ODISHA POWER TRANSMISSION CORPORATION LIMITED

TECHNICAL SPECIFICATION

FOR

CIVIL WORKS
(PART-A)

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1. GENERAL

1.1 Scope of work

The scope of Civil works includes the following items.

The scope shall generally cover foundations for switch yard structures, including gantries and equipment support structures, cable trenches along with covers, cable trench/drain crossings of road, sump pits, marshalling box/control cubicle foundations, switch yard levelling, site clearance, soil investigation, roads, drains, fencing, gravel filling, transformer / reactor foundations, firewalls, boundary wall, control room building & other auxiliary buildings. Any other items, not specifically mentioned here but required for the commissioning of switch yard/substation shall be deemed to be included in the scope of this Specification. The scope shall further cover design, engineering, erection, testing and commissioning of all civil works at each substation. All civil works shall also satisfy the General Technical Clauses specified in other sections of this specification and as detailed below.

Excavation, de watering, carriage of excavated earth, plain cement concrete (PCC), casting of reinforced cement concrete (RCC) foundations, super-structures for switch yard structures, equipment supports, their control cubicles, bus post supports, lighting poles and panels, brick and stone masonry, cable trenches, pipe trenches with necessary pre cast RCC removable covers, with lifting facility and sump pits, cable supports and their embodiment in cable trenches and cable trench/drain crossings of road, with backfilling complete as per drawings approved by the OPTCL, shall be carried out by the contractor. The cable trenches inside the control room shall be provided with MS chequered plate with angle stiffeners at the bottom for mechanical strength and painting there of as per the standard practice.

The Contractor shall furnish all designs, (unless otherwise specified) drawings, labour, tools, equipment, materials, temporary works, constructional plant and machinery, fuel supply, transportation and all other incidental items not shown or specified but as may be required for complete performance of the Works in accordance with approved drawings, specifications and as per direction of the Site In-charge.

The work shall be carried out according to the design/drawings to be developed by the Contractor, and approved by the Site In-charge or supplied to the bidder by the Site In-charge. For all buildings, structures, foundations etc. necessary layout, levels and details shall be developed by the Contractor keeping in view the functional requirement of the plant and facilities and providing enough space and access for operation, use and maintenance based on the input provided by the Site In-charge. Certain minimum requirements are indicated in this specification for guidance purposes only. However, the Bidder shall quote according to the complete requirements.

**** The various works in this section shall also be read in conjunction with Part-B of the technical specification for the materials and workmanship.***

**** The "*Engg In-charge" mentioned in the TS shall be the Divisional Head for the project.**

2. 0 SITE CLEARANCE & CONTOUR SURVEY

2.1 Clearing and Grubbing

The work shall consist of numbering of trees, removing and disposing of all materials such as trees, bushes, woods, shrubs, grass, stumps, rubbish, rank vegetation, roots, foreign materials, etc., which in the opinion of the Site In-charge are unsuitable for incorporation in the works, from within the limits and such other areas as may be specified on the drawings or directed by the Site In-charge. Clearing and grubbing shall be performed in advance of earthwork operations and in accordance with the requirements of these Specifications. During clearing and grubbing, the contractor shall take all adequate precautions against soil erosion, water pollution etc., and where required undertake additional works to that effect.

2.2 Setting out and making profiles (Contour Survey)

After the site has been cleared as per Clause 2.1 above, the limits of excavation shall be set out true to lines, curves, slopes, grades and sections as shown on the drawings or as directed by the Site In-charge. The Contractor shall provide all labour, survey instruments and materials such as strings, pegs, nails, bamboos, stones, lime, mortar, concrete, etc., required in connection with the setting out of works and the establishment of bench marks. A grid system of co-ordinates shall be established by the Contractor at the site.

Masonry or concrete pillars shall be erected suitably at minimum of four places in the area to serve as bench marks for the execution of the work. Each bench mark shall be protected from damage or disturbance. These bench marks shall be connected with G.T.S. of any other permanent bench mark approved by the Site In-charge. Necessary profiles with pegs, bamboos and strings or “Burjis” shall be made to show the correct formation levels before the work is started and the same shall be approved by the Engg Incharge

3. SOIL INVESTIGATION

This test shall be performed on the original soil of the substation area before cutting or filling is done.

3.1 General

The Contractor shall perform a detailed soil investigation to arrive at sufficiently accurate general as well as specific information about the soil profile/strata and the necessary soil parameters of the site in order that the foundations of the various structures can be designed and constructed safely and rationally. Foundation systems adopted by the contractor shall ensure that relative settlement shall be as per provision in IS 1904 and any latest IS and other Indian Standards.

This Specification covers all the work required for detailed soil investigation and preparation of a detailed report. The work shall include mobilisation of necessary equipment, provision of necessary engineering supervision and technical personnel, skilled and unskilled labour etc., as required to carry out field investigation and tests, laboratory tests, analysis and interpretation of data and results, preparation of detailed soil report including specific recommendations for the type of foundations and the safe bearing capacity for different sizes of foundations at different founding strata for the various structures of the substation. The Contractor shall make his own arrangements for locating the coordinates and various

test positions in field and also for determining the reduced level of these locations with respect to the bench mark. All the test are to be carried out before the OPTCL officials or before any agency engaged by OPTCL. Prior intimation in this effect has to be given to OPTCL.

A report to the effect will be submitted by the Contractor for the Site In-charge specific approval giving details regarding his assumed data for Civil structures design.

Any variation in soil data shall not constitute a valid reason for any additional cost and shall not affect the terms and condition of the Contract. Nothing extra what so ever shall be paid to the Contractor on account of any variation in subsoil properties /or conditions. Tests must be conducted under all the critical locations i.e. Control room building, auto/power transformer, reactor, lightning mast, 400 kV/220 kV/132 kV column location etc. However, some of the soil parameters given below for substations have to be determined and submitted to Site In-charge.

- Dry density
- Bulk density
- Angle of internal friction/cohesion
- Specific gravity
- Natural moisture content.

3.2 Bore holes

Drilling of a specified number of bore holes of 150 mm dia. in accordance with the provisions of IS 1892 at approved locations to specified depths or to refusal whichever occurs earlier. (By refusal it shall mean that a standard penetration blow count (N) of 100 is recorded for 30 cm penetration). However, at least 5 boreholes or as specified in BOQ shall be drilled to the required depth (15 mts. approximately).

Performing Standard Penetration Tests at approximately 2.0 m intervals in the bore hole starting from 0.5 m below ground onwards and at every change of stratum. The disturbed samples from the standard penetrometer shall also be collected for necessary tests.

Collecting undisturbed samples of 100/75 mm diameter 450 mm long from the bore holes at intervals of 2.5 m and every change of stratum starting from 1.0 m below ground level onwards.

The depth of Water Table shall be recorded in each bore hole.

All samples, both disturbed and undisturbed, shall be identified properly with the bore hole number and depth from which they have been taken. The sample shall be sealed at both ends of the sampling tubes with wax immediately after the sampling and shall be packed properly and transported to the Contractor`s laboratory without any damage or loss.

The logging of the bore holes shall be compiled immediately after the boring is completed and a copy of the borelog shall be handed over to the Site In-charge.

3.3 Dynamic cone penetration test

Two Dynamic cone penetration tests under the locations of auto transformers shall be carried out with the circulation of bentonic slurry at specified location and a continuous

record of penetration resistance (NG) upto 15 metre from natural ground level or refusal, shall be maintained by the Contractor.

Dynamic cone penetration tests are conducted to correlate engineering properties such as stratification density, bearing capacity, settlement, etc., of soils which are primarily cohesive in nature. The tests shall be conducted by driving a standard size cone attached loosely or screwed to a string of drill rods. The specification for the equipment and accessories required for performing this test, test procedure, field observations and reporting of results shall confirm to IS 4968 part 11 latest revision. The driving system shall comprise of 65 kg weight having a free fall of 75 cm. The cone size shall be 65 mm diameter, and provided with vents for continuous flow of bentonite slurry through the cone and rods in order to avoid friction between the rods and soil. The location for tests shall be as directed by the Site In-charge. On completion of the test, the results shall be presented as a continuous record as the number of blows required for every 300 mm penetration of the cone into the soil.

3.4 Trial pits

Trial pits shall be made at two locations as approved by the Site In-charge. The trial pits shall two metres squar in size extending to (four) metres depth or as specified by the Site In-charge. Undisturbed samples shall be taken from the trial pits as per the direction of the Site In-charge.

3.5 Field California Bearing Ratio test

This test shall be carried out to obtain the properties of soil required for the construction of roads. The equipment and accessories required for carrying out the test, test procedure, recording of observations and presentation of results shall confirm to IS 2770 part **XXXI.** The test locations of CBR test shall be on the road locations as per GA drawing. These tests shall be performed on remoulded and undisturbed, soaked and un soaked samples.

3.6 Plate load test

Plate load test shall be conducted to determine the bearing capacity and load/ settlement characteristics of soil at shallow depths by loading a plane and level steel plate kept at the desired depth and measuring the settlement under different loads, until a desired settlement takes place or failure occurs. The specification for the equipment and accessories required for conducting the test, the test procedure, field observations and reporting of results shall conform to IS 1888. The location and depth of the test shall be given by the Contractor and approved by the Site In-charge. Undisturbed tube samples shall be collected at 1.0 m and 2.5 m depths from the natural ground level for carrying out laboratory tests.

The size of the pit shall not be less than five times the plate size and shall be taken upto the specified depth. All provisions regarding excavation and visual examination of pit shall apply here.

If the ground water table is at a depth higher than the specified test depth, the ground water table shall be lowered and maintained at the test depth for the entire duration of the test. Dewatering shall be at Contractor`s cost.

Unless otherwise specified the reaction method of loading shall be adopted. Settlement shall be recorded from dial gauges placed at four diametrically opposite ends of the test plate. The test plate shall be 600 x 600 mm size and at least 25mm thick. The bottom of the pit shall be levelled before placing the plate in position for conducting the test.

A seating load of 70 gm/sq.cm shall be applied and after the dial gauge readings are stabilised, the load shall be released and the initial readings of the dial gauges recorded after they indicate constant reading. The load shall be increased in stages. These stages shall be 20, 40, 70, 100, 150, 200, 250, 300, 400. 500, 600 and 800 KN per sq.m. or as directed by the Site In-charge. Under each loading stage, record of time versus settlement shall be kept as specified in IS 1888**.**

The load shall be maintained for a minimum duration of one hour or till the settlement rate reduces to 0.02 mm/m. whichever is later. No extrapolation of settlement rate from periods less than one hour shall be permitted.

Loading shall be carried out in stages as specified above till one of the following conditions occurs:

- Failure of the soil under the plate i.e. the settlement of the plate at constant load becomes progressive and reaches a value of 40 mm or more.
- Total settlement of the plate is more than 4Omm.
- Load intensity of 800 kN/sq.m is reached without failure of the soil.

Backfilling of the pit shall be carried out as per the directions of the Site In-charge. Unless otherwise specified the excavated soil shall be used for this purpose. The quoted rates shall include backfilling.

Dial gauge readings for settlement shall generally be taken at 1, 2, 4, 6, 9, 16, 25, 60, 90 and 120 minutes from the commencement of each stage of loading. Thereafter the readings shall be taken at hourly intervals upto a further four hours and at two hours intervals thereafter for another six hours.

3.7 Water sample

Representative samples of ground water shall be taken when ground water is first encountered before the addition of water to aid drilling of boreholes. The samples shall be of sufficient quantity for chemical analysis to be carried out and shall be stored in air-tight containers.

3.8 Laboratory Test

The laboratory tests shall be carried out progressively during the field work after a sufficient number of samples have reached the laboratory, in order that the test results of the initial bore holes can be made use of in planning the later stages of the field investigation and quantum of laboratory tests.

All samples brought from field, whether disturbed or undisturbed shall be extracted/prepared and examined by competent technical personnel, and the tests shall be carried out as per the procedures laid out in the latest edition of the relevant IS Codes and Standards.

The following laboratory tests shall be carried out:

- Visual and engineering classification.
- Liquid limit, plastic limit and and shrinkage limit.
- Natural moisture content, bulk density, dry density and specific gravity.
- Grain size distribution.
- Unconfined compression test.
- Unconsolidated undrained test.
- Swell pressure and free swell index determination.
- California bearing ratio.
- Consolidated undrained test.
- Consolidated drained test.
- Chemical tests on soil and water to determine the carbonates, sulphates, nitrates, chlorides, Ph value, and organic matter and any other chemicals harmful to the concrete foundation.

3.9 Test results and reports

The Contractor shall submit the detailed report in four (4) copies wherein information regarding the geological detail of the site, summarised observations and test data, bore logs, and conclusions and recommendations on the type of foundations with supporting calculations for the recommendations. Initially the report shall be submitted by the Contractor in draft form and after the draft report is approved, the final report in eight (8) copies shall be submitted.

The report shall include, but not be limited to the following :

- A plan showing the locations of an exploration work i.e. bore holes, dynamic cone penetration tests, trial pits, plate load test, etc.
- Bore logs: Bore logs of each bore holes clearly identifying the stratification and type of soil stratum with depth upto the refusal. The values of Standard Penetration Test (SPT) at the depths where the tests were conducted on the samples collected shall be clearly shown against that particular stratum.
- Test results of field and laboratory shall be summarised strata wise as well in combined tabular form. All relavant graphs, charts tables, diagrams and photographs, if any, shall be submitted along with report.
- **Recommendation** The report should contain specific recommendations for the type of foundation for the various structures envisaged at site. The Contractor shall acquaint himself about the type of structures and their functions from the Site In-charge. The observations and recommendations shall include but not be limited to the following :
  - Geological formation of the area, past observations or historical data, if available, for the area and for the structures in the nearby area, fluctuations of water table, etc..
  - Recommended type of foundations for various structures. If piles are recommended the type, size and capacity of pile shall be given.

- Allowable bearing pressure on the soil at various depths for different sizes of the foundations based on shear strength and settlement characteristics of soil with supporting calculations for the recommendations.
- Recommendations regarding slope of excavations and dewatering schemes, if required.
- Comments on the chemical nature of soil and ground water with due regard to protective measures.
- If expansive soil is met with, recommendation on removal or retainment of the same under the structure/road etc. shall be given. In the latter case detailed specification of any special treatment required including specification for materials to be used, construction method and equipment to be deployed etc. shall be furnished.

- Recommendations for additional investigation beyond the scope of the present work, if Contractor considers such investigation necessary.

4.0 ELECTRICAL RESISTIVITY TEST.

This test shall be performed on the original soil of the substation area before cutting or filling is done.

This test shall be conducted to determine the electrical resistivity of soil required for designing safety grounding system for the entire station area. The specifications for the equipment and other accessories required for performing electrical resistivity test, the test procedure, and reporting of field observations shall confirm to IS 3043. The test shall be conducted using Wenner's four electrode method as specified in IS 1892, Appendix-B2. Unless otherwise specified at each test location, the test shall be conducted along two perpendicular lines parallel to the coordinate axis.

The soil resistivity should preferably be taken during the month between January to April when the soil would be relatively dry. Provisions laid down in IS: 3043-1987 / CBIP manual for earthing should be followed for measurement of soil resistivity.

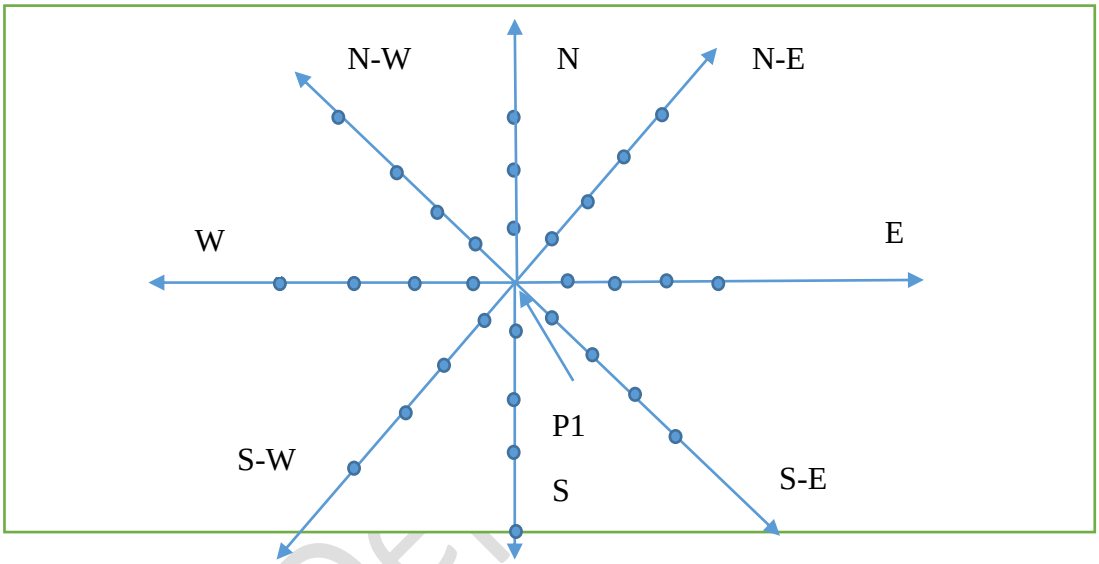
- The date of measurement, weather condition and ambient temperature should be mentioned in the report.
- In case rain has occurred within a week, measurement shall not be taken.
- Name of the test instrument must be mentioned in the report.
- Before the use of the instrument, calibration certificate should be checked.
- In case of doubt, readings may be confirmed by a second instrument.
- Apart from construction Engineer, one engineer from local E & MR wing and concerned construction Division in-charge should also remain present.

The procedure and the report formats are given below.

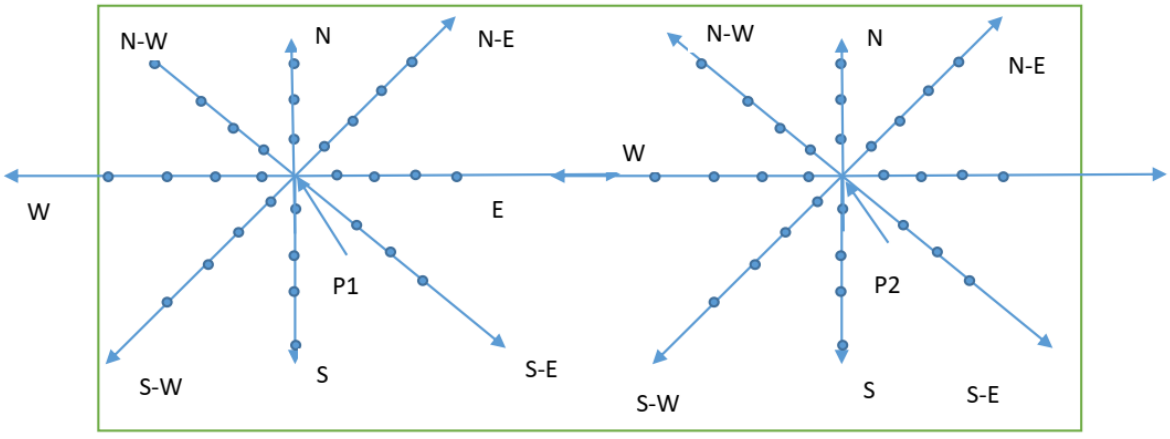
<u>Test Procedure</u>

1. The soil resistivity shall be measured by Wenner's four electrode method.

2. A point shall be chosen inside the substation area of each voltage class so that most of the switchyard area is covered for the test. The number of such points shall be decide as per the size of the switchyard for that voltage level.
3. The number of such locations for GIS substation shall also be decided so as to cover most of the area of the GIS substation.
4. **The electrode spacing shall be 1m, 3m, 5m, 7.5m, 10m, 15m in 08 (eight) directions (E, W, N, S, N-E, N-W, S-E, S-W) and the depth of electrode insertion into the ground shall be less than 1/20 th of the above spacing.** Note that when calculating the spacing-to-depth ratio, the spacing distance is the primary value. Determine the electrode spacing first, and then adjust the depth accordingly.



Typical model each for 220KV, 132KV & 33KV S/Y



Typical model for 400KV S/Y

5. If the resistivity variations are within 30%, the soil is said to be uniform. These values are plotted on the graph sheets in the appropriate directions. A closed curve is plotted and the area inside the curve is measured. The equivalent radius of the circle having the same area as above curve is the "Average Soil Resistivity".
6. Otherwise, a curve of resistivity versus electrode spacing shall be plotted and this curve is further analyzed to deduce stratification of soil into two or more layers of appropriate thickness or soil of gradual resistivity variation.
7. The readings taken as per the above method shall be recorded in a tabular form and all concerned persons must sign the report. The concerned DGM (Const) shall certify the report.
8. A separate format is enclosed for checking the soil uniformity and calculation of average soil resistivity. This report shall also be signed by all concerned and certified by the DGM (Const).

    - The soil shall be considered uniform if the variation is within 30% for that location.
    - The above test shall be checked for each location for the substation.
    - The larger value of the different locations in the switchyard shall be taken as the soil resistivity of the substation.
    - If variation is more than 30%, soil shall be declared as non-uniform and two layer or multilayer soil resistivity model shall be adopted as the case may be.
9. The value so obtained in the above step shall be taken for design of the earth mat.

SOIL RESISTIVITY REPORT FORMAT

Location:	Date of Measurement:
Ambient Temperature:	Date of Soil Investigation:
Relative Humidity	Depth of Water Table:
Make & Model of test kit Used:	Calibration Date:

Direction: **East/ West/ North/ South/ N-E/ N-W/ S-E/ S-W**					
Sl No	Electrode Spacing, mtr	Depth of electrode inside ground, mtr	Measured Resistance, Ohm	Measured/Calculated Resistivity, Ohm mtr	Remarks
1	1.5				
2	3				
3	5				
4	7.5				
5	10				
6	12				

- Check for soil uniformity and Calculation of Average soil resistivity Location:

Sl NO	Spacing	Resistivity Value								Agg	Loc Avg	Variation %	Check Variation %
		E	W	N	S	N-E	N-W	S-E	S-W				
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.5												
2	3												
3	5												
4	7.5												
5	10												
6	12												

- Values at column 11= (Sum of values at column 3 to 10 for the corresponding row)/8
- Value of column 12= (Sum of all values at column 11)/6
- Values at column 13= (Values at column 12-11 at each row)*100/(value of Column 12)
- Values at Column 14= Check if values at Coilumn 13 is less than 30%

Note: The agency shall declare the soil resistivity model (Uniform or otherwise) based on calculation.

5.0 EXCAVATION AND BACKFILL FOR FOUNDATIONS

Excavation and backfill for foundations shall be in accordance with the relevant Code. The back fill around the foundations shall be compacted according to Clause 5.7 for Compaction.

Whenever water table is met during the excavation, it shall be dewatered and water table shall be maintained below the bottom of the excavation level during excavation, concreting and backfilling.

When embankments are to be constructed on slopes of 15% or greater, benches or steps with horizontal and vertical faces shall be cut in the original slope prior to placement of embankment material. Vertical faces shall measure not more than one metre in height.

Embankments adjacent to abutments, culverts, retaining walls and similar structures shall be constructed by compacting the material in successive uniform horizontal layers not exceeding 15 cm in thickness, (of loose material before compaction). Each layer shall be compacted as required by means of mechanical tampers approved by the Site In-charge. Rocks larger than ten centimetres shall not be placed in embankment adjacent to structures.

Earth embankments of roadways and site areas adjacent to buildings shall be placed in successive uniform horizontal layers not exceeding 20 cm in thickness in loose stage measurement and compacted to the full width specified. The upper surface of the embankment shall be shaped so as to provide complete drainage of surface water at all times.

5.1 Rock excavation

The rock to be excavated shall be classified under the following categories:

5.1.A Ordinary rock

Rock which does not require blasting, wedging or similar means for excavation is considered as ordinary rock.. This may be quarried or split with crowbars or pickaxes and includes lime stone, sand stone, hard laterite, hard conglomerate and reinforced cement concrete below ground level. It will also include rock which is normally hard requiring blasting when dry but can be excavated without blasting, wedging or similar means when wet. It may require light blasting for loosening materials, but this will not any way entitle the material to be classified as hard rock.

5.1.B Hard Rock

Any rock or boulder for the excavation of which blasting is required, for example quartzite stone, granite, basalt, reinforced concrete (reinforcement to cut through but not separated from concrete) below ground level.

5.1.C Hard Rock (Blasting prohibited)

This shall cover any hard rock requiring blasting as described in above but where blasting is prohibited for any reason and excavation has to be carried out by chieselling, wedging or any other approved method.

5.1.D Authority for classification

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

5.2 Excavations for foundations and other purposes

Excavations shall be of the minimum sizes necessary for the proper construction of the works, and excavations shall not be kept open for periods longer than that reasonably required to construct the works. The Contractor shall take all precautions necessary to ensure that the bottoms of excavations are protected from deterioration and that the excavations are carried out in such a manner that adjacent foundations, pipes or such like are not undermined, damaged or weakened in any way. Any excavation taken out below the proper level without approval shall be made good at the expense of the Contractor using concrete or other material as directed.

All excavated materials obtained from excavation shall remain OPTCL`s property. The useful portion shall be separated from the useless one and deposited in regular stacks at places indicated and as directed by the Site In-charge.

5.3 Support of excavations

The Contractor shall be responsible for the stability of the sides of the excavations. Excavations shall be close timbered or sheeted, planked and strutted as and when necessary during the course of the work and shall ensure the safety of personnel working within them. If any slips occur, they shall, as soon as practicable, be made good in an approved manner at the expense of the Contractor. Shoring shall not be removed until the possibility of

damaging the works by earth pressure has passed. No payment for shoring or timber left in shall be made, unless agreed in writing by the Site In-charge.

5.4 Works to be in dry

All excavations shall be kept free from water and the Contractor shall take whatever action is necessary to achieve this. Pumping, well pointing and other means necessary to maintain the excavations free from water shall be at the expense of the Contractor, and carried out in an approved manner.

5.5 Backfill

As soon as possible after the permanent works are sufficiently hard and have been inspected and approved, backfill shall be placed where necessary and thoroughly consolidated in layers not exceeding two hundred (200) millimetres in depth.

On completion of structures, the earth surrounding them shall be accurately finished to the line and grade as shown on the drawings. Finished surfaces shall be free of irregularities and depressions.

The soil to be used for back filling purposes shall be from the excavated earth or from borrow pits, as directed by the Site In-charge.

5.6 Disposal of surplus

Surplus excavated material not required or not approved for fill or backfill shall be loaded and deposited either on or off site as directed. The Contractor shall not delay disposal of surplus material after receipt of instructions from the Site In-charge. The contractor shall arrange to transport the excavated earth by mechanical transport, not necessarily on Pucca roads. The soil so transported shall be stacked and levelled neatly and dressed. The location where the soil is to be stacked / disposed shall be as directed by the Site In-charge.

5.7 Compaction

The method and equipment used to compact the fill material to a density that will give the allowable soil bearing pressure required for the foundations, roads, etc. in each layer of fill material. Each layer of earth embankment when compacted shall be as close to optimum moisture content (OMC) as practicable. Embankment material which does not contain sufficient moisture to obtain proper compaction shall be wetted. If the material contains an excess of moisture, then it shall be allowed to dry before rolling. The rolling shall begin at the edges overlapping half the width of the roller each time and progress to the center of the road or towards the building as applicable. Rolling will also be required on rock fills. No compaction shall be carried out in rainy weather.

At all times, unfinished construction shall have adequate drainage. Upon completion of the road surface course, adjacent shoulders shall be given a final shaping, true alignment and grade.

The density to which fill material shall be compacted shall be as per relevant IS and as per direction of Site In-charge. All compacted sand filling shall be confined as far as practicable. Backfilled earth shall be compacted to minimum 95% of the Standard Proctor's density at OMC. The subgrade for the roads and embankment filling shall be compacted to minimum 95% of the Standard Proctor's density at OMC

5.8 Requirement for fill material under foundations

The thickness of fill material under the foundations shall be such that the maximum pressure from the footing, transferred through the fill material and distributed onto the original undisturbed soil will not exceed the allowable soil bearing pressure of the original undisturbed soil.

Where compacted fill is required it shall consist of suitable sand, or other selective inorganic material, subject to approval by the Site In-charge. The filling shall be done with locally available sand. The filled in sand shall be kept immersed in water for sufficient time to ensure compaction, if so desired by the Site In-charge.

6.0 FOUNDATION/RCC DESIGN

6.1 General

All foundations shall be of reinforced cement concrete (RCC) design excluding where it is mentioned otherwise. The design and construction of RCC structures shall be carried out as per IS 456 and minimum grade of concrete shall be M20 corresponding to 1:1.5:3 (**M20**) nominal mix ratio with 12-20 mm coarse aggregate. Higher grades of concrete than specified above may be used at the discretion of the Bidder without any financial implication to the owner. Work covered under this clause of the specification comprises the construction of foundations and other RCC constructions for switchyard structures, equipment support structures, Cable trenches, drains, jacking pad, pulling block, bus supports, Auto transformer/power transformer/reactors, LT Distribution Boards as per TS, Station Transformer, auxiliary equipment, Store shed, Open stockyard system buildings, tank or for any other equipment or service and any other foundation required to complete the work. Also applicable to other RCC constructions. The grade of concrete for other buildings, buildings etc shall be as per the BOQ.

If the site is sloping, the foundation height will be adjusted to maintain the exact level of the top of structures to compensate such slopes.

The switchyard foundations plinths and building plinths shall be minimum 200mm and 500mm above finished ground level (top of switchyard gravel surface) respectively. Minimum 75 mm thick lean concrete shall be provided below underground structures' foundations, trenches etc to provide a base for construction.

The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The special footing or pile foundations as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.

Admixtures in concrete shall confirm to IS:9103. The water proofing cement additives shall confirm to IS:2645. Concrete Admixtures/Additives shall be approved by the owner.

Limit state method of design shall be adopted unless stated otherwise in the Specification.

For design and construction of steel-concrete composite beams IS 11384 shall be followed.

For detailing of reinforcement IS 2502 and SP:34 shall be followed. Cold twisted deformed bars (Fe= 415 N/sq mm) conforming to IS 1786 shall be used as reinforcement. However, in

specific areas, mild steel (Grade1) conforming to IS 432 can also be used. Two layers of reinforcement (on inner and outer face) shall be provided for wall and slab sections having thickness of 150 mm and above. Clear cover to reinforcement towards the earth face shall be minimum 40 mm.

RCC water retaining structures such as storage tanks, cooling water basin etc. shall be designed as uncracked sections in accordance with IS 3370 (Part 1 to IV) by working stress method and shall also be tested for water tightness at full water level. However, water channels shall be designed as cracked sections with limited steel stresses as per IS 3370 (Part 1 to IV) by working stress method.

The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and /or equipment and /or superstructure, and other conditions which produce the maximum stresses in the foundation or the foundation component and as per the relevant IS Codes of foundation design. The design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used.

All foundations shall rest below virgin ground level and the minimum depth of foundation below the virgin ground level shall be maintained.

Design shall consider any sub-soil water pressure that may be encountered.

Necessary protection to the foundation work, if required, shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental or harmful to the concrete foundations.

RCC columns shall be provided with rigid connection at the base.

All building sub-structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factors of safety for these cases shall be as stated in relevant IS Codes or as stipulated elsewhere in the Specifications.

Earth pressure for all underground structures shall be calculated using coefficient of earth pressure at rest, coefficient of active or passive earth pressure (whichever is applicable). However, for the design of substructures of any underground enclosures, earth pressure at rest shall be considered.

In addition to earth pressure and ground water pressure etc., a surcharge load of 2T/sq.m shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, and substructures of any underground hollow enclosure etc., to allow for vehicular traffic in the vicinity of the structure.

The following conditions shall be considered for the design of water tanks, pump houses, channels, sumps, trenches and other underground concrete structures such as basements etc.

- Full water pressure from inside and no earth pressure, ground water pressure and surcharge pressure from outside (applicable only to structures which are liable to be filled with water or any other liquid).

7.0 Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside.

Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the superimposed loadings.

Base slabs of any underground enclosures shall be designed for empty condition during construction and maintenance stages with maximum ground water table (GWT). Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the super-imposed loadings.

Base slab of underground enclosures such as water storage tank shall also be designed for the condition of different combination of pump sumps being empty during maintenance stages with maximum GWT. Intermediate dividing piers of such enclosures shall be designed considering water in one pump sump only and the other pump sump being empty for maintenance.

The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.

The foundation of the transformer and circuit breaker shall be of block type foundation. Minimum reinforcement shall be governed by IS:2974 and IS:456.

The tower and equipment foundations shall be checked for a factor of safety of 2.2 for normal condition and 1.65 for short circuit condition against sliding, overturning and pullout. The same factor shall be used as partial safety factor over loads in limit state design also.

All underground concrete structures such as basements, pump houses, water retaining structures etc. shall have plasticizer cum water proofing cement additive conforming to IS 9103. In addition, the limit on permeability as given in IS 2645 shall also be met. The concrete surface of these structures in contact with earth shall also be provided with two coats of bituminous painting for water /damp proofing.

In case of water leakage in the above structures, leakage repair shall be achieved by the injection method.

6.2 Machine Foundations

All machine foundations shall be designed in accordance the provisions of the relevant parts of the latest revisions of IS 2974, IS 456 and IS 2911.The provisions of DIN 4O24 (latest) shall also be followed.

All block foundations resting on soil or piles shall be designed using the elastic half space theory.

The mass of the RCC block shall not be less than three times the mass of the machine. Dynamic analysis shall be carried out to calculate natural frequencies in all the modes including coupled modes, and to calculate vibration amplitudes. Frequency and amplitude criteria as laid down by the relevant IS codes and/or machine manufacturers, shall be satisfied. Minimum reinforcement shall be governed by IS 2974 and IS 456.

For the foundations supporting minor equipment, weighing less than one tonne, or if the mass of the rotating parts is less than one-hundredth of the mass of the foundation, no dynamic analysis is necessary. However, if such minor equipment is to be supported on

building structures, floors etc. suitable vibration isolation shall be provided by means of springs, neoprene pads etc. and such vibration isolation system shall be designed suitably.

6.3 Other Foundations

All foundations shall be designed in accordance with the provisions of the relevant parts of latest revisions of IS 2911 and IS 456.

Type of foundation system i.e. isolated footing, raft or piling shall be decided based on the load intensity and soil strata.

A minimum three piles shall be provided in any pile group.

Gantry and tower foundations shall be designed for an additional factor of safety of 1.1 for normal/ broken wire conditions and for short circuit condition.

Circuit breaker foundations shall be designed for impact loading and shall be strictly in accordance with the Manufacturer`s recommendations.

7.0 LEVELLING OF S/S AREA

Providing, neatly dressing up and levelling of substation area (only the area utilised for construction i.e. 3mtr beyond the utilised area) including switchyard area to a required level as decided by the Engineer in Charge.

The work includes:

a) Cutting: Cutting of substation area soil as per requirement of the formation level and utilising the usable soil for filling and compaction and disposing the unsuable soil from site as per direction of the Engineer in Charge.

b) Filling: of substation area with borrowed earth (as per requirement after filling the cut soil from the substation area) as per requirement of the formation level.

8.0 SITE SURFACING

- **Levelling & compaction**
- **Anti-weed treatment**
- **Laying of PCC**
- **Metal/gravel spreading**

8.1 Scope of Work

The contractor shall furnish all labour, equipment and materials required for complete performance of the work in accordance with the drawings, specification and direction of the Site In-charge.

8.2 General Requirement

a) The material required for site surfacing/gravel filling shall be free from all types of organic materials and shall be of standard approved quality, and as directed by the Site In-charge.

b) The Contractor shall furnish and install the site surfacing to the lines and grades as shown in the drawing and in accordance with the requirements and direction of the Site In-charge.

c) The soil of the periphery area of the switchyard area shall be subjected to sterilisation or anti-weed treatment before laying the PCC or requirement of the manufacturer of the chemical required for soil sterilisation or anti-weed treatment.

d) After all the structures and equipment have been erected and accepted, and soil sterilisation of the switchyard area including the peripheral area as specified is complete, the site shall be maintained to the lines and grades indicated in the drawing and rolled or compacted by using three ton roller with suitable water sprinkling to form a smooth and compact surface condition which shall be matching with finished ground level of the switchyard area.

e) The details of quantities and method of application of chemicals used for soil sterilisation/anti-weed treatment shall be as per manufacturer`s recommendations. Bidders are required to submit the details of chemicals proposed to be used and recommendations of manufacturer with required guarantee along with their bids for necessary approval of the Site In-charge. Approval of the Site In-charge by no means shall relieve the contractor of their contractual obligations as stipulated in General and Special Conditions of Contract.

f) After due anti-weed treatment & compaction of the surface of the entire switchyard area & peripheral area, it shall be provided with plain cement concrete of 75 mm thickness, having cement concrete ratio 1:4:8. Care shall be taken for proper gradient for easy discharge of storm water. Holes of 3 inch dia shall be left at every 3m in the PCC for better water absorption.

g) After the PCC is applied and surface prepared to the required slope and grade, a base layer of uncrushed/crushed broken gravel of 20 mm nominal size shall be spread, rolled and compacted by using 1/2 ton roller (30'' width and 24'' dia) with 4 to 5 passes and water sprinkling to form a minimum 50 mm layer on the designed finished formation level of the entire switchyard area and extend beyond the fenced area (by 2mtr).

h) As a final surface course minimum 50 mm. uniform layers of uncrushed /crushed broken metals (gravel) of 20 mm. nominal size shall be spread over the base layer/course. This final surface course shall be applied in all areas exclusive of roadways and shall extend beyond the fenced area (by 2 mtr) as indicated in the drawing. This surface course shall then be compacted by light roller using 1/2 ton steel roller (width 30" x dia 24") and 4 to 5 passes or any other means with water sprinkling as directed by the Site In-charge. Water shall be sprinkled in such a manner that bulking does not take place. The 20 mm. nominal size (for both layers) shall pass 100% through IS sieve designation 37.5 mm and nothing through 16.0 mm. IS sieve.

i) In areas that are considered by the Site In-charge to be too congested with foundations and structures for proper rolling of the site base course material by normal rolling equipment, the material shall be compacted by hand, if necessary. Due care shall be exercised so as not to damage any foundation structure or equipment during rolling or compaction.

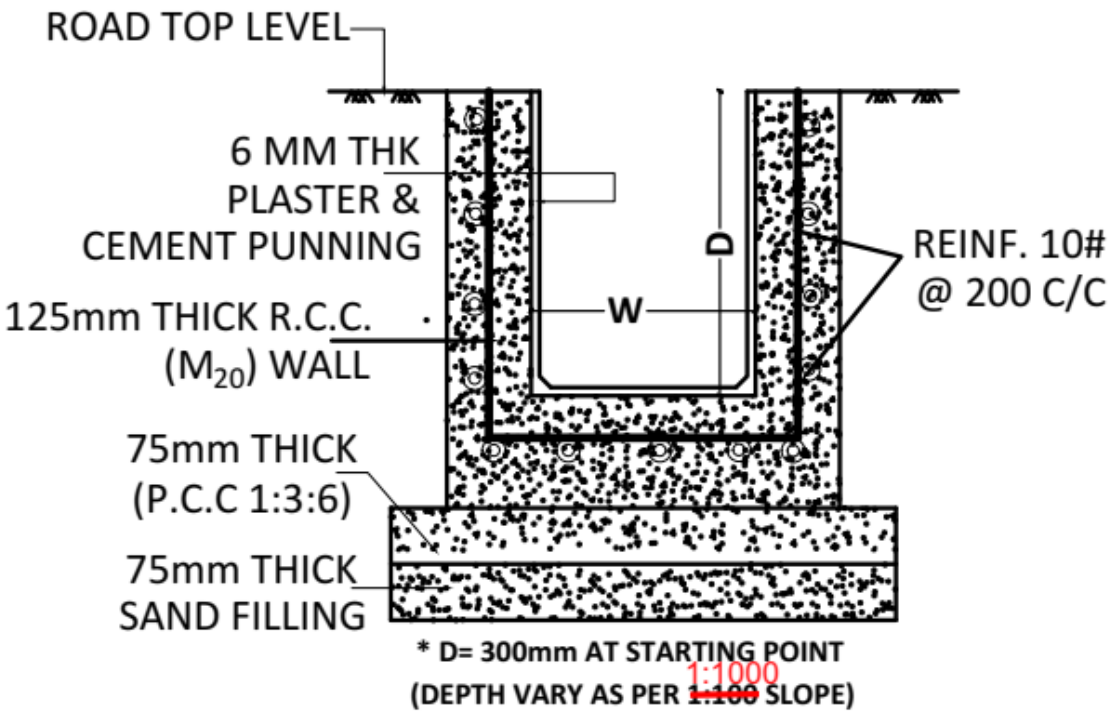
Site In-charge by no means shall relieve the contractor of their contractual obligations as stipulated in General and Special Conditions of Contract.

9.0 SITE DRAINAGE

9.1 General

The Contractor shall be responsible for constructing open surface drains so that the rain water dose not accumulate inside the substation. The work includes excavation in all types of soil or rocks, back filling, disposal of excess earth, supply of all material, T & P, Labour etc as per the direction of Engineer In-charge to complete the work in all respect.

A typical cross section of the open drain drawing is given below for reference.



SECTION FOR R.C.C. SURFACE DRAIN

DRAIN DETAILS		
TYPE	W	D
ROAD SIDE DRAIN	300 MM	STARTS FROM 250MM
MAIN DRAIN	450 MM	STARTS FROM 300MM

Open storm water drains shall be provided on both sides of the roads and shall be designed to drain the road surface as well as all the free and covered areas.

Invert of the drainage system shall be decided in such a way that the water can easily be discharged above the High Flood Level (HFL) outside substation boundary at suitable location and approved by Site In-charge. Pumping of drainage water, if required, shall be provided by Contractor.

All internal site drainage systems, including the final connection and disposal shall be part of Contractor`s scope including all required civil work, mechanical and electrical systems. The Contractor shall connect his drain(s) at one or more points.

Suitable pumping arrangement shall be provided by the Contractor to pump out the water from sump (if required) to the open channel; automatic float valve type pump shall be provided and installed by Contractor.

The Contractor shall locate the outfall point outside the substation vicinity and the substation storm drainage must be connected to this point.

The drainage scheme and associated drawings shall be subject to approval of the Site In-charge.

9.2 Regulations

The regulations and recommendations of any relevant drainage or sanitary authority shall be fully observed, and the Contractor shall be responsible for acquainting himself with any such regulations.

10.0 ROADS AND CULVERTS

The Contractor shall be responsible for constructing approach roads, sub-station roads and service roads etc. within the substation area. The work includes excavation in all types of soil or rocks, back filling, disposal of excess earth, supply of all material, T & P, Labour etc as per the direction of Engineer In-charge to complete the work in all respect.

Layout of the roads shall be based on general details and arrangement drawings for the substation. Adequate turning space for vehicles shall be provided and bend radii shall be set accordingly. Roads to the transformer bays shall be as short and straight as possible. Where the substation layout warrants headroom safety barriers shall be installed to prevent vehicles coming into contact with overlying conductors. Such barriers shall be included as part of the scope of the work.

All substation roads shall be constructed so as to permit transportation of all heavy equipment. Finished top (crest) of roads shall be a minimum of 300 mm above the surrounding grade level (Formation level).

Road construction shall be as per Indian Road Congress (I RC) standards.

Adequate provision shall be made for road drainage.

All culverts and allied structures required for road/rail, drain, trench crossings etc. shall be designed for class AA loading as per IRC standard.

All roads shall be designed for class 'E' of traffic i.e. traffic intensity of 450-1500 vehicles per day (heavy vehicles exceeding 3 tonnes laden weight) as per IRC-37-1984, Guide-lines for the design of flexible pavements.'

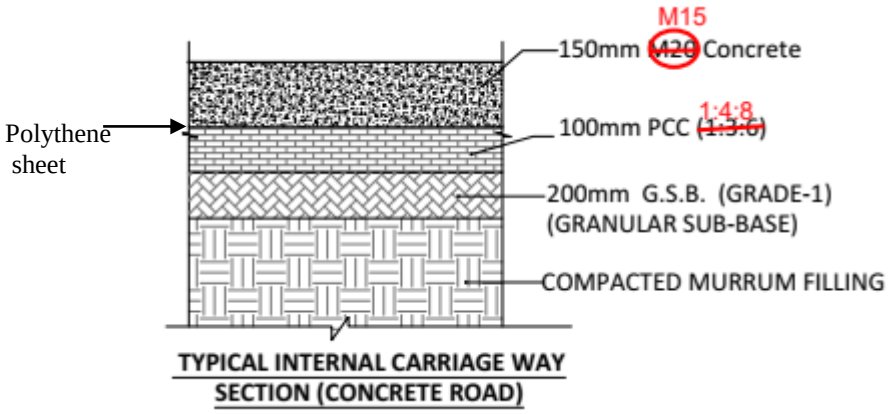
California Bearing Ratio (CBR) method shall be followed for the design of roads. A detailed CBR test which is an adhoc penetration test shall be carried out as per the procedure outlined in IS 2720 (Part XVI).

The surface of the hard standing shall be laid with falls to the drainage system. Care shall be taken during the construction that no materials enter the drainage system.

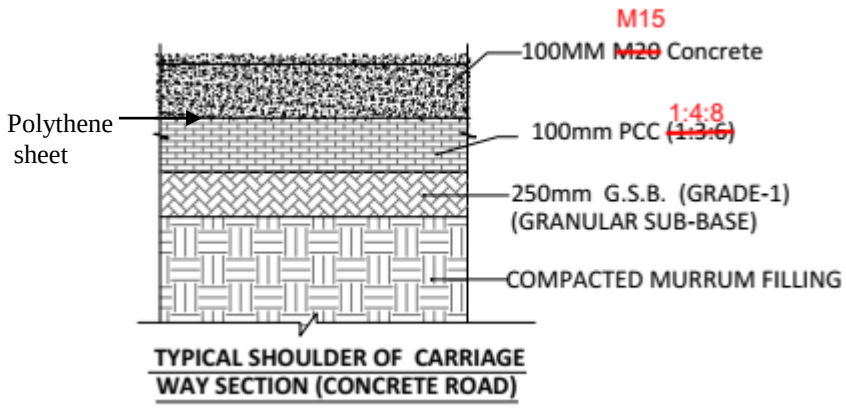
At the junction of the hard standing and roads due to different thickness of foundations, precautions shall be taken to ensure that sub-surface drainage from the hard standing does not have a detrimental effect upon the road foundations.

10.1 CONCRETE ROAD:

A typical drawing for the concrete road is given below.



The concrete road shall have 150 mm thick PCC (1:2:4). Below it 100 mm thick PCC (1:4:8) shall be provided. 200mm G.S.B. (Granular Sub Base) Grade-1 shall be laid & compacted below the PCC. Below the G.S.B., Murrum shall be laid in layers and compacted as per the requirement of level.



The shoulder also shall be as per the drawing above. PCC and WBM shall extend upto the shoulder width on both sides of the road outside switch yard area as per drawing and the shoulder shall be provided with cement chequered tiles of adequate strength as per standard practice. In case of road within the switch yard area the PCC and WBM shall be placed only up to the width of the road.

Polythene sheet of 125 microns shall be placed between the RCC and PCC slab.

ASPHALT expansion joint shall be considered (composed of a blend of asphalts, vegetable fibers, and mineral fillers formed under heat and pressure between two asphalt-saturated liners)/FIBRE expansion joint (cellular fibers securely bonded together and uniformly saturated with asphalt to assure longevity, versatile, resilient, flexible, and non-extruding)

for concrete road. It is waterproof, permanent, flexible, and self-sealing Expansion joints required thickness shall be provided at every 8 mtrs.

In addition, in case of 7 mtrs /3.5m wide roads (excluding the 7m approach road), 100 mm Dia hume pipe (NP-3) shall be provided at every 100 mtrs interval across the length of the road for cable crossing. The width of the road shall be 7mtrs /3.5 mtrs.

A camber shall be provided at the center of the road along the length, so that rain water flows to the road side drains.

10.2 Periphery roads outside the fencing:

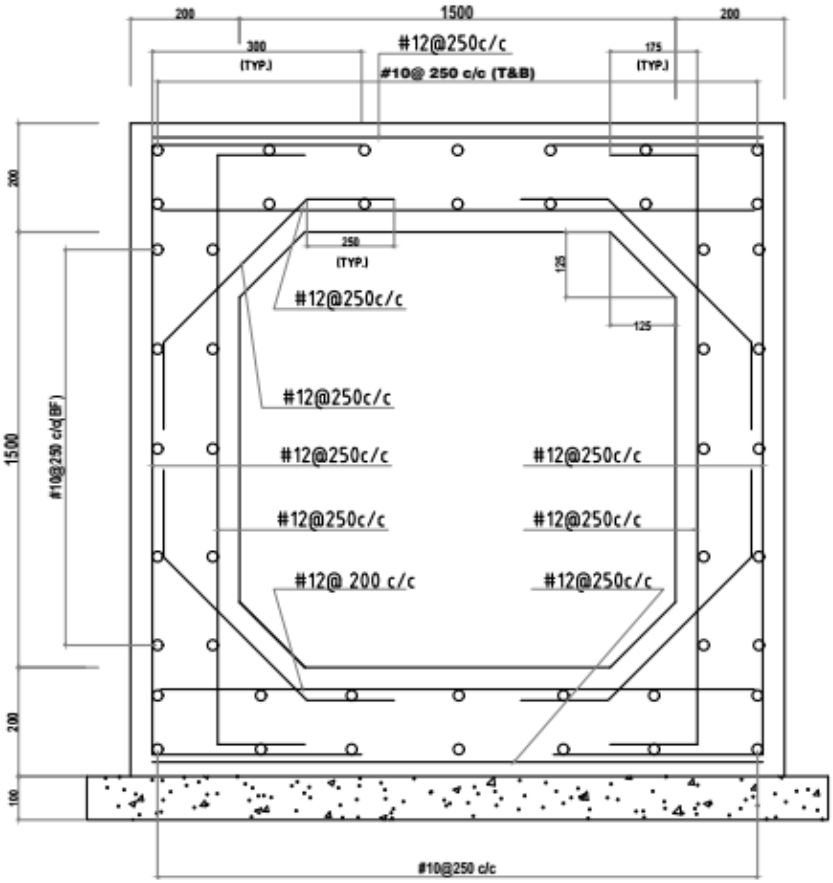
Periphery roads to be constructed outside the fencing. The width of the road is 3.5 mtrs having shoulder of 500mm *at both sides* of the roads. The roads shall be concrete road with general specifications as in 10.1.

10.3 The width and type of other roads are:

a) Approach road & inside main road shall be 7 mtr wide *with both side shoulder of 600mm*. The roads shall be concrete type complete in all respect.

b) Other roads shall be (peripheral and colony) 3.75 mtrs width *having shoulder of 500mm at both the side.* The roads shall be concrete type complete in all respect.

10.4 Box Culvert



SECTION OF BOX-CULVERT

For construction of culvert, final drawing as per site condition may be submitted for approval. The wall and base of the culvert shall be matched with that of

11 TRANSFORMER/REACTOR FOUNDATION, RAIL TRACK / ROAD CUM RAIL TRACK

11.1 General

The Contractor shall provide a permanent transfer track system integrated with the auto/power transformer foundation to enable installation and the replacement of any failed unit with a spare unit. The transfer track system shall be suitable to permit the movement of any failed unit fully assembled (including OLTC, bushings) with integral radiators and oil, without the de-energization of any other equipment in the station. The system shall enable the removal of any failed unit from its foundation to a repair area and the installation of a spare unit. The system shall not interfere with the normal internal road and trench system. If trench or drain crossings are required then suitable R.C.C culverts shall be provided in accordance with IRC Code and /or relevant IS.

Rail tracks shall be of RCC, M20 (1:1.5:3 mix) grade. The space between the tracks shall be suitably filled with local sand and 75 mm thick PCC of grade 1:3:6 placed over sand filling. The top of PCC shall be up to the formation level. In case of road cum rail track, 75mm thick PCC of grade 1:1.5:3 shall be placed up to the road level. Suitable oil drainage system between the tracks shall be provided.

The rails shall be first quality 52 kg/m medium manganese steel as per Indian Railway specification T-12-64 and its subsequent revision, joined together by fish plates as per Indian Railway specification T-1/57, and 27 mm diameter fish bolts.

A pylon support system shall be provided for supporting the fire fighting system by the Contractor.

For design of foundation for transformer refer the weightage of the transformer indicated in the BPS (civil works)

11.2 Oil Recovery System below transformer & Common Oil Sump Pit

11.2.1 General

An oil recovery system shall be provided for below all transformers (containing insulating oil or any flammable or polluting liquid) in order to avoid spread of fire by the oil, and for environmental protection.

11.2.2 Description

Each auto transformer/transformer/Reactor including oil conservator tank and cooler banks etc. shall be placed in a transformer pit surrounded by retaining walls (pit walls). The clear distance of the retaining wall from the transformer shall be 20% of the transformer height or 0.8 m whichever is greater. The transformer pit thus formed shall have a capacity equal to volume of oil, usually 30%, in each of the transformers. The MS grating placed at the formation level shall be covered with 100mm thick gravel of 40 mm nominal size which acts as an extinguisher for flaming oil. The bottom of the pit shall have an uniform slope towards the sump pit.

Each transformer pit shall be drained towards a common sump pit whose role is to recover the infiltrating water and the drained oil from of the pit. The sump pit shall have sufficient capacity (150% of the highest oil volume of transformers) to receive, without overflowing, the oil content of large transformers plus the water content of any fixed fire fighting system and a certain quantity of rain water collected from the pit connected to it. The system shall be provided with air vents large enough to avoid over-pressure during operation. The whole internal surface of the sump pit should be impermeable.

11.2.3 Materials

The retaining walls which make up the transformer pit shall be made of fire resistant material such as reinforced cement concrete, fire brick etc., and shall be impervious to oil.

The minimum height of the retaining walls shall be 15 cm above the finished level of the ground to avoid ingress of water from outside.

The floor of the transformer pit shall be of plain cement concrete of concrete grade 1:2:4

11.2.4 Drainage

A device showing level of sump pit shall be fitted along with an automatic pumping system which shall have sufficient capacity (5 HP) to evacuate the fire fighting and rain water from the sump pit. The water/oil separation and drainage scheme shall be provided as described in the paper (23-07/1972 CIGRE Session) presented by working group 23.04 regarding oil pollution. The Contractor may propose an alternative better scheme, which will be subject to the approval of the Site In-charge.

The pump with control gear should be housed in a pump shed of sufficient size over the sump pit slab to allow for easy installation, dismantling cabling and maintenance. Other piping and necessary valves shall be provided to remove water from the oil sump pit.

11.2.5 Particular Specification

If the height of the retaining walls which form the transformer pit exceed 60 cm, steps shall be provided to facilitate access to the transformer or auto transformer and reactor

When designing the transformer pit, the movement of the auto transformer must be taken into account.

It must be assured that the coefficient of crushed stone (granular material) penetration which fills the transformer pit will be retained regardless of the climatic conditions.

12.0 **FIRE PROTECTION WALLS**

12.1 General

Fire protection walls shall be provided in accordance with Tariff Advisory Committee (TAC) recommendations.

12.2 Application criteria

A fire wall shall be erected between the transformers and or the reactors if the free distance between the various pieces of equipment is less than 10 m, to protect each one from the effects of fire on another.

Fire walls shall also be erected between the transformers, reactors, and auxiliary services transformers if the free distance is less than ten metres.

12.3 Fire resistance

The fire wall shall have a minimum fire resistance of three hours. Partitions which are made to reduce the noise level of the transformers shall have the same fire resistance where they are also used as fire walls. The walls of buildings which are used as fire walls, shall also have a minimum fire resistance of three hours.

Fire walls shall be designed in order to protect against the effect of radiant heat and flying debris from an adjacent fire. The column of the fire walls shall be type be RCC, M20 (1:1.5:3 mix).

12.4 Mechanical resistance

Fire walls shall have the mechanical resistance to withstand local atmospheric conditions. If the wall is intended to serve as a support for equipment such as insulators etc., its mechanical rigidity must be increased accordingly.

Connecting the walls by steel or other structures, which may produce a reversing torque if overheated, shall be avoided.

12.5 Dimensions

Fire walls shall extend at least two metres on each side of the power transformers or reactors and at least one metre above the conservator tank or safety vent.

These dimensions might be reduced in special cases, and if TAC permits so, where there is lack of space. A minimum of two metres clearance shall be provided between the equipment e.g. reactors, transformers and fire walls.

Building walls which act as fire walls shall extend at least one metre above the roof in order to protect it.

12.6 Materials

Fire walls may be made of reinforced concrete (M20 grade), fire brick, concrete blocks or corrugated iron on a steel structure as per the system requirements. Materials used must conform to the standards of the National Fire Prevention Association and TAC norms.

13.0 CABLE TRENCHES

General

Cable trenches and pre-cast removable RCC covers (with lifting arrangement) shall be constructed using RCC of M20 grade.

The cable trenches shall be designed for the following loads.

- Dead load of 155 kg/ m length of cable support plus 75 kg on one tier at the end.

Triangular earth pressure plus uniform surcharge pressure of 2 tonnes per sq.metre.

Cable trench covers shall be designed for (i) self-weight of top slab plus concentrated load of 200 kg at centre of span on each panel and a surcharge load of 2 tonnes per sq. metre.

Cable trench crossings of road and rails shall be designed for class AA, class A and class 7 OR loading of IRC or relevant IS Code and should be checked for transformer loading.

Trenches shall be drained. Necessary sumps be constructed and sump pumps shall be supplied. Cable trenches shall not be used as storm water drains.

The top of trenches shall be kept at least 250 mm above the finished ground level. The top of cable trench shall be such that the surface rain water does not enter the trench.

All metal parts inside the trench shall be connected to the earthing system.

Cables from trench to equipment shall run in hard conduit pipes (GI pipe and necessary G.I bends and sockets)

A suitable clear gap shall be maintained between trench walls and foundations.

A clear (vertical) space of at least 300 mm shall be available for each tier in cable trench. From trench bed to lowest tier, a minimum clearance of 200 mm shall be available for one tier trench and 300 mm for trenches having more than one tier. The spacing between stands shall be 400mm.

The trench bed shall have a slope of 1/500 along the run and 1/250 perpendicular to the run.

All construction joints of cable trenches i.e. between base slab to base slab and the junction of vertical wall to base slab, as well as from vertical wall to wall, and all expansion joints shall be provided with approved quality PVC water stops of approximately 230 x 5 mm size for those sections where the ground water table is expected to rise above the junction of base slab and vertical wall of cable trenches.

Cable trenches shall be blocked at the ends if required with brick masonry in cement sand mortar 1:6 and plaster with 12mm thick 1:6 cement sand mortar.

Cable tray supports(all galvanised structures) shall be designed and constructed to be a single complete fabrication or assembly such that every layer of the horizontal cable tray supports are fixed, either bolted or welded, to a vertical steel support (insert plate, M.S.) that is embedded in the concrete wall of the cable trough. It shall not be permitted to embed a horizontal support beam directly into the wall of the trough in order to use the concrete wall as a means of load bearing.

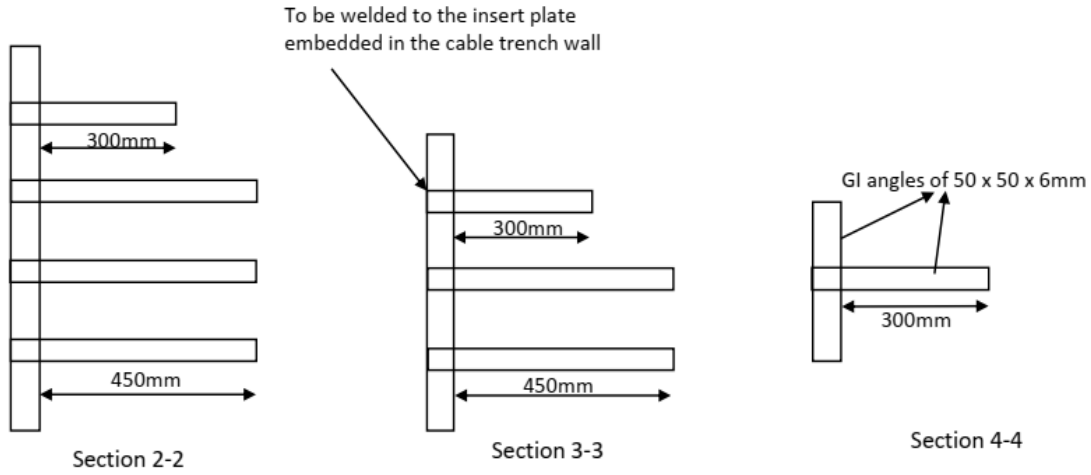
Concrete troughs shall be provided with concrete covers of suitable load bearing strength. Where the cable troughs are run across or within 3 m of substation roads, the trough covers shall be capable of bearing an accidental wheel load of 20 kN.

MORE ON CABLE TRENCH.

The work includes excavation in all types of soil or rocks, back filling, disposal of excess earth, supply of all material, T & P, Labour etc as per the direction of Engineer In-charge to complete the work in all respect.

All the cable trenches shall be RCC type with mixing ratio 1:1.5:3 (M20). The size of MS rod to be used for the same are of 8mm and 6mm. All the vertical rod shall be 8 mm continuous and the wall and raft shall contain 2 nos 8 mm rods at two layers and spacing shall be 150mm. The horizontal binders shall be of 6mm rod two nos in two layers and to be placed at 200mm center to center for both on the wall and raft portion of the trench. The mentioned rod placements are for section 2-2 and 3-3. For section 4-4 instead of two 8mm and 6mm rods single rods can be used.

A frame of hot dip galvanized angles of size 50X50X6 mm which shall be weleded to the M.S. insert plate embedded on the wall of the cable trench. For section 2-2 only one frame of 4 tier mechanism for fixing of cable tray having width of the angle 450mm (3 nos) and the top angle shall be of 300 mm, shall be used. For section 3-3 there shall be one frame but with three tier mechanism for fixing the cable trays. For section 4-4, single tier system of angle width shall be 300 mm width. Fixing of the cable tray support stand (Frame) is to be fixed at a distance of 1 mtrs from one frame to the other. Hence the insert plate shall be embedded to the wall of cable trench at every 1m. The insert plate shall have provision which shall be welded to the reinforcement pf the cable trench before casting.



GI Frame for cable tray support

The thickness of the RCC wall of the trench shall be 100mm and thickness of the raft shall also be 100mm. All the frames for fixing of cable trays shall be of hot dip galvanized. A running earth strip has to run all through the cable trench for proper earthing of the cable trays and stand (frame).The size of the earth strip is of 50X6mm G.I flats. Welding the GI flats to the frame to be carried out. **Earthing strips to be welded with the running earth mat at 10mtrs interval.**

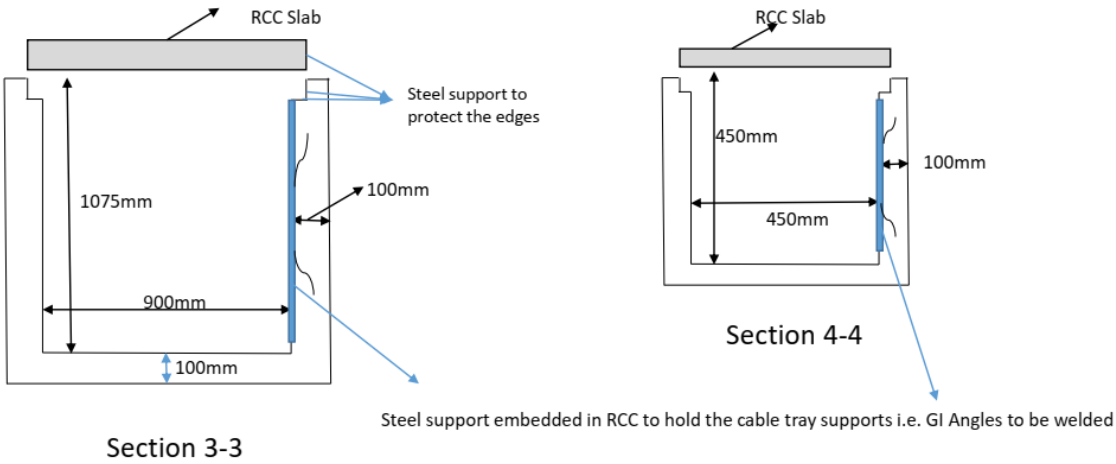
The bidder also to supply and fix G.I perforated cable trays (of thickness 2mm) of appropriate size before laying of cables on the cable tray stand.

The other dimensions of the cable trench are as below.

Sl No	Section	No of tiers	Gap between the two angles in mm	Inside clearance in mm		Outside clearance in mm		Concrete thickness in mm	
				Top to Bottom	Wall to wall	Top to bottom of wall	Raft width	Wall	Raft
2	2-2	4 (3 x 450mm + 1 x 300mm)	200	1275	900	1350	1450	100	100
3	3-3	3 (2 x 450mm +1 x 300mm)	200	1075	900	1150	1450	100	100
4	4-4	One (150mm +150mm)	-	450	450	550	650	100	100

The outdoor cable trench wall top surface shall be "L" shaped (as shown in the drawing below) and the cover slabs shall be placed with in the"L shaped" surface of both the walls. The top surface of the slab and cable trench shall be same. The top surface of the trench shall be smooth finished.

TYPICAL CABLE TRENCH DRAWING



The covers of the slab are also of RCC with ratio mixing 1:1.5:3.The thickness of the slab for sections 2-2, 3-3 shall be 60mm (MS Rod to be used 8mm) and section 4-4 shall be 50mm(MS Rods to be used 8mm & 6mm). The MS rods to be used shall be placed at 100 mm centre to centre both way and properly bound .The cover slab shall have provision of

lifting hooks at two points for easy lifting of the slabs. Slabs having lifting hooks shall be placed at every 10th slabs. The lengths of the cable trench cover slabs are as below.

Section	Length of the slab	Thickness of the slab
2-2	1100mm	60mm
3-3	1100mm	60mm
4-4	400mm	50mm

The covers for the cable trench inside the control room shall be provided with MS chequered plate with MS angle stiffeners at the bottom for proper mechanical strength.

13.1 Excavation

Excavation for cable ducts shall generally be carried out in accordance with Clause no. 4.0 of this specification.

13.2 Back fill

Except where ducts are to be encased in concrete, sand is to be packed and well tamped round the duct until it is covered to a depth of 75 mm above the upper surface of the duct. Filling above this level is to be with suitable excavated material free from large stones. In multiple duct runs the interstices between the ducts are to be filled with sand and compacted. A cover of 75 mm above the uppermost ducts shall be maintained. The sand used shall be the same quality as approved for use in making concrete.

13.3 Laying of ducts

Telephone and electrical cable ducts shall be laid and jointed in accordance with the Manufacturer's instructions.

13.4 Multiple runs to ducts

Electrical cable ducts in multiple runs whether encased in concrete or not, shall be laid at approved centres vertically and/or horizontally. The minimum concrete encasement where required is to be 150 mm. The final jointing of ducts in multiple runs shall be done in the trench, i.e. the duct shall be lowered and jointed singly not in groups, and duct joints shall be staggered by approximately half the duct length in alternate lines.

13.5 Cutting of ducts

The Contractor shall carry out any necessary cutting of pipe ducts according to the requirements of the work. Except where ducts enter the cable trench at an angle, they shall be cut at right angles to the length of the duct. The inside edges of cut ducts shall be thoroughly rounded off or so dressed before being placed in position so that there can be no possibility of damage to cables from the edges of the ducts. All electrical ducts entering draw pits shall be provided with suitable bellmouths.

13.6 Cleaning and testing of ducts

On completion of all electrical cable ducting, two mops of appropriate size connected one to each end of an iron mandrel shall be passed twice through each way to clean the conduit and to remove any foreign matter which may have entered. If any obstruction or other defect be discovered it shall be removed or rectified forthwith.

13.7 Sealing of electrical ducts

As soon as every duct or set of ducts has been proved and its draw wire material installed, the ends of the cut or its bellmouth where provided, shall be sealed to a depth of 5 mm with an appropriate sealer, and a single coat of bitumastic paint shall then be applied over the end of the ducts and the seal. The length of draw wire installed shall be such that at least one metre of draw wire extends from each end of each duct. After the ends of ducts have been sealed the free ends of draw wires shall be neatly coiled.

13.8 Concrete cable and pipe trenches

In-situ concrete trenches are to be provided inside and outside the Substation. The trenches are to have falls in the floor and must be drained at regular intervals.

All trenches must have trench covers suitable for their location and loading. Any beams or supporting covers must be as shallow as possible to avoid interfering with the pipes and cables in the trench.

Once the trench covers have been made they are to be stored and not laid until all trench cabling, piping, etc. is finished. Any covers laid before this time which become damaged shall be replaced at the Contractor's expense.

Trench covers and bridging beams for covers, except where heavy duty, shall be light enough for two men to lift.

13.9 Buried cables

Cables are to be laid in neat lines and at suitable levels. For Control and Power cables, the depth is 750mm below the ground and in all cases the excavation must provide a clear trench. Sand filling below, around and above (100mm each) the cables will always be required and protection covers such as Bricks or tiles will be placed in position over the sand filling before final backfilling to the ground level. The line of the cable trenches shall be marked with suitable posts as required by relevant section of this Specification.

14.0 BOUNDARY WALL:

The scope includes the design, engineering and construction of the boundary wall all along the property line of the OPTCL on each sub-station.

The boundary wall shall be constructed as per the drawing enclosed in the bid document. However, the foundation of the boundary wall shall be as per the actual soil investigation report and site conditions. The design and drawing for the boundary wall foundation (keeping the superstructure as per OPTCL drawing) with respect to the actual site requirement shall be submitted to OPTCL for approval. The work shall be taken up only after approval of the design and drawing.

15.0 SWITCHYARD FENCING

15.1 General

Fencing shall be designed for the most critical loading combination taking into account wind forces, stability, tension on wires, minimum requirements as per this clause and relevant IS recommendations.

The un-climbable or security or anti-intruder fencing shall consist of chain link mesh, as specified below, supported on approved sections of structural steel. The posts shall be erected truly vertical, and all posts and struts shall be set in concrete block foundations.

15.2 Areas requiring fencing

The design and drawing for the Galvanised Chain Link fence fabric, Galvanised Fence Posts, fencing panel, Post foundation and the Brick wall below the fencing needs to be submitted to OPTCL for approval. The work can be taken up only after approval of the same.

Fencing shall be provided for the following areas:

- Site fencing for the complete Switchyard area including the station transformers. Separate gates shall be provided for men and equipment.

15.3 Fencing materials

13.1.1 Galvanised Chain Link fence fabric

The Galvanised Chain Link fence fabric in accordance to IS :2721 and shall also meet the following requirements.

- Type of selvage — Both end knuckled
- Size of mesh — 75 ± 4mm
- Size of HDG wire in mesh — 5 mm diameter
- Width of chain link — 1500 mm
- Class of zinc coating — 'HEAVY' as given in IS 4826 or in IS 12753.
- Zinc coated after weaving

13.1.2 Galvanised Posts for the Fencing

The galvanised posts shall be made from M.S tube, heavy gauge of 65 mm diameter confirming to Yst-22 (Kg / sq. mm). The tubes shall be also confirm to IS:1161/IS 806. The length of the tubular post shall be 3200mm.

An M.S base plate of size 180X180X6mm thick shall be welded with the tubular post. The post shall be provided on the top with M.S plate.

The tubular post shall be welded with adequate numbers of M.S flat of size 50X6mm of required length so that the Chain Link Fencing Panes can be fixed to the posts rigidly through bolts & nuts. The M S flats shall be welded accordingly for the corner posts to suit the site requirement.

The whole assembly of tubular post shall be hot dip galvanised. Site fabrication of the posts shall not be acceptable. The zinc coating shall be minimum 615 gram per sq mm. The purity of the zinc shall be 99.95% as per IS:209.

Fence fabric panel:

Chain link fencing shall be fabricated in the form of panel 1500X1928 mm. GI angle frame (50X50X6 mm) with bracing of 50X6 mm GI flat on both the corners shall be welded all round fence fabric to form a panel. Four pairs of 13.5 mm diameter holes on the vertical MS flat matching the spacing of holes in cleats fixed with pipe shall be provided to fix the fence panel with tubular posts. A washer shall also be provided below each nut. 12 mm diameter bolts and nuts including washers **shall also be supplied. All bolts, nuts and washer shall be hot dip galvanised.** The fence panel shall be provided with two GI flats of size 50X6 mm placed cross wise for rigidity of chain link.

Installations:

Fence shall be installed along switch yard line as per the approved GA drawing. Post holes shall be excavated by approved method. All posts shall be 2 mtrs apart measured parallel to ground surface.

Posts shall be set in 1:2:4 plain cement concrete block of minimum 0.4X0.4X(1.2+0.5)mtr depth. 75 mm thick PCC 1:4:8 shall be provided below concrete block.

Fence posts shall be erected in vertical and kept for minimum 7 days curing before fence fabric erection.

Continuous running earth by using 50 X 6 mm GI flats to be provided for safety purpose. The Fencing shall be connected to the substation earth mat at every alternate chain link panel.

A 345/380 mm thick (one and a half brick size) toe wall of Brick/Rubble masonry, or concrete with notches shall be provided below all fencing and shall be minimum 500 mm above and 500 mm below finished ground level. All exposed surfaces for brick toe wall shall be provided with 15 mm 1:6 cement sand plaster and coated with two coats of water proofing weather paint. In case if rubble masonry is provided suitable pointing shall be done.

16.0 SWITCHYARD GATES: (2 gates)

Main Entrance Gates: shall be installed at locations as per the switchyard layout design, direction of the Site In-charge and approved drawing. Next to the main gate, a wicket gate (1.25 m wide, single leaf) shall also be provided.

Substation end gate: Same as above but without the wicket gate.

Bottom of gates shall be set approximately 40 mm above ground surface and necessary guiding mechanism (with roller on the bottom of the gate and fixed guider in the road) shall be fitted to avoid hanging of the main gate.

16.1 Gate Frame

The switchyard gates shall be of 2m height. Gate frames shall be made from galvanized steel of 40x40mm square pipe (main frame) and vertical pipes of 25x25mm square pipes @ 125 mm spacing (pipe to relevant IS) welded to the main frame.

Gates shall be fabricated with welded joints or other approved methods to achieve rigid connections. The fabricated portions shall be painted with one coat of steel primer and two coats of Aluminium paint.

The gate frames (main and wicket) shall be hanged to RCC columns. Gates shall be fitted with galvanized malleable iron hinges, latch and latch catch. Latch and latch catch shall be suitable for attachment and operation of padlock from either side of gates. **Hinges shall permit gates to swing through 180 degree back against fence.**

Gates shall be fitted with galvanized chain hook or gate hold back to hold gates open. Double gates shall be fitted with centre rest and drop bolt to secure gates in closed position.

Lihghts shall be installed on the cloumns as per BOQ.

16.2 Patching

Damaged galvanized surfaces shall be repaired. Damaged surfaces shall be cleaned with wire brush removing loose and cracked spelter coating. Two coats of approved zinc pigmented paint shall be applied to damaged areas in accordance with manufacturer's instructions.

17.0 BUILDINGS & MAIN GATE

- **Control room building**
- **Transit house**
- **Staff quarters**
- **Security shed and main gate**

17.1 General

The scope includes the design, engineering and construction of the above buildings as per the enclosed drawings, BOQ and this technical specification, complete in all shape.

The foundation design of the buildings may vary as per the actual soil type of the project site. The contractor shall take into account the same for design of the foundations keeping the design of the superstructure same.

The contractor shall submit the design and drawing considering the above for approval by OPTCL. The work can be taken up only after approval of the same.

18.0 PROVISION OF PLANTATION, LANDSCAPING AND DEVELOPING A GARDEN INSIDE THE SUB-STATION.

18.1 At least, 100 nos. of fruit bearing different type plants as decided by OPTCL to be planted in the substation area after making surface treatment, as per direction of the Site In-charge. The fruit bearing plants are to be planted immediately after the Land Utilization Plan is approved by OPTCL. It is the responsibility of the contractor to ensure that the plants live and grow till hand over of the substation after completion of the project.

18.2 Provision of developing a garden in front of the control room building or any suitable area and shall be of size as decided as per the availability of land. Garden grass, variety of flowering plants and decorative plants etc are to be provided after

making proper surface treatment. Provision of water tap with water sprinkler arrangement including water pipe laying with control at different location.

18.3 At least 100 nos of decorative plants shall be planted in the garden and along both side of the RCC roads as per the instruction of the Site In-charge. Adequate quantity of different varieties of plants to be considered in consultation with Horticulturists & Site In-charge.

18.4 Construction of a platform with suitable GI pipe & other attachment for hoisting of National Flags as per the direction of Engineer in charge. The site for the platform shall be as per the site in-charge.

19.0 STORE SHED + OPEN STOCKTARD & VEHICLE PARKING SHED.

19.1 Design, engineering, procurement of labour, all required material including all associated works for construction of store shed and open stockyard as per enclosed drawing and specifications given below.

a. The work includes supply of all required material, T & P, labour etc for completing the construction of Store + Open stockyard in all respect.
b. The work also includes excavation in all types of soil or rocks, back filling and disposal of excess earth, RCC, PCC, Brick Masonry, Plastering, Painting as per the approved drawing, complete in all respect and direction of Engineer In charge.
c. The foundation of the store shed shall be designed as per the soil condition and shall be submitted for approval.
d. The dimensions of the Store shed + Open stockyard shall be as per the enclosed drawing.
e. The position of the rolling shutter shall be as per site requirement.
f. The flooring shall be of 75 mm thickness PCC (1:2:4) over RR masonry works (as per standard practice of flooring).
g. Brick walls shall be 250mm wide with cement mortar ratio of 1:6.
h. Provision of RCC shelves on three side of the store (3 shelves within 5ft of walls) for keeping the spare materials and T & P etc.
i. The height of the shed shall be 3.6m above the plinth.
j. Internal concealed wiring (including supply of flexible copper FRP 1.1 KV PVC wire, conduits & its accessories, modular type switches & switch board, Junction boxes with required MCB & Earth leakage detector switchgear etc), fixing of lighting fixtures & switchgear, ceiling fans of 1400 sweep and regulators (including supply) and provision of incoming AC supply from the ACDB /outdoor kiosks installed nearby.
k. The work also includes painting of the building (inside and outside) as per recommended for Transit house /staff quarters in the specification.
l. Installation of smoke and fire detection & Alarm system of the building. Provision of conventional fire fighting equipment (including supply of FFE) at strategic location suitable for wall hanging as per direction of engineer in charge.

19.2. There shall be one no **Vehicle Parking Shed** inside the sub-station area. The size of the parking area shall be as per the enclosed drawing. The flooring of the entire area of the vehicle parking shall be as mentioned in the drawing.

19.3 Work specifications:

i. RCC- M20
ii. PCC- 1:3:6
iii. Brick Masonry- Brick size- 25cm x 12 cm x 8 cm with cement mortar 1:6
iv. Plastering- Inside surface- 16mm & outside surface-16mm with cement mortar 1:6
v. Steel- Fe 500D
vi. Painting of walls- Inside & Outside- 2 coats of weather coat paint over one coat of primer

20.0 SWITCHYARD KIOSK

The scope includes the design, engineering, supply and construction of the switchyard kiosks as per the enclosed drawing and this technical specification, complete in all respect.

The work include the required excavation, backfilling, RCC (M20), PCC (1:3:6), Bick masonry (1:6), plastering (inside 12mm & outside 16mm) with ratio 1:6 &, supply of all construction materials, Doors & door frames etc. The work shall be complete in all respect as per the instruction of the site In-charge including any other material required for completing the work.

a) Switchyard Kiosk shall be of size 6m x 5m x 3.3 mtr having RCC structure, brick walls and plastering, with RCC roof (slanted).
b) There shall be a cable trench of section 3-3 of required length to accommodate the SAS panels inside the kiosk. The SAS panels are to be installed over the cable trench on base channels. The cable trench inside the kiosk shall be connected to the cable trench of the S/Y through ducts. The orientation of the kiosk and the cable trench shall be as per the site condition and as per approval of the Site In-charge.
c) The kiosk shall have two doors opening to outside.
d) The kiosk shall also have wall cut-outs for installation of the industrial AC.
e) The floor level of the 300mm above the finished ground level (gravel surface/road).
f) It shall be ensured that rain water shall not enter the kiosk through doors.
g) The foundation of the Kiosk shall be designed as per the actual soil condition. The foundation design and drawing shall be submitted to OPTCL for approval.
h) Smoke and fire detection alarm system shall be installed in the Kisoks and integrated with the system available in Control Room Building.
h) Work specifications:

vii. RCC- M20
viii. PCC- 1:3:6
ix. Brick Masonry- Brick size- 25cm x 12 cm x 8 cm with cement mortar 1:6
x. Plastering- Inside surface- 12mm & outside surface-16mm with cement mortar 1:6
xi. Flooring: of 75 mm thickness PCC (mix ratio1:2:4) over RR masonry works (as per standard practice of flooring).
xii. Steel- Fe 500D
xiii. Painting of walls- Inside- Wall putty (water based), at least 2 coats (till even look) of emulsion paint over one coat of primer, Outside- 2 coats of weather

seal coat emulsion paint over one coat of primer after proper finishing of the wall surfaces.

xiv. Painting of steel surface- Two coats of Synthetic enamel paint over a coat of primer after proper cleaning of the steel surfaces.

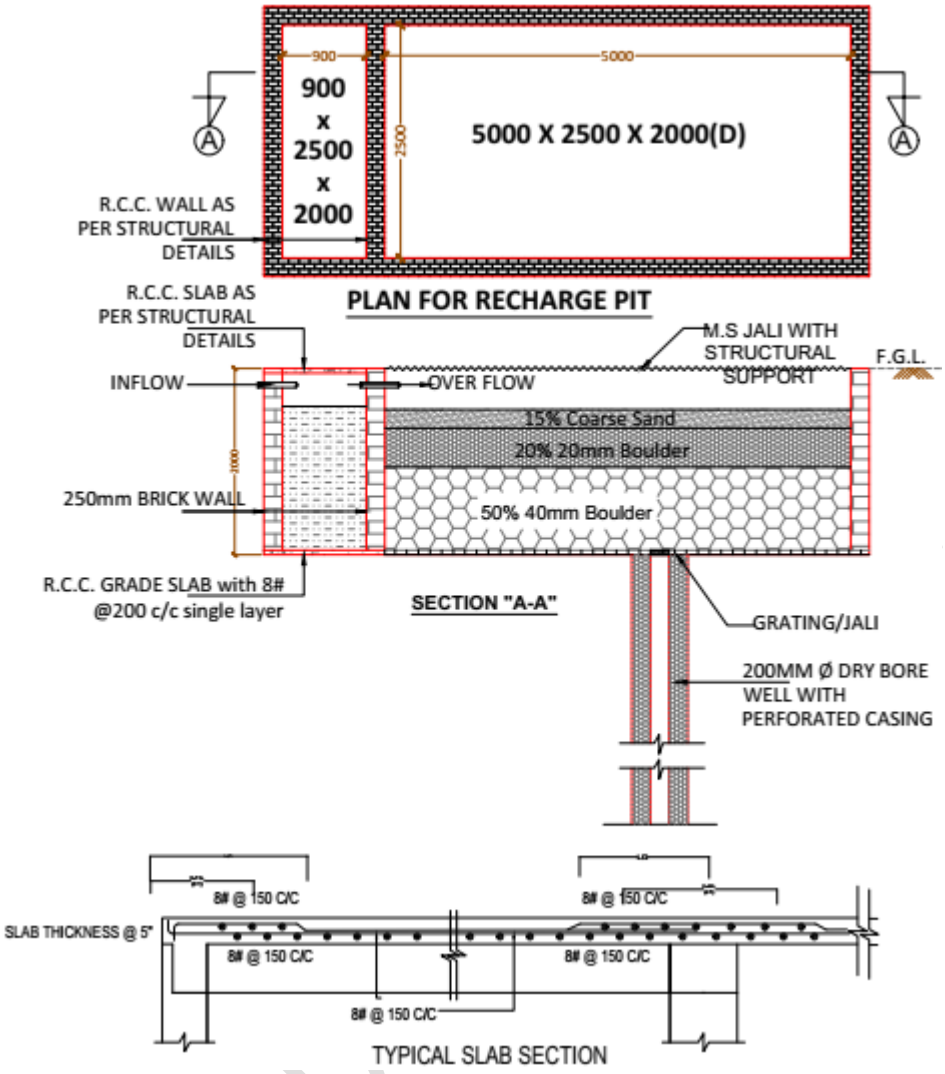
21.0 RAINWATER HARVESTING:

In addition to drainage of rainwater, the contractor shall make arrangement for rainwater harvesting also.

Rainwater harvesting shall be done by providing recharge structures with bore wells. The recharge structures shall be suitably located within the S/S. Branch drains from the main drain carrying rainwater from entire switchyard shall be connected to the recharge structures.

The design of the recharge structures shall be as per the drawing enclosed.

The work include the required excavation, backfilling, RCC (M20), PCC (1:3:6), Bick masonry (1:6), plastering (inside 12mm & outside 16mm) with ratio 1:6 &, supply of all construction materials, supply & installation of the 200mm bore well perforated casing, MS Jali with supporting structure, Jali for covering the bore well casing, material required for filling the recharge pit in layers etc. The work shall be complete in all respect as per the instruction of the site In-charge including any other material required for completing the work.



22.0 FIRE WATER TANK:

This is a lump-sum item. The contractor shall be required to complete the work in all respect as per requirement. All the items including excavation, compaction, brick work, roof truss, corrugated A.C. Sheet roofing, all types of miscellaneous steel internal and external plastering, concrete (all types), reinforcement and the steel embedment painting etc shall be deemed to be included in this lump-sum water tank.

23.0 SECURITY WATCH TOWERS:

There shall be provision of security watch tower at the corners of the switch yard. These watch towers shall be of RCC type. Standard practice in this effect shall be followed. The maximum numbers of such towers shall be 4.The size of the tower platform shall be 2.5mtrsX2.5mtrs and height as per standard practice.

24.0 SAND BED:

Design, engineering, supply of labour, materials including all associated works for construction of sand bed as per specification and approved drawing. This also includes

excavation in all types of soil or rocks, back filling and disposal of excess earth as per specification mentioned herein and the direction of Site In-charge. The sand bed size shall be of 10m x 5m constructed with bricks, plastered and the filled with river sand for storing of Transformer Bushings and other Insulators. The height of the sand bed shall be 300mm above and 450mm below the road level. The width of the brick work shall be 250mm. 75 mm thick PCC 1:4:8 shall be provided below the brick work. The sand bed shall be filled for 200mm, below which a PCC (1:4:8) of 75mm shall be laid for the inside area of 10m x 5m. The work shall be complete in all respect as per instruction of the Site In-charge.

25.0 PROGRAMME

The Contractor shall construct the works in compliance with the outline programme appended to the Bidding Document, and shall submit for the approval of the Site In-charge a detailed programme in accordance with the requirements of this Specification.

26.0 INCLEMENT WEATHER

As per relevant Code, during hot weather, precautions shall be taken to avoid premature stiffening of the fresh mix and to reduce water absorption and evaporation losses. During hot weather (atmospheric temperature above 40 degree C) or cold weather (atmospheric temperature at or below 5deg.C) concreting shall be done as per the procedure set out in IS 7861.

27.0 STANDARDS

All Civil works shall be carried out as per applicable Indian Laws, latest revision of International Standards and Codes. All materials shall be of best quality confirming to relevant Indian Standards and Codes.

Civil works shall be designed to the required service conditions and /or loads as specified elsewhere in this Specification or implied as per National and International Standards.

A list of code of practice and standards used for civil works in general is enclosed for reference. In case of any conflict between I.S. Code and the Procedures specified herein, the later shall prevail.

28.0 STATUTORY RULES

The Contractor shall comply with all the applicable statutory rules pertaining to Factories Act (as applicable for ORISSA State), Fire Safety Rules of Tariff Advisory Committee, Water Act for pollution control etc.

Provisions for fire proof doors, numbers of staircases, fire separation wall, plastering on structural members (in fire prone areas) etc. shall be made according to the recommendations of Tariff Advisory Committee.
Statutory clearance and norms of State Pollution Control Board shall be followed as per Water Act for effluent quality from plant.

TECHNICAL SPECIFICATION

FOR

CIVIL WORKS

TECHNICAL SPECIFICATION OF MATERIALS & WORKMANSHIP

(PART-B)

TECHNICAL SPECIFICATION OF MATERIALS

1. Materials shall be of the approved quality best obtainable. A list of materials of approved brand and manufacturer is indicated in the annexure. Testing of materials of approved brand may have to be done at the discretion of Site In-charge.
   In case, some reason or other materials are required to be obtained from any manufacturer other than those listed, then prior approval from Site In-charges will be necessary supported by relevant test certificates qualifying the required standard. Further tests as directed by the Site In-charge shall also be carried out by the Contractor at their own cost, if required.
2. Sample of all materials shall be got approved by Site In-charge before placing order & the approved sample shall be carefully preserved in an appropriate manner at the site office for verification from time to time.
3. For standard bought out item, the size manufactured by the firms listed shall prevail when there is discrepancy in the size mentioned in the schedule without any financial adjustment.
4. Materials shall be tested in any approved Testing laboratory conforming to the requirements and frequency indicated in the list of "Mandatory Tests". The test certificate in original shall be submitted to the Site In-charge and entire charges connected with testing including charges for requested tests if ordered shall be borne by the Contractor.
5. It shall be obligatory for the Contractor to furnish certificate, from manufacturer or the material supplier that the work has been carried out by using their material and as per their recommendations.
6. All materials supplied by the any other specialist firms shall be properly stored and the Contractor shall be responsible for its safe custody until they are required on the works and till the completion of work.
7. All equipment & facilities for carrying out field tests on materials shall be provided by the Contractor without any extra cost.

8.1 EARTH FILLING:

Earth filling shall be done with selected earth suitable for filling as approved by the Site In-charge and preferable free from building rubbish or organic decomposed material. They shall be obtained either from excavation or brought from outside, as specified in the schedule of items.

Black Cotton soil shall not be used for filling.

8.2 CEMENT:

Cement shall comply in every respect with the requirements of the latest publication of I.S. 269 / I.S.455/ I.S 1489/ I.S. 12269. The use of cement other than ordinary Portland cement / Blast furnace slag cement/ Pozzolona cement may be allowed with prior approval of Site In-charge if not mentioned in the approved list of materials. * (Not less than 43 grade of approved make)

The weight of cement shall be taken as 1440 kg per cum (90 Lbs / cft) cement shall be measured by weight and in whole bags and each undisturbed and sealed 50 kg Bag being considered equivalent to 35 liters (1.2 cft.) in volume. Care

should be taken to see that each bag contains full quantity of cement. When part bag is required cement shall be taken by weight or measured in measuring boxes.

No other make of cement but that approved by the Site In-charge will be allowed on works. Test certificates to show that cement is fully complying the specifications shall be submitted by the Contractor to the Site In-charge. Notwithstanding this, cement brought on site shall be retested in an approved testing laboratory every 30 M.T. or part thereof to ensure quality of materials used. In case manufactures test certificate is not submitted the frequency of test shall be reduced to 30 M.T. or part thereof Cement ordered for retesting shall not be used for any work pending results of retest.

Cement shall be restored in order to prevent deterioration by dampness or intrusion of foreign matters. It shall be stored in such a way as to allow the removal & used. Cement deteriorated or clodded shall not be used on work but shall be removed at once from the site. However, the Site In-charge whose decision in this regard shall be final and binding shall determine slowing use of warehouse set cement. The Site In-charge at site will maintain cement register.

8.4 FINE AGGREGATE:

Sand shall be from natural source or crushed stone screenings, if allowed chemically inert, clear, hard, durable and well graded and free from excessive dirterious materials. The silt content shall be within 8%. If it excess washing shall be done in an approved manner to bring it within allowable limit. Sand will be used as per relevant I.S. specification.

The fine aggregate shall be stacked carefully on a clean hard dry surface so that it will not mixed up with deleterious foreign materials. If such a surface is not available a platform of planks or corrugated torn sheets or brick floor or a thin layer of lean concrete shall be prepared.

8.5 COARSE AGGREGATE:

shall consist of crushed or broken stone 95% of which shall be retained on 4.75mm IS test Sieve. It shall be obtained from crushing Granite, Quartzite, Trap, Basalt or similar approved stones. Coarse aggregate shall be chemically inert when mixed with cement and shall be roughly cubical in shape and free from soft friable, thin laminated or flaky pieces.

8.6 STEEL REINFORCEMENT:

8.7 HIGH YIELD STRENGTH DEFORMED BARS

Where of deformed high strength reinforcement bars are specified, the contractor use one of the following:

a. "Tor steel" as per I.S. 1786-1985. Fe 550D grade TMT bars shall be used unless specifically mentioned.

b. For a total requirement of less than 10 Mt. Steel may be obtained from recognized dealers with prior approval of Site In-charge. It will be the sole responsibility of the Contractor to obtain test certificate from the manufacturers. Over and above the said quantity, Contractor at his own cost shall arrange to get materials tested from any recognized govt. laboratory to ensure & satisfy

the Site In-charge regarding compliance of the materials to relevant Indian standard Codes. Sources of supply once approved by the Site In-charge shall not be changed without their prior consent. Tests to be conducted as per list of mandatory tests.

8.8 BRICKS:

The Fly ash Bricks with tolerance of ± 2% size bricks having crushing strength not less than 75 kg/cm2 with cement mortar 1 cement: 6 sands, immersing bricks in vat before 6 hours of use, with all necessary projection, splay cutting, circular moulding, corbelling, etc., the brick shall be class designation of 75 kg of regular and uniform size, shape and color.

The brick shall show a fine grained, uniform homogenous and dense texture on facture and be free from lumps of lime laminations, cracks, air holes, soluble salts causing efflorescence or other defects which may in any way impair their strength, durability, appearance usefulness for the purpose intended. The size of brick shall (250mm x 125mm x 75mm) or (230mm x 115mm x 65mm) only. Tolerance on dimensions up to (+ or -) 8 % shall be permitted.

After immersion in water, absorption by weight shall not exceed 20 percent of the dry weight of the brick when tested according to I.S.S. No -1077-1970.

The bricks to be used for the work shall be approved by the Site In-charge s beforehand.

8.9 WATER :

Water for mixing Cement/lime/ Surkhi mortar or concrete shall not be salty or brackish and shall be clean, reasonable clean and free from objectionable quantities of slit traces of oil, acid and injurious alkali, salts, organic matter and other deleterious materials which will either weaken the mortar or concrete on cause efflorescence or attack the steel in reinforced cement concrete water shall be obtained from sources approved by the Site In-charge portable water is generally considered satisfactory for mixing and curing concrete, mortar, masonry etc. Where water other than Municipal source is used this shall be tested in an approved testing laboratory to establish its suitability. All charges connected herewith shall be borne by the Contractor.

8.10 TIMBER:

Unless otherwise specified, timber for carpentry / joinery works of all description shall be Sal / Piasal or equivalent hard wood, seasoned naturally or artificially as indicated in Schedule. These shall be free from knots, shakes, fissure, flaws, sub-cracks and other defects to a reasonable extend. Site In-charge's decision in this regard is final and binding. The moisture content for timber will be used as per relevant I.S. specification normally should not exceed for the following limits:-

i) Timber for frames : 12%
ii) Timber for Planking/Shutters etc. : 8%

In measuring cross-sectional dimensions of timber or the frames/ shutters styles, rails or a panel members, tolerances up to 1.5mm shall be allowed for each planed surface.

All fully fabricated timber shall be seasoned at site of work for a period of not less than two months to allow for any shrinkage that may take place unless sit kiln seasoned.

The decision regarding acceptance/ rejection of material on the basis of aforesaid norms lies with the Site In-charge which is final and binding on the Contractor.

8.11 FLUSH DOORS:

All flush doors shall be I.S.I. stamped (confirming to IS-2202, Pt-1) and obtained from approved manufacturer as listed shall be solid core exterior grade unless otherwise specified.

8.12 ALUMINIUM DOORS/WINDOWS :

Aluminum doors and windows shall be obtained from approved manufacturer. Aluminum sections for fabricating frame work doors, windows, jailies, etc. shall be of extruded sections conforming to I.S 1948, 1949 or latest edition or as per drawings or as manufacturer by Indian Aluminum co. Ltd. or approved equivalent. The alloy used shall conform to I.S designation H.E. 9 WP of I.S. 733.

8.13 FLOOR TILES :

Plain cement tiles, chequered tiles. mosaic tiles, terrazzo tiles shall be compacted by mechanical vibrator and hydraulically pressed and shall be of choice shade & shall have desired pattern of chip distribution. The size and thickness of tiles shall be as approved by the Engineer-in-chage. For neutral shade tiles, gray cement shall be used.

8.14 CERAMIC TILES :

White or colored Ceramic tiles shall be obtained from an approved manufacturer and shall be flat an true to shape. The tiles shall be free from cracks, crazing, spots, chipped edges and liners. The Glazing and color shall be uniform shade and unless otherwise specified the tile shall be as per manufacturer's specification.

8.15 MARBLE :

Marble slabs for flooring, dado veneering etc shall be of the kinds specialized in the item such as white of pink Markana, Chittor black. Bhansalana black, jaisalmer baroda green; atiaalka (pepsu) gray etc. Marble from which the homogenous in texture. free from cracks decay weathering and flaws .Before starting the work the contractor shall be get the sample of marble slab approved by the Site In-charge and .

The Slabs shall be machine polished.

8.16 KOTA /GRANITE:

shall be of selected, qualified ,hard, sound, dense , homogenous texture ,free from cracks, decay weathering and flaw stone slabs shall be approved by the Site In-charge and . They shall be machine polished where specified and shall conform to the required sizes. Thickness shall be as specified item.

8.17 GLAZING:

Glass used for glazing shall be sheet glazier unless otherwise specified clear or obscured as directed by the Site In-charge of best approved quality, free from

flaws speck, bubbles and shall be 2.9mm thick up to 0.6 * 0.60 m size it shall be 4mm thick unless otherwise specified in the schedule of quantities.

8.18 HOPE RAIN WATER PIPES:

Pipes and fitting as per IS -4984-1987 (latest edition)

8.19 PAINTS:

Distemper and cement primer, oil paint, enamel paint, plastic emulsion paint , anti-corrosive primer , read lead water proof, cement paint shall be from an approved manufacture as listed Ready mixed paint shall be from an approved a manufacture without any admixture shall be used expect for addition of thinner if recommended by the manufacturer.

8.20 CEMENT ADMIXTURES:

Cement admixture are to be obtained from manufacture with the explicit approval of the Site In-charge the use admixture contain calcium chloride, fluorides, nitrates and sulphates is prohibited The Site In-charge's decision as regards use of admixture of admixture is final and binding

8.21 HARDWARE FITING:

The hardware fitting iron or aluminum /brass/ Stainless Steel shall be obtained from approved manufacturer and invariable is ISI stamped the M.S. iron fitting are to be oxidized & aluminum fittings anodized in natural color mat satin finish even if not otherwise specified.

8.22 PLOYSULPHIDE SEALANT:

Polysulphide sealant should be obtained from approved manufacture as listed.

8.23 MORTAR:

CEMENT MORTAR:

Cement mortar shall be proportion specified for each type of work in the schedule it shall be composed of Portland cement and sand the ingredient shall be accurately gauged by measure and shall be evenly mixed together in a mechanical mixture

SECTION - I
EARTH WORK

1.1 GENERAL:

The excavation will generally refer to open excavation of foundation area wet or dry in all sorts of soils at any depth, unless otherwise specified except hard rocks for which separate provisions are made.

1.2 EXAMINE THE SITE:

The Contractor shall visit and ascertain the nature of the ground to be excavated and the work to be done and shall accept all responsibility for the cost of the work involved.

1.3 SETTING OUT:

The Contractor shall clear the entire site of jungles, bushes, grass, vegetation growth & trees & generally level the site and set out the center line of the building or other involved works & get the same approved from Site In-charge. It shall be the responsibility of the Contractor to install substantial references marks, bench marks etc. and maintain them as long as required by the Site In-charge. The Contractor shall assume full responsibility for proper setting out, alignment, elevation and dimension of each and all parts of the works.

1.4 GROUND LEVEL AND SITE LEVEL:

Before starting the excavation the existing ground level of the entire plot shall be taken by the Contractor in consultation with the Site In-charge and a proper record of these levels kept, which the Contractor & the Site In-charge shall jointly sign.

1.5 EXCAVATION AND PREPARATION OF FOUNDATION FOR CONCETE, OTHER HARD ROCK:

Excavation shall include removal of all materials of whatever nature, including moorum, soft rock, boulders, old foundations, concrete, asphalt or paved surface etc.at all depths & whether wet for dry necessary the construction of foundation & sub-structure including mass excavation for underground reservoir, cess pits, septic tanks etc. where applicable exactly in accordance with lines, levels, grades and curves shown in the drawings or as directed by the Site In-charge, he shall at his own expenses till the extra depth or width in cement concrete in proportion as directed by the Site In-charge but in no case with concrete of mix leaner than (1:5:10) cement concrete.

The Contractor shall report to the Site In-charge when the excavations are ready to receive concrete. No concrete shall be placed in foundations until the contractor has obtained Site In-charge approval. In case, the excavation is done through different strata of soil and if the same is payable as per provision in the Schedule of Quantities the contractor shall get the dimensions of the strata decided by the Site In-charge for payment. *If no specific provisions is made in the Schedule of Quantities it will be presumed that excavation shall be in all types of strata & the contractor's rate shall cover for the same which are treated as a single entity*.

After the excavation is passed by the Site In-charge & before laying the concrete, the Contractor shall get the depth & dimensions of excavation levels, and nature of strata (As applicable as per Schedule of Quantities) like hard rock, soft rock etc.) measurement recorded from the Site In-charge.

1.6 EXCATATION IN HARD ROCK :

Rock which is in solid beds, which can only be removed whether by blasting or by wedging or chiseling shall be treated as hard rock. A boulder or detached rock measuring one cubic meter or more shall also be treated as hard rock if the same cannot be removed with blasting, wedging or chiseling.

Where hard rock is met with and blasting operations as considered necessary, the Contractor shall intimate about the same to the Site In-charge.

The Contractor shall obtain license from District Public Authorities for carrying out blasting work as well as for obtaining, transporting and steering explosives as per "explosives Rules 1940" or amended. He shall purchase the explosives, fuses detonators, etc., only from a licensed dealer. He shall maintain the account of explosive etc. purchase and used by him. He shall be responsible for safe custody and a proper accounting of explosive materials. The Site In-charge shall have access to check to store of explosives and accounts thereof.

Blasting shall normally be done with gun power, Dynamite, Gelatin or any other high explosive shall only be used in special cases with written permission of the Site In-charge and District/Public authorities concerned under the "Explosive Rules" Blasting operations shall be carried out under supervision of a responsible representative of the Contractor during hours to be approved in writing by the Site In-charge or concerned Authorities. The representative shall be conversant with the rules of blasting.

Proper precautions for safety of persons shall be taken red flag shall be prominently displayed around the area to be blasted and all people work except those actually light fuses shall be withdrawn to a safe distance of not less than 10 meters from the blast. Blasting shall not be done within 100 meters of an existing masonry or any other kind of structure unless special precautions are taken by heavy blanketing.

Where blasting is not practicable or prohibited, excavation shall be done by wedging or chiseling and it shall be restricted to the quantity required to enable the necessary foundations, etc., to be put in. In case the dimension of trenches, exceed those shown in drawings or as directed by dimension of trenches, exceed those shown in drawings or as directed by the Site In-charge, the excess quantity shall not be paid for. The item also covers bailing out sub-solid or rain water including pumping at any stage of the work, shoring, strutting etc.

1.7 SHORING :

The sides of the excavation, if required, should be protected by shoring in such a way as is necessary to secure them from failing in and the shoring shall be maintained in position a long as necessary. The Contractor shall be responsible for the proper design of the shoring to hold the sides of the excavation in position and ensuring safety and injury to persons and

properties etc. The shoring shall be removed as directed after the items for which it is required are completed

1.8 PROTECTION:

If instructed by the Site In-charge all foundation pits and similar excavations shall be strong fenced and marked with red lights at bring in charge of watchman to avoid accidents, adequate protective measures shall be taken to see that the excavation does not affect or damage adjoining structures. All measures required for the safety or the excavations, the Contractor at his own cost shall take the people working in and near the foundation trenches and people in the vicinity. The Contractor will be entirely responsible for any injury or damage to property caused by his negligence or accident due to his constructional operations.

1.9 STACKING OF EXCAVATED MATERIALS:

All materials excavated will remain the property of the Owner. The excavated materials at first instance shall be stored as directed by the Site In-charge and stacked appropriately by the sides of trenches in conformity with standard safety codes before they are disposed off and leveled within the site at locations directed by the Site In-charge. Materials suitable and useful for back filling or leveling of the plot or other use shall be stacked in convenient places in such a way so as not to obstruct free movement of man, animals encroach on the area required for constructional purposes. The cost on account of disposal within the site will not be additionally paid for.

1.10 BACKFILLING :

All shoring and form work shall be removed after their necessity ceases & trash of any sorts shall be cleaned out from the excavation shall be refilled to the original surface with approved excavated materials in a layers 25.00cm, in thickness watered & rammed with iron and wooden rammers weighing 7-8 kg., with a base of 20cm.square or 20cm. diameter. The filling shall be done after concrete or masonry is fully set and done in such a way as not to cause undue thrust on any part of the structure where suitable excavated materials is to be used for refilling it shall be brought from the place where it is temporarily stacked and used in refilling.

No excavation of foundation shall be filled or covered up until all measurements of excavations, masonry concrete and other works below ground level are jointly recorded. Black cotton soil shall not be used for backfilling or in plinth filling.

1.11 DEWATERING:

Rate for excavation shall include bailing or pumping out water which may accumulate in the excavation during the progress of work whether from seepage

, springs, rain or any other means. Pumping out water shall be done in such approved manner as to preclude the possibility of any damage to the foundation trench concrete or masonry or any damage to the foundation trench concrete or masonry or any adjacent structure. When water is met in foundation trenches of in tank excavations, when water is met in foundation trenches of in tank excavations, pumping out water shall be from auxiliary pit of

adequate size dug slightly outside the building excavations. The depth of auxiliary pit shall be refilled with approved excavated materials after the dewatering is over.

The excavation shall be kept free from water:

a. During inspection and measurement.
b. When concrete and/or masonry are in progress and till they come above the natural water level and
c. Till the Site In-charge consider that the concrete mortar is sufficiently set.

1.12 <u>SURPULS EXCAVATED MATERIALS</u>:

All excavated materials certified as surplus and not useful shall be removed by the Contractor confirming to local civic regulations from the site in an approved manner at locations to be arrange made by him and shall be paid as a separate item as in schedule of quantities.

The Contractor shall only undertake the item of removal of surplus excavated materials when specific instruction in this regard has been obtained from the Site In-charge.

SECTION -II
PLAIN AND REINFORCED CEMENT CONCRETE

PLAIN AND REINFORCED CEMENT CONCRETE:

The provisions for Indian Standards for Plain and Reinforced concrete, mild steel, hot rolled deformed bars, cold twisted bars etc. to be used reinforcement, cement of different qualities, coarse and fine aggregates, water to be used in concrete and other Indian Standards specifications should be generally applicable except where they are varied by the requirements of these specifications. It shall be the intent of these specifications to ensure that all concrete placed at various locations of the job should be durable, should wear and practically impervious to water. It should free from defects like cracking, honey combing etc.

The Contractor under the Supervision of an Engineer shall carry out all concrete work.

I.S. code under reference should mean the latest code together with amendments in circulations at the time of awards of the contract.

1.1 INGREDIENTS TO BE USED IN CONCRETE AND REINFORCED CONCRETE WORK:

Ingredients to be used in concrete should confirm to the specifications as indicated under "Technical Specification for materials" given earlier.

As regards admixture, this may be used with prior approval of Site In-charge.

1.2.0 MIX PROPORTION: (Normal Volumetric mix)

The mix proportions shall be selected to ensure that workability of the fresh concrete is suitable for the conditions of handling and placing, so that after compaction it surrounds all reinforcements and completely fills the form.

The determination of the proportions of cement aggregates and water to attain the required strength shall be made as follows for volumetric mix:-

1.2.1. TABLE - "A":

GRADES OF CONCRETE :	Compressive strength of 15cm Cube.	
	Kg/cm^2	Kg/cm^2
1:1:2	210	315
1:1.5:3	175	265
1:2:4	140	210

1.2.2. VOLUMETRIC MIX CONCRETE :

Volumetric mix concrete may be used for concrete of grades 1:1:2, 1:1.5:3, 1:2:4. The Proportion of materials for volumetric mix concrete shall be in accordance with Table "B".

The Proportions of fine to coarse aggregates should be adjusted from upon limit to lower limit progressively as the grading of the fine aggregates become finer and the maximum size of coarse aggregates become larger. Graded coarse aggregate shall be used.

The cement content in the mix specified in Table "B" of any volumetric mix be proportionately increased to overcome the difficulties of placement & compaction, so that the water cement ratio as specified is not changed.

In the case of vibrated concrete, the limit specified may be suitable reduced to avoid segregation.

The quantity of water used in the reinforced concrete work should be sufficient, but not more than sufficient to produce a dense concrete of adequate workability for it purpose, which will surround and properly grip all the reinforcement. Workability of concrete should be controlled by maintaining a water content that is found to give a concrete which is just sufficiently wet to be placed and compacted without difficulty with the means available.

TABLE "B"
PROPORTIONS FOR VOLUMATRIC MIX CONCRETE:

Grade of concrete	Total quantity of dry Aggregate by mass per to coarse (Maximum)	Proportion of Fine aggregate 100 kg of cement to be taken as the sum of the individual masses of fine and coarse aggregate (in cum)	Quantity of water per 100 kg of cement, aggregate (by volume) in litres
1	2	3	4
1:5:10	0.70	Generally 1:2 but subjected to an upper of 1:15 and lower limit 1:2:5 on approval of Site In-charge	120
1:4:8	0.53		90
1:3:6	0.40		68
1:2:4	0.24		64
1:1.5:3	0.22		60

1.3.4 MIXING:

Concrete shall be mixed in a mechanical mixer. The mixer should comply with I.S. 1791. The mixing shall be continue until there is a uniform in color and consistency. If there is a segregation after unloading from the mixer the concrete should be one and half to two minutes generally. In exceptional circumstances such a mechanical breakdown of mixer, or when the quantity of concrete is very small, hand mixing may be permitted, subject to adding 10%

extra cement. When hand mixing is permitted, it should be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in color and consistency.

1.3.5 Workability of concrete should be controlled by direct measurement of water content and it should be checked at frequent intervals, of nominal mix workability measured by slump test may have the values given in Table D.

TABLE-D

Sl. No.	Type of Work	When Vibrated
1.	Mass concrete in R.C.C. foundation footings retaining wall and road slabs.	2.5 cms. (1")
2.	Beams, slabs, columns with simple reinforce cement	2.5 cms to 5 cms (1" to 2")
3.	Tees section with congested reinforcement	5 cms to 10 cms

Note : should conditions governing slump and workability change pointing to advisability of increased slumps, this shall be done by decreasing the amount of aggregate and not by increasing the amount of water.

1.4.1 TRASPORTING:

Concrete shall be transported from the mixer to the form work as rapidly as possible by methods which prevent the segregation of loss of any of the ingredient and maintain the required workability in no case more than 30 minutes shall elapse between mixing and consolidation in its position. During hot and cold weather, concrete shall be transporting in deep containers other suitable method to reduce the loss of water by evaporation in hot weather and hat loss in cold weather may also be adopted.

1.4.2 PLACING:

The concrete shall be deposited as nearly as practicable in its final position to avoid re-handling The concrete shall be placed and compacted before setting Commences and should not be subsequently disturbed method of placing should not be to preclude segregation care should be taken to avoid displacement of reinforcement or movement of form work. Concrete shall not be drooped into position from a height greater than 2.0 meter

1.4.3 COMPACTION:

Concrete should be thoroughly compacted and fully worked around the reinforcement embedded fixtures into corners of the form work mechanical vibrators should general be used as per I.S –2505, I.S- 2514 and I.S-4656 over vibration or vibration of very wet mixes is harmful and should be avoid under vibration is harm full .

When the vibration is to be applied external the design of form work and the disposition of vibrators should receive special consideration to ensure efficient compaction and surface blemishes.

Beams and columns shall be vibrated using immersion vibrators then section like walls of water tanks, chajjas aprons etc. should be vibrated using surface vibrators it is better to vibrate in smaller intervals for short period of time rather than at wider intervals for longer periods of time the vibrator shall be used only to aid compaction and not push concrete laterally in the forms.

1.4.4 CONSTRUCTION JOINT:

Concreting shall be carried out continuously up to construction joints the position and arrangement of which shall be designed by the designer when work is to be resumed on a surface which hardened such surface shall be roughened, it shall be then has swept clear and thoroughly wetted for vertical joints neat cement slurry shall be applied on the surface before it is dry for horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and in concrete mix .this layer of cement slurry or mortar shall be freshly mixed and applied immediately before placing of concrete .

Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire of bristle brushes caring taken to avoid dislodgment of practical of aggregate the surface shall then be located with a neat cement slurry .On this surface a layer of concrete not exceeding 150mm in thickness shall first be placed and shall be well rammed against old work particular proceed in the normal way

1.4.3 PROTRECTION OF CONCRETE & CURING:

Newly placed concrete shall be protect by approved means from rain, sun and dry winds. Exposed faces of concrete shall kept continuously in a damp or wet conditional by ponding or by covering with a layer of wet sacking canvas hessian or similar absorbent material and kept constantly wet for at least 10 to 15 days (10days in winter or concrete mere spring of water vertical surface shall not be allowed approved curing compounds may be used in lieu of moist curing with the permission of the Site In-charge. Such compound shall be applied of all exposed surface of the concrete as soon as possible after the concrete placed below ground shall be protected from failing earth during and after placing. Approved means shall be taken to protect immature concrete from damage by debris excessive loading, vibration, abrasion delectation grounds water mixing with earth or other material floatation and other influence that may in pair the strength and durability of concrete horizontal surface that may impair the strength and durability of concrete means of bund

1.5 FACILITES FOR PREPRATION AND TESTING OF AT SITE :

In order to exercise the required degree of consultant control over the concrete material and their preparation the contactor is expected to set up and maintain at his own expense a testing laboratory at site. He shall

apparatus required for sensitive testing of concrete materials and in particulars he is to have the following equipment in the site laboratory -

i. concrete testing machine of capacity 60T/100T
ii. A set of standard sieves and sieves vibrator
iii. Measuring cylinder adequate number of cubes and cylinder moulds and slump cones.
vi vibrating table
v. weight balance
vi. weighing balance .
vii. oven and other apparatus for drying aggregate
vii. vicat apparatus.
viii. Curing tanks for cubes

1.6 <u>SAMPLES .TESTING AND ACCPETANCE OR CONCRETE:</u>

Samples from fresh concrete shall be taken as per I.S.1199 and cubes shall be made cured and tested at 7 days and 28 days in accordance with IS- 516.

Test shall be conducted for compressive strength on 15 cm x 15cm x15cm cubes of concrete for concrete .companion specimen shall be cast from a signal batch of concrete & shall be of the same age at the same time of testing, in all be compressive strength specified in table alone be the criteria for accepting for acceptance or rejection of the concrete.

1.6.1 Six test specimen shall be made from testing three at 7days and three at 28 days the specimen shall be tested as per I.S 516 the samples tested at its laboratory generally but may be tested in any other test house /laboratory of govt recognized institute also.

1.6.2 Concrete of each grade shall be assessed separately and shall be assessed daily for compliance concrete is liable to be rejected if it is porous or honey - combed .its placing has been interrupted without providing a proper construction joint the reinforcement has been displaced beyond the tolerance specified or construction tolerance have not been met However ,the hardened may be accepted after carrying out suitable remedial measure to minimum to the satisfaction of the Engineer -in charge

1.6.3 If nominal mix concrete made in accordance with the aggregate cement prop. given for a particular grade does not yield specified strength , such concrete shall be classified to nearest to the appropriate lower grade .Nominal mix concrete proportioned for a given grade shall not lower be placed in higher grade than the minimum specified.

1.6.4 If the deficiency in the opinion of the Site In-charge is such as to necessitate removal of the concrete from the structure. Then on being so directed by the Site In-charge the contractor at his own expense shall remove and replace by the concrete of specified strength.

1.6.5 However when the strength is so deficient as to call for removal, Site In-charge before ordering removal provided the contractor agree, may direct for "load tests" or standard tests which shall be carried out by the contractor at his own cost in the manner as will be directed by the Site In-charge and if the result is such that on all consideration the can be retained then it may be accept at adequate.

STANDARD OF ACCEPTANCE:

1.1 **Seven days test:**

The average compressive strength of the three specimens tested at seven days shall satisfy the specified strengths given in Table A, for the appropriate mix. As a guidance the difference between the maximum and the minimum strength of the three specimens shall not exceed 15% of the average strength. In case seven days result is not satisfactory all further work structurally interlinked with the concrete represented by the samples shall be stopped unless otherwise decided by Engineer.

1.2 **Twenty eight days test:**

Acceptance criteria of twenty eight days shall be as follows:

a) If the average compressive strength of three cubes is more than the compressive strength indicated in Table A, the concrete shall be accepted at full rates.

b) If the average compressive strength of three cubes is less than the specified but not less than 85% of the specified strength. the concrete may be accepted at reduced rate or prorate basis up to 80% of original rate of items.

c) If the average compressive strength of three cubes is less than 85% of the specified strength, Site In-charge shall reject and get dismantled and defective portion of the work represented by the sample along with the structurally connected work as considered necessary at the risk and cost of the Contractor.

In case of (b) and (c) above , Site In-charge, If he so decides may order the additional tests like fore test, ultrasonic test, rebound hammer test, load test of structure of part of structure etc. to be carried out. All the charges in connection with these additional tests shall be borne by the contractor if on the basis of these additional tests the Site In-charge is satisfied about t he structural adequacy of the concrete, he may accept the work at reduced rates.

CONCRETE ORDERED TO BE DISMANTLED

Where the Site In-charge does not accept the poor or defective concrete, the contractor at his expense will dismantle the portion of structure and reconstruct the same to the Site In-charge's satisfaction.

Concrete thus dismantled will not be measured and paid for. The additional work if and required to be carried out for re-concreting, shall be to the contractor's account.

QUANTITY OF DEFECTIVE CONCRETE REPRESENTED BY CUBES

In all cases of defective concrete as revealed by works test cubes strength failing below the specified strength. the quantity of concrete thus affected and represented by the cubes shall be decided by the Site In-charge whose decision shall be final and binding on the contractor.

HONEY COMB IN.

a) Where honey combed surfaces are noticed in the concrete the contractor shall not patch up the same until examined by the Engineer-in-charge and decision given regarding the acceptance with rectification of rejection of the same. If contractor with rectification or rejection of the same. If contractor patches up such defects without the knowledge of the Engineer-in-charge, the Engineer will be at liberty to order demolition of the concerned concrete members to the extent be considers necessary. In such case, the contractor at his expense, shall reconstruct demolished work. Demolished work shall not be measured and paid for.

b) If in the opinion of the Engineer-in-charge the honey combing is harmful to the structure and where so directed by the Site In-charge, the full structural members affected by dismantled and reconstructed to Site In-charge's approval at Contractor's expense. The demolished concrete will not be measured and paid for.

CONCRETING UNDER SPECIAL CONDITIONS:-

The specifications and references given in I.S.456-2000 for concreting in extreme weather condition under water concreting, concrete in sea water, concrete in aggressive soil and water should be adhered to.

The form work shall conform to the shape, lines and dimensions as shown on the plans and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete and shall be sufficiently water tight to prevent loss of cement slurry from the concrete. If directed be the Site In-charge, building paper or polythene sheets shall be used by the Contractor to ensure water tightness without additional costs to the Form work or centering shall be constructed on wet concrete and laborers without deflection and retain its form during laying, ramming and setting of concrete. Timber used shall be properly seasoned so as to prevent wrapping when wetted.

All props either timber or steel shall be straight and or full height and no joints shall be allowed. Props shall be braced with wooden battens and where additional staging is necessary extra care should be taken to use bigger diameter props with bracing at a 4 or 5 levels. All props shall be supported on sole plates and double wedges. At the time of removing props, wedges shall be gently cased off and not knocked out:-

All rubbish, chippings, shavings and saw dust shall be removed from the interior of the forms before the concrete shall be cleaned and thoroughly wetted or treated if considered necessary, with non-sticking mineral oil or any other approved materials. Care shall be taken that oil or such approved materials is kept out of contract with the reinforcement.

All form work shall be removed without shock or vibration and shall be ceased off caref1ully in order to allow the structure to take up its load gradually. Forms shall not be disturbed until concrete has adequately hardened to take the superimposed load.

3.1 CLEANING OF REINFORCEMENT:-

Before steel reinforcement is placed in position, the surface of the reinforcement shall be cleaned of rust, dust, grease and any other objectionable substances.

3.2 BAR BENDING SCHEDULE OF REINFORCEMENT:-

On receipt of structural drawing Contractor shall prepare bar bending schedule of reinforcement and shall be got approved by the Site In-charge.

3.3 CUTTING OF REINFORCEMENT:-

Before Steel reinforcement bars are cut, the contractor shall study the lengths of bars required as per drawing and shall carry out cutting only to suit the sizes required as per drawings.

3.4. PLACING AND SECURITY:-

Reinforcement bars shall be accurately placed & secured in position and firmly supported or wedged by pre-cast concrete blocks of suitable thickness, at sufficiently close intervals that they will not sag between the supports or get displaced during the placing of concrete or any other operation of the work. It is most important to maintain reinforcement in its correct position without displacement and to maintain the correct specified cover. The Contractor shall be responsible for all costs for rectification required in case the bars are displaced out of their correct position.

3.5. BINDING WIRE:-

The reinforcement shall securely bond where ever cross or whenever required for with 18 gauge soft annealed steel wire.

3.6. WELDING:-

Welding of bars shall not be carried out unless specifically authorized in writing by the Site In-charge as per I.S. code of practice in place of splicing. However no extra payment shall be allowed for the same.

3.7. BEND ETC.:-

Bends, cranks etc., in steel reinforcement shall be carefully for made. Care being taken to keep bends out of winding, otherwise all rods shall be truly straight. If any bend shows signs of or site minimum radius of nine times diameter of the bar shall be used unless otherwise specified in the drawings. However in respect of standard hooks the radius of bend shall be two times the diameter of bar. Heating of reinforcement of bars to facilitate bending will not be permitted. The bars shall always be bend cold. In case of mild steel reinforcement bars of larger sizes where colds bending is not possible they may be bend by heating with written permission of the Site In-charge. Bar when bent shall not be heated beyond very red colour and after bending shall be allowed to cool slowly without quenching. The bars damaged or weakened in any way in bending shall not be used on the work. High strength deformed bars shall in no case be heated to facilitate bending cranking.

3.8. INSPECTION OF REINFORCEMENT:-

No concreting shall be commenced until the Site In-charge have inspected the reinforcement in position and until their approval have been obtained. A notice of at least 72 hours shall be given to the Site In-charge by the contractor for inspection of reinforcement. If in the opinion of the Site In-charge any materials is incorrectly spaced, bend or otherwise defective. The contractor shall immediately remove such materials from the site and replace with new and rectify any other defects in accordance with the instruction of the Site In-charge and to their entire satisfaction.

3.9. STOCK PILING OF STEEL:-

Reinforcement steel required shall be stock pilled well in advance of need in the work. The Contractor shall stockpile advance of need in the work. The contractor shall stockpile 1/3rd requirement within15 days of commencement 2/3rd requirement at 1/4th contract time and full requirement a 1/2 contract time.

3.10 COVER FOR FEINFORCEMNT:-

Cover shall be measured from the outer surface of main reinforcement. Cover shall be as follows:-

a. At each end of a reinforcing bar 25 mm or twice the diameter of such rod or bar whichever is greater.
b. For longitudinal reinforcing bar in beam 25mm or the diameter of such rod or bar whichever is greater.
c. For tensile, compressive shear or other reinforcement in a slab 20 mm or the diameter of such reinforcement whichever a greater.
d. For reinforcement in any other member such as a lintel, chajja, canopy 20 mm or the diameter of such reinforcements whichever is greater.
e. For main reinforcement in isolated footings (side a bottom) clear cover shall be 50mm.
f. For column bars clear cover shall be 40 mm, unless otherwise specified in drawing.
g. For bars in slabs of strips footings and mat foundation clear cover shall be 50mm. Beam bars shall be placed over slab in the case of beam & slab type foundation
h. For any other types, covers as specified in I.S. 456- 2000 shall be provided.

3.11. FORM WORK: - MATERIALS AND DESIGN:-

a. The from work shall be of timber or plywood or steel. If any particular material or materials be specified in the Schedule of quantities for form work such particularly specified material or materials shall be used in work. The form work shall be so constructed as to remain sufficiently rigid during placing of the concrete and shall be sufficiently tight to prevent, loss of liquid from the concrete. The forms shall have sufficient strength and rigidity to hold concrete and withstand the pressure of ramming and vibration without excessive deflection of the prescribed lines and more so when the concrete is vibrated. The surface of the forms in contact with concrete shall be clean, rigid,

watertight and smooth. Suitable devices shall be used to hold corners, adjacent ends and edges of panels of other forms together in accurate alignment.
If steel formwork is used the slab shuttering to be done with steel plates made out of 2mm sheets with pressed flanges and stiffener with standard shuttering made in 60mm width and 115, 100,90,80cm lengths with adjusters made in 40,25 cm widths and 115, 90,80,60cm lengths.

If tubular telescopic steel props are used then all steel scaffold tubes are to be of 40mm nominal bore mild steel continuous weld. props must be braced in both directions by tube and right angle couplers at approximately 250mm above prop nut when extended beyond 3.6m. All scaffolds fittings conform to I.S.2750:1968.

TIMBER SHUTTERING:-

If timber is used it shall not be less than 30mm thick fixed on to rigid supporting materials and scaffolding.

If shuttering plywood is used it should conform to IS-4990-1993. The plywood may be fixed on to a timber frame or straight on to the rigid supporting materials and scaffolding. The minimum thickness for straight surface should be 9mm and for curved surfaces, minimum 6mm thick.

b. The form work shall conform to the shape, lines and dimensions to suit the RCC members as shown on drawings and to be so constructed. Form work shall be adequately designed to support the full weight of workers, fresh placed concrete without yielding settlement or deflection and to ensure good and truly aligned concrete finished in accordance with the construction drawings. A camber in all directions of 6mm for every 5m span in all slab and beam centering shall be given to allow for a unavoidable sagging due to compression or other causes.
c. The form work shall be so designed that the sides of the beams shall be first struck leaving the soffit of beams and the supporting props in position. Props shall be designed to allow accurate adjustment and to permit of their being struck without jarring the concrete.
d. Temporary opening shall be provided at the base of column form and at other points where necessary to facilitate cleaning and observation immediately before concrete is deposited.
e. Vertical shuttering : The vertical shuttering shall be carried down to such solid surface as is sufficiently strong to afford adequate support and shall remain in position until the newly constructed work is about to support itself. Props shall be securely braced against lateral deflection. Where timber props are used like bullies, they shall be of a minimum diameter of 10cm. and shall be straight and adequately strong. The spacing of such struts shall be designed to carry loads imposed on it without undue deflection of the members supported by the props. The spacing of props shall be approved by the Site In-charge and any alterations suggested by him shall be carried out at contractor's expense. Bracing shall be provided as directed without extra cost. Contractor shall allow in his rates providing props and struts for any height shown in the working drawings issued to

contractor from time to time.

3.12 WATER TIGHTNESS:-

It is the contractor's responsibility to ensure that the forms are checked for water tightness just before concreting operation starts and to make good any deficiencies.

3.13 CLEANING AND TREATMENT OF FORMS:-

All rubbish, particularly chippings, shavings and sawdust shall be removed from the interior of the forms before the concrete is placed and the form work in contract with the concrete shall be cleaned and thoroughly wetted or treated with an approved composition. Care shall be taken that such approved composition is kept out of contract with the reinforcement.

3.14 STRIPPING:-

Forms shall left in place until their removal is authorized by the Site In-charge and shall then be removed with care so as to avoid injury to concrete. In no circumstances shall forms be struck until the concrete reaches a strength of at least twice the stress to which concrete may be subjected at the time of striking. The strength referred to shall be that of concrete using the same cement and aggregates with the same proportions, and cured under conditions of temperature and moisture similar to those existing on the work where possible, the form work shall be left longer, as it would assist the curing.

3.15 STRIPPING TIME:-

In normal circumstances (generally where temperatures are above 20° C) and where ordinary cement is used, forms shall be struck after expiry of the following periods given in table VI.

TABLE-VI

Sl	Location	Striking Time In Days For Ordinary Pozzolana/ Portland Cement
a.	Vertical sides of walls, slabs, beams and columns	24 hrs
b.	Bottoms of slabs up to 4.5 m span	7-14 days
c.	Bottoms of slabs above 4.5 m span, bottoms of beams up to 6 m span rib bottoms up to 6 m span rib bottoms up to 6 m span	14-21 days
d.	Bottoms of beams over 6 m span and arch rib bottoms above 6 m span	21-30 days

Note 1 : In case the shuttering for the part of the structure is supported or suspended from the shuttering of the concrete member already cast then the shuttering of the concrete member (already cast) supporting the new shuttering shall not be removed until the concrete of the supported /suspended member is matured.

Note 2 : Special care shall be taken while striking of the shuttering for (i) canopies (ii) chajja (ii) cantilever slabs and beams and (iv) retaining walls, so as to ensure stability of these structural elements. Relevant notes given in the structural drawings in this connection shall be strictly followed.

3.16 FORM WORK IN LIFTS FOR CONTINUOUS SURFACES. :

Where forms for continuous surface are placed in successive units (as for example in columns or walls), the forms shall fit tightly over the completed surfaces so as to prevent leakage or mortar from the concrete and do maintain accurate alignment of the surface.

3.17. PROCEDURE FOR REMOVING THE FORM WORK :

All form work shall be removed without such shock or vibration as that would damage the reinforced concrete. Before the soffit and struts are removed, the concrete surface shall be exposed where necessary in order to ascertains that the concrete has sufficiently hardened. Proper precautions shall be taken to allow for the decrease in the rate of hardening that occurs with all cements in the cold weather. For cantilevers props shall be removed from the tip towards support. Special notes given in relevant structural drawing shall be strictly adhered to in order of avoid mishaps.

3.18 TOLERANCES:

1.3 The following shall be the maximum permissible tolerances:-

a. On general setting out dimensions up to 4m length, a tolerance up to 3mm will be allowed.
b. On lengths or more than 4m tolerance of not more than 5mm will be allowed.
c. On the cross sectional dimensions of columns, beams, slabs, facia, chajja, mullions, grilles, fins, louvers and such other members tolerance of more than 2mm will not be allowed.
d. The top surface of concrete floor slab shall be within 4mm of the level and line shown on the drawings.
e. Column and walls and other vertical members shall not be more than 3mm out of plumb in their storey height and not more than 6mm out of plumb in their full height.

If the work is not carried out within the tolerances set out above in (a) to (e), the cost of all rectification measures or dismantling and reconstructing as decided by the Site In-charge shall be borne by the contractor. In case work is dismantled, the same shall not be measured and paid for.

SECTION-III

BRICK MASONRY

GENERAL

All brick work should be carried out as shown on the drawings with setbacks, projections, curvatures, cuttings etc. No additional cost for use of cut bricks shall be allowed. Wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in the proportion of (1:6) shall be used. Flat brick shall be provided wherever required without any extra cost. Brick work shall be kept wet while in progress till mortar has properly set. On holidays or when work is stopped the top of all unfinished masonry shall be kept wet. Should the mortar become dry, white or powdery, for want or curing, work shall be pulled down and rebuilt at the contractor's expenses.

1.0 BRICK MASONRY:

a. SOAKING :

All bricks shall be immersed in water for twenty-four (24) hours before being put into work so that they will be saturated and will not absorb water from the mortar.

B. BATS:

No bats or out bricks shall be used in the work unless absolutely necessary around irregular openings or for adjusting the dimensions of different course and for closures, in which case full bricks shall be laid at corners, the bats being placed on the middle of the courses.

C. LAYING:

The bricks shall be laid in mortar to line, level & shape shown on the plane, slightly present and thoroughly bedded in mortar and all joints shall be properly flushed and packed with mortar and no hollows left anywhere. Brick shall be handed carefully so as not to damage their edges. They should not also be thrown from any height to the ground but should be put down gently. All courses shall be laid gently horizontal and all vertical joints made truly vertical. Vertical joints on one course and the next below should not come over one another and shall not normally be nearer than quarter of a brick length. For battered faces binding shall be at right angles to the face. Fixtures plus frames etc. If any shall be built in at place shown in the plans while laying the courses only and not later by removal of bricks already laid.

Care shall be taken during construction to see that edges of bricks at quoins, sills, heads etc. are not damaged.

The verticality of the walls and horizontality of the courses shall be checked very often with plumb bob and spirit level respectively.

D. JOINTS:

Joints shall not exceed 10mm. (About 3/8") in thickness & this thickness shall be uniform throughout. The joints shall be raked but not less than 10mm (3/8") deep when the mortar is green where pointing is to be done. When the brick

surface are to be plastered, the joints shall be raked to a depth of 5mm when the mortar is green so as to provide good key to plaster.

E. UNIFORM FACING:

Brick work shall be carried up regularly in all cases where the nature of work will admit, not leaving any part 60mm lower than another but where building at different levels is necessary the bricks shall be stepped so as to give later at uniform level & effectional bond. Horizontal courses should be to line and level, and face plumb or to latter as shown on the plan.

F. SCAFFOLDING:

The scaffolding must be strong and rigid, stiffened with necessary cross bearers and always checked and beared on the sills which closed board ceilings and swings to prevent and injury of persons or materials. The Contractor shall have to allow other trades to make reasonable use of his scaffolding as directed by the Site In-charge, if for the interest of work the contractor have to erect scaffolding in the other properties including local bodies. Corporation, the arrangement for the same including the cost of licensing fees etc., shall to be borne by the contractor and should be kept free form any liability on this account. But, log holes shall be made good by bricks to match the face work when out logs are removed after ensuring that the holes behind are solidly filled in with (1:4:8) cement concrete.

All brick works shall be kept will watered for 14 days after laying If white pozzalana cement issued for mortar the curing shall be extended by one week at contractor's expenses.

2.0 Half Brick work :

The mortar for half brick thick walls shall be as specified. For half brick thick long walls 2 nos 6mm dia mild steel bars shall be provided every third course according to standard practice. M.S. bars shall be paid extra.

3.0 Brick Flat Soling :

For soling, the bricks shall be picked of approved, sound, hard, durable, dense, free from soft spots, cracks, decay and other defects. Brick bat shall not be used. All necessary trimming or filling for laying of the soling in line and required grade shall be done. The sub-grade shall be marked by stacking and strings for required depth for laying of soling. The cushioning as well as filling of joints shall be done with local sand.

The bricks shall be laid on flat (Unless otherwise specified) touching each other. Brick shall be laid in parallel rows breaking bond or in herring bond pattern as directed and firmly embedded true to line and filled with local sand. The joint should not be less that 12mm.

SECTION -IV
PLASTERING

1.1 Scaffolding for carryout plastering work shall be double scaffolding having two sets of vertical supports so that the scaffolding is independent of the walls.

1.2 PREPARATION OF SURFACE:

All putlog holes in brick work and junction between concrete & brick work shall be properly filled in advance. Joints in brick work shall be clamped 10mm deep and concrete surface hacked to provide the grip to the paste. Projecting burns of mortar formed due to gaps at joints in shuttering shall be removed.

The surface shall be scrubbed clean with wire brush to remove dirt, dust etc. and the surface thoroughly washed with clean water to remove efflorescence, grease and oil etc., and shall be kept wet for a minimum of six (6) hours before application of plaster.

2.0 ORDINARY CEMENT PLASTER:

The Preparation of surfaces shall be as stated above. The thickness and proportion of plaster shall be as specified in the schedule of items. Plaster mix will be prepared using mixer machine.

The mortar shall be applied evenly with force on the surface to be plastered. The mortar surface shall be finished at once by being rubbed over with a trowel till the cement appears on the surface. All corners, angles and junctions shall be truly vertical & horizontal as the case may be neatly finished. Rounding of corners and junctions where required shall be done without extra charge. The mortar shall adhere to the surface intimately when set and there should be hollow sound when struck and curing shall be done for 7 days.

SECTION -V
FLOOR FINISHING

1.0 CERAMIC TILES/ VITRIFIED TILE FLOORING :

1.1 PREPARATION OF SURFACE AND LAYING :

Sub-grade concrete or the R.C.C. slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tile shall be with cement mortar 1:3 (1 cement: 3 coarse sand) or as specified in the specification. The average thickness of the bedding shall be 20mm while the thickness under portion of the tiles shall not be less than 12mm.

Mortar shall be spread, temped and corrected to proper levels and allowed to harden sufficiently to offer a fairly rigid cushion for the tiles to be set to enable the mason to place wooden plank across and squat on it.

Over this mortar bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 3.3 kg. of cement per square meter over such and area as soaked in water washed clean and shall be fixed in this grout one after another, each tiles gently being tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joint shall be kept as thin as possible and in straight lines or to suit the required pattern.

The surface of flooring during laying shall be frequently checked with a straight edge about 2m long, so as to obtain a true surface with their required slops.

Where full size tiles cannot be fixed these shall be cut (Sawn) to the required size, and their edge rubbed smooth to ensure straight and true joints.

Tiles which are fixed in the floor adjoining the wall shall enter not less than 10mm. under plaster, skirting or dado.

After tiles have been laid surplus cement grout shall be cleaned off.

Painting and Polishing:- The joints shall be cleaned off the grey cement grout with wire brush or trowel to a depth of 2mm to 3mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigment if required to match the color of tiles. The floor shall be washed and finished clean. The finished floor shall not sound hollow when tapped with a wooden mallet.

2.0 CERAMIC TILES IN SKIRTING AND DADO:-

2.1 PREPARATION OF SURFACES :-

The joints shall be raked out to a depth of at least 15mm in masonry walls, while the masonry is being laid. In case of concrete walls, the surfaces shall be hipped and roughened with wire brushes. The surface shall be cleaned thoroughly, washed with water and kept wet before skirting work is commenced.

2.2 LAYING:-

12mm. thick plaster of cement mortar 1:3 (1cement:3 coarse sand) of mix as specified shall be applied and allowed to harden. The plaster shall be roughened with wire brushes or by scratching diagonally closed intervals.

The tiles should be soaked in water, washed clean and a coat of cement slurry applied liberally at the back of tiles and set in the bedding mortar. The tiles shall be tamped and corrected to proper plane and lines. The tiles shall be set in the required pattern and butt jointed. The joints shall be as fine as possible. Top of skirting of dado shall be truly horizontal and joints vertical except where otherwise indicated.

Skirting & dado shall rest on the top of the flooring, Where full size tiles cannot be fixed these shall be cut (Sawn) to the required size and their edges rubbed smooth.

2.3 CURING AND FINISHING:

The joints shall be cleaned off the grey cement grout with wire brush or trowel to a depth of 2mm to 3mm & all dust & loose removed. Joints shall then be flush pointed with white cement added with pigments if required to match the color of tiles. The surfaces shall then be kept wet for seven days. After curing the surface shall be washed and finished clean. The finished work shall not sound hollow when tapped with a wooden mallet.

3. ARTIFICIAL STONE FLOORING:

Selection of materials, methods of mixing, placing and compacting shall generally conform to the specification under plain and reinforced cement concrete described earlier. A stiff mix consistent with workability shall be used.

3.1 PREPARATION OF SURFACE:

Before the operation for laying topping is started the surface of base concrete shall be thoroughly cleaned of all dirt, loose particles, caked mortar, droppings and laitance of any by scrubbing with coir or steel wire brush where the concrete has hardened so much that roughening of surface by wire brush is not possible, the surface shall be roughened by chipping or hacking at close intervals. The surface shall then be cleaned with water & kept for 12 hours and surplus water shall be removed by mopping before the topping is laid.

3.2 LAYING:

The screed strips shall be fixed over the base concrete dividing it into suitable panels. Before placing the concrete for topping, neat cement slurry shall be thoroughly brushed into the prepared surface of the base concrete just ahead of the finish. Concrete of specified proportion and thickness shall be laid in alternate panels to required level and shape and thoroughly tamped.

3.3 FINISHING THE SURFACE:

After the concrete has been fully compacted it shall be finished by toweling or floating with neat cement rendering Finishing operations shall start shortly after the compaction of concrete and the surfaces shall be trowelled three times at intervals so as to produce a uniform and hard surface. The satisfactory resistance of floor to wear depends largely upon the care with trowelling is carried out. The time interval allowed between successive trowelling is very important. Immediately trowelling shall be done to give a level surface. Excessive trowelling in the earlier stages shall be avoided as this tends to bring a layer rich in cement to line surface. Sometime after the first trowelling, the

duration depending upon the temperature, atmospheric conditions and the of cement used, the surface shall be re-trowelled to close any pores in the surface and to bring to surface shall be re-trowelled to close any pores in the surface and to bring to surface and to scrap off any excess water in concrete or laitance. No dry cement shall be used directly on the surface to absorb moistures or to stiffen the mix. The final trowelling shall be done well before the concrete has become too hard but at such a time that considerable pressure is required to make any impression on the surface if directly by the Site In-charge approved minerals pigment shall be added to the rendering to give desired color and shade to the flooring at no extra cost.

4. MARBLE / KOTA STONE FLOORING:

4.1 DRESSING OF SLABS :

Every stone shall be hand/machine cut to the required size and shape, fine chisel dressed on all sides of the stone shall be fully in contact with it. The top surface shall also be fine chisel dressed to remove all waviness. The sides and top surface of slabs shall be machine rubbed or table rubbed with coarse sand before paying. All angles and edges of the marble slab shall be true, square and free from chipping and the surface shall be true and plane.

The thickness of the slabs shall be as specified in the description of the item, Tolerance of +/-2mm. shall be allowed.

4.2 LAYING:

The sub-grade concrete or the R.C.C. slab on which the slabs are to be laid shall be cleaned, wetted & mopped. The bedding for the slabs shall be with cement mortar 1:4.

The averages thickness of the bedding mortar under the slab shall not be less than 20mm.

The slabs shall be laid in the following manner:-

Mortar of the specified mix shall be spread the area of each slab, roughly to the average thickness specified in the item. The slab shall be washed clean before laying. It shall be laid on top, pressed, trapped with wooden mallet and brought to level with the adjoining slabs. It shall be lifted and laid aside. The top surface of the mortar is allowed to harden bit and cement slurry of honey like consistency cement per sqm. The edges of the slab already paved shall be buttered with grey or white cement with or without admixture of pigment to match the shade of the paved, shall then be lowered gently back in position and tapped with wooden mallet till it is properly bedded in a joint as possible. Subsequent slabs shall be laid in the same manner. After each slab has been laid, surplus cement or the surface of the slabs shall be cleaned off. The flooring shall be cured for a minimum period of seven days. The surface of the flooring as laid shall be true to levels and slopes as instructed by the Site In-charge.

The slabs shall be matched as shown in drawings or as instructed by the Site In-charge. Slabs which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster, skirting or dado. The junction

between wall plaster and floor shall be finished neatly and without variness.

4.3 POLISHING AND FINISHING:-

Slight unevenness at the meeting edges of slabs shall then be removed by fine chiseling and finished in the same manner as specified in Para 7.3 above.

5.0 MARBLE / KOTA STONE IN SKIRTING, DADO, RISERS STEPS ETC.

5.1 PREPARATION OF SURFACE:-

The masonry joints shall be raked or concrete surfaces hacked and roughened. If considered necessary , the wall surface shall be cut uniformly to the requisite depth so that the skirting face shall have the projection from the finished face of wall as shown in drawings or as required by the Site In-charge. No additional cost on this account shall be paid.

5.2 LAYING:-

The risers of steps and skirting shall be set in grey or white cement admixed with or without pigment to match the shade of the stone as specified in the description of the item with the line of the slab of such a distance from the wall that the average width or the gap shall be 20mm. and at no place the width shall be less than 15mm. If necessary, the slab shall be held in position by temporary M.S. hooks fixed in to the wall at intervals. The skirting or riser face shall be checked for plane and plumb and corrected. The skirting shall thus be left to harden then the rear of the skirting or riser slab shall be packed with cement mortar 1:3 (1 cement : 3 coarse sand) or other mixed as specified in the description of the item. The fixing hooks shall be removed after the mortar filling the gap has acquired sufficient strength.

The joints shall be as fine as possible. The top line of skirting and risers shall be truly horizontal and joints truly vertical, except where otherwise indicated.

The risers and skirting slab shall be matched as shown in drawing or as instructed by the Site In-charge.

5.3 CURING. POLISHING AND FINISHING:-

It shall be as specified in Para 8.3 as far possible except that cement slurry with or without pigment shall not be applied on the surface and polishing shall be done with hand. The face and lop skirting shall be polished.

SECTION -VI
EXTERNAL AND INTERNAL PAINTING WORKS

1.0 DISTEMPERING:-

1.2 SCAFOLDING:

Wherever scaffolding is necessary, it shall be erected on double supports tied together by horizontal pieces, which scaffolding planks shall be fixed. No ballies, bamboos or planks shall rest on or touch the surface which is being white washed. For all exposed brick work or tile work, double scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

Note: In case of special type of brick work, scaffolding shall be got approved from Site In-charge in advance.

Where ladders are used, pieces of old gunny bags shall be tied on their tops to avoid damage or scratches to walls.

For white washing the ceiling, proper stage scaffolding shall be erected.

1.3 PREPARATION OF SURFACE:-

Before new work is white washed the surface shall be thoroughly brushed free from mortar droppings & foreign mater.

In the case of old work, all loose pieces & scales shall be scrapped of and holes in plasters as well as patches of less than 50.00 sqm area shall be filled up with mortar of the same mix. Where so specifically ordered by the Site In-charge, the entire surface of old white wash shall be thoroughly removed by scrapping and this shall be paid for separately.

1.4 APPLICATION:

The distemper shall be applied with moon brush to the specified number of coats. The operation of each coat shall consist of a stock of the brush given from the top downwards, another from the bottom upward over the first stroke, and similarly one stroke horizontally from the right & another from the left before it dries.

Each coat shall be allowed to dry before the next one is applied. Further each coat shall be inspected and approved by the Site In-charge before the subsequent coat is applied. No portion of the surface shall be left out initially to be patched up later on.

For new work, three or more coats shall be applied till the surface presents a smooth & uniform finish through which the plaster does not show. The finished dry surface shall not show signs of cracking and peeling nor shall it come off readily on the hand when rubbed.

For old work, after the surface has been prepared as described, in Para 1.2 and a coat of white wash shall be applied over the patches and repairs. Then a single coat or two more coats of distemper wash as stipulated in the description of the item shall be applied over the entire

surface. The distempered surface should present a uniform finish through which the plaster patches do not appear. The washing on ceiling should be done prior to that on walls.

1.5 PROTECTIVE MEASURES:

Doors, windows, floors, articles of furniture etc., & such other parts of the building not to be white washed shall be protected from being splashed upon. Splashing and drooping, if any, shall be removed by the contractor at his own cost and the surfaces cleaned. Damages if any to furniture of fittings and fixtures shall be recoverable from the Contractor.

2.0 CEMENT PAINT:

2.1 PREPARATION OF SURFACE:

For new working the surface shall be carefully cleaned of all mortar dropping, dirt, algae, grease and other foreign matter by brushing & washing. The surface shall be thoroughly wetted with clean water before the cement paint is applied.

In the case of old work, all loose pieces and scales, shall be cleaned of all dirt, dust, algae, oil etc. by brushing and washing. Ptting in plaster shall be made good and coat of water proof cement paint shall be applied over patches after wetting them thoroughly.

2.2 PREPATION OF MIX:

Cement paint shall be mixed in such quantities as can be used up within an hour of its mixing as otherwise the mixture will set & thicken, affecting flow and finish.

Cement paint shall be mixed with water in two stages. The first stage comprise of 2 parts of cement paint and 1 part of water stained thoroughly and allowed to stand for five minutes. Care should be taken to add the cement paint gradually to the water and not vice- versa. The second stage shall comprise of adding further one part of water to the mix and stirring thoroughly to obtain a liquid of workable and uniform consistency. In all cases the manufacturer's instructions shall be followed meticulously.

The lids of cement paint drums shall be kept tightly closed when not in use, as by exposure to atmosphere the cement paint rapidly becomes air set due to its hygroscopic qualities.

The solution shall be applied on the clean and wetted surface with brushes or spraying machine. The solution shall be kept well stirred during the period of application. It shall be applied on the surface which is on the shady side of the building so that the direct heat of the sun of the surface is avoided. The method of application of the second or subsequent coats, the surface of the specification. The completed surface shall be watered after the day's work.

The second coat shall be applied after the first coat has been set for at least 24 hours. Before application of the second or subsequent coats, the surface of the previous coat shall not be wetted.

For new work, the surface shall be painted with three or more coats of water proof cement paint as found necessary to get a uniform shade.

For old work, the treatment shall be with one or more coats as found necessary to get a uniform shade.

Water cement paint shall not be applied on surfaces already treated with white wash, color wash, distemper dry oil bound, varnishes, paints, etc., It shall not be applied on gypsum, wood and metal surfaces.

The specifications in respect of scaffolding, protective measures, measurements and rate shall be as described under white washing with lime.

3.0 PAINTING:

Approved paints, oil or varnishes shall be brought to the site of work by the Contractor in their original containers in sealed condition. The materials shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The empties shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the Site In-charge.

3.1. COMMERCIAL WORK:

Painting shall not be started until the Site In-charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Painting of external surface should not be done in adverse weather conditions like hail storm and dust storm.

Painting except the priming coat, shall generally be taken in and after practically finishing all other builders work. The rooms should be thoroughly swept out and the entire building cleaned up at least one day in advance of the painting work being started.

3.2 PREPARATION OF SURFACE:

The surface shall be thoroughly cleaned and dusted. All rust, dirt, scales, smoke and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Site In-charge a fter inspection, before painting is commenced.

3.3 APPLICATION:

Before pouring into smaller container for use, the paint shall be stirred thoroughly in the containers. When applying also, the paint shall be continuously stirred in the smaller container so that its consistency is kept uniform.

If for any reasons, thinning is necessary in case of ready mixed paint, the brand of thinner recommended by the manufacturer or as instructed by the Site In-charges shall be used.

The painting shall be laid on evenly and smoothly by means of crossing and smoothly by means of crossing and laying off , the latter in the direction of the grain of wood. The crossing & laying of consists of

covering the area over with paint, brushing the surface hard for the first time over and ten brushing alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after laying off is finished. The full process of crossing and laying off will constitute one coat. Where so stipulated the painting shall be done by spraying. Spray machine used may be (a) high pressure (small air aperture) type (b) a low pressure (large air aperture) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.

Spraying should be done only when dry condition prevails. Each coat shall be allowed to dry thoroughly and rubbed smooth before the next coat is applied.

This should be facilitated by through ventilation. Each coat except the last coat, shall be lightly rubbed with sand paper or with pumice stone and cleaned off dust before the next coat is laid.

No left over paint shall be put back into the stock tins. When not in use the container shall be kept properly closed.

No hair marks from the brush or clogging of paint puddles in the corners of panes, angles of moldings etc., shall be left on the work.

In painting doors and windows, the putty round, the glass panes must also be painted, but care must be taken to see that no paint stains etc. are left on the glass top of shutters and surfaces in similar hidden location shall not be left out in paint. In painting steel work, special care shall be taken while painting over bolts, nuts, rivets, overlaps etc.

The additional specifications for primer & other coats of paints shall be as according to the detailed specifications under the respective headings.

3.4 BRUSHES AND CONTAINERS:

After work, the brushes shall be completely of paint and linseed oil rinsing with turpentine. A brush in which paint has dried up is ruined and shall on no account be used for painting work. The containers when not in use, shall be kept closed and free from air so that paint does thicken and also shall be kept safe from dust , When the paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

4.0 PRIMING COAT ON WOOD, IRON OR PLASTERED SURFACE :

4.1 PREPARATION OF SURFACE :

i. WOODEN SURFACE

The wood work to be painted shall be dry and free from moisture. The surface shall be thoroughly cleaned. All unevenness shall be rubbed down smooth with sand paper and shall be well ducted, Knots, if any, shall be

covered with preparation of red lead made by grinding red lead in water and filled materials with same shade as paint shall be used where specified .

The surface treated for knotting shall be dry before painting is applied. After the priming coat is applied, the holes and indentations on the surface shall be stopped with glaziers putty or wood putty. The primer shall be prepared on site or shall be of approved brand and manufacture as specified in the item. Paint shall be anti-corrosive bitumastic paints, aluminum paint or other types of a paint as specified in the description of the item. Stopping shall not be done before the priming coat is applied as the wood will absorb the oil in the stopping and then latter is therefore liable to crack.

II. IRON AND STEEL SURFACE:

All rust and scales shall be removed by scrapping or by brushing with steel wire brushes. Hard skin of oxide formed on the surface of wrought iron during rolling which become loose by rusting, shall be removed.

All dust and dirt shall be thoroughly wiped away from the surface.

If the surface is wet, it shall be dried before priming coat is undertaken

III. OKASTERED SURFACE:

The surface shall ordinarily not be painted until it has dried completely. Trial patches of primer shall be laid at intervals and where drying is satisfactory, painting shall then be taken in hand. Before primer is applied, holes and undulations, shall be filled up with plaster of Paris and rubbed smooth.

4.2 APPLICATION:

The primer shall be applied with brush, worked well in to the surface and spread even smooth. The painting shall be done by brushing and laying off as described in cement paint above.

5.0 Painting with ready mixed paint/synthetic enamel paint:

5.1 Painting on new surface :

The surface, which has not been painted earlier, or the paint has been removed by paint remover, burning, caustic soda etc., shall be considered to the new surfaces.

5.2 PREPARATION OF SURFACE:

i. WOOD WORK :

The surface shall be cleaned and all unevenness removed as specified in wooden surface. Knots if visible shall be covered with a preparation of red lead. Holes, and indentations of the surface shall be filled in with glazier's putty and rubbed smooth before painting is done. The surface should be thoroughly dry before painting.

II. IRON AND STEEL WORK:

The priming coat shall have dried up completely before painting is started. Rust & scaling shall be carefully removed by scrapping or by brushing with steel wire brushes. All dust and dirt shall be carefully & thoroughly wiped away.

III. PLASTERED SURFACE:

The priming coat shall have dried up completely before painting is started. All dust or dirt that has settled on the priming coat shall be thoroughly wiped away before painting is started.

5.3 APPLICATION:

The specification described in cement paint shall hold good as far as applicable. The number of coats to be applied will be as stipulated in the item. The painted surface shall present a uniform appearance and glossy/mat finish as described in schedule of quantities free from streaks, blisters etc.

5.4 PAINTING AND OLD SURFACE:

The surface which has been painted earlier shall be considered to be old surface.

5.5. PREPARATION OF SURFACE:

i. WOOD WORK :

If the old paint is sound and firm and its removal is considered necessary the surface shall be rubbed down with pumice stone after it has been cleaned of all smoke and grease by washing with lime and rinsing with water and drying. All dust and loose pint shall be completely removed. The surface shall then be washed with soap and water.

If the old painted surface is blistered or flaked badly, paint shall be completely removed with the application of a paint remove following the specification of the manufacturer. The paint remover shall be of a brand and manufacturer approved by the Site In-charge. It shall be free from alkaline matter and non-caustic so that it can be handled by workmen without injury. It shall be of non-flammable quality as far as possible and such removal shall be paid for separately. Holes and cracks if any shall be stopped with glazier's putty or wood putty. Further the painting itself shall be treated as on new surface and paid for accordingly.

II. IRON AND STEEL WORK:

If the old paint is sound and firm and its removal is considered unnecessary, it shall be rubbed with wire brushes and any loosened paint taken off. All dust shall be thoroughly wiped away. This surface shall then be wiped finally with mineral turpentine to remove grease and perspiration of hand marks etc., and then allowed to dry.

If the old painted surface is in bad condition and blistered and flaked, the old paint shall be completely removed and the surface prepared as described in above. Such removal shall be paid for separately. The painting including the priming coat shall be treated as on new work and paid for accordingly.

6.0 FRENCH SPIRIT POLISHING:

Pure sello varying from pale orange to lemon yellow colour free from resin or dirt shall be dissolved in methylated spirit at the rate of 140 gm. of shellac to 1 liter of spirit. Suitable pigment shall be added to get the required shade.

6.1 POLISHING NEW SURFACES:

Preparation of surface - The surface shall be cleaned. All unevenness shall be rubbed down smooth with sand paper and well dusted. Knots if visible shall be covered with a preparation of red lead and glue sized and used hot. Holes and indentations of the surface shall be sloped with glaziers putty. The surface shall be then given a coat of wood filler made by ming whiting (Ground Chalk in methylated spirit at the rates of 1.5 kg. of whiting per liter of spirit). The surface shall again be rubbed down perfectly smooth with glass paper and wiped clean.

6.2 APPLIACATION:

The number of coats of polish to be applied shall be as decided by the Site In-charge to get the desired finish. A pad of woolen cloth covered by the fine cloth shall be used to apply the polish. The pad shall be moisture with the polish and rubbed hard on the wood, in a series of overlapping circles applying the mixture sparingly but uniformly over the entire area to give an even level surface. A trace of linseed oil on the face of the pad facilitates this operation. The surface shall be all owed to dry and the pad shall be covered with a fresh piece of clean fine cotton cloth slightly damped with methylated spirit and rubbed lightly and quickly with circular motions. The finished surface shall have a uniform texture.

SECTION –VII
CARPENTARY AND JOINERY WORKS

1.0 GENERAL

Arrangement for procurement of timber section shall be made with the receipt of order of facilitate natural air seasoning at site.

The Contractor shall invariably submit test certificate in cases where seasoned and treated timber have been specified. Arrangements for test check at site for random samples shall be made by the contractor.

No timber material shall be painted till such time it has been approved by the Site In-charge. A coat of primer shall immediately be applied on receipt of approval from the Site In-charge. The final painting shall be done as indicted in the schedule or as directed by the Site In-charge, when all other works are generally completed and Site In-charge has given approval to proceed with final painting.

If after finishing and erection of wood work any undue shrinkage or cracks due to bed workmanship or material is found, the contractor shall remove the same & supply better and approved materials at his own cost.

All wood savings, cuttings and other rubbish shall be removed and the site left clear as the work progress. All precautions against fire shall also be taken by the contractor.

1.0 WORKMANSHIP :

1.1 FRAME :

The workmanship shall be first class and to the approval of the Site In-charge. Scantlings and boarding shall accurately be sawn and shall be of the required width and thickness with allowable tolerance. All carpenter's work shall be wrought (Planed) except where otherwise described. The workmanship and joinery shall be accurately set out in strict accordance with the drawings and shall be framed together and securely fixed in approved manner with properly made joints. All work is to be properly tennoned, shouldered, wedged, pinned, bided, etc. and properly glued with approved quality adhesive to the satisfaction of the Site In-charge.

All wedges of timber frames shall be protected from being damaged during construction by providing rough timber casing securely fixed and other adequate protective measures.

Door/ Windows frames shall have cut rebates. Planted rebates unless shown in drawing shall not be permitted.

All fully fabricated timber shall be air- seasoned at site for about two months to allow for any shrinkage that may take place. As such it is desirable that the fabrication of frames is started with the commencement of the project work.

The faces of frames or any timber coming in contact with masonry or concrete or embedded in ground shall be treated with hot tar primer or crested before they are placed in position.

No frames shall be painted until it is inspected by the Site In-charge and passed. Immediately after it is passed it shall be given a coat of primer. The final painting or polishing shall be done only when advised by the Site In-charge.

1.2 HOLDFASTS:

Three holdfasts shall be fixed to each post of the door frame. The M.S. holdfasts shall be of size 37. 5cm x 40 mm x6 mm or as required at site and shall be fixed to the frames by means of screws and not nails. The other end of the holdfasts shall be fixed into jambs with [1:2:4] P.C.C. of dimensions as directed. Ends of holdfasts will be fish tailed. Corner straps of M.S. sheets shall be provided and fixed on corners with screws.

Whenever asked for metal fastener or bolts as directed shall be used for rough ground, framing, hangers etc.

The rates quoted for wood work and joinery shall include the cost for all types of holdfasts or Rawl plugs or other approved fasteners directed (Horns for frames shall be cut and shall not be used as holdfasts) cement grouting and fixing to frame work with screws etc. all materials, wastages, labour, T&P hoisting and fixing in position at all heights and depths, providing two coats of creosote /solignum air seasoning of wood.

1.3 PANELLED AND GLAZED SHUTTERS:

Solid wood panels for shutters shall be of pattern & size as specified. Generally each panel shall be in a single width piece. If unavoidable, the panels can be made from more than one place with the prior approval of the Site In-charge. In such cases the pieces shall be jointed with continuous tongue and groove joints and glued together & reinforced with metal dowels. Jointed piece of timer shall be of the same species. The styles and rails shall have 12mm groove in paneled portion, for the panel to fit in. Tenons in rails shall pass through the styles. While assembling leaf, styles shall be left projecting as horn. After the joinery work is assembled and approved by the Site In-charge, the joints will be pressed and secured by about 6mm. dia bamboo/wooden pins and the horns of styles sawn off.

The grains of the solid panel shall run along with the longer dimensions of the panel. Panels shall be framed into grooves to the full depth of groove leaving an air space of 1.6 mm. and the faces shall be closely fitted to the sides of the grooves.

The style and rails of glazed shutter shall be rebated of sizes as shown in drawing to receive glass.

1.4 BATTENED. LEDGED AND BRACED SHUTTERS:

Battens shall not be more than 150mm. in width and shall be put together by tongue and groove joints. Each batten, except the edge batten, shall be nailed to ledges with two wire nails at each crossing of batten with ledges and the nails clenched. The length of nails shall be about 6mm. more than the combined thickness of ledges and battens. The edge

battens shall be fixed to the ledges by two W.I. Screws in lieu of nails. Braces shall run upward from the hinged side the edges of braces and ledges shall be chamfered and the ends of braces bird mouthed into the edges.

1.5 SHUTTERS:

Shutters shall be planned at site to match the finished dimension between rebates of frames leaving and uniform gap of not more than 3mm. between the frame and the shutter end. Shutters shall be hung by screws, as per drawing and specification and properly threaded in. The finished work shall be true to plumb and true to shape. The shutters shall be so fixed, that while closing, the left hand leaf of the shutters is closed first and the right hand leaf of the shutter overlaps on the left hand leaf by minimum 20mm.

SECTION -VIII
SPECIFICATION FOR WATER PROOFING.

1.0 DAMP PROOF COURSE (D.P.C.) :

D.P.C. shall be of thickness as shown in drawing or in the bill of quantities. Unless otherwise mentioned, prop, shall be 1 part of cement, 2 parts of sand, 4 parts of aggregate mixed with approved water proofing compound @ 3% by weight of cement or as per manufacturer specification. Before laying the concrete, the top surface of the wall shall be thoroughly cleaned of all dirt and loose particles, mortar dropping and laitance of any, scrubbing with coir or steel wire brush or by hacking, if necessary, The surface is then thoroughly wetted and the concrete is placed. The concrete shall be laid in every case the full width of the plinth or as shown in drawing. The top surface shall be kept rubbed or rough or double chequered for adhesion of mortar for brick work over D.P.C. On top of D.P.C. bitumen painting is to be done as per I.S. specification.

1.1 METHOD OF MEASUREMENT:

D.P.C. shall be measured net in square meter.

2.0 CEMENT BASED WATER PROOFING:

2.1 MATERIAL :

Water proofing compound confirming to I.S. 2645 shall be used only as per enlisted/ approved manufactured.

2.2 PROPORTION, MIXING AND WORKMANSHIP:

The surface shall be well cleaned by water before the treatment. Then a slurry coat of neat cement using 2.75 Kg./Sqm of cement admixed as per manufacturer's instructions will be grouted water proofing compound conforming to IS . 2645 over the RCC slab.

The cement concrete shall be laid using broken bricks/brick bats 25mm to 100mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with approved water proofing compound conforming to IS :2645 to required slope and treated similarly the adjoining walls up to 300mm height including rounding of junctions of wall and slabs, in the form of ghoondies at rain water pipe.

After two days of proper curing apply a second coat of cement slurry admixed with approved water proofing compound conforming to IS : 2445.

The surface will be finished with 20mm thick joint less cement mortar of mix 1:4 (1cement :4 coarse sand) admixed with approved water proofing compound conforming to IS : 2645 and finally finished the surface with trowel with neat cement slurry and false thread marking of 300x300mm square.

The whole area so finished shall be flooded with water for a minimum period of two weeks for curing and for final test.

The average thickness of the treatment shall be 120 mm and the minimum thickness near khurra /rain water outlets shall be not less than 65mm.

SECTION-IX

METAL DOORS, WINDOWS AND VARIOUS STEEL WORKS

1. **GRILLS AND RAILINGS :**

The grills and railings for windows, verandah & balcony etc., shall be of mild steel. The design of grills/railings and shape and sizes of various a component shall be according to the drawings.

The edge angles and corners shall be cleaned and true to shape. The joints, if possible shall be mechanically inter locked and neatly spot welded in such a way that the grills is rigid. Grinding of the joins to achieve at neat regular finish shall be done. The grills shall be fixed to true plumb line and level as per drawings. Grills etc. shall be painted with one coat of approved primer before they are fixed. The final painting shall be done only after obtaining approval the Site In-charge.

2. Aluminum sections for fabricating fame work door, windows, jallies, etc, shall be of extruded sections conforming to I.S 1948, 1949 or latest edition or as per drawing or as manufactured by Indian Aluminum Co. Ltd. or approved equivalent. The alloy used shall conform to I.S. designation H.E. WP I.S. 733.

SECTION-X

LIST OF MATERIALS OF APPROVED BRAND AND / OR MANUFACTURERS

ITEM	DESCRITION	APPROVED MAKE	
R.C.C WORK			
M25	Footing, Column, beam, lintel, chajjas, slab etc.		
M25	Drain, underground sump, septic tank, site development etc.		
M20	Equipement foundations, Tfr foundation, cable trench, storm water drain, fire wall etc		
STEEL	HYSD Bar Fe 500 grade		
P.C.C (1:3:6)	Below foundation, grade beam, Flooring		
P.C.C (1:2:4)	Toilet sunken slab		
Fly **ash brick**			
25cm x 12cm x 8cm size with cement mortar (1: 6)	All peripheral wall		
25cm x 12cm x 8cm size with cement mortar (1 : 4)	toilet partitions		
Plaster			
16mm thick	All inside wall area		
6mm thick	Ceiling area		
18mm thick	All external building area		
Full body Matt vitrified Tile			
10MM thick, size (600mm x 600mm)	Entrance lobby, staircase, corridor ,Room entry part, gymnasium, housekeeping room etc.	(kajaria / somany / Johnson)	base price of the tile Rs. 90 / Sqft
Full body vitrified tile			
10MM thick, size (600mm x 600mm)	All rooms	(kajaria / somany / Johnson)	base price of the tile Rs. 90 /

			Sqft
Mirror polished granite flooring			base price of the tile Rs. 152 / Sft
20mm thick with cement mortar of mix (1:1)	Window sill		
Ceramic tile			
Ceramic floor tile (30cm x 30cm)	Toilet floor area	Special plain/ Printed series of (somany / kajaria)	base price of the tile Rs. 35 / sqft
Ceramic wall tile (30cm x 45 cm) /(30 x 60cm)	Toilet wall area	Special plain/ printed series of (somany / kajaria)	base price of the tile Rs. 35/- per sqft
Tile for site development & Parking	Paver blocks	Durastone	
Door frame	All main door & toilet door	W.P.C door frame.	Alstone
35mm thick W.P.C door **shutters**	All door		Alstone
Oil bound distemper paint with 1 coat of cement primer and putty	All internal plaster area	Asian paints / Burger paint / Nerolac	
Two coats of weather seal coat with 1 coat of cement primer	All external plaster surface of building	Asian paints / burger paint / Nerolac	
Synthetic enamel paint with 1 coat of primer	All M.S grill area	Asian paints / Berger paint	
Railing	Staircase railing	Stainless steel of 304 grade	
UPVC ventilator	Toilet		
Window shutter	All window (UPVC 2-track Sliding / 3 track window	NCRAFT, KOMMERLING, Duraplast	

TECHNICAL SPECIFICATION OF INTERNAL ELECTRIFICATION WORKS

The details of internal wiring, the position of fittings, fans, switches and plug sockets etc. are indicated in the layout drawings. The position of light fittings, fans, switchboards etc. indicated n these drawings are only for the guidance of the supplier and the actual position of these shall be mutually decided between the supplier and the purchaser. The supplier shall submit the purchaser of his consideration and approval all runs of wiring and the exact position of all the points and the switch boxes first marked on the points buildings.

All internal wiring shall be done in conformity to the latest Indian standard specification/Rules, code of practice adopted by CPWD and other standard practices prevalent in the part of the country. For the purpose of the specification the terminology used shall be as defined in IS:732 and IS:1356 of the definition of points wiring. The installation shall be carried out in conformity to all requirements of IE Act, 1910 and IE Rules 1956.

a) Ceiling rose or connector (in case of pendants except stiff pendant points)

b) Bank plate (in case of stiff pendant).

c) Socket outlet (in case of socket outlet points)

d) Lamps holder (in case of wall Bracket, batten holder bulk head fitting and similar other fittings)

e) Call bell / buzzer (in case words 'via' the switch shall be read 'via' the ceiling rose / socket outlet for bell push, where no ceiling rose / socket outlet its provided.

The following shall be deemed to be included in the point wiring

a) Switch and ceiling rose are required

b) In case of wall brackets, bulk head fittings, cables as required up to the lamp holders]

c) Bushed conduit for porcelain tubing where cables pass through walls.

d) All wood or metal blocks, boards and boxes, R.J. Boxes sunks or surface type including those required for fan regulator but excluding those under the distribution board and main control switch.

e) Earth wire from 3 pin socket point to the common earth including connection to the earth dolley.

f) Earth wire of 16SWG/14 SWG/I.G. wire for loop earthing of the fixture

g) All fixing accessories such as clips, nails, screw, plug, rawl plug, wooden plug, round blocks etc. as required.

h) Joint for junction boxes and connecting the same as required

i) Connections to ceiling rose or connection socket outlet, lamp holders, switch, fan regulators etc

The point wiring in case of fan and light points shall mean the distance between the control switch and ceiling rose, connect or back plate, socket outlet or lamp holder depending upon the fittings measured along the runs of wiring irrespective of the number of wires in run. In the case of socket outlet points, the length shall mean the distance between the socket outlet and the tapping point of live wire on the nearest switchboard or junction box, as the case may be.

In the case of exclusive socket outlet circuits wired on 'Joint Box' system of wiring, any junction provided for extending the wiring beyond the point referred to, shall be treated as the nearest tapping point.In case of call bell / buzzer points the length shall mean the distance between the call bell and the ceiling rose / socket outlet or the bell push (when the ceiling rose / socket outlet is not used).

Sub main shall include the earth wire of adequate size main distribution Board up to sub distribution board B.B. such wiring has been classified on the basis of length. For the internal lighting, either surface conduct wiring system or recessed conduit or batten wiring system shall be provided as specific in the bill of quantities and working drawings.

LED LIGHTS

1. LED light distribution pattern, illuminance, Luminousfles, chromaticity, color temperature, color rendering Index to applicable standard Lm79 & Lm80.
2. LED lights should be as per standards IEC EN 60598 and IEC61547.
3. LED luminaries should in function in a temperature raise -30°C + 60°C under 95% relative humidity condition to simulate adverse operating environment.
4. The LED produces should meet safety standards as per EN60598, EMCIEMI standard as per EN611547/EN 55015 and EN61000-3-2 and 61000-3-3 for Harmonics.
5. The electronic driver should work in the short circuit and open circuit conditions and should work in the voltage range 90V to 3000 volts.
6. LED lighting fixtures should be manufactures with LEDs of on only reputed makes such as Cree, Samsung, Lumiled, osram and other equivalent.
7. The officer-in-change has reserve the right to inspect and tested the quality in Govt. laboratory to ensure technical qualifications to meet the requirements.
8. LED lights no toxic materials U V and IR spectrum protects insect life.
9. It should be manufactured with die-cast aluminum with required colour as per manufacture for released months.

10. The LED lights should function 90 to 380V, 50/60 Hz, PF-Z0.9 (230V AC), Copper temp- 3000K/4000K/ 6000K/ operation temperature - 20°C + 50°C in-gross protection-IP 20, lifespan 30000 hrs.

Conduit wiring

For recessed conduit wiring system the conduit shall be placed in the ceiling / columns etc. before the casting of the slab or column. The conduit pipes shall be properly positioned and fixed so that it will not be displaced at the time of concreting. The junction boxes provided shall be so arranged that its cover will be flushed with the finished surface of the ceiling or column.

For placing the conduits in the walls, chases of ample dimension shall be made neatly to fix the conduit in a desired manner. The conduit pipe shall be fixed by means of staple or saddles not more than 600mm apart. Fixing of standard bends or elbows shall be avoided and all curves maintained by bending the conduit itself with a long radius will permit easy drawing of the conductors. Suitable inspection boxes shall be provided to permit periodical inspection and removal or replacement of wires if necessary. There shall be mounted flush with the wall with holes in the cover of the box.

The switch or regulator box shall be made of metal on all sides except on the front where backlight sheet or Perspex cover painted to match the colours of the wall shall be used I case of surface wiring system. For recessed wiring system, these boxes shall be made flush with the conduit of each conduit or section shall be completed before conductors are drawn in. The entire system of conduit after installation shall be tested or mechanical strength and electrical continuity throughout the earthing of the entire installation shall be carried out in accordance with I.E. Rules and standards. The number of wires drawn in the conduits shall not exceed the numbers those specified in Indian standard specification No.732.

Main and Sub distribution Boards:

The position of main boards for lighting and sub distribution board for different buildings are approximate and the exact location shall be given to the successful tenderer at the time of installation. The scope of this specification includes installation of the panel boards and distribution boards and making necessary connections. The installation of the boards shall be done strictly in accordance with the details supplied with the specifications; the instructions supplied by the switchgear manufacturer, Indian standard specifications and H.E. rules. The supplier shall submit the details of installations to the purchaser for his consideration and approval, prior to installation.

When the switchboards are wall / column mounted top, they shall, be mounted on a suitable angle iron framework. All the metal supports etc. shall be protected against corrosion. The mounting height for such switchboards shall be such that it can be conveniently operated.

Earthing

Earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules and the relevant rules and regulations of electrical supply authorities. The complete earthing work for the installation covered by this specifications shall also be provided taking into account Indian Standard Specification No.IS:732 and IS:3043. The earthing system adopted shall also have adequate mechanical strength.

The work shall include earthing o non-current carrying metallic parts of all the equipment, light fittings, conduit pipes, cable and cable supports and earth strips (the design to be approved by the purchaser) and all the inter connection between the earthing system to a value mutually agreed upon\ between the purchasers and the supplier.

Installation, testing and Commissioning:

The supplier shall be responsible for the installation testing the commissioning of all the equipment and materials supplied by him against this specification. This shall also include the provision of miscellaneous wiring and supports and earthing in compliance with Indian Electricity rules and to the full satisfaction of the Government Electrical Inspector. All small items such as clamps, bolts, nuts, racks, supports, miscellaneous wiring etc. required to make the installation complete, shall constitute the part of major items specified in the bill of quantities and the tenderer should quote for each item taking these into consideration.

The responsibility of the supplier shall include receiving all the equipment and materials at site, storage for required period, handling the same at the site of erection, final execution , erections, revisions of equipment, if any, testing and commissioning and handing over the installation complete in all respect to the entire satisfaction of the purchaser's authorized representative. The supplier shall make good of all the damaged equipment and materials during this period at his own expense. The supplier shall submit sample of each and every equipment and materials for the final approval of the purchaser's representatives immediately after the acceptance of offer. All the equipment and materials shall be supplied exactly as per the approved samples. If at any stage the purchaser brings to the notice of the

supplier any discrepancy or defect the supplier shall replace the same at his own expense.

The supplier shall render all reasonable assistance to the purchaser in getting the installation approved by the Government Electrical Inspector prior to the energisation and supply necessary drawings, test certificates and both for tests carried out at the factory and site as well as the tests which the inspector may demand. In case any addition of alternations are required, to be made in the installation or in the equipment as per the directive of the Government Electrical Inspector / Local Authorities, the same will have to be carried out by the supplier, at his own expense.

The position of light fittings, main board, switches, sockets and routes of pipes and cables shown in the drawings are only indicative. The actual position of these shall be decided at site at the time of execution joints by the supplier and the purchaser's authorized representative. The position of light fittings, pipes and board if required, to be changed / shifted due to the change in the building design etc by the purchaser's authorized representative, the same shall be carried out at no extra cost.

All the materials supplied to the contractor according to the Contract condition will be subject to inspection and approval of the officer or his representative from time to time. The contractor will provide all facilities of such inspections free of cost. At the time of inspection, OPTCL representative will have full liberty to reject any such materials, which does not conform to the specification / requirement. No claim for any rejected materials will be entertained by OPTCL. The contractor will remove all rejected materials from site at his own cost. No surplus materials procured by the contractor will be accepted by OPTCL. The contractor will be responsible to get the Electric installations cleared by the Electrical Inspector of Odisha Government. Only the inspection fee will be reimbursed by Department on production of challan copy.

Installation and Maintenance Tools:

The supplier along with the tender shall furnish a complete list of tools, appliances and accessories required for the installations of switch grass, light fittings, pipes cables and wires.

Drawings:

All drawings, test certificates, instructions manuals etc. shall be in English Language and all dimensions and weights shall be in metric units.

The tenderer shall submit with the tender general arrangement drawings for the installations work, typical methods and cabling and cables supports pipe work and pipe

supports, typical methods of earthing and fixing of light fittings earthing etc. as offered by him in the tender.

The contractor shall submit for the purchaser's approval all layout, the general arrangement drawings as well as the typical details of all types of installation work in three sets before commencing the manufacture and the site installations work well in advance so that the site work shall not suffer.

After obtaining approval of the above drawings the contractor shall supply three sets of the following drawings:

(a) The arrangement and support of conduit pipe

(b) The position of light fittings, switches / plug socket and switch boards

(c) Earthing installations

(d) Layout plan showing the entire cable network

On completion of work, the successful tenderer shall supply one set of tracing in transparent linen and five sets of prints of all drawings incorporating all the changes / modifications affected during the execution of the contact. All wiring diagrams shall indicate clearly, the switch board, the runs of main and sub-main wiring and the position of all the points with their controls. All the circuits shall be clearly indicated and numbered in a accordance with IS:375. The technical literatures and operating instructions and the maintenance manuals shall also be supplied in triplicate to the purchasers after the completion of the installations work.

Test:

Manufactures standard tests in accordance with Indian Standard and other standards, adopted shall be carried out on all the equipment and accessories covered by this specification so as to ensure efficient and satisfactory performances of all the components and also the equipment as a whole under working conditions at site. The tenderer shall submit a complete list of all such tests. If the purchaser, if so desired for special tests, to be carried out, under certain conditions the same shall be made by the successful tenderer at his own expenses. All equipment shall be tested at site before the commissioning in accordance with the adopted standard and Indian Electricity Rules. Voltage test shall be carried out on each circuit on completion of wiring and cabling.

Technical Data:

The tenderers shall submit with their tender all such technical data, which are required for complete evaluation of the equipment offered. The suppliers shall give complete technical information of the equipment as detailed in Annexure and relevant Indian standards. The tenderer should supply such details of all equipment and materials offered especially with regard to the following.

a) Fuse switch board and distribution boards

b) Light fittings

c) Conduits and the accessories for them

d) Switches / plug sockets

e) Cable and wires

The tender shall give along with his tender the following details:

a) Complete details of earthing electrodes, earthing station and earthing conductors

b) Details of conduit supports

c) Details of all the equipment and accessories to be supplied

Exception to Specifications:

The object of this specification is to have all tenderers quote for equivalent materials and workmanship. It is, however, understood the certain manufacturers may not be able to offer as specified in every case, where the tenderer may find it necessary to deviate from the exact letter and not the intent of the specification, he must specifically state what these deviations may be at the time he submits the tender. All deviations must be grouped in one statement. No deviations other than those includes in the tender will be permitted.

PVC insulated Cables and Wires:

For 415V Distribution system, cables of voltage grade not less than 1000V shall be used. These cables shall be heavy-duty class, PVC insulated and PVC sheathed copper conductors. The wires used in the lighting installation shall be PVC insulated and PVC sheathed copper wire in case of conduits wiring and of 660V grade. Wires of different colours shall be made use of for quick identification of phase wire / neutral wire etc. All cable of wires shall comply with the requirements regarding the manufacture and testing etc as specified in India Standard Specification IS: 1554 and IS:694.

The length of cables indicated in the bill of quantities and drawings are only indicative and the Successful tenderer will be paid for the exact length of cables laid at site. No joint shall be allowed in a run of cables, which can be covered by a possible drum length of cables.

Fuse switch / switch fuse shall be metal-clad dust and vermin proof suitable for use under climatic conditions prevailing at site. Switch fuse / fuse switch units shall comply in general to IS:1567/4064 with regard to design and constructional / features.

The 'ON' and 'OFF' position of the switch handles shall be distinctly indicated and interlocks shall be provided to ensure that the switch cover cannot be opened

unless the switch is in the 'OFF' position. Means shall, however, be provided for releasing the interlock to permit closing of switch with cover open for testing purposes. Designs with normal conventional position of switch handles, i.e. with switch handle up in the 'ON' position and down I the 'OFF' position shall be preferred. All live parts inside the switch shall be properly surrounded and inter phase barrier shall be provided.

Switch fuse / fuse switch units, distribution boards shall be provided with necessary metal fame work so that they can be mounted on wall / columns structure etc. as desired. The panel boards, shall be wall mounted type or floor mounted type as specified in the bill of quantities or drawings. Necessary supporting metal frame of approved design shall be provided for all panel boards

The arrangements of work boards shall be such that the operational handle of the top mounted switches are within the convenient of operators (about 1.2 M from the finished floor level) and proper space shall be provided for the termination of the cable in the switches provided below the bus-bars.

The bus-bars within the bus-bar chamber shall be liberally spaced for taking the riser connection. The bus bars with aluminium conductors shall be provided and PVC sleeves of different colour shall be mounted on them for easy identification, Clamped joints for taking the riser connections, instead of bolted type shall be preferred.

Two bolted type earthing terminals shall be provided on the switch boards. All individual switches shall be connected with suitable size earth wire to the main earthing terminals of the switchboard. Hanger Board and shock treatment / charts shall be supplied wherever required. At the incoming side of each pen phase, 3-neon type indicating lamps should be provided at the main board.

Switches and Plug Sockets

Switches provided for control of light points shall conform to IS:1087 and shall be rated for 5A/15A 250V

Ceiling Fans and Exhaust Fans:

Ceiling fans shall conform to Indian standard specification IS: 374-1960. The fans shall be supplied with all standard accessories like regulator and capacitors etc.

The performances rating of the propeller fans shall in accordance with stipulations of IS:2312. All fans shall be robust in design and construction and shall be supplied complete with wall brackets / clamps etc.

C O D E S

Codes shall mean the following including the latest ascendants and / or replacement if any.

a) Indian Boiler Act, 1923 and Rules and Regulations made their under

b) Indian Electricity Act, 1923 and Rules and Regulations made there under

c) Indian Factories Act, 1948 and Rules and Regulations made there under

d) The minimum wages Act

e) The Women's Compensation Act

f) The Payment of Wages Act

g) The Fatal Accident Act

h) The Industrial Employment Act

i) The Employment provident Fund Act

j) Indian Explosive Act 1984 the Rules and Regulations made there under

k) Indian Petroleum Act 1934, and Rules and Regulations made there under

l) A.S.M.E. Test Codes

m) AIRE Test, Codes

n) American Society of Materials Testing Codes

o) Standards of the Indian Standards Institution

1) Low Tension Circuit Breakers : IS 2516-1955 Part I Sec.1

2) Switchgear Bus Bars IS 375-1963

3) HRC fuse links IS 2208-1962

4) Distribution fuse boards IS2675-1966

5) Enclosure for Low Voltage switchgear IS214701962

6) PVC Cables IS1554-1975

7) Tabular fluorescent lamps for Cameral lighting service IS2418-1963

8) Tungsten Filament Lamps for cameral service IS415-1963

9) Ceiling Fans IS274-1966

10) Flood lights IS1947-1961

11) Wall Glass flame-proof electric light fittings IS2206-1962 (Part 1)

12) Water Tight Electric Light Fittings IS3553-1956

13) Steel Boxes for Enclosure of Electrical Accessories IS5133-1969

14)	Fittings for Rigid Steel conduit	IS2667-1979
15)	Rigid steel circuits for electrical wiring	IS3837-1966
16)	Accessories for Rigid Steel Conduits for Electrical Wiring	IS3837-1966
17)	Switch Socket Outlets	IS3837-1966
18)	PVC Wiring	IS694-1977
19)	Switches for domestic and similar purpose	IS3854-1966
20)	PVC wiring	IS694-1977
21)	Call Bell and Buzzers	IS2268-1966
22)	Straight through joint boxes and leads sleeves or paper insulated cables-	EID-0032-1964
23)	Earthing	IS3043-1966
24)	Electrical Wiring installations	IS732-1963
25)	Switchgear	IS3072-1965 (Part I)
26)	Lighting protection	IS2309 –1969
27)	Public Address system	IS1882-1962
28)	Low Tension switch use units	IS4064-1978
29)	Code of Practice for Automatic FIRE ALAM system	IS2189-1970
30)	Specification for Heat Sensitive Fire Detectors	IS2175-1977
31)	Guide for Safety procedure in Electric work	IS5216-1969
32)	Rubber Mats for Electric works	IS5424-1969
33)	Low Tension Circuit Breakers :	IS 2516-1955 Part I Sec.1
34)	Switchgear Bus Bars	IS 375-1963
35)	HRC fuse links	IS 2208-1962
36)	Distribution fuse boards	IS2675-1966
37)	Enclosure for Low Voltage switchgear	IS214701962
38)	PVC Cables	IS1554-1975
39)	Tabular fluorescent lamps for Cameral lighting service	IS2418-1963
40)	Tungsten Filament Lamps for cameral service	IS415-1963
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42)	Flood lights	IS1947-1961
43)	Wall Glass flame-proof electric light fittings	IS2206-1962 (Part 1)
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63) Guide for Safety procedure in Electric work IS5216-1969
64) Rubber Mats for Electric works IS5424-1969

List of Approved Makes

N.B: Any other reputed equivalent make, may be considered with due approval, Subject to fulfilment of required technical specification and relevant BS/ISI marks.

Sl No	Material Description	Makes Materials
1	Non-Metallic Conduit pipe &Accessories	AKG/Sudhakar/Polycab/Precision
2	Modular Switch, Socket, Plug, fan Regulator & SwitchBoards	Legrand/L&T/Anchor/Havells

3	PVC Insulated wires	Finolex/Anchor/Polycab/L& T/Havells/R.R/KEI
4	PVC Insulated cable	Gloster/Polycab/Havells/Finolex/KEI
5	Cable lugs	Dowells/Clipon
6	Cable, Jointing kits	M-Seal
7	MCB, MCCB, RCCB, RCBO, Change over switch, Isolator	Legrand/L&T/ ABB/Siemens/C.S
8	Distribution Boards	ESS/Technocrat/Power Tech/Utkal
9	Metal Plug Socket	L&T/Crompton/Legrand
10	LED Light Fittings	Phillips/Crompton/Wipro /LT/TRILUX/Halonix/REGENT
11	Ceiling Fan/wall fan	Halonix/ Havells/ Bajaj /Usha
12	Exhaust Fan	Crompton /Bajaj/ Almonard/Usha
13	Call bell	Anchor/Cona
14	G.I Pipe	TATA/Jindal/Prakash

TECHNICAL SPECIFICATION FOR SANITARY AND PLUMBING WORKS

The following specifications are to be read in conjunction with the details given in the schedule of quantities.

1. Standard Specifications: All works under this contract shall be carried out in accordance with the technical specifications & the latest issue of the Indian standard Specifications applicable to the particular class of work. If Indian Standards are not formulated for any particular material of work, the relevant British Standards shall apply, relevant issues of I.S. Specifications applicable to the particular work have been described along with the specification for the respective works. In case of any confusion or dispute regarding the meaning and interpretation of any specification for the respective works. In case of any confusion or dispute regarding the meaning and interpretation of any specification for the respective works, the decision of the /Site In-charges shall be final and binding on the Contractors.

2. General Specification for water supply. Sanitary Installations, sewerage & Drawing works.

a. Execution through licensed Sanitary contractors Firm.
All water supply, sanitary installations, sewerage & drainage works shall be executed through licensed sanitary contractors. Particulars of the firm viz. Name & address of the firm, r egistration & license no etc. (Issued by the authorities) shall be furnished along with the tender.)

b. Complying with by-laws etc. of local Authorities.

All water supply, Sanitary installations, sewerage & drainage works shall be carried out by skilled and licensed plumbers/ technicians in a workman like manner complying in all respects with the relevant by-laws of the Municipal or of the local Authorities under whose jurisdiction the work has be executed.

c. Contractor's responsibility for sanction from local authorities.
For the works undertake by him & works dependent on his work, the contractor shall prepare plans / drawings and get it sanctioned from the Municipal or other Govt. Authorities as may be required by law, the contractor shall include the cost for the same in his tender rates unless otherwise specified in the tender Items.

d. Contractor's responsibility to ensure continuance of existing services.
During execution of the new works, the Contractor should ensure that the existing services (viz. water supply, sewer, drain Lines etc.) are not disrupted in any way & in case it happens accidentally the services shall be restored immediately at contractor's cost.

However, when in the opinion of the Site In-charges, it is imperative to locally divert/ Disconnect for a short time/reconnect the existing lines, it shall be done by the Contractor as directed by the Site In-charge. Payment for the

necessary pipe lines would be made as per tender items, however all other costs including temerity measures shall be borne by the contractor.

3. Documents to be enclosed along with the final bill :

3.1 Completion Dressings: On completion of all works under his contract, the contractor shall prepare & submit (At his own cost) 3 sets (1. Blue print or Drawing on treating cloth & 2. Ammonia prints of each drawing) of completion drawings, showing the entire system of water supply, sanitary installations, drainage & sewerage disposal incorporating up to date changes (If any) at site in all the works mentioned above & permanent structures, roads, pathways, boundary lines etc.

The following drawing (In scales as instructed by the Site In-charges) shall be prepared and submitted to the Site In-charges along with the contractor's final bill: The following drawings (In scales as instructed by the Site In-charges) shall be prepared and submitted to the Site In-charges along with the Contractor's final bill.

a. Site layout (Sewerage & Drainage Lines)
b. Any other drawings as required any instructed to be done by the Site In-charges.

3.2 List of materials / installations handed over: on completion of works in all respects and satisfactory testing, the contractor shall prepare & submit a list, along with the final bill of all materials / installations handed over to the authorized representative of OPTCL.

3.3 Transfer of Manufacture's guarantee : When manufacturers guarantee period for any material/ installation expired at a letter date then that of the expiry date of the defect liability period of the contractor, the contractor shall transfer the guarantee in the name of the this transfer should be made at the item of submitting the contractor's bill for release of retention money.

4. Cement: The cement must be kept in dry place under cover, Samples of cement may be taken by the Site In-charges from time to time for testing at any approved laboratory whose reports shall be accepted by both parties.

5. Sand: Sand is to be clean, coarse and sharp and is to be washed, if so directed.

6. Aggregate: The aggregate for the reinforced cement concrete work shall be stone chips or broken gravel of approved quality which will pass through 12mm. mesh but be retained on 6mm mesh.

The aggregate for the support or drain pipes, manhole chambers etc. shall be of stone chips of 20mm & down size.

7. Concrete : For reinforced cement concrete work the cement, sand and aggregate shall be in the proportion of (1:2:4) for foundation work, the mix will be in the proportion of (1:3:6) whenever reinforced cement concrete (RC.C.) is mentioned in schedule of quantities, it shall mean inclusive of cost of steel reinforcement bars, providing & removing shuttering etc. all complete.

8. Bricks : Bricks shall be of the best quality will burnt sound, hard & giving clear

ringing tone of sound when struck against each other and well-shaped bricks having crushing strength so kg/sq. cm. unless stated otherwise in the respective schedule of items of standard dimensions and to be soaked for at least six hours in water before use.

9. Brick work: The brick work shall be in English bond, and shall be laid in cement sand mortar in the proportion of (1:6), if not mentioned otherwise. Where corbelling is necessary, projection in each course shall not exceed (2 1/4") 57mm. All brick work must be kept wet till the mortar will fully set.

10. Soling: For soling, the bricks shall be having crushing strength 75 kg/sq. cm., bricks laid flat, the joints being well packed with loose sand.

11. a) Excavation general: Excavation shall generally form part of the item under the schedule and shall not be paid for separately unless otherwise specified in the schedule of quantities. It includes excavation in all kinds of soil including shoring and bailing out water where necessary and refilling the excavated trenches, in 5 cm layers properly rammed and watered and neatly dressed at top. If the excavation is done to dimensions greater than those shown on the drawings or as directed by the Site In-charge, the excess depth shall be made good at the cost of the contractor. The excavation work should be done in a manner that does not in any way endanger the stability of the adjacent buildings or other structure or services. Where any road. Pavement of crossing are cut these shall be restored to their original conditions at no extra cost. Moreover after completion of the work the contractor shall have to dress the site including disposal of the surplus earth at their own cost as directed by the Site In-charge.

b. Trenches, General: The width of the bed of trenches shall be the exact width as show on the drawings or as specified.

In the firm soil, the sides of trenches shall be kept vertical up to a depth of 1.82 meter and for a greater depth, the trench shall be widened be allowing steps of 45cm (1'-6") on either side after every 1.82 M depth from bottom so as to give side slopes of (1/4" to 1") 6 mm to 25mm. Where the soil is soft, loose or slushy the width of steps shall be suitably increased as directed by the Site In-charge. It shall be the responsibility of the contractor to take complete instructions in writing from Site In-charge regarding the stepping, sloping or shoring to be done for excavation in trenches deeper than 1.83 M for firm sill or any depth for soft, loose of slushy soil.

The bed of the trenches shall be made level and firm by watering and ramming. Any soft or defective spots that are found shall be filled with concrete of the same proportion as specified or as may be directed by the Site In-charge.

12. Sanitary Installation:

a) Indian Type W.C. Pan: The W.C. pan shall be of white vitreous China of specified size and pattern wash down type unless otherwise specified. It shall be of back flush inlet type. The pan shall be of approved best quality and shall bear the mark of the Manufacturer. The pan shall be provided with

a 100 mm C.I. ''P' or 'S' trap as specified in the item with minimum 50 mm seal.

b) Fixing: The W.C. pan shall be sunk or raise from the general floor as specified, but its surrounding floor shall be sloped towards the pan. Care shall be taken so that the pan is not damaged in the process of fixing; if damaged in any way, it shall be replaced immediately. It shall be fixed in a proper cement concrete base of [1:3:6] proportion taking care that the cushion is uniform and even without having any hollows between the concrete base and pan.

The joint between the pan and the trap shall be made with cement mortar [1:2] with jute hessian gasket soaked in coal tar and shall be leak proof.

13. European type W.C.

a) European type W.C. pan shall be readily flushed of wash down type, shall bear the mark of an approved firm and shall be of best quality. The closet shall be of vitreous china ware having integrated trap 'p' or 's' type with or without vent hole right or left as directed.

b) Seat: The seat with lid shall be of solid white plastic or approved colour or as specified with rubber buffers and shall be fixed in position by using chromium plated (C.P.) brass hinges and screws.

14. Urinal:

a) Lipped Front Urinal: The urinal shall be of flat back lipped front basin of required dimensions of white vitreous chinaware of an approved make as specified. It shall be fixed in position by using rawl plugs embedded in the wall with screws of proper size or fixed as per approved Manufacturer's specification. Each urinal shall be connected to a 32 mm N.B. PVC waste pipe with clamps which shall discharge into a channel or floor trap, or as specified.

b. Painting : The inside of the invisible portions of the fittings and brackets connected with urinal basin shall be painted with approved bituminous paint and outside of the brackets, etc. shall be painted with a priming coat of red oxide to give an even shade to match the colour of surrounding walls. The cost of such painting shall be included in the rate quoted for the concerned tender items.

15. Flushing System

Only where specifically instructed for E.P.W.C.s and Orissa type I.P.W.C.s, low level type flushing cistern to be provided and shall be of white vitreous chinaware of approved make, 10 liters capacity with internal fittings, brackets and C.P. 40mm flush pipe & bend with rubber packing , brass C.P. handle etc. The low level type flushing cistern shall be connected with the W.C. pan by means of 40mm dia C.P. flush bend with rubber packing. The inlet pipes shall be connected with brass C.P. heavy connector of required length with both ends C.P. nuts & washers.

16. Wash Hand Basin

a) Wash Hand Basin: The basins shall be of white vitreous china of approved pattern. The size of the basin shall be as specified. The basins shall be of approved quality and make.

b) Fittings: Each wash hand basin shall be provided with pillar tap as specified, having a centered tap hole with C.P. protruded nose pillar cock heavy type. This must be included with 32 mm dia C.P. basin waste, C.P. Bottle trap & concealed G.I. waste pipes (Or heavy PVC water pipe of required length with C.P. brass couplings) as stated in the respective Schedule of items.

c) Fixing: The circular basins shall be supported on counter top and the rectangular basins shall be supported on a pair of C.I. concealed type brackets embedded in wall or fixed in position by means of wooden cleats and screws as required.

d) The waste pipes shall discharge into the floor trap inlet or as specified.

17. Sinks :

a. Sinks: The sink with drain board shall be of best quality stainless steel, make of approved quality & brand . The size of the sink shall be as specified. The sink shall be of approved quality.

b. Fixing: The sink shall be supported on M.S. fabricated on C.I. cantilever bracket to match with sink profile. Embedded or fixed into position by means of wooden cleats and screws or embedded in wall with concrete as per site condition. The brackets shall be painted with approved shade and colour to match with the surrounding finish.

c. The G.I. waste pipe shall discharge into floor trap inlet or as specified.

18. Toilet Requisites:

a) Mirrors: The piece glass mirrors shall of approved make glass as specified. The size and shape of the mirror shall be as specified. It shall be mounted on the asbestos sheet and shall be fixed in position by means of C.P. brass dome shaped screws over rubber washers and rawl plug firmly embedded in wall.

b) The plate glass mirrors of suitable shapes & size as per detailed drawings shall be provided with accessories for round counter type basins.

c) Water connection: water connection to flushing cistern, wash hand basins shall be by means of white PVC connector or C.P. connector with stop cock as specified in the respective items.

d) Shelf: Unless otherwise specified the shelf shall be of porcelain of approved quality & design. The size of the shelf shall be as specified. The brackets shall be fixed to the wall with C.P. brass screw to wooden plug firmly embedded in the wall.

e) Urinal Partition: Unless otherwise specified partition for urinal shall be shape

out of 20mm thick x 900 mm white marble. Fixing shall be done by inserting the portion approx 75mm inside wall & grouting the same in cement concrete (1:3:6). All the exposed surfaces & edges shall be properly ground to shape and polished. Joint with wall to be finished with white cement.

f) Towel Rail: The towel rails with bracket of brass C.P. or anodized aluminum as stated in Schedule of Items shall be of approved shape and design. The size of the rail shall be of approved shape and design. The size of rail shall be of approved shape and design. The size of the rail shall be as specified. The brackets shall be fixed by means of C.P. brass screws or Rawl plug firmly embedded in wall.

g) Paper Holder:- The paper holder shall be for white vitreous chinaware of recessed type & the rate shall include chase cutting of walls, setting in cement sand mortar & making good the all-round joint with white cement.

19. H.C.I. soil, waste and vent (Anti-syphonage) Pipes and fittings:

a) H.C.I Pipes and fittings: The heavy cast iron pipe and fittings should be of I.S.I marked pipes & fittings conforming to I.S 3989 & I.S. 1729 of latest editions, of approved quality. The pipes shall be free from cracks and other flaws. The interior of pipes and fittings shall be clean and smooth and painted inside with approved anti-corrosive paint.

Nominal mass: The nominal mass and thickness of pipes are given below along with Tolerance acceptable as per I.S. norms:

Dia of pipe	Thickness	Nominal Mass of pies exclusive of ears (Kg)	
	5	9.56	11.41
75	5	13.83	16.52
100	5	18.14	21.67
150	5	26.70	31.92

b) Fixing: The pipes and pipes and fittings shall be fixed to walls by using proper clamps. The pipes shall be fixed perfectly vertical or in a line as directed. All soil pipes shall be carried up above the roof and shall have H.C.I. vent cowl. Where pipes are laid along walls, the cast iron pipes are to be fixed 25mm away from the wall surface. Cast iron bobbing with nails & clamps etc. are to be used for this purpose. Cost of these items shall be included in the item for pipes & specials.

Fabricated M.S. clamps / hangers may be used only on specific instructions of Site In-charges, where diversions are to be provided. Payment for such fabricated M.S. clamps /hangers shall be made separately as per Schedule of items.

The access door fittings shall be of proper design so as not to from any cavities in which fill may accumulate. Doors shall be provided with brass bolts & rubber

insertions connections between main pipe and the SBI pipes shall be mad by using trenches and bends invariable with access doors for cleaning.

c) Jointing: The angular space between the sockets and spigots will be first well packed in with spun yarn leaving a depth of not less than half the depth of the sockets as measured from the lip of the socket for lead. However, the minimum quantity of lead to be used per joint shall be as follows :
For 100 mm nominal dia pipes-1.25 kg of lead per joint For 75 mm nominal dia pipes-0.87kg of lead per joint For 50 mm nominal dia pipes - 0.56 kg of lead per joint

The joint may be leaded by using proper leading rings or by wrapping a ring of lamp rope covered with clay round the pipe at the end of the socket leaving a hold through which lead shall be poured in. For pipes with sockets facing upwards 15mm high clay round the socket edge may be used as guide for leading.

The spigot shall be carefully centered in the socket by two or three laps of treated (Soaked in hot coal tar & dried) spun yarn, twisted into ropes of uniform thickness, well caulked, into the back of the socket, leaving the requisite depth of the lead. The lumps of the yarn must be longer than the circumference of the pipe. No making up of the pieces of yarns shall be allowed.

The lead shall be rendered thoroughly fluid and each joint shall be filled in one pouring.

d) Lead for joints: It shall be bluish grey in colour very soft and malleable, readily melted. free from mixture of zinc or tin conforming to I.S. 782 of latest edition.

e) Spun yarn for joints: This shall be of best quality preferably white. It shall be free from dust etc. It shall be soaked into hot coal tar or bitumen and dried before use.

f) Caulking: After the joints have been run they must be thoroughly caulked until they are perfectly water tight. Caulking of joints will be done after conveniently length of pipe has been laid and leaded. The leading ring shall first be removed with a flat chisel but leaving enough so that the joint can be finished 3mm beyond the socket face and then the joint caulked round three times with caulking tools of increasing thickness and hammer of 4 to 6 lbs, weights. Lead joints shall not be covered till the pipe line has been tested under pressure but the rest of the pipe line may be covered up to prevent expansion and contraction due to variation in temperature, and any lead outside the socket shall be removed.

g) When it is inconvenient or dangerous to use molten lead for joints, they may be made with lead wool inserted in the sockets not less than 6mm thick and thoroughly caulked, When working with lead wool, it is very important to use caulking tools of appropriate thickness to fill the joint space and to thoroughly consolidate the materials from the back to the front on the

socket.

h) Testing: All H.C.I. pipes and fitting including joints will be tested by smoke test and left in working order after completion. The smoke test shall be carried out as stared under smoke shall be pumped into the drainage at the lowest end from smoke machine which consists of blower and burner. The materials usually burnt are greasy cotton waste which form clear pungent smoke which is usually detectable by sight as well as by smell if leaking occurs as any point of the drain. The contractor will have to rectify all defects traced in such tests at his own expense to the complete satisfaction of the Site In-charge. The traps and soil fittings should be of heavy cast iron and should have water seal at least (3") 50 mm deep.

i) Anti-syphonage pipes: H.C. I. Anti-syphonage pipes shall conform to I.S. 3989/1970 & I.S. 1729/1964 with lead chalked joints. The main anti- syphonage pipes shall be of 3" (75mm dia) or (2") 50mm dia internal as specified.

a) Painting: All the exposed H.C. I. pipes and fittings shall be painted with two coats of oil pint of approved quality, manufacture, colour and shade to match with the surroundings, unless stated otherwise all concealed pipes & fittings shall be painted with 3 coats of anticorrosive bitumastic paint. The cost of such painting shall be included in the contractor's rates.

b) The surface of the pipes and fittings to be painted shall be cleaned thoroughly, red oxide or other metal primer shall be painted and allowed to dry. The finishing shall be done by painting 2 or more coats with paint of an approved colour to give an even shade.

20. Galvanized Iron pipes

a) Fittings: The pipes shall be of galvanized (As per I.S. 4736 of latest edition) steel, screwed and socketed and shall conform to I.S. 1239 (Part-I) of latest edition. The fittings shall be of malleable cast iron (Galvanized) with ISI mark up to 100mm nominal bore. For pipes above 100 mm N.B., welded steel fittings (Galvanized) may be used. Unless otherwise specified thread shall be screws taper thread and sockets parallel thread and each tube shall be laid beveled sufficiently to prevent damage to the leading thread.

Nominal Bore	Weight of Pipe in kg/mtr		
	Light	Medium	Heavy
15 mm	0.96	1.23	1.46
20 mm	1.42	1.59	1.91
25 mm	2.03	2.46	2.99
32 mm	2.61	3.17	3.87
40 mm	3.29	3.65	4.47
50 mm	4.18	5.17	6.24

b) Laying & Fixing: Where pipes have to be cut or rethreaded, ends shall be carefully filled out so that no obstruction to bore is offered.

In jointing the pipes, the inside of the socket and the screws end of the pipes shall be rubbed over with white lead and few turns of hemp yarn wrapped round the screwed end of the pipe which shall then be screwed home to the socket with a pipe wrench. Care must be taken that all pipes and fittings are kept at all times free from dust and dirt during fixing. Any threads exposed after jointing shall be pined.

c) All cutting holes, chases, trenches etc, at any place necessary in connection with the work as per items of this tender any subsequent mending damages are to be included in the rates and not paid extra unless other - wise specified. Internal work: Internal G.I. pipes and fittings inside the duct walls shall be generally fixed on walls by means of standard pattern holder bat clamps keeping the pipe 20mm clear of the wall everywhere or concealed where required as directed. If G.I. pipes and fittings of inside wall are to be concealed, it shall be by chasing floors and walls as directed, where it is imperative to fix the pipe inside toilers , kitchen, pantries, in front of a house or any conspicuous position, where it looks unsightly, chasing to be adopted. The holder bat clamps shall be fixed at a distance not exceeding

3.00 meter apart for vertical pipes & 1.50 meters for horizontal pipe s which are to be secured to walls by hooks. The valves shall be fitted with a union. In long length run of a pipe at least in every 3.00 meters apart there shall be a long screw/union.

All pipes and fittings shall be fixed truly vertical and horizontal or as directed by the Site In-charges.

d) **External work:** For external work G.I. pipes and fittings shall be laid in trenches. The width of the trench shall be of minimum width required for the work. The pipe s laid underground shall not be less than 60cm from the ground level. They shall be surrounded on all sides by sand of approved quality. The work of excavation and refilling shall be done in accordance with the general specification for earth work.

e) **Painting:** All internal G.I. pipes and fittings shall be painted with 2 coats of oil paint of approved quality manufacture, colour and shade. The cost of such paintings shall be included in the contractor's rate. All pipes and fittings in external work shall be painted with 3 coats of anti-corrosive Bitumastic paint. Unless otherwise specified all concealed pipes and fittings shall be painted with 3 coats of Bitumastic anticorrosive paint.

f) **Testing:** After installation (But before covering up where needed) all G.I. pipes, and fittings shall be tested by Hydraulic pressure machine to a pressure of 7 kg. per sq. cm. All lead joints must be mad e leak proof by tightening or re-doing at contractor's expense and the pipe line must be retested to the above pressure.

21. Brass or C.P. on Brass water Fittings (As specified in respective schedule of items):

All fittings shall be of standard Manufacture and shall in all respect comply with thE Indian standard specifications. The brass fittings shall be fixed in pipe line in workman like manner . Care must be taken to see that joints between fittings are made leak proof . The fittings and joints shall be tested to a pressure of 7 kg. per 80cm unless otherwise specified. The defective fittings and the joints shall be repaired, redone or replaced at the contractor's expenses.

21.1 Bib cock : The bib cock shall be of horizontal inlet & free outlet of specified quality of screw down a pattern of the size as specified. The closing device shall work by means of disc carrying a renewable non-metallic washer which shuts against water pressure on a seating at right angles to the axis of threaded spindle which operates it. The handle (Head) shall be of approved design & shape. The cock shall open in anti-clockwise direction. The cock shall be polished bright (For brass) and chrome plated on brass (For C.P.). Minimum weight shall be 0.40 kg. for 15mm size bib cock.

21.2 Stop Cock: The stop cock shall be plain or angular type as per it's place of installation & of specified quality opening anti clockwise & of screw down pattern of the size as specified. Other specifications shall be as per the specification of Bib cock above.

22. Stoneware pipe Drain :

a) Salt Glazed stoneware pipes and fittings: This shall conform to Indian Standard specification No. 651 of latest edition and shall be of the size and type as indicated in the Schedule. Where not specified, the S.W. pipes and fittings should be of M/s Hind's products of M/s Perfect Potteries, Jabalpur or Orind brand. The rate shall be inclusive of jointing materials and making holes/chases (if required) through masonry and concrete and making good the same, and cost of concrete and earth works.

Pipes shall be laid in straight lines and to even gradients as shown in the drawings or as instructed. Adequate care shall be exercised in setting out and determining the levels of the pipes and the contractor shall provide suitable instruments. templates and equipment necessary for the purpose. All pipes shall be kept free from earth, debris, superfluous mortar and other obstructions drying, laying and until the completion of the contract when the work shall be handed over in a clean condition.

b) Buried Services: All pipes, ducts, cables, mains as other services exposed by the excavation shall be effectively supported by timbering or other means. The contractor shall be responsible for any damage occurring to the buried existing services and make good the same at his own cost to the satisfaction of the Site In-charges.

c) Laying and jointing stone ware pipes: Stoneware spigot and socket pipes

and fittings as specified shall be thoroughly bedded on the solid ground, throughout the length between joint holes laid to true invert, straight lines and falls, each pipe being separately bonded between sight rails. The spigot to each pipe shall be placed in the socket of the one previously laid. The pipes shall ten by adjusted and fixed in its correct position but it shall not be jointed until the earth has been partly refilled over the portion of pipe between joint holes. A ring of rope yarn dipped in tar and liquid mortar or neat cement slurry shall next be inserted in the socket of t he pipe previously laid and driven home with a wooden mallet. Such yarn, when in position, shall not occupy more than one fourth of the total depth of socket. The socket shall then be completely filled with stiff mixture of cement mortar (1:2) and a fillet of the same worked around outside. The fillet shall be beveled off at an angle of forty five degrees to the barrel of the pipes. The cost of such jointing shall be included in the concerned schedule Item of pipelines.

Special care shall be taken to see that any excess of cement etc. is neatly cleaned off while each joint is being made. Any earth, cement or other materials shall be thoroughly cleaned out of the pipe as the work proceeds. A properly fitting plug is to be well secured to the end of the last laid pipe, and shall only be removed when pipe laying is proceeding. The refilling of trenches shall not be done until the joints of the pipes are thoroughly set and have been inspected and approved and the finest of the excavated soil shall be used immediately under and around the pipes. No pipes shall be laid until a distance of approx 9 meters along the trench has been prepared and bottomed to receive the pipe, unless otherwise required in special circumstances of which the Site In-charge shall be the final judge. No greater length of trench shall be opened at one time than the pipe laying can keep pace with, and the filling in of the trench shall be proceeded with to complete the water test.

The trench and joint holes and shall be kept free from water until the pipes are laid and the joints thoroughly set.

The Contractor shall exercise every possible care to prevent the accumulation of sand, silt or nay deposit during the construction of the drain and will be held responsible for any damage or expense arising from such causes of any costs or charges in connection with the removal of any such accumulation.

d) Testing: Comprehensive tests of all appliances shall be made by simulating conditions of use. The pipes shall be subjected to a test pressure of at least 1.5m head of water at the highest point of the section under test. The tolerance figured of 2 liters per centimeter of diameter per kilometer away be allowed during a period of ten minutes.

The test shall be carried out by suitably plugging the lower end of the drain and the ends of connections, if any & filling the system with water. A

knuckle bend shall be temporarily jointed in at the top end and a sufficient length of vertical pipe joined to it is as to provide the required test head. Or the end may be plugged with a lowered till the required head is obtained and fixed suitably for observation. Subsidence of water may be due to one or more of the following caused. :-

i) Absorption by pipes & joints
ii) Sweating of pipes & joints
iii) Leakage at joints or from defective pipes. and
iv) Trapped Air.

Allowance for cause no. (i) above shall be made by adding water until absorption has ceased after which the test proper should the work shall be cut & made good. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from particular pipe or joint shall be watched for and taken as indicating a select to be made good.

23. Manholes, Gully Chambers etc.:

a) Size of Manhole: The size specified shall be the internal size of the manhole. The work shall be done strictly as per drawing and specification. The following specifications shall be adopted.

b) Excavation: The manhole shall be excavated true to dimensions and levels shown on the plan or as directed by the Site In-charge.

c) Brick work: The brick work shall be with bricks having crushing strength 75/sq. cm brick in cement mortar 1:4. It shall be 250 mm thick or as instructed by the Site In-charge.

d) All angles shall be rounded 7.5 cm radius and all rendered internal surfaces should be hard impervious finish obtained by using a steel trowel. The external troe joints of the masonry shall be finished smooth.

e) In wt ground 20mm thick cement plaster of the above specifications shall be done on the outside surface of the walls also. This plaster shall be water proofed with addition of 1 kg of acco proof to 50 kg (1 bag) of cement or with addition to any other equal and approved waterproofing compound. The plastering shall be done up to 30cm above the set soil lines.

f) Channel and Benching: Channels shall be semi-circular in the bottom half and of diameter equal to the sewer. Above the horizontal diameter, the sides shall be extended vertically to the same level as the crown of the outgoing pipe and the top edge shall be suitable rounded off. The SBI channels shall also be similarly constructed with respect to the benching but at their junction with the main channel on appropriate single suitably rounded off in the direction of flow in the main channel.

g) The channel and benching shall be done in cement concrete (1:2:4) rising at a slope of 1 in 6 from the edges of channel. The channels at the bottom of the chamber shall be plastered with cement mortar 1:4 (1 cement: 4 coarse sand) and steel trowelled smooth.

h) R.C.C. Work : R.C.C. work for slabs etc. shall be in cement concrete 1:2:4

with steel reinforcement as per detail drawings. Plain Concrete : If used for fixing manhole covers, shall be of the above specifications.

i) Foot Rests : These shall be of M.S. square rods 22 mm or as specified and shall be galvanized or painted with coal tap these shall be embedded in cement concrete (1:2:4) at least (9) 23 cm. while the brick work is in progress. These shall be fixed 30 cm, apart vertically and staggered laterally and shall not reject more than 11 cm from the wall.

j) Manhole covers and frames: All covers shall be of heavy type. these shall be non -locking or locking type as specified and capable of easy opening and closing . These shall ordinarily be gas and water tight, These shall be soluble water seal type manhole cover and frame. the covers as specified in schedule of Quantities, C.I. Surface box for air valves, sluice valves, peet valves etc. shall be of sufficient dimensions to suit the sizes of these fittings and shall be of heavy pattern when fitted in level to heavy traffic and shall be of standard design or as directed by the Site In-charge .

k) The frame of manhole cover shall be embedded firmly in the R.C.C. slab or plain concrete as the case may be on the top of the masonry.

l) When the manhole is built on the footpath, this shall be provided with 45cm internal diameter or as specified heavy type C.I. cover, or 56cm internal dia R.C.C. covers as specified. When it is built the metalled width of the road under traffic, it shall be provided with approx 22" (560mm) internal diameter heavy type C.I. cover.

m) Painting: All C. I. / M.S. fittings like Manhole covers & frames, gratings, footrests etc, shall be painted with two or more coats of Bitumastic paint & it's rate shall be included in the rate of the Manholes, Gully chambers etc.

24. Types of Manholes

a) Manhole up to 0.75 Meter Depth: This shall be 0.9M x 0.8 M size (Internal dimension) unless otherwise shown in drawings instructed per site conditions.

b) Thickens s of brick wall-250mm

c) Cement brick work - (1:4)

d) Plaster: Plaster on inside surface of walls, bottom & part of outside surface of walls and on RCC cover slabs shall be done as per drawings and directions.

e) Bed concrete (1:4:8)-150 mm thick with stone chips.

f) Brick flat soling- 75mm thick.

24.1 Depth of Manhole above 0.75 M up to 1.5 M : This shall be of 1.2 M x 0.9 M (internal) size unless otherwise shown in drawings or instructed as per site conditions. Details same as that in item No 28.1 above.

24.2 Depth of Manhole above 1.5 M : This shall be of 1.2 M x 0.9 M (Internal) size or as specified.

a) Thickness of brick wall

i. 250 mm up to 1.5 M from finished G.L.

ii. 375 mm below 1.5 M from finished G.L.

Cement brick work plastering and Brick Flat Soling same as mentioned in above sections. Thickness of bed concrete (1:4:8)- 225 mm with stone chips.

25. Prior approval of Sample Materials/Works: Samples and all materials & works shall be approved by the Site In-charges before the contractor undertakes any major procurement of materials or proceeds with the works concerned. The quantum of materials/works for approval of samples shall be decided by the Site In-charge & no extra payment shall be made to the contractor for sample materials procurement or works & replacement of materials altering or redoing of works as required and instructed by the Site In-charges.

The typical approved sample material for each work shall be kept in the office of the Site In-charges at site until the satisfactory completion of the works. The materials supplied and installed at site shall be of the same quality & size as of the approved samples, otherwise they shall be rejected.

The decision of the Site In-charges or their authorized representatives of whether a materials compares well with he approved sample shall be final and binding on contractor. The same principal shall be applicable to sample work approved & further works done at site.

26. Cleaning & disinfections of the supply system, water storage tanks and down take distribution pipes: All water mains, communication pipes, service and distribution pipes used for water for domestic purpose should be thoroughly and efficiently disinfected before being taken into use and allows after every major repair. The method and disinfections shall be subject to the approval or the Site In-charges.

The water storage tanks (underground and overhead) & pipes shall first be filled with water & thoroughly flushed out. The storage tanks shall ten be filled with water again and disinfecting chemical containing chlorine added gradually while the tanks are being filled, to ensure thorough mixing, sufficient chemical shall be used to five water a dose of 50 parts of chlorine to one million parts of water. If power to 1000 Liter of water. The power shall be mixed with water to a creamy consistency before being added to the water in the storage tank. If proprietary brand of chemical is used, the proportions shall be as specified by the markers. When the storage tank is full, the supply shall be topped and all the taps on the distribution pipes opened successively, working progressively away from the storage tank. Each tap shall be closed when the water discharge begins to smell of chlorine. The storage tank shall then be topped up with water from the supply pipe and with more disinfecting chemical in the recommended proportions. The storage tank & pipes shall then remain charged at least for three hours. Finally, the tank and pipes shall be thoroughly flushed out before any water is used for domestic purpose.

INDICATIVE DESCRIPTION AND QUANTITY OF VARIOUS (STANDARDIZED) CIVIL WORKS

Please note that the following descriptions and quantities are as per enclosed civil drawings and are only indicative and *not restrictive.* Actual quantities may differ as per actual site condition and additional requirements specified in the LOA, Price Schedule/BOQ and/or contract.

Additional materials may be required to complete the work in full shape. Bidder is requested to quote considering any other materials which may be required for completing the respective works in full shape without any additional cost to OPTCL.

The various makes for sub components as specified below are also indicative, any other makes/make list if specified as per latest vendor list or specified specifically in the LOA, Price Schedule/BOQ and/or contract shall be followed.

Bidder shall adhere to additional requirements as specified in the BOQ.

CONTROL ROOM (CUM OFFICE) BUILDING (B.1 to B.8)

B.1	CONTROL ROOM BUILDING	UOM	Approx Qty
1	Earthwork excavation in all kinds of soil as per drawing and technical specification including dressing and levelling the bed, sides and bottom and removing the excavated earth and depositing the same away from the work site within initial lead of 50m and initial lift of 1.5m, including cost, conveyance of all materials, all labour, T&P articles required for the work, including shoring, shuttering, propping and dewatering if required etc. complete in all respect as per direction of the Engineer-in-Charge.	Cum	329.07
2	Extra lift or 1.5m or part there of over the initial lift of 1.5m in all kinds of embankments and road works and ordinary earth work in general.	Cum	112.12
3	Cutting in disintegrated rock not requiring blasting to be removed by pick axes and crow bars and depositing materials within 50m initial lead and 1.5m initial lift including rough dressing as per direction and specification of the department including stacking the useful materials separately as ordered.	Cum	219.39
4	Back filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead upto 50 m and lift upto 1.5m.	Cum	109.69
4	Carriage / disposal of excavated surplus earth from the worksite by mechanical means within a lead of 5Km including loading and unloading etc. complete. in all respect as per direction of Engineer-in-Charge.	Cum	438.77

5	Supplying, filling in foundation and plinth with sand in 22.5 cm (9”) thick layers including watering and ramming with cost, conveyance, royalties and taxes of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	Cum	543.37
6	Providing and lying Plain Cement Concrete of proportion (1:3:6) in foundation and floors using 4cm (1 1/2") 0 mm & down grade black hard crusher broken granite stone metal, washed and screened sharp sand of approved quality from approved quarry including hoisting, lowering, laying the concrete, ramming, watering and curing etc. complete to required thickness including cost of all materials, conveyance, loading, unloading, cost of labours, T&P, hire & running charges of concrete mixer, etc. all complete as per the direction of the Engineer -in -charge.	Cum	86.34
	Providing & laying Plain cement concrete (1:2:4) using 12mm size black hard crusher broken granite chips of approved quality from approved quarry including hoisting, lowering and laying concrete in layers, watering, curing etc. complete including cost, conveyance, royalties and taxes of all materials with labour, cess and T&P etc. required for the work complete.		
	FIRST FLOOR	cum	5.26
8	Providing and laying in position ready mixed M-25 grade concrete having compressive strength at 28 days test not less than 250 kg/ sq.cm for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying , including the cost of centering, shuttering finishing and excluding reinforcement including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, and hoisting, lowering, laying and compacting concrete, watering and curing and finishing the exposed surfaces smooth with cost, conveyance, royalties, of all materials with all labour, Labour cess and T&P required for the work improve workability without impairing strength and durability as per direction of the Engineer - in - charge.		
A	GROUND FLOOR		
a	Foundation & bases of column	cum	142.73
b	Plinth Beam	cum	16.23
c	Pedestal & Columns	cum	30.41
d	Roof Beam	cum	22.24
e	Lintel	cum	2.74
f	Chajja	sqm	25.32
g	R.C.C. floor and roof slab	cum	54.37
h	R.C.C. staircase	cum	3.09

B	FIRST FLOOR & HEAD ROOM		
a	Columns	cum	19.09
b	Roof Beam	cum	21.89
c	Lintel	cum	3.36
d	Chajja	sqm	16.10
e	R.C.C. floor and roof slabs	cum	47.64
f	R.C.C. staircase	cum	3.27
9	Cutting, straightening coiled or bent up M.S. rods, HYSD steel or Tor Steel welding or jointing if necessary, bending, binding, tying the grills as required for RCC works, and hoisting, lowering and placing in proper position according to approved designs and drawings including cost, conveyance, loading, unloading, M.S. rods, HYSD steel or Tor steel and binding wires of 18 to 20 gauge required for the work and cost of all labour, sundries, T&P and scaffolding complete in all respect as directed by the Engineer-in-Charge (payment will be made according to the actual weight of M.S. rod, HYSD steel or Tor steel consumed in the work and no separate payment will be made towards weight of binding wires which is to be borne by the contractor at his own cost).		
A	GROUND FLOOR	Qntl	336.87
B	FIRST FLOOR	Qntl	131.06
10	Fly Ash brick masonry using fly ash bricks of size 25 cm. x 12 cm. x 8 cm. having crushing strength not less than 75 kg. Per Sqr. Cm. in cement mortar of mix (1:6) with ordinary portland cement (OPC) and screened & washed sand for mortar after immersing the bricks for 6 (Six) hours in water before use including splays cutting, circular moulding, corbelling, chamfering and similar such type of works, watering and curing etc. including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, scaffolding, sundries, T&P required for the works etc. complete in all respect as directed by the Engineer-in-charge		
A	Foundation & Plinth	Cum	47.26
B	GROUND FLOOR	Cum	97.83
C	FIRST FLOOR & HEAD ROOM	Cum	67.06
11	Fly Ash brick masonry using fly ash bricks of size 25 cm. x 12 cm. x 8 cm. having crushing strength not less than 75 kg. Per Sqr. Cm. in cement mortar of mix (1:4) with ordinary portland cement (OPC) and screened & washed sand for mortar after immersing the bricks for 6 (Six) hours in water before use in Superstructure including splays cutting, circular moulding, corbelling, chamfering and similar such type of works, watering and curing etc. including cost, conveyance, loading, unloading, royaltiesof all materials, cost of all labour, scaffolding, sundries, T&P required for the works etc. complete in all respect as directed by the Engineer-in-charge		
A	GROUND FLOOR	cum	2.13

B	FIRST FLOOR HEAD ROOM	cum	5.33
12	Providing 16 mm. thick cement plaster (1:6) finished smooth to inside brick walls after racking out the joints including watering and curing with cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.		
A	GROUND FLOOR	Sqm	809.76
B	FIRST FLOOR	Sqm	672.45
13	Providing 6mm thick cement plaster in cement mortar of (1:4) to RCC surfaces such as ceilings of roof slabs, stairs, landings, chajja, shelves, columns, beams and lofts etc. including roughening/chipping, scraping and cleaning and finishing the plastered surface smooth using wooden floats, bars, etc. only to proper plumbs and level, making grooves, beads and drip coarse to give required ornamental finish as per drawing including cost of all materials, conveyance, loading and unloading, royalties, cost of all labour, scaffolding, staging, watering before plastering and curing, sundries and T&P, etc. complete as per direction of the Engineer-in-charge.		
A	GROUND FLOOR	sqm	463.25
B	FIRST FLOOR	sqm	303.12
14	Providing 18mm C.P. in two coats underlayer 12mm C.P. 1:5 and top layer 6mm thick C.P. 1:6 finished even and smooth on masonry walls including racking out joints, scrapping and cleaning the surface and finishing the plastered surface smooth to proper plumbs and levels and providing grooves as shown in the drawing including cost of all materials, labour, conveyance, loading and unloading, royalty, scaffolding, watering, curing, sundries, tools and plants, etc., complete excluding GST as per the direction of the Engineer-in-charge.		
A	GROUND FLOOR	sqm	331.63
B	FIRST FLOOR	sqm	388.88
17	Providing vitrified tile flooring using Matt vitrified tiles having thickness of 8mm to 10mm conforming to IS 13756 of 600mm x 600mm / 600mm x 300mm Colour & Printed Series (homogeneous) of approved quality of Somany / Kajaria / Asian / Johnson or equivalent in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened and washed sharp sand for mortar and grouted with epoxy grout with required quantities of pigments of approved marks to match the shades of the vitrified tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, sundries, T&P required for the work, complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	274.85

B	FIRST FLOOR	sqm	207.60
18	Supplying , fitting and Fixing Matt finish full body vitrified tile in dado /skirting of 10MM thick, size 600mm x 600mm with water absorption less than 0.3 % of somany / Kajaria of approved make having base price of the tile Rs. 90 / sqft confirming to I.S.15622 laid on 12mm thick cement mortar (1:3) (1 cement : 3 coarse sand) and filling joints with white cement of approved quality including cost of all materials, labour, T&P etc. required for the work all complete as per direction of Architect. (At corridor & lobby area)		
A	GROUND FLOOR	sqm	31.02
B	FIRST FLOOR	sqm	28.86
	Providing, fitting & fixing anti-skid ceramic floor tiles in flooring in toilets using special plain/ printed series anti-skid ceramic floor tile of premium grade (having minimum thickness 7 mm to 8 mm & size 300 mm x 300 mm confirming to IS 13755 of approved quality and shade of Somany/ Kajaria on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened & washed sharp river sand for mortar ceramic floor tiles with neat white cement slurry, mixed with required (tiles are to be immersed in the water for required time before use) quantities of pigments of approved marks to match the shades of the anti-skid ceramic floor tiles if required including cost, conveyance, loading, unloading, stacking, royalties of all material, cost of all labour, sundries, T&P required for the work, watering, complete in all respect as per specification excluding GST as per specification as directed by Engineer-in-charge. (Note- sample of tiles shall be approved before procurement and use)		
A	GROUND FLOOR	sqm	24.19
B	FIRST FLOOR	sqm	33.64
	Providing & Fixing tiles of size 30cm x 45 cm glazed ceramic wall tiles of premium grade of approved quality and shade having thickness 8mm to 10mm confirming to IS 13755 in dados skirting and risers of steps on 12mm thick cement plaster (1:3) to proper slope, line and level including cutting to required size and shape, fixing at corners and splays etc including filling the joints with neat white cement slurry mixed with pigments to match the shade of the tiles including cost, Conveyance, loading, unloading, stacking, royalities of all materials, cost of all labour,T&P, sundries, watering and curing for the required period for the work complete in all respect excluding GST as directed by the Engineer-in-charge.(Note- Sample of tiles shall be approved before procurement and use.) (All toilets wall)		
A	GROUND FLOOR	sqm	71.70
B	FIRST FLOOR	sqm	115.29

19	Providing Granite stone prepolished 20mm thick of area above 0.40 Sqm in flooring of approved quality, colour and size in floors, treads on steps and landings in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened and washed sharp sand for mortar and grouted with neat white cement slurry jointing the tile with neat white cement slurry mixed with required quantities of pigments of approved marks to match the shades of the granite tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P required for the work etc. complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	48.41
B	FIRST FLOOR	sqm	20.89
20	Providing Granite stone prepolished 10mm thick in dado of approved quality, colour and size in dado, riser of steps and dado of landings in all floors at all height on 12mm thick bed of cement mortar of mix **(1:3)** with screened and washed sharp sand for mortar and grouted with neat white cement slurry jointing the tile with neat white cement slurry mixed with required quantities of pigments of approved marks to match the shades of the granite tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P required for the work etc. complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	12.03
B	FIRST FLOOR	sqm	4.49
21	Providing edge moulding to 18 mm thick granite stone counters, Vanities, steps etc., including machine polishing to edge to give high gloss finish including making three nos of groove over tread etc. complete including cost, coveyance, loading and unloading and ,es of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by the Engineer in charge.		
A	GROUND FLOOR	rnm	123.75
B	FIRST FLOOR	rnm	83.77
25	Providing and fixing in position wood plastic composite door frame with appropriate length of ETA Approved carbon steel galvanized (minimum 5 microns) double threaded 6.8 grade Polyamide PA 6 grade sleeve HRD C 10 anchor suitable for fastenings both on concrete & masonary/aerated blocks including cost of all materials, labours, T & P etc required for the work. complete in all respect as directed by the Architect/Engineer-in-charge		
A	GROUND FLOOR	rnm	71.00
B	FIRST FLOOR	rnm	97.15

26	Providing , fitting & fixing of 32mm thick flush door shutter with 32mm thick BWP block board and paisting 1 mm thick laminate to both sides with adhesive including fitting & fixing of all fixtures like godrej make ofice lock haveing model. No. 6548. Godrej make door clouser having model no- 2701. including cost of all materials, all labour, all T&P etc. required for the work complete in all respect as per the direction of the Engineer-in-Charge excluding G.S.T.		
A	GROUND FLOOR	sqm	3.57
B	FIRST FLOOR & HEAD ROOM	sqm	7.14
	Providing , fitting & fixing of 32mm thick flush door shutter with 32mm thick BWP block board,Vision glass panel and paisting 1 mm thick laminate to both sides with adhesive including fitting & fixing of all fixtures like godrej make ofice lock haveing model. No. 6548. Godrej make door clouser having model no- 2701. including cost of all materials, all labour, all T&P etc. required for the work complete in all respect as per the direction of the Engineer-in-Charge excluding G.S.T.		
A	GROUND FLOOR	sqm	30.96
B	FIRST FLOOR & HEAD ROOM	sqm	34.92
27	Supplying, fitting and fixing of M.S grills, Grill window (as per I.S. specification and as per approved drawings) in proper position in all floors and at all height including making holes to brick walls/ R.C.C structure/wood work etc. and making good to the damaged walls/ structures with cement concrete (1:2:4) with black hard crusher broken granite stone chips of 12mm to 20mm size (20mm size not to exceeds 25%) including watering and curing etc. complete in all respect as directed by the Engineer in charge (W.I. / M.S. windows grills, grill gates, collapsible gates with top and bottom rails, steel windows, steel doors, steel frames for doors and windows, staircase and parapet railings square bar along with required nos. of nails and screws and other required materials of approved quality and approved size shall be supplied by the contractor at his own cost.)		
A	GROUND FLOOR	KG	821.75
B	FIRST FLOOR & HEAD ROOM	KG	1091.50
28	Finishing wall surface of walls with **wall putty (water based)** of approved make and finished smooth and even surface to receive painting including cost of scaffolding staging charges with cost of all materials, labour T&P etc. complete the work as per the direction of engineer incharge.		
A	GROUND FLOOR	sqm	1273.01
B	FIRST FLOOR & HEAD ROOM	sqm	1335.59
29	Providing Wall painting with **cement primer(oil bound)one coat** to the internal wall surface including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as per the direction of engineer incharge.		

A	GROUND FLOOR	sqm	1273.01
B	FIRST FLOOR & HEAD ROOM	sqm	1335.59
30	Providing Wall painting with Oil bound distemper paint two and more coats to all New work to get an even shade including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as per the direction of engineer incharge.(interior)		
A	GROUND FLOOR	sqm	1273.01
B	FIRST FLOOR & HEAD ROOM	sqm	1335.59
31	Painting to external surface of building with **two coats of weather seal coat** of approved shade and quality of approved design after cleaning by watering & removing the dirts etc. to the surface to be painted including watering, curing, cost, conveyance of all materials, cost of all labour, brushes, T&P etc. and necessary scaffolding work complete as directed by the Engineer-in-charge.		
A	GROUND FLOOR	sqm	331.63
B	FIRST FLOOR & HEAD ROOM	sqm	388.88
31	Providing Wall painting with **cement primer(water bound) one coat to the external wall surface** including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects.		
A	GROUND FLOOR	sqm	331.63
B	FIRST FLOOR & HEAD ROOM	sqm	388.88
32	Providing and painting **two coats with synthetic enamel paint** of approved quality and approved shade confirmming to ISI on steel work to give an even shade in all floors at all height over a coat of primer of approved quality and shade including sand papering and making the surface smooth with cost, coveyance, loading and unloading, of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by Engineer-in-charge.		
A	GROUND FLOOR	sqm	16.44
B	FIRST FLOOR & HEAD ROOM	sqm	28.82
33	Providing approved primer of one coat to the Iron work including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as directed by Engineer-In-Charge.		
A	GROUND FLOOR	sqm	16.44
B	FIRST FLOOR & HEAD ROOM	sqm	28.82
34	Supplying, fitting and fixing of Stainless steel of 304 grade in hand railing using 50mm dia of 2mm thick circular pipe with Balustrade of size 32mm x 32mm x 2mm @ 0.90mtr. C/C and stainless square pipe bracing of size 32mm x 32mm x 2mm in 3 rows in stair case as per approved design and specification, buffing, polishing etc with cost, conveyance, cost of all labour,labour cess, T&P etc. required for the work complete in all respect as per direction of the Engineer-in-charge.		

A	GROUND FLOOR	kg	75.38
B	FIRST FLOOR & HEAD ROOM	kg	75.38
35	Providing 2.5 cm thick grading concrete(1:2:2) on roof slab using 6mm size hard granite chips including hoisting, lowering, laying, concrete with watering, curing in all floors with cost, conveyances, royality of all materials, all labour, labour cess, T&P etc. complete as per direction of the Engineer in charge		
A	FIRST FLOOR & HEAD ROOM	Sqm	304.34
36	Providing & applying of pre constructional anti-termite treatment by drilling 12mm dia holes at distance of 30cm @ junction of wall & floor about 300mm apart deep enough to reach the soil below & chemical emulsion (PREMISE, IMIDACHLOPRIED 30.5SC OF BAYER MAKE mixed with 47.5ltr water) pumped these holes to soak the soil @ 1 ltr solution of each hole as per manufactures specification & the holes should be pluged the filling materials including cost of all materials, labour,conveyance, T&P , all taxes and hire charges of machinaries as per direction of Engineer-in-charge.	Sqm	224.23
37	Providing and fixing of UPVC sliding windows 2 track sliding-60 series/Top hung ventilator of any approved make ,duly manufactured using upvc reinforced profiles of 62mm x 60mm x 2.25mm for outer frame, 66mm x 38mm x 2.25mm for sliding shutter frames capable of mounting single glazing system,structurally reinforced with hot dip galvanised upto 50 microns of minimum thickness of 1.2 mm prefabricated and welded through fusion welding & the window sash shall be fitted with 5 mm thick clear float glass of reputed make duly fixed with EPDM weathering seal including the cost of all materials,necessary locking arrangements ,fittings,cost of labour,T&P ,etc complete as per direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	36.17
B	FIRST FLOOR	sqm	43.66

36	Waterproofing to the roof slab (a) Surface preparation : Cleaning the surface thoroughly by chipping the roof slabs using breakers, wire brush, mechanical grinder for making it free from all loose particles, dust etc. then total cleaning through air blower followed by water jetting and allowing the surface to dry. (b) Application : Supply and application of Nano Technology OrganoSilane based Zycosil + @ 1:20 (one part Zycosil + and 20 parts of clean water) to the saturation level on the entire flat surface and upto 300mm (1ft.) to the parapet walls and then allowing for drying 24 hrs., test the surface for hydrophobicity. Then application of 100% acrylic co-polymer Zycoprime+, cement and fine sand (100 mesh) mixed at a consistency of paste form and filling drainage pipes gaps. Then application of one coat of Zycoat mix of Zycoprime + and grey cement @ 1:1.5 ratio (1 part Zycoprime + and 1.5 part cement). 2ndcpat of Zycoat mix to be applied after the drying of first coat in the same procedure followed by sprinkling of sieved sand on the top of the slurry. Then allow it to dry followed by proper curing with water for at least two days. (c) Coving : Coving has to be done with Zycomix (a mortar prepared with Zycoprime+, cement and sand in the ratio of 1:5:15 and water as per workability to obtain a uniform paste). Finally cure with water to the entire treated roof and parapet wall for three days.		
a	FIRST FLOOR	SQM	304.34

	Water proofing to the sunken slab (a) Surface preparation : Cleaning the surface thoroughly by wire brush, mechanical grinder for making it free from all loose particles, dust etc. then total cleaning through air blower followed by water jetting and then allowing the surface to dry. (b) Application before PCC : Supply and application of Nano Technology OrganoSilane based Zycosil+@ 1:20 (one part Zycosil+ and 20 parts of clean water) to the saturation level on the entire flat surface and upto to the height of the sunken slab casted and then allowing for drying 24 hrs., test the surface for hydrophobicity. (c) Coving : Coving has to be carried on with Zycomix (a mortar prepared with Zycoprime+, cement and sand in the ratio of 1:5:15 and water as per workability to obtain a uniform paste). This should be followed by application of Zycoat on the corner surface of the sunken slabs. The above Zycomix must be applied in the gaps of pipe joints in the sunken slabs followed by application of Zycoat. (Note : The above application " b & c" should be done before PCC)	sqm	22.22
	(d) Application after PCC: Supply and application of Nano Technology OrganoSilane based Zycosil+@ 1:20 (one part Zycosil+ and 20 parts of clean water) to the saturation level on the entire flat PCC surface and upto to 1 mtr height of the wall. This should be done on a sound PCC surface with sufficient curing and drying. Then application of one coat of Zycoat (1 part Zycoprime+ mixed with 1.5 part cement) on Zycosil+ treated surface followed by one coat of Elastocoat (mixing of 100% acrylic co-polymer high strength elongation of 200 - 250% Elastobar 1 part and grey cement 1 part) with the help of brush. Then allow it to dry followed by proper curing with water for at least 3 days.		
	Providing & filling sunken slab with 40mm size brick bat with overburnt kiln burnt bricks including filling, compacting, watering , levelling the same as per the direction of Engg-in-Charge with all material,labour, scafolding, tools, plant etc for complete.	cum	3.33

	Providing and fixing removable Raised/False Flooring System with system and its components of approved make for different plenum height with possible height adjustment upto 50 mm, comprising of modular load bearing floor panels supported on G.I. rectangular stinger frame work and G.I. Pedestal Providing at required spacing to form modular framework, pedestals made out of GI tube of thickness minimum 2 mm and 25 mm outer diameter, fully welded on to the G.I. Base plate of size 100 mm x 100 mm x 3 mm at the bottom of the pedestal tube, G.I. pedestal head of size 75 mm x 75 mm x 3.5 mm welded with Cl fully threaded stud 16 mm outer diameter with two GI Check nuts screwed on the stud for level adjustment upto 50 mm, locking and stabilizing the pedestal head in position at the required level. Access Floor panel of 600 x 600 x 32 mm medium grade Filled Steel anti static high pressure Lamination of 800H grade (FS800H).		
	Access Floor panel shall be steel welded construction with an enclosed bottom pan with uniform pattern of 64 hemispherical cones.The access floor shall be factory finished with Anti-static High Pressure laminate with Non Warp technology upto 1 mm thickness for superior adhesion and Surface flatness within 0.75 mm. The panel into withstand a Concentrated Load of 363 kgs applied on area 25 mm x 25 mm without collapse in the centre of the panel which is placed on four steel blocks.The panel will withstand and Uniformly Distributed Load (UDL) minimum 1250 kg/sqm and an impact load of 50 kg all complete as per the approved manufacturers specification and as per the direction of Engineer-in-charge		
	FIRST FLOOR	SQM	56.06
	TOTAL CIVIL WORKS-CONTROL ROOM BUILDING (B.1)		
B.2	**PLINTH PROTECTION**		
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	CUM	9.00
2	Supplying, filling in foundation and plinth with sand including watering and ramming with cost, conveyance, royalties of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	CUM	10.13
3	Providing & laying Plain Cement concrete (PCC) of proportion (1:4:8) in foundation and floors using 4cm (1½") size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6") thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and ,es of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	CUM	4.05

4	Providing & laying Plain cement concrete (1:2:4) using 12mm size black hard crusher broken granite chips of approved quality from approved quarry including hoisting, lowering and laying concrete in layers, watering, curing etc. complete including cost, conveyance, royalties of all materials with labour, cess and T&P etc. required for the work complete.	CUM	2.70
5	Providing Brick work with Fly ash bricks 23cm x 11cm x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1:6) (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloadining, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.	CUM	10.80
6	Providing 12 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and ,es of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	45.00
	TOTAL CIVIL WORKS-PLINTH PROTECTION (B.2)		
B.3	**COVERED DRAIN**		
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	CUM	50.63
2	Supplying, filling in foundation and plinth with sand including watering and ramming with cost, conveyance, royalties of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	CUM	10.13
3	Providing & laying Plain Cement concrete (PCC) of proportion (1:3:6) in foundation and floors using 4cm (1½") size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6") thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and ,es of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	CUM	10.13

4	R.C.C. work of Grade- M 25 in following works using 20mm size & down graded hard black crusher broken granite stone chips of approved quality from approved quarry in specified proportion including hoisting, lowering, laying and compacting concrete, watering and curing and finishing the exposed surfaces smooth with cost, conveyance, royalties, taxes of all materials with all labour and T&P required for the work etc. complete in all respect but excluding the cost and conveyance of M.S./TMT/HYSD rods or Tor steel and binding wire of 18 to 20 gauge and labour charges for straightening, cutting, bending, binding and tying the grills and placing in proper position, centering & shuttering		
a)	R.C.C. floor and roof slabs, landings, balconies, projecting sun shades and chajjas upt 4.3m height	CUM	13.50
5	Reinforcement for RCC work including straightening, cutting, bending, placing in position HYSD and binding all complete. lifting and placing in position as per design complete including cost of bars , binding wires , including cost of all materials, labour, conveyance, loading and unloading,, royalties, sundries, tools and plants, etc. complete as per the direction of the Engineer-in-charge. (linear measurement will be taken and quantity will be calculated on standard weight for all heights)-Thermo Mechanically Treated bars	QNTL	6.75
6	Providing Brick work with Fly ash bricks 23cm x 11cm x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1:6) (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloadining, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.	CUM	20.25
7	Providing neat cement punning over plastered/ concrete surface including watering and curing complete with cost, coveyance, loading and unloading, royalties of all materials and cost of all labour, T&P and scaffolding required for the work etc. as directed by the Engineer in charge.	SQM	157.50
8	Providing 12 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and ,es of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	157.50
	TOTAL - COVERED DRAIN (B.3)		
B.4	**P H WORKS**		

1	Providing, Supplying & Fixing of Rimless, Blind Installation wall Hung WC of CERA (CAT NO S1059102and Cistern-B1510121), (Size :520x360x390mm) with PP soft close slim seat cover (Cat. No. B1510121 Cajol seat cover), Hinges, Accessories with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	EACH	6.00
2	Providing, Supplying & Fixing of Toilet roll Holder with Stainless steel flap of CERA (CAT- F5001109) with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	EACH	6.00
3	Providing, Supplying & Fixing of Hand Shower (Health Faucet) with 8mm dia, 1.2m long flexible tube and wall hook of CERA (F8030103)with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	each	6.00
4	Providing, Supplying & Fixing of Stop cock, male end with wall flange of CERA(F1018201) will all fittings & fixtures complete including making good the damages including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architec/Engineer in charge.	each	6.00
5	Providing, Supplying & Fixing of 2 Way Bib cock with wall flange of CERA (F1018163) with all fittings & fixtures complete including making good the damages. including cost of all mateials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	6.00
6	Providing, Supplying & Fixing Basin of CERA of size 515x410x195 mm (CAT-NO. S2040120) with full pedestal height 850MM (CAT NO. S2090113) with all fitings & fixtures complete including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge	EACH	8.00
7	Providing, Supplyin & Fixing of Basin inlet connection (angle valve) of CERA (F1018201) with all fittings & fixtures complete including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	EACH	8.00
8	Providing, Supplying & Fixing Glass Shelf 300X300mm long of CERA (F5005103) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	EACH	8.00
10	Providing, Supplying & Fixing pillar cock with aerator with long screws, shanks and back nuts of CERA (CAT-F2007101) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	8.00

11	Providing, Supplying & Fixing standard sized Single Towel rail of 600mm long, stainless steel complete with Chromiun Plated brass brackets of CERA (F5003103) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all rescpects as per direction of Engineer in charge.	each	6.00
12	Providing, Supplying & Fixing standard sized Chromium Plated brass towel ring(round) of CERA (F5003105) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royalitity etc. complete in all respects as per direction of Engineer in charge.	EACH	8.00
13	Providing, Supplying & Fixing Soap dish holder of CERA (F5007105) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	EACH	14.00
14	Providing, Supplying & Fixing Towel Shelf 600mm long with lower hangers, stainless steel complete with Chromiun Plated brass brackets ofCERA (F5007101) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	EACH	6.00
15	Providing, Supplying & Fixing of Bib cock short body (with straight line model) with wall flange polished bright ofCERA (F2013151) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	6.00
16	Providing, Supplying & Fixing of Long body Bib cock with wall flange polished bright of CERA (CAT-SQT-512KN) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	6.00
17	Providing, Supplying & Fixing Overhead shower 70mm Round shape single flow (ABS Body Chorme plated with Gray face plate) with Rubit cleaning system (EOS-542A) and Shower arm 235mm long (Light weight) round shape for wall mounted showers with wall flange (ALE-536A) of CERAwith all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	6.00
18	Providing, Supplying & Fixing of Concealed Stop cock, Heavy Body with Cap of CERA (F1018201) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	6.00

19	Providing, Supplying & Fixing Double Coat hook ofCERA (F5003108) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	each	6.00
20	Providing, Supplying & Fixing 600mm x 300mm bevelled edge mirror of superior glass mounted on 5mm thick A.C sheet or plywood sheet with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Engineer in charge.	EACH	8.00
21	Providing & Fixing of PVC nahani trap with 125mm stainless steel grating with/ without hole for waste pipe in floors / at any location cost includes all materials, labour, tools,plant etc. complete in all respects.as per price list of ASTRAL	EACH	12.00
22	Fixing bowl pattern urinal conforming to IS 2556 : Part 6-1996 including connecting the urinal of 330x310x420 mm size with waste pipe by means of white lead mixed with chopped hemp etc all complete as per specification. (CERA MAKE, CAT-F5001109)	EACH	6.00
23	Supplying all materials, labour, T&P and fitting and fixing U-PVC SWR soil waste ventilating pipes (type-A / ring fit type) with all PVC fittings of ASTRAL/AJAY/SUPREME make as per IS 13592 to walls with nails, bobbins and laying in trenches including all pipe fittings, jointing materials, tools plant, labour & all material, earthwork in excavation in all kinds of soil and refilling of trenches as per specification and direction of the engineer in charge.		
24	160mm dia PVC (SWR) pipe class "A" (with wall thickness of 3.2mm to 3.8mm)	MTR	50.00
25	110 mm dia PVC (SWR) pipe Class 'A' (with wall thick of 2.20 mm to 2.70 mm)	MTR	50.00
26	75 mm dia PVC (SWR) pipe Class 'A' (with wall thick of 1.8 mm to 2.20 mm)	MTR	50.00
27	Providing all materials, labour and T&P for fixing of Upvc SWR fittings		
a	75 x 75 x 75mm single Tee with door	Each	10.00
b	110 x 110 x 110 mm single Tee with door	Each	10.00
c	75 x 75 x 75mm single Tee without door	Each	5.00
d	110 x 110 x 110 mm single Tee without door	Each	5.00
e	160 x 160x 110 mm Reducing Tee with door	Each	10.00
f	110 x 110 x 75 mm Reducing Tee with door	Each	10.00
g	75 mm x 87.50 Plane Bend	Each	40.00
h	110 mm x 87.50 Plane Bend	Each	40.00
i	75mm coupler	Each	40.00
j	110mm coupler	Each	50.00
k	75 mm vent cowl with SS Jali	Each	20.00
l	110 mm vent cowl with SS Jali	Each	20.00

m	75mm pipe clip	Each	50.00
n	110mm pipe clip	Each	50.00
o	160mm pipe clip	Each	50.00
p	110 mm x 75 mm Nahani Trap without Jali	Each	12.00
q	110 mm Square Gully Trap	Each	6.00
r	125 x 110mm WC Connector	Each	8.00
s	110mm WC Connector (Bend)	Each	8.00
t	110mm WC Connector (Straight)	Each	8.00
28	Providing and laying in trench cement concrete (1:4:8) with 40mm size hard granite metal in the following type of bedding for 150mm diameter including curing complete as per specification	MTR	150.00
29	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes of (ASTRAL/AJAY/SUPREME) confirming to ASTM F442 Specific-2 having thermal stability for hot & cold water supply SDR 11 , including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge.		
	Internal work		
V	GROUND FLOOR		
a	15 mm nominal outer dia Pipes	MTR	25.00
b	20 mm nominal outer dia Pipes	MTR	25.00
c	25 mm nominal outer dia Pipes	MTR	20.00
VI	FIRST FLOOR		
a	15 mm nominal outer dia Pipes	MTR	25.00
b	20 mm nominal outer dia Pipes	MTR	25.00
c	25 mm nominal outer dia Pipes	MTR	20.00
30	Providing all materials, labour, T&P for laying/fixing to wall or ceiling and floor uPVC solvent weld pipe Sch-80 as per ASTM-D-1785 and pipe fittings of following nominal bore with clamps including making good the wall, ceiling & floor all complete as per specification.		
	External work		
V	GROUND FLOOR		
a	40 mm nominal outer dia Pipes	MTR	20.00
VI	FIRST FLOOR		
a	40 mm nominal outer dia Pipes	MTR	10.00
b	50 mm nominal outer dia Pipes	MTR	150.00
31	Cutting grooves in pucca floors and walls for taking GI/PVC /CPVC pipes including making good the damages caused with cost of all material,labour, scafolding, tools, plant, royalty etc. complete in all respects.	MTR	200.00
32	Supplying all materials, jointing materials, labour and T&P and fixing of uPVC pressure fittings (Sch-80) as per ASTM-D 2467 (Make: ASTRAL)		
a	20 mm	EACH	10.00

b	25 mm	EACH	10.00
c	32 mm	EACH	10.00
d	40 mm	EACH	10.00
e	50 mm	EACH	10.00
33	Supplying all materials,labours,T&P and cutting holes through existing brickwork including making good the damages in cement mortar (1:4) for taking GI /CPVC /PVC pipes and fittings etc all complete as per PH specification and direction of Engineer-in-charge.	EACH	150.00
34	Supplying all materials,labour,T&P and fixing Rotational moulded polyethylene cylindrical vertical water storage tanks conforming to IS : 12701--1996 including cutting holes through the tank and fixing mild steel tubes and fittings and providing extra sockets and jam nuts, fixing ball valve etc, including hoisting upto a height of 5 metres above ground level and placing the tank to the required position and providing 1st class Fly ash brickwork in cement mortar (1:6) of 0.46m height in staging and in circular protection wall to support the tank, 12mm thick cement plaster (1:6) over brickwork, R.C.C slab of size 1.60mx1.60m and 0.10m thick, R.C.C beam of 0.25mx0.30m and 2.60m average length in cement concrete(1:2:4) using 12mm size h.g chips including centering and shuttering, watering, curing, conveyance of all materials to worksite etc all complete as per specification and direction of the Engineer in charge. Fixing 2000Ltr Roto-moulded water storage tank (Syntax Make) In first Floor	NO	1.00
	Total -P H WORKS (B.4)		
B.5 SEPTIC TANK & SOAK PIT			
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	CUM	57.02
2	Extra lift of 1.5m or part there of over the initial lift of 1.5m in all kinds earth work (1st extra lift of 1.5mt (upto 7.5m)	CUM	51.84
3	Filling foundation trenches and plinth with excavated earth including laying the earth in layers not exceeding 23.5cm (9”) thick ramming and watering with all leads and lifts including cost of all labour, T&P etc. complete as directed by the Engineer-in-charge.	CUM	11.40
4	Supplying, filling in foundation and plinth with sand in 22.5 cm (9”) thick layers including watering and ramming with cost, conveyance, royalties and taxes of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	CUM	4.32

5	Providing & laying Plain Cement concrete (PCC) of proportion (1:3:6) in foundation and floors using 4cm (1½") size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6") thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and taxes of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	CUM	4.32
6	Cutting, straightening coiled or bent up M.S. rods, HYSD steel or Tor Steel welding or jointing if necessary, bending, binding, tying the grills as required for RCC works, and hoisting, lowering and placing in proper position according to approved designs and drawings including cost, conveyance, loading, unloading, M.S. rods, HYSD steel or Tor steel and binding wires of 18 to 20 gauge required for the work and cost of all labour, sundries, T&P and scaffolding complete in all respect as directed by the Engineer-in-Charge (payment will be made according to the actual weight of M.S. rod, HYSD steel or Tor steel consumed in the work and no separate payment will be made towards weight of binding wires which is to be borne by the contractor at his own cost).	CUM	2.88
7	Providing strong, rigid, leveled, and plumbed centering and shuttering to required shape and size , for floors with ply or steel centering materials with all necessary bracing and tiles and supports with leveling centering covered with plastic sheet with provisions necessary holes and pockets for electrical conduits, pipes, P.H. pipes, for hooks or boxes, switch and board insert plates, clamps and extension bars etc., including dismantling the same after the required interval from the date of casting including cost of all materials, labour, conveyance, loading and unloading, taxes, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., complete as per the direction of the Engineer-in-charge.		
A	R.C.C. floor and roof slabs, landings, balconies, projecting sun shades and chajjas upto 4.3m height	SQM	28.80
8	Reinforcement for RCC work including straightening, cutting, bending, placing in position and binding all complete. lifting and placing in position as per design complete including cost of bars , binding wires , including cost of all materials, labour, conveyance, loading and unloading, taxes, royalties, sundries, tools and plants, etc. complete as per the direction of the Engineer-in-charge. (linear measurement will be taken and quantity will be calculated on standard weight for all heights)-Thermo Mechanically Treated bars	QNTL	2.88

9	Providing Brick work with Fly ash bricks 25cm x 12m x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloadining, taxes, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.		
	Foundation & Plinth	CUM	25.99
10	Providing 16 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and taxes of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	107.58
11	Providing neat cement punning over plastered/ concrete surface including watering and curing complete with cost, coveyance, loading and unloading, royalties and taxes of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. as directed by the Engineer in charge.	SQM	107.58
12	Providing 6 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:4) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and taxes of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	28.80
13	Supplying & Fixing of Manhole cover (heavy duty) 450mm x 450mm water tight type including frame cost includes all material,labour, tax,lead tools & plant etc. complete	NO	2.00
14	**Supplying all materials,labours,T&P and constructing 1.22m dia and 2.1m depth soakway pit with precast RCC rings joined loose,gravel backing in the rear of well steining,precast RCC cover slab in cement concrete (1:2:4) using 12mm size hg chips fitted with iron lifting handles including cutting hole in the rings for inlet pipe,earthwork in open well excavation in all kinds of soil and refilling of cavity around the pit & painting the iron works, watering, curing, conveyance of all materials to worksite, payment of royalty, taxes etc all complete as per approved specification and direction of Engineer-in-charge**	NO	1.00
	TOTAL-SEPTIC TANK & SOAK PIT (B.5)		
B.6 BORE WELL			

1	Conducting VES Test for locating feasible site for drilling of bore well with minimum yield of 1.75 LPS and above (Minimum 3 VES Test are to be conducted for one location) including 20% failed VES Tests and as per direction of the Engineer-in-charge		
2	Labour for drilling a perfectly vertical bore hole of specified dia for a specified depth below ground level through consolidated and unconsolidated rock with down the hole hammer rig or combination drilling rig as required to suit the site condition as per direction of the Engineer-in-charge including use of own/hired/leased rigs with its accessories, tools, plants and consumables etc. for lowering of 200mm dia PVC Pipes for housing with or without screen as per the necessity for soft, medium, hard and boulder formation (suitable casing pipe, if required to prevent collapse of over burden is to be provided by the service provider including lowering and withdrawing after completion of the bore well). 200 mm dia to 400mm dia in over burden portion including packing of gravel where ever necessary & as per direction of the Engineer-in-charge.		
A	Cost of drilling to accommodate 200mm dia pipe lowering 0 to 30 mtrs and above. T=30 Mtr.		
B	Drilling of minimum 150mm dia bore hole in hard rock up to 100 Mtr. & above. T=49 Mtr.		
C	Lowering the casing pipe of 200mm dia with or without slotted pipes as per the necessity from ground level up to 30 meters & above depth and fitted and fixed up in perfectly vertical position, including cutting, threading and slotted pipe and supply and fixing all jointing materials, tools and plants etc. complete and keeping the top of the casing pipe threaded including plugging the bore well to prevent entry of foreign materials from above 0 to 30 meter and above. T=30 Mtr.		
D	Cost of 200mm dia PVC C.S. Class Pipe of reputed make with IS 12818/2010 specification. Manufacturer name should prominently be marked with CIPET test certification in the body of the pipe in indelible ink or stencilled to the satisfaction of Engineer-in-charge.T-30 Mtr.		
3	cleaning and developing the tube well using their own compressor continuously worked till clear and adequate discharge is obtained from the well including supply and use of all necessary equipment and labour as per the direction of the Engineer-in-charge		

4	Conducting yield test through pumping for minimum 6-8 hours including supply of suitable Submersible pump set having capacity of discharge of 3.50 LPS at 100 Mtr. head with 15KVA D.G. Set and a container of 200 ltrs. Capacity as required to suit the site condition as per the direction of the Engineer-in-charge including supply of tools plants labourers for lowering and lifting the pump set and measuring the yield of the bore well		
5	Supplying, lowering and installing testing and commissioning of submersible pump motor sets with the following accessories.		
	Submersible pumping sets of approved make having delivery outlets with built in spring loaded non-return valve capable of delivering 5000lit/hr. against a total head of 25m from all cases directly coupled with submersible motors of suitable H.P. to give the required discharge suitable for operation at 400V, 3 phase 50 c/s A.C. power supply including necessory.		
	G.I. bends, supporting clamps pressure gauge etc. complete.		
6	Floor-cum wall mounting electrical control panel board of suitable size M.S. angles, channels and 16 SWG M.S. sheet complete with connections PVC insulated copper wires of required size including making good the damage and painting complete including the following electrical components.		
	1 No. automatic star delta starter of approved make.		
	1 No. single phasing preventor of approved make.		
	1 No. main switch with HRC fuse.		
	Electronic water level guard of approved make.		
	Ammeter with circuit and selector switch.		
	Voltmeter (0-500V) with selector switch and controlling HRC fuses of approved make.		
	Over load relay.		
	Dry sun protection.		
	Signal lamp.		
	Phase changer.		
	3 phase control switch.		
	Water proof cable sizes 1 x 3 x 2.5 Sqmm. with cable protection pipe from top of wall up to electrical motor control panel, required dia of water column pipe with fittings gun metal fixing valves etc. complete.		
	Note - Pumping set as specified above is subject to modification to suit the actual requirement of depth and yield available from the permanent tube well. The payment of the modified pumping set is to be made on the basis of actual cost of the pumping set plus 15% as overhead & profit including all type of levies and taxes.		

7	Supplying and laying 3 core 10 Sqmm. PVC aluminium armoured cable 1100V grade from existing pump room panel from 32 Amp. T.P. switch partly on wall and mainly undergraound including necessary trench cutting with brick protection 16 Nos. bricks per metre and filling the trench with shifted soil leveling up and restoring the surface duly rammed.		
8	Supplying and fixing compression type gland complete with brass gland insulated cable ends by soldering with cable sockets and insulated tapes etc.		
9	Supplying, fitting and fixing 50mm dia full way valve (heavy quality) ISI marked.		
10	Supplying, fitting and fixing M.S. clamp to hold 50mm dia G.I. pipe and submersible pump set.		
	Rate for Item No. 1 to Item No. 10	SET	1.00
11	Supplying and fixing complete in operational conditions, including necessary jointing and coupling centifugal pump self priming type with automatic on/off (make- Crompton Greaves/ KSB/Kirloskar) and motor of specified complete with 50mm x 50mm suction and delivery, motor starter (star/delta) and suitable for lifting water to a height of 25 Mtr approx (vertical head) complete with connections and accessories etc. complete with a guarantee of one year. (1 H.P. capacity.)	NO	1.00
12	Supplying & fixing G.I. Pipes (TATA medium tube) 50mm dia for connection the suction to the pump & from delivery to the overhead tank with all necessary G.I. fittings such as bends,U , tees, elbows, reducers, sockets, caps, clamps, plugs,union etc. & making good the damages as per drawing including cost of all materials, labour,T&P etc.complete in all respects as per direction of Engineer.	MTR	80.00
	Total - BOREWELL (B.6)		
B.7 CONTROL ROOM BUILDING ELECTRICALS			
	All the electrical work as mentioned below shall be complete in all aspect for proper, safe operation and as per instruction of site engineer including the cost of all material & accessories, T & P, labour as required.		
1.1(a)	GROUP A :Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. ((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)	Nos.	30

(b)	GROUP B: Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. (((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)	Nos.	40
(c)	GROUP C: Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. (((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)	Nos.	60
(b)	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed PVC conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required. (((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)	Nos.	30
(d)	Recessed wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metalic PVC flexible conduit with modular type switch ,4 module 18SWG modular GI box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required. (Make of wire Finolex / Anchor / Havels / V Guard/KEl)	Nos.	20
(e)	Supplying and fixing of 4module GI box with cover on surface or in recess with suitable size of phenolic laminated sheet cover in front including providing and fixing 5 pin 15 / 16 amps socket outlet and 15 / 16 amps modular type switch, connection, painting etc as required.(Make-Anchor/crabtree/Legrand)	Nos.	15
1.2	Recessed wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metalic PVC flexible conduit with modular type switch ,6 module 18SWG modular GI box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required. (Make of wire Finolex / Anchor / Havels /KEI)	Nos.	30
1.3	Supply and fixing of 20 amp 240 V SPN industrial type socket outlet with 2 pole and earth metal encloser plug top along with 20 amp "C" series SP MCB in sheet steel enclosure on surface or in recess with chained metal cover for the socket outlet and complete connections, testing and commissionig etc. as required.(Make-Legrand (Mylink)/Siemens/Hager)	NO	18
1.4	Supplying and fixing of 100W,step type regulator, 2 Module without base and cover including connection etc as required.(Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)	Nos.	36

1.5	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	Nos.	10
1.6	Supply, delivery, installation and testing of TV Antenna Wires RG6 in PVC Pipe and making good the damages caused complete as required and as per Direction of Engineer-In-Charge. (Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)	Mtrs.	100
1.7	Supplying and fixing T.V. antenna socket outlet piano type ISI marked on the existing switchboard / cover including connections etc as requird.	NO	2
1.8	Supply, delivery and laying of following sizes of 2 mm Wall thickness rigid PVC Conduit Concealed in Wall/ Column/ Roof Slab of the Building or mounted on surface along with other accessories and 18 SWG GI Fish Wire complete for Telephone / TV / Computer / Circuit or Sub main wiring as required & as per Direction of Engineer-In-Charge.		
(a)	20 mm dia.	Mtrs.	50
(b)	25 mm dia.	Mtrs.	60
1.9	Supplying, delivery, installation, testing and commissioning of Flush mounted Cat 6 Information DUAL Outlet Box.on GI concealed Modular Switch Board including connections and making good the damages caused complete as required & as per Direction of Engineer-In-Charge.	Nos.	15
2	Supplying, laying of UTP 4 PAIR Cat 6 lane 2 run cable Wire in the existing surace/recessed PVC Pipe as required.	Mtrs.	400
2.1	Supplying, delivery, installation, testing and commissioning of 9U SERVER rack with PDU 6 SOCKET 2 nos ventilating IN-out ans and cable manager including connections and making good the damages caused complete as required & as per Direction of Engineer-In-Charge.	Nos.	2
2.2	Supplying, delivery, installation, testing and commissioning of 24 port 10/100/1000 Mbps managed switch with 4 gigabit sfp slots as per direction of E.I.C	Nos.	2
2.3	Supplying, delivery, installation, testing and commissioning of 24 port Cats 6 utp patch panel with cable manager as per direction of E.I.C	Nos.	2
2.4	Supplying, delivery, installation, testing and commissioning of 24 port Cats 6 utp Factory crimped patch cord 1m as per direction of E.I.C	Nos.	20
2.5	Supplying, delivery, installation, testing and commissioning of 24 port Cats 6 utp Factory crimped patch cord 2m as per direction of E.I.C	Nos.	20
2	Wiring for Circuits and Submain with following number & sizes of PVC insulated 1100 Volt Grade Multistranded Copper Conductor FRLS Wire run inside 2 mm thick PVC Conduit Pipe Recessed in Ceiling / Column / Walls of Building including supply of all materials such as wires, PVC Conduit, Junction Box & Pull Box etc. complete with making good the damages caused as required and as per Direction of Engineer-In-Charge. (Make of wire Finolex/Anchor/Havels/KEI)		

(a)	2 Nos. Single Core 1.5 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 1.5 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD (Make of wire Anchor/Havels/KEI)	Mtrs.	200
(b)	2 Nos. Single Core 2.5 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 1.5 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD (from LDB to Room & Power Point and Common Light Point looped).(Make of wire Anchor/Havels/KEI)	Mtrs.	220
(c)	2 Nos. Single Core 4.0 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 2.5 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD.(Make of wire Anchor/Havels/KEI)	Mtrs.	150
(d)	2 Nos. Single Core 10.0 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 4 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD.(Make of wire Anchor/Havels/KEI)	Mtrs.	110
(e)	4 Nos. Single Core 16.0 mm2 FRLS Copper Wire for Phase and Neutral and 2 No. Single Core 10 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD.(Make of wire Anchor/Havels/KEI)	Mtrs.	80
3	BRANCH DISTRIBUTION BOARDS:		
3.1	Supplying and fixing following way, Three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) 4 way, TPN DB Double door Make:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE	Nos.	2
3.2	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) 12 way, SPN DB Double door Make:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE	Nos.	2
3.3	Supplying and fixing following rating, 63 amp 4pole MCB , (Three phase and neutral), 415 V having a sensitivity current 10 KA in the existing MCB DB complete with connections, testing and commissioning etc. as required.	Nos.	2
3.4	Supplying and fixing following rating, double pole, 40 amp RCCB(single phase and neutral), 240 V, residual current circuit breaker (RCCB), having a sensitivity current 300 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required. Make:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE	Nos.	2
3.3	Supplying and fixing Single pole 5 amps to 32 amps rating, 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.	Nos.	40

3.6	Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.	Nos.	6
5	FITTINGS & FIXTURES:		
5.1	Supply,Installation and testing of following types of LED Tube Fixtures Directly on Wall / Ceiling/ Structure of Building with all accessories such as Electronics Ballast, Lamps, Stove Enameled Box, Perplex Sheet Cover etc. complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge. Make-PHILIPS, ,LT,WIPRO,TRILUX, PAC,HALONIX/Eq make		
(A)	Supply of Surface mounted indoor type 20 WATT LED Inverter LED Batten with Opal Diffuser, IP20, Battery back-up & Functioning as per Product TDS complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge(Make-Halonix Cat No LED INVERTER BATTEN HLB-08-20-CW-INV/WIPRO/CROMPTON/LT/PHILIPS	Nos.	32
(B)	Supply of 18 watt Surface mounted indoor type Round LED Luminaire with LED GLARE FREE opal diffuser ,IP20 Lamp complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge.	Nos.	19
C)	Supply of 10 WATT LED BOLLARD LIGHT complete 5700K assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge	NOS	4
D)	Supply 36 W LED PREMISES LIGHT 6500 CCT complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge	Nos.	6
E)	Supply of 10 W Inverter LED Bulb in B-22 cap and with Opal Diffuser, IP20, Battery back-up & Functioning as per Product TDS Luminaire with LED complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge(Make-Make-HALONIX Cat No 10W B22 CW IP/PHILIPS/WIPRO/CROMPTON	Nos.	8
F)	Supply delivery, installation, testing & commissioning of following types of recessed/Surface mounted 36 watt indoor type LED panel 2' x 2' square LED Luminare with 120 Lm/w with high efficency made 6500 cct IP40 LED chip life of 50,000 burning hours at L70 - Minimum tested for 10K hours for complaince of TM21 projection. Luminaire driver should be Isolated and multistage constant current APFC type. Driver should be BIS registered with Input voltage range of 90V to 265V (nominal rated voltage – 240V) with minimum 2 KV surge protection, PF >0.90, THD <10%; IP 40; and as per the direction of E.I.C;. Make:WIPRO / LT / TRILUX/REGENT/HALONIX/OSRAM	Nos.	25

5.2	Installation, testing and commissioning of pre-wired, LED fitting / compact LED fitting of all types, complete with all accessories and tube/lamp etc. directly on ceiling/ wall, including connections with 1.5 sq. mm FRLS PVC insulated, copper conductor, single core cable and earthing etc. as required.	Nos	92
5.3	Numbering of ceiling fan/ exhaust fan/ light fittings as required.	Nos.	138
6	Supply, delivery, installation and testing of following Sweeps of High Speed Energy Efficient A.C 1200 mm 48 '' Sweep Ceiling Fan 210 CMM Air Delivery.. GOOD BYE Anti Dust Super striker Ceiling Fan complete with Fan Blades, Down Rod, Canopies & Capacitor etc. including supply of Sundry Materials, making connection from the suitable point outlet but excluding cost of Fan Regulator complete as required and as per the Direction of Engineer-In-Charge.(Make-USHA , Halonix,Bajaj)	Nos.	36
6.1	Supply, delivery, installation & testing of following Sweep & Speed 230 mm EXHAUST FAN 1400 RPM. on Existing Sheet Metal Switch Board including loop connections and making good the damages caused complete as required and as per direction of Engineer-in-charge(Make-USHA , Halonix, ,Bajaj)	Nos.	8
7	EARTHING:	0	0
7.1	Providing and fixing 25 mm x 5 mm Copper earth strip in 40 mm dia G.I. pipe surface or in recess as strip electrode for connections etc. as required.and making good the damages caused complete as required and as per direction of Engineer-in-charge	meter	30
7.2	Extra for using salt and charcoal for G.I or copper plate earth as required and making good the damages caused complete as required and as per direction of Engineer-in-charge	set	2
7.3	Providing and fixing 8 SWG COPPER wire on surface or in recess for loop earthing along with existing surface / recessed conduit / submain wiring / cable as required and making good the damages caused complete as required and as per direction of Engineer-in-charge	meter	50
7.4	Earthing with COPPER plate 600 mm x 600mm x 6 mm thick ISI marked including accessories and providing masonary with cover plate having loccking arrangement and watering pipe etc (But wih out charcoal and salt) as required.and making good the damages caused complete as required and as per direction of Engineer-in-charge	set	2
8	Laying of one number of PVC insulated and PVC seathed / XLPE power cable of 1.1 KV grade of size excedding 120 sq.mm but not exceeding 400 sq.mm direct in ground in the same trench in one , sand cushioning, protective covering and refilling the trench etc. as required.	Mtr	100
9	Supply, Laying and Testing of following Size XLPE insulated 1.1 Kv alluminium armoued cable making good the damages caused as required complete as per Direction of Engineer-In-Charge. (Make: polycab,KEI)		
a)	185 mm2 3 1⁄2 Core , Al Armoured , XLPE Cable	Mtrs.	50
b)	25 mm2 3 1⁄2 Core , Al Armoured , XLPE Cable	Mtrs.	25

10	Supply of all materials like cable lugs, gland etc as required & terminal of below mentioned cable complete as per required technical specifications & direction of EIC		
(a)	185 mm2 3 1⁄2 Core , Al Armoured , XLPE Cable	Nos	1
b)	25 mm2 3 1⁄2 Core , Al Armoured , XLPE Cable	Nos	2
11	Supplying of following Materials		
a)	First Aid Box.	Set.	1
b)	Shock Treatment Chart (Odia / Hindi & English).	Set	1
c)	8 mm thick Rubber Mat.	Sqmtr.	12
d)	Danger Board.	Set	1
	CONTROL ROOM BUILDING ELECTRICALS (B.7)		
B.8	**CONTROL ROOM BUILDING FIRE ALARM SYSTEM**		
1	Supply testing &commissioning of 6 Zone conventional solid state digital panel suitable for wall/floor mounted, microprocessor based incorporating visual indication for each zone fitted with 24 volts S.M battery with battery charger all complete as required as per direction of Engineer-in-charge.	Nos	1
2	Supply, installation, testing and commissioning of stylish low profile designed conventional Photo electric smoke detector Make-Siemens/ Honeywell /Bosch/GST/equivalent make as per direction of Engineer-in-charge.	Nos	15
3	Supply, installation, testing and commissioning of analogue soft addressing resettable PVC body Manual call point with integral short circuit isolator etc as reqd. Make-Siemens/ Honeywell /Bosch/GST/equivalent make as per direction of Engineer-in-charge.	Nos	2
4	Supply, installation, testing and commissioning of soft addressed wall mounting / ceiling mounting sensor based sounder low profile designed The sounder uttilises high intensity LEDS to provided highly visiable red coloured flash light with sound to alert (Up to 100 DB) occupancies for evacution during fire etc as reqd. Make-Siemens/ Honeywell /Bosch/GST/equivalent make as per direction of Engineer-in-charge.	Nos	2
5	Supplying and drawing followings sizes of PVC insulated copper conductor 2 core 1.5 sqmm flexible cable in the existing surface / recessed steel conduit etc as reqd.Make-Polycab/Havells/equivalent make as per direction of Engineer-in-charge.	Mtr	150
	Sub TOTAL-CONTROL ROOM BUILDING FIRE ALARM SYSTEM (B.8)		
	TOTAL CONTROL ROOM BUILDING (B.1+B.2+B.3+B.4+B.5+B.6+B.7+B.8)		

MAIN GATE, WICKET GATE & SECURITY SHED (GATE COMPLEX) (C.1 to C.2)

C.1	MAIN GATE, WICKET GATE & SECURITY SHED	UOM	Approx Qty
1	Earthwork excavation in all kinds of soil as per drawing and technical specification including dressing and levelling the bed, sides and bottom and removing the excavated earth and depositing the same away from the work site within initial lead of 50m and initial lift of 1.5m, including cost, conveyance of all materials, all labour, T&P articles required for the work, including shoring, shuttering, propping and dewatering if required etc. complete in all respect as per direction of the Engineer-in-Charge.	Cum	27.9
2	Cutting in disintegrated rock not requiring blasting to be removed by pick axes and crow bars and depositing materials within 50m initial lead and 1.5m initial lift including rough dressing as per direction and specification of the department including stacking the useful materials separately as ordered.	Cum	18.61
3	Back filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead upto 50 m and lift upto 1.5m.	Cum	9.3
4	Carriage / disposal of excavated surplus earth from the worksite by mechanical means within a lead of 5Km including loading and unloading etc. complete. in all respect as per direction of Engineer-in-Charge.	Cum	37.21
5	Supplying, filling in foundation and plinth with sand in 22.5 cm (9”) thick layers including watering and ramming with cost, conveyance, royalties and taxes of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	Cum	39.32
6	Providing and lying Plain Cement Concrete of proportion (1:3:6) in foundation and floors using 4cm (1 1/2") 0 mm & down grade black hard crusher broken granite stone metal, washed and screened sharp sand of approved quality from approved quarry including hoisting, lowering, laying the concrete, ramming, watering and curing etc. complete to required thickness including cost of all materials, conveyance, loading, unloading,cost of labours, T&P, hire & running charges of concrete mixer, etc. all complete as per the direction of the Engineer -in -charge.	Cum	6.56

7	Providing and laying in position ready mixed M-25 grade concrete having compressive strength at 28 days test not less than 250 kg/ sq.cm for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying , including the cost of centering, shuttering finishing and excluding reinforcement including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, and hoisting, lowering, laying and compacting concrete, watering and curing and finishing the exposed surfaces smooth with cost, conveyance, royalties, of all materials with all labour,Labour cess and T&P required for the work improve workability without impairing strength and durability as per direction of the Engineer - in - charge.		
A	GROUND FLOOR		
a	Foundation & bases of column	cum	8.82
b	Plinth Beam	cum	3.63
c	Pedestal & Columns	cum	5.71
d	Roof Beam	cum	1.97
e	Lintel	cum	0.78
g	R.C.C. floor and roof slab	cum	2.23
B	FIRST FLOOR		
a	Columns	cum	4.20
b	Roof Beam	cum	11.94
e	R.C.C. floor and roof slabs	cum	5.46
8	Cutting, straightening coiled or bent up M.S. rods, HYSD steel or Tor Steel welding or jointing if necessary, bending, binding, tying the grills as required for RCC works, and hoisting, lowering and placing in proper position according to approved designs and drawings including cost, conveyance, loading, unloading, M.S. rods, HYSD steel or Tor steel and binding wires of 18 to 20 gauge required for the work and cost of all labour, sundries, T&P and scaffolding complete in all respect as directed by the Engineer-in-Charge (payment will be made according to the actual weight of M.S. rod, HYSD steel or Tor steel consumed in the work and no separate payment will be made towards weight of binding wires which is to be borne by the contractor at his own cost).		
A	GROUND FLOOR	Qntl	30.32
B	FIRST FLOOR	Qntl	33.55

9	Fly Ