractor shall submit to the Engineer in Charge, a detailed narrative (not more than 250 words) on provision for safe drinking water and sanitation facility for construction workers and site personnel.

g) Provide supporting document from the manufacturer of the cement specifying the fly-ash content in PPC used in reinforced concrete.

h) Provide supporting document from the manufacturer of the pre-cast building blocks specifying the fly ash content of the blocks used in an infill wall system.

i) The contractor shall, at the end of construction of the buildings, submit to the Engineer in Charge, submit following information, for all material brought to site for construction purposes, including manufacturer's certifications, verifying information, and test data, where

Specifications sections require data relating to environmental issues including but not limited to:

i) Source of products: Supplier details and location of the supplier.

ii) Project Recyclability: Submit information to assist Owner and Contractor in recycling materials involved in shipping, handling, and delivery, and for temporary materials necessary for installation of products.

iii) Recycled Content: Submit information regarding product post industrial recycled and post consumer recycled content. Use the "Recycled Content Certification Form", to be provided by the Commissioning Authority appointed for the Project.

iv) Product Recyclability: Submit information regarding product and product's component's recyclability including potential sources accepting recyclable materials where ever applicable.

j) Provide final certification of well-managed forest of origin to provide final documentation of certified sustainably harvested status: Acceptable wood "certified sustainably harvested" certifications shall include:

a) Wood suppliers' certificate issued by one of the Forest Stewardship Council-accredited certifying agencies;

b) Suppliers' invoice detailing the quantities of certified wood products for project;

c) Letter from one of a certifying agency corroborating that the products on the wood supplier's invoice originate from certified well-managed forests.

i) Clean tech: Provide pollution clearance certificates from all manufacturers of materials

ii) Indoor Air quality and Environmental Issues: Submit emission test data, sourced from the manufacturers, produced by acceptable testing laboratory listed in Quality Assurance Article for materials as required in each specific Specification section.

a) Certifications from manufacturers of Low VOC paints, adhesives, sealant and polishes used at this particular project site.

b) Certification from manufacturers of composite wood products/agro fibre products on the absence of added urea formaldehyde resin in the products supplied to them to this particular site.

c) Submit environmental and pollution clearance certificates for all diesel generators installed as part of this project.

Provide total support to Engineer in Charge and Green Building Consultants appointed by the Engineer- in- Charge in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead whenever required.

17.2.31 EQUIPMENT

a) To ensure energy efficiency during and post construction all pumps, motors and engines used during construction or installed, shall be subject to approval and as per the specifications of the Engineer in Charge.

b) All lighting installed by the contractor around the site and at the labour quarters during construction shall be CFL bulbs of the appropriate illumination levels. This condition is a must, unless specifically prescribed.

The contractor is expected to go through all other conditions of the LEED & GRIHA rating stipulations.

Failure to adhere to any of the above mentioned items, without approval of the Engineer in Charge, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as per terms of the agreement.

18.1 Formwork for exposed concrete surfaces: -

18.1.1 Where it is specifically shown on the drawings to have original fair face finish of concrete surface without any rendering of plastering, formwork shall be carried out by using plywood on steel plates of approved quality.

18.1.2 The forms shall be constructed so as to produce a uniform and consistent texture and pattern on the face of the concrete. The formwork shall be placed so that all horizontals are constructed of lumber and are not paneled and the formwork joints shall be staggered.

18.1.3 To achieve a finish which shall be free of board marks, the formwork shall be faced with plywood or equivalent material in large sheets. The sheets shall be arranged in an approved pattern. Whenever possible, joints between sheets shall be arranged to coincide with architectural feature, sills, window heads or change in direction of surface. All joints between panels shall be vertical or horizontal unless otherwise directed. Suitable joints shall be approved between sheets. The joints shall be arranged and fitted so that no blemish or mark is imparted to the finished surfaces.

18.1.4 Forms for exposed concrete surfaces shall be constructed with grade strips (the underside of which indicate top of pour) at horizontal constructions joints, unless the use of groove strips is specified on the drawings. The reset forms shall be tightened against the concrete so that the forms will not be spread and permit abrupt irregularities or loss of mortar. Supplementary form ties shall be used as necessary to hold the reset forms tight against the concrete.

18.1.5 For fair faced concrete, the position of through bolts will be restricted and generally as indicated on the drawings.

18.1.6 Plywood and steel plates used in the formwork for obtaining exposed surfaces shall be got approved from Engineer-in-Charge on each use. However, no forms will be allowed for reuse if it is doubtful to produce desired texture of exposed concrete.

18.1.7 Cement of only approved shade shall be used preferably of single lot to achieve integrity of texture.

18.2 Class of Surface Finish: -

18.2.1 For Beams & Slabs:

The finish shall be uniform, dense and smooth, no grout, no grain pattern, no crazing and no major blemishes shall be permitted. Abrupt irregularities not exceeding 3mm and gradual irregularities less than 5mm in 2m length only shall be permitted.

18.2.2 For Columns/Wall/Fins:

The finish shall be uniform and smooth leveling the surface of the compacted concrete shall be done with a screed board with power floating the surface and over that steel trowelling the surface under firm pressure characteristics of finish shall be brush marks < 3mm gradual irregularities less than 10mm in 2m.

18.3 Tolerance in Finished Concrete: -

The formwork shall be so made as to produce a finished concrete true to shape, lines, level, plumb and dimensions as shown in the drawings subject to the following tolerance unless otherwise specified in this specification or drawings.

18.4 WALL/COLUMN/FINS:

17.4.1 Variation from the plumb	± 6mm	Upto 3m height
18.4.2 Variation from the plumb of conspicuous liner	± 6mm	Upto 6m height
18.4.3 Variation in the size of wall openings	(+)15mm (-) 6mm	
18.4.4 Variation in parapet wall thickness		
(a) Upto 30cm thickness	± 6mm	

18.5 SLAB, BEAM & GIRDER FORMS:

18.5.1 Variation from the level or from the specified grid for beam soffit before removal of shores,

(a) In any 3m	± 6mm
(b) In any 6m	± 10mm

All the tolerances mentioned above shall apply to concrete dimensions only, and not to positioning of vertical steel or dowels. The tolerances given above are specified for local aberration in the finished concrete surface and should not be taken as tolerance for the entire structure taken as whole for the setting and alignment of formwork. Any error, within the above tolerance limits, or any other if noticed in any of the structure after part or portion stripping of forms, shall be corrected in the subsequent work to bring back the structure to its true line, level and alignment.

19.0 Ultrasonic pulse velocity method test for RCC as per technical circular No. 18 issued vide CE(CSQ) letter No. G-2/SE(QA)/CSQ/69 dated 12.02.2013 shall be carried out as a routine test to assess the homogeneity and uniformity of concrete. The fulfilling criteria and other conditions shall be as detailed, as per the method stated in the aforesaid circular.

20.0 **Conditions for Ready-mix concrete**: -

(a) The contractor can use concrete from RMC plants also with prior approval of the Engineer in-charge, instead of preparing the same in central batching plant at site within agreement item of Batch Mix Plant without any extra cost, looking to expedite the progress and need of work. However, for procuring RMC from approved plant the contractor shall follow the following conditions. Nothing extra shall be payable to the contractor for procuring RMC from the external plant.

(b) For procurement of ready mix concrete from approved RMC plants, the contractor shall, within a 15 days of award of the work, submit list of at least three RMC plant companies of repute along with details of transit mixer and pumps etc. to be deployed indicating name of owner / company, its location capacity, technical establishment, past experience and text of MOU proposed to be entered between purchaser (the contractor) and supplier (RMC Plant). The Engineer – in – Charge shall give approval in writing (subject to draw of MOU). The contractor shall draw the MOU with approved RMC plant owner / company and submit to Engineer – in – Charge within a week of such approval. The contractor will not be allowed to purchase ready mixed – concrete without completion of above stated formalities for use in this project. Notwithstanding the approval granted by Engineer-in-charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, transportation and placement etc.

(c) The Engineer-in-charge will reserve right to inspect at any such stage and reject the concrete if he is not satisfied about quality of product. The contractor should therefore draw MOU / agreement with RMC owner / company very carefully, keeping all terms and conditions / specifications forming a part of this tender document. Including the following controls.

i. The Engineer-in-charge reserves the right to exercise control over the ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting of tests for checking quality of Materials, recordings of test results and declaring the Materials fit or unfit for use in production of mix.

ii. Calibration checks of the RMC.

iii. Weight and quantity check on the ingredients, water and admixtures added for batch mixing.

iv. Time of mixing of concrete.

v. Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action.

For exercising such control, the Engineer-in-charge (if required) shall periodically depute his authorized representative at the RMC plant. It shall be responsibility of the contractor to ensure that all-necessary requirement manpower & facilities are made available to Engineer-in-charge and / or his authorized representative at RMC plant.

(d) The ready mix concrete should be produced in RMC plant using fully automatic batching plant having capacity to produce 30 cum/hr. The plant should have computerized control and shall give print out of all the ingredients.

(e) All required relevant records of RMC shall be made available to the Engineer-in-charge or his authorized representative. Engineer-in-charge shall, as required specify guidelines & additional procedures for quality control & other parameters in respect of materials and production & transportation of concrete mix, which shall be binding on the contractor & the RMC plant.

(f) 43 grade OPC/ PPC as per schedule of the contract (conforming to relevant IS Codes) of brand / make / source as approved by Engineer-in-charge shall only be used for production of concrete.

(g) The RMC produced concrete be accepted by Engineer-in-Charge at site after receipt of the same after fulfilling all the requirements of mix mentioned in the tender documents.

(h) The item of design mix cement concrete shall be inclusive of all the ingredients including admixtures if required, labour, machinery, T&P etc. required for a design mix concrete of required strength and workability. The rate quoted by the agency shall be net & nothing extra shall be payable on account of change in quantities of concrete ingredients like cement and aggregates and admixtures etc. as per the approved mix design.

(i) Ready mix concrete shall be arranged in quality as required at site of work by transportation in a transit mixer. [The general conditions of transit mixer and other requirement shall conform to IS:5892.] Ready mix concrete shall be supplied as per the pre-agreed schedule approved by Engineer-in-charge.

(j) All other operations in concreting work like Mixing, Slump, transportation, laying / placing of concrete, compaction, curing etc. not mentioned in this particular specification for Design Mix Concrete shall be as per IS : 456-2000 or amended thereafter.

(k) For design mix concrete of RCC other than those specified above, the contractor shall use the Design mix concrete produced by a central batching and mixing plant at his own cost. The contractor, if he so desires, can arrange the design mix concrete also from Ready mix concrete producer after obtaining written approval of the Engineer-in-charge. Nothing extra whatsoever shall be payable on this account.

(l) Ready mix concrete shall be arranged in quantity as required at site of work. The ready mix concrete shall be supplied as per the pre-agreed schedule approved by Engineer-in-charge. Nothing extra shall be payable on this account.

(m) The item of design mix cement concrete (produced at site as well as arranged from RMC producer) shall be inclusive of all the ingredients including admixtures if required, labour, machinery, transportation etc. (except reinforcement and shuttering which will be measured & paid as per provision of contract) required for a design mix concrete of required strength and workability. The rate quoted by the agency shall be net & nothing extra shall be payable on account of changes in quantities of concrete ingredients like cement and aggregates and admixtures etc. as per approved mix design except for quantity of extra cement payable as per schedule of quantity. Other operations in concreting work like Mixing, Slump, transportation, laying / placing of concrete, compaction, curing etc. not mentioned in this particular specification for Design Mix of Concrete shall be as per IS : 456-2000.

Annexure – 'A'

On Non-Judicial Stamp Paper of minimum Rs. 100

(Guarantee offered by Bank to CPWD in connection with the execution of contracts)

Form of Bank Guarantee for Earnest Money Deposit / Performance Guarantee / Security Deposit / Mobilization Advance

1. Whereas the Executive Engineer…….(name of division)……, CPWD on behalf of the President of India (hereinafter called "The Government") has invited bids under ……(NIT Number) ……dated …….for……(name of work) …….. The Government has further agreed to accept irrevocable Bank Guarantee for Rs. ……..(Rupees ……only) valid upto ……..(date)* …….as Earnest Money Deposit from ……..(name and address of contractor) ……..(hereinafter called "the contractor") for compliance of his obligations in accordance with the terms and conditions of the said NIT.

   Or**

   Whereas the Executive Engineer……..(name of division)……..,CPWD on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing number ……. With ……..……..(name and address of contractor)…… ……..(hereinafter called "the contractor") for execution of work …..……(name of work) …….. The Government has further agreed to accept irrevocable Bank Guarantee for Rs. ……..(Rupees ……only) valid upto ……..(date)* …….as Performance Guarantee / Security Deposit / Mobilization Advance from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.
2. We, ……(indicate the name of the bank)……..(herein after referred to as "the Bank") , hereby undertake to pay to the Government an amount not exceeding Rs. ……..(Rupees……only) on demand by the Government within 10 days of the demand.
3. We,……(indicate the name of the Bank)……..,, do here by undertake to pay the amount due and payable under this guarantee without any demur, merely on the demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor. 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).
4. We, ……(indicate the name of the Bank)……, further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment.

5. We, ……(indicate the name of Bank)……, further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extended time of

performance by the said Contractor 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 and to forbear or enforce any of the terms and conditions relating to the said agreement and wr shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor 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. We, ……(indicate the name of the Bank)…….., further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the contractor's liabilities.
7. This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor.
8. We, ……(indicate the name of the Bank)…….., undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank 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……only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date…….

Witnesses:

1. Signature……..
   Name and address

   Authorized signatory
   Name
   Designation
   Staff code no.
   Bank seal

2. Signature ……..
   Name and address

*Date to be worked out on the basis of validity period or 90 days where only financial bids are invited and 180 days for two / three bid system from the date of submission of tender.

**In paragraph1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or for performance guarantee / security deposit / mobilization advance, as the case may be.

Annexure 'B'

FORMAT OF RECEIPT OF DEPOSITION OF ORIGINAL EMD ALONGWITH NIT :-

Receipt of deposition of original EMD
(Receipt No. ...../ date.....)

Name of work : Re-carpeting of existing road in Indian Institute of Soil Science (IISS) Campus at Navi Bagh, Bhopal (M.P.).

1. **NIT No. 31/CE(Bhopal/EE-I/2026-27**
2. **Estimated Cost : Rs. 1,54,37,095/-**
3. **Amount of Earnest money Deposit : Rs. 3,08,742/-**
4. **Last date of submission of bid 05.11.2026 up to 15.00 Hrs.**

1. **Name of contractor.....#....**
2. **Form of EMD .....#....**
3. **Amount of Earnest Money Deposit .....#....**
4. **Date of submission of EMD .....#.....**

Signature, Name and Designation of EMD receiving officer (EE/AE(P)/AAO) along with stamp

(# To be filled by EMD receiving Executive Engineer/AE(P)/AAO, or NIT issuing EE / AE(P)/AAO as the case may be)

CORRECTION **NIL** INSERTION **NIL**
CUTTING **NIL** OVERWRITING **NIL** EE(C.)/AE(P) EE-I

Annexure 'F'

Undertaking on structural stability and soundness of already completed buildings and infrastructure projects: -

I / we undertake and confirm that any building / infrastructure constructed by our firm / partnership firm / company has not suffered any failure, making it unfit for intended use, either due to structural design and defects or due to use of sub-standard materials or execution of sub-standard work, poor workmanship or any other reason during the last 25 (twenty-five) years.

I/we, further undertake that if such information comes to the notice of CPWD, then Engineer-in-charge shall be free to terminate the bid / agreement and to forfeit the entire amount of earnest money deposit, performance guarantee and security deposits.

I / we, also undertake that in addition to above, the Engineer-in-charge shall be free to debar us forever from tendering in CPWD.

The decision of Engineer-in-charge or any higher authority shall be final and binding.

Signature of
Notary with seal

Signature of bidder or
an authorized person
Of the firm with stamp

Note: Affidavit to be furnished on a 'non-judicial' stamp paper of Rs. 200/- (scanned copy of the notarized affidavit to be uploaded at the time of submission of bid.)

CORRECTION	**NIL**	INSERTION	**NIL**		
CUTTING	**NIL**	OVERWRITING	**NIL**	EE(C.)/AE(P)	EE-I

Annexure - I

(SPECIMEN)

(Ref. para 3.7 of Particular Specifications and Special conditions)

GUARANTEE TO BE EXECUTED BY CONTRACTORS FOR REMOVAL OF DEFECT AFTER COMPLETION IN RESPECT OF WATER PROOFING WORKS

The Agreement made this ……day of ……two thousand and …… between ……son of ……of ……(hereinafter called the **Guarantor** of the one part) and the PRESIDENT OF INDIA (hereinafter called Government of the other part).

WHEREAS this agreement is supplementary to a contract (hereinafter called the Contract) dated …….. and made between the **GUARANTOR** of the one part and the Government of the other part, whereby the Contractor, inter alia, undertook to render the buildings and structures in the said contract recited completely water and leak – proof.

AND WHEREAS **GUARANTOR** agreed to give a guarantee to the effect that the said structures will remain water and leak proof **for 5 (Five) years** from the date of giving of water proofing treatment.

NOW THE **GUARANTOR** hereby guarantees that water proofing treatment given by him will render the structures completely leak-proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the maintenance period prescribed in the contract.

Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse of roof or alteration and for such purpose;

(a) Misuse of roof shall mean any operation which will damage water proofing treatment, like chopping of firewood and things of the same nature which might cause damage to the roof;
(b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts;
(c) The decision of the Engineer-in-charge with regard to cause of leakage shall be final.

During this period of guarantee the **guarantor** shall make good all defects and in case of any defect being found, render the building water – proof to the satisfaction of the Engineer in Charge at his cost, and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer in Charge calling upon him to rectify the defects, failing which the work shall be got done by the Department by some other contractor at the **GUARANTOR'S** cost and risk. The decision of the Engineer in-Charge as to the cost, payable by the **Guarantor** shall be final and binding.

That if **GUARANTOR** fails to execute the water proofing or commits breach thereunder then the **GUARANTOR** will indemnify the Principal and his successors against all loss, damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the **GUARANTOR** in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by the Government the decision of the Engineer – in – Charge will be final and binding on the parties.

IN WITNESS WHEREOF these presents have been executed by the Obligor …… and by …….. and for and on behalf of the PRESIDENT OF INDIA on the day, month and year above written.

Signed, sealed and delivered by OBLIGOR in the presence of –

1. ……
2. ……

Signed for and on behalf of THE PRESIDENT OF INDIA by ……..in the presence of –

1. …….
2. …….

CORRECTION	**NIL**	INSERTION	**NIL**		
CUTTING	**NIL**	OVERWRITING	**NIL**	EE(C.)/AE(P)	EE-I

Annexure –II

GUARANTEE BONDS/AFFIDAVIT FOR ALUMINIUM WORK

GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF ALUMINIUM WORKS

The agreement made this _____ day of _____ two thousand and _____ between _____ S/o _____ (hereinafter called the GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part).

WHEREAS THIS agreement is supplementary to a contract. (Herein after called the Contract) dated _____ and made between the GUARANTOR OF THE ONE PART AND the Government of the other part, whereby the contractor interalia, under look to render the work in the said contract recited structurally stable workmanship and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guarantee against faulty workmanship, finishing, manufacturing defects of materials and leakages etc.

NOW THE GUARANTOR hereby guaranty that work executed by him will remain structurally stable, after the expiry of maintenance period prescribed in the contract for the minimum life of **5 (Five)** years, to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer in charge with regard to nature and cause of defects shall be final.

During the period of guarantee the guarantor shall make good all defects to the satisfaction of the Engineer in charge calling upon him to rectify the defects, failing which the work shall be got done by the Department by some other contractor at the guarantor's cost and risk. The decision of the Engineer in charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach there under then the guarantor will indemnify the principal and his successor against all loss, damage cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by the Government the decision of the Engineer in charge will be final and binding on the parties.

IN WITHNES WHEREOF those presents have been executed by the obligator _____ and _____ by for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

Signed sealed and delivered by OBLIGATOR in presence of:

1. _____
2. _____

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY_____ _____ in the presence of:

1. _____
2. _____

CORRECTION **NIL**	INSERTION **NIL**		
CUTTING **NIL**	OVERWRITING **NIL**	EE(C.)/AE(P)	EE-I

Annexure –III

GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF ROAD WORK

The agreement made this ____ Day of ____ Two thousand …….. between M/s _____ S/o _____ (Hereinafter called the GUARANTOR of the one part) and the President of India (hereinafter called the Government of the other part).

WHEREAS this agreement is supplementary to a contract (hereinafter called the contract) dated _____ and made between the GUARANTOR OF THE ONE PART AND the Government of the other part, whereby the contractor inter-alia, undertook to render the work in the said contract recited structurally stable workmanship, finishing and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable and guaranteed against faulty workmanship, finishing, manufacturing defects of materials and leakages, etc.

NOW THE GUARANTOR hereby guarantees that the work executed by him will remain structurally stable after the expiry of maintenance period prescribed in the contract for the minimum life of **05 Years (Five years)** to be reckoned from the date after the expiry of maintenance period prescribed in the contract**.**

The decision of the Engineer-in-charge with regard to nature and cause of defect shall be final.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of the Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-Charge as to the cost payable by the guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the Government, the decision of the Engineer-In-Charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator _____ and _____ by _____ for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

Signed, sealed and delivered by OBLIGATOR in the presence of:

1._____ 2. _____

SIGNED FOR AND ON BEHALF OF THE PRESIDENT OF INDIA BY ____in the presence of :-

1._____ 2. _____

CORRECTION	**NIL**	INSERTION	**NIL**		
CUTTING	**NIL**	OVERWRITING	**NIL**	EE(C.)/AE(P)	EE-I

Annexure –IV

UNDERTAKING REGARDING ERP TRAINING IN CPWD DEPARTMENT (FOR NEWLY ENLISTED CPWD CONTRACTORS)

To

The Executive Engineer-I,
CPWD, Bhopal.

Name of Work :- Re-carpeting of existing road in Indian Institute of Soil Science (IISS) Campus at Navi Bagh, Bhopal (M.P.).

Having examined the details given in the bid document for the above work, I/we hereby submit that the Undertaking that,

"I/we shall obtain ERP Training Certificate, as applicable, within Ninety (90) days from the date of issue of enlistment order or failing which a recovery of Rs. 10,000/- per week shall be made from the R.A. Bill till receipt of ERP Training Certificate without giving any show cause notice in this regard, if I/we being the lowest tenderer after work awarded to me."

Signature of Bidder(s) or an authorized Officer of the firm with stamp
Date of Submission:

Annexure 'V'

FORMAT FOR UNDERTAKING FOR SITE INSPECTION

To,

The Executive Engineer-I,
C.P.W.D., Bhopal.

I/we hereby give an undertaking for the given work as follows:

NIT No. :- 31/CE(Bhopal)/EE-I/2026-27

Name of work : Re-carpeting of existing road in Indian Institute of Soil Science (IISS) Campus at Navi Bagh, Bhopal (M.P.).

I/we have inspected and examined the site and its surroundings is / are satisfied before submitting our bid as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation I/we may require and in general shall myself / ourselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect our bid. I/we shall be deemed to have full knowledge of the site whether I/we inspect it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. I/we shall be responsible for arranging and maintaining at our 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 I/we implie(s) that I/we have read this notice and all other contract documents and has made myself / ourself 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 us by the Government and local conditions and other factors having a bearing on the execution of the work.

Place :
Date :

Yours faithfully

(Signatures of Bidder(s))

Annexure 'VI'

FORMAT FOR UNDERTAKING

To,

The Executive Engineer-I,
C.P.W.D., Bhopal.

I/we hereby give an undertaking for the given work as follows:

NIT No. :- 31/CE(Bhopal)/EE-I/2026-27

Name of work : Re-carpeting of existing road in Indian Institute of Soil Science (IISS) Campus at Navi Bagh, Bhopal (M.P.).

I/we assure that I/we shall follow all the Conditions of this NIT, failing which, I / we shall be solely responsible on this account for any action taken by CPWD in this regard.

Place :

Date :

Yours faithfully

(Signatures of Bidder(s))

CORRECTION **NIL** INSERTION **NIL**
CUTTING **NIL** OVERWRITING **NIL** EE(C.)/AE(P) EE-I

LIST OF APPROVED MATERIALS (CIVIL)

Note :

1. Unless otherwise specified, the brand/make of the material as specified in the item nomenclature or in the particular specifications or in the list of approved materials attached in the tender, shall be used in the work.
2. The Contractor shall obtain prior approval from the Engineer-in-charge before placing order for any specific material/ Brand/ Make.
3. Whenever the specified brand of material is not available than, the NIT approving authority may approve any material equivalent to that specified subject to proof being offered by the Contractor for its equivalence and its non-availability to his satisfaction.
4. If any brand which have been approved by the ADG(RBH)/CE(Bhopal) till the date of last date of submission of respective tender shall be deemed as approved brand even if it has not been mentioned in approved brand or make in the NIT.

	MATERIALS:	BRAND/MAKE
1.	AAC Block	Aerocon, Ultratech, Ecolite, Concrelite, BILTECH, Dlite Blocks, Orillite – Kota, E-Crete, Ferrous Crete
2.	AAC Block Adhesive	Ferrous crete(Ferro-1188), ARDEX ENDURA (White Star), Ultratech (Fixo- Block), Berger Home Shield, Dlite Blocks, Ferrous Crete
3.	(a) Acrylic Exterior paint	Apex Ultima of Asian Paints, Weather Coat all Guard of Berger, Weather Shield Max of Dulux, JK Maxx
	(b) Acrylic Emulsion paint	Royal Luxury Emulsion of Asian Paints, Silk Luxury emulsion of Berger Paint, Velvet touch emulsion of Dulux, JK Maxx
	(c) Acrylic Distemper	Tractor Uno acrylic distemper of Asian Paints, Bison acrylic distemper of Berger Paint, Duwel acrylic distemper of Dulux, JK Jambo acrylic distemper of JK Maxx
	(d) Synthetic Enamel Paint	Apcolite of Asian Paint, Luxol of Burger Paint and Dulux Paint, JK Maxx
4.	Acoustic wall panel	Knauf, Armstrong, Himalayan, Acoustic Hunter Douglas, MCRA, Bollard, Credence, BSR Calsi Ceilings, Visual Acoustic
5.	Aluminium Composite Panel	Alpolic, Aluco Bond, Reynobond, Euro bond, Alstrong, Aludecor. Alex, Alumaze Elite
6.	Aluminum Door window hardware (ISI Mark only)	Shalimar, Archie, Classic(ISI)
7.	Aluminium Extrusions / sections	Hindalco, Indian Aluminium Co., Jindal
8.	Annealed Float Glass	Saint Gobain, Modi Guard, Asahi

CORRECTION **NIL** INSERTION **NIL**

CUTTING **NIL** OVERWRITING **NIL** EE(C.)/AE(P) EE-I

9.	Auditorium Chairs/ Furniture	Godrej, Wipro, Methodex, Bonton, Penworker, Durian, Harman Miller, Featherlite, Haworth & Geeken
10.	Bitumen	Indian Oil, Hindustan Petroleum, Bharat Petroleum
11.	Calcium Silicate Board / Tiles	Aerolite, Hilux, Starpan
12.	CC Pavers / Grass Pavers*	Nitco, Ultra, KJS Concrete, Duracrete, Mehtab Tiles, Kaptim, Khalsa, Dalal, Mehtab Tiles, Ratnesh Multi Products
13.	Centrifugally Cast Iron Pipe & Fittings	NECO, SKF, BIC, RIF, KAPILANSH, HIF, Electrosteel, RPMF, Electrotherm
14.	Ceramic Tiles	Kajaria, Somany, Nitco, Johnson, RAK Ceramics,Italica, HAWK, FLAIS, ICON, ITACA, MOTTO
15.	Channelled Perforated Wall Panels	Knauf, Armstrong, Himalayan, Acoustic Hunter Douglas
16.	Chequered Tile	Dura, Eurocon, Modern, Hindustan, Johnson, NITCO
17.	CI Double flanged non-return valves	Kirloskar, Sant, Kartar
18.	C.I. Hubless pipe	SKF, NECO, Kapilansh, RPMF
19.	CI Manhole Cover	SKF, NICO, Hepco, Kapilansh, RPMF
20.	CI / SCI Spun pipes and fittings	NECO, HEPCO, Bengal Iron Corporation, Kapilansh, RPMF
21.	Cover Block	Khalsa, Balaji, Simcom
22.	CP fittings	Jaquar, Marc, Kohler, Hindware , Prayag Polymers(P), Ltd., PRIMA, Plasto
23.	CPVC Pipes & Fittings	Astral , Ashirvad, Prince, Supreme, Finolex, Prayag, Flowkem, Plasto, Vigor, Texmo, KSR
24.	CRCA Steel sheet	TATA, Jindal, Sail
25.	Curtain Carrier / Drapery Rod/ Curtain & Venetian Blinds.	Marvel, Vista levlor, Johnson
26.	Dash fastener, Expansion Bolt	Hilti, Bosch, Fischer
27.	Ductile Iron Pipe (Water Supply)	Electro steel, Kesoram, Electro Spun, TATA DUCTURA, Swastic, Electrotherm
28.	Elastomeric Antifungal Exterior Paint	Ultima of Asian Paints, Weathershield of ICI Dulux, Alguard of Berger
29.	EPDM Gasket	Hanu, Anand, Lescuyer
30.	Epoxy Adhesive	Aquomix , Choksey, BAL-ENDURA, Berger Paints India Ltd. , Ferrous Crete
31.	Epoxy Grouting Compound	Pidilite, Ferrous Crete(Ferro-102), MYK- LATICRETE, Berger Paints India Ltd., Ultratech, Ferrous Crete
32.	Epoxy Primer & Paints	Berger, Pidilite, CICO, BASF, SIKA, Asian Paints
33.	Fibre Glass Acoustical Suspended Ceiling	Knauf, Armstrong, Himalayan, Acoustic Hunter Douglas
34.	Fire Check door **(Metal/Wooden)**	Navair International Pvt. Ltd., Pacific, Shakti Harmann, C4 fire, ASES

CORRECTION **NIL** INSERTION **NIL**

CUTTING **NIL** OVERWRITING **NIL** EE(C.)/AE(P) EE-I

35.	Float Glass Mirror	Modifloat, Saint Gobain, Asahi, TATA float
36.	Flush Doors (ISI Mark only)	Century, Archid, Greenply, Marino, Duro, Jayna, Gujcon, Durian, A1 flush door, M.P. Wood
37.	Friction Stay	Albihari, Geze, Hettich, Securistyle, Ebco
38.	FRP Door	Fiberways, Jayna, Shiv Shakti
39.	FRP Chajja	Fiberways, Jayna, Shiv Shakti
40.	Galvanized/Stainless Steel Anchor Fasteners	Shakti, Arrow, Hilti, Fischer
41.	GI Pipe & fittings	Tata, Zenith, Jindal, Prakash Surya, Swastik
42.	GI Sheet	Sail, TATA, Jindal, National, Bhushan
43.	Geotextile	Manas, Osian, Wadhwa
44.	GRC	Unistone, Dalal, Swastic
45.	Gun Metal Gate Valve , Ball valve	Zoloto, Leader, SANT
46.	Glass Mosaic Tile	Bisazza, Italia, Palladio, Mridul
47.	Gypsum Board (False Ceiling)	Boral Gypsum, India Gypsum, Saint- Gobain, Western
48.	Gypsum Plaster	Asian Paints, BASF, Sika, Saint-Gobain, Pidilite, Ferrous Crete, Western
49.	Hardener	Hardcrete of Snowcem India, Pidilite, CICO., Berger Paints India Ltd., Ferrous Crete
50.	HDPE Pipes	Emco, Polyfins, Pioneer, Plyfab, Jain Irrigation, Kissan, Prayag, Plasto, Texmo, KSR
51.	Hydraulic Door closer, Floor springs	Dorma, Hettich, Hafele, dorset, Hardwin, kelvin, Godrej
52.	Jet Assembly for EWC/Health Faucet	Parryware , Jaquar, Marc, Hindware
53.	Kerb Stone	Mehtab, Hindustan, Concreto, Kaptim, K.K., Khalsa
54.	Kitchen loft tank	Tirupati Structurals Ltd, KMS Plast world P.Ltd. Planet Plastics, Sri Kamakshi Traders, Sreyah Novel InC.
55.	Laminate and Veneers	Merino, Greenlam, Formica, Kitlam, Durian
56.	Locks / Latch	Godrej, Harrision, Dorma, Yale, dorset, Hafele
57.	Marine Plywood / BWP Ply/Plywood	Duro, Century, Kitply, Greenply, Archidply, Durian
58.	Melamine Polish	Asian Paints, Pidilite, ICI Dulux, Berger
59.	Metal False Ceiling	Nitobond, Armstrong, Trac, Durlum, Lafarge, Anutone, Hunter Douglas, Hi-steel / MCRA / Bollard, Credence, BSR Calsi Ceilings, Western, Visual Acoustic
60.	Mineral Fibre/ GRG Ceiling	Armstrong, Daiken, Anutone, Diamond / Hi-steel, Credence, BSR Calsi Ceilings
61.	M.S. Pipe (Railing)	Jindal, Tata, RINL, Prakash Surya
62.	M.S. Tubes	SAIL, Tata, Prakash Surya, RINL, JSW and JSPL
63.	Multi-coat Synthetic Plaster/ Textured Exterior wall paint	Spectrum, Heritage, Ultratech, Asian Paints, Berger Paints India Ltd. / JK Maxx

64.	PL.AL.PL. Pipes	Kitech, Vectus, Jindal
65.	Polycarbonate Sheet	Macrolux, Danpalon, DPI Daylights, Fibreways, UltraLite
66.	Polysulphide / Silicon Sealant	Pidilite, Tuffseal, Berger Paints India Ltd., Ferrous Crete
67.	Pre-coated Profile Sheet	Tata, Bhushan (Jindal), National, Jindal
68.	POP (Plaster of paris)	JK-Laxmi, Sriram Nirman, Sakarni
69.	PPR Pipes	SFMC, SAFE, Poineer Industries
70.	Precast CC interlocking Tiles	Hindustan, Paver India, KK, Dalal, Unistone, Mehtab Tiles
71.	PVC Cistern	Steelbird, Jindal, Prayag, Commander, Shakti, Jaquar, Hindware
72.	PVC Connection Pipe	Supreme, Prince, Finolex
73.	PVC Rain Water Pipe & Fitting (SWR) Pipes	Finolex, Kisan, Kasta, Supreme, Astral, Prince, Prayag
74.	PVC Shutter	Polygreen, Rajshri, Plastogreen, Fiberways
75.	PVC Water storage Tank (Only ISI)	Water well, Gangotri, Prayag, Plasto, Texmo
76.	Ready Mix Concrete (RMC)	ACC, L&T, Grasim, Ultratech, RMC Ind, Supermax
77.	Ready Mix Plaster	Ready Plast (Ultratech), Silico Plast, Perma Plast, Insta Plast, Ferrous Crete
78.	Road Safety Products	Shakti or equivalent
79.	Rust Remover	Perma, Sunanda, Dr. Fixit, Sika
80.	SBR Polymer	Perma, Sika, Roff Bond
81.	Sluice Valve	Kirloskar, Venus, Kalpana, SANT, KARTAR, Zoloto
82.	Solid PVC frames and shutters	Polygreen, Rajshri, Plastogreen
83.	Stainless Steel	Jindal, Salem or equivalent
84.	Stainless steel Sink with or without Draining board.	Nirali, Hindware, Frankee, Neelkanth, Jaquar, Prayag
85.	Stainless steel Door/Window fittings & Fixtures	Dorset, Prayag, Dorma, Ozone, Hettich, Kich, Geze
86.	Structural steel section	TATA, SAIL, RINL, JSW Steel Ltd., Jindal Steel & Power Ltd. (JSPL)
87.	Super plasticizer / admixture	Sika, Chouksey Chemicals, BASF, Asian Paints, Berger Paints India Ltd., Ferrous Crete

CORRECTION **NIL** INSERTION **NIL**

CUTTING **NIL** OVERWRITING **NIL** EE(C.)/AE(P) EE-I

88.	Tactile Tiles	Somany, Johnson, Dura, Dalal & NITCO
89.	Tensile Fabric	Bluestone, Encon, Structure Flex, Visual Acoustic, Fibreways
90.	Telescopic Drawer Channels	Godrej, Hetich, Ebco
91.	Tile Adhesive	Ferrous Crete(Ferro-1122), Ardex Endura (Gold Star), PIDILITE (Fevimate XL), WEABR(Saint-Gobin) Sika, Thermoshield, Asian Paints, Berger Paints India Ltd., Ultratech (tile-fixo), JK Tilo, ICON
92.	Towel Ring/Towel Rod/Towel Rack	Marc, Jaquar, Kohler, Grohe, Hindware, Prayag
93.	Tubular Sealer Window/ M.S. Tubular Window	M/s Engineers & Fabricator, Raipur, M/s J.K. Enterprises, Jaipur, M/s Swastik Super Industries, Mohali (Punjab) M/s Jangid Engg. Jaipur
94.	UPVC Pipes & Fittings	Astral, Flowguard, Ashirvad, Prince, Supreme, Finolex, Prayag, Flowkem, Vigor, Texmo, KSR
95.	UPVC Windows	Fenesta, Aluplast, Kommerling, Duraplast, Rajshri
96.	Urinal, Washbasin, Orrisa Pattern W.C., Wall mounted European W.C. Seat with Cistern	Hindware, Parryware, Jaquar, Kohler, Grohe, Prayag
97.	Vitrified Tile, Rectified Tile	Johnson, Marbonite, Somany, Kajaria, NITCO, RAK, Italica, FLAIS, HAWK, ICON, ITACA, MOTTO
98.	Wall Putty	JK, BIRLA, SARAPUTTY, Asian Paints, Berger Paints India Ltd
99.	Waste Pipe	Kamal, Viking, Jaquar
100.	Water Proofing Compound (Liquid)	Pidilite, Cico, Impermo, BASF, Ardex Endura, Sika, Berger Home Shield, Ferrous Crete
101.	Water Proofing membrane- PU based	Asian Paints, Berger Home Shield or equivalent, Ferrous Crete
102.	White Cement	JK White, Birla White, Grasim

103.	Wire Mesh door	A-1 Teak, Century, Greenply, M.P. Wood, Durian
104.	Wooden Frames	A-1 Teak, Century, Greenply, M.P. Wood, Durian
105.	Wooden Flooring	Armstrong, Action Tesa, Visual Acoustic
106.	Wood polymer composite (WPC) Door frames and shutters	Rajshri, Plastiwood, Alstone, Polygreen, A-1 Teak, Plastogreen

* Paver blocks produced at site under controlled condition may also be allowed after approval of Engineer-in-charge

Note : 1) In case approved make for any material/item is not specified in the NIT, the decision of finalizing a particular brand shall rest with CE, CPWD, Bhopal or his successor there off.

2) In case of non-availability of a particular material/item from specified manufacturers/makes, the decision of CE, Bhopal, CPWD, Bhopal or his successor there off in selection of alternate manufacture/ make is final.

3) The name of approved make is in the above list is indicative. The validity of approval of brand manufacture should not be expired. The brand / Manufacture whose validity has been expired at the time of execution shall be allowed.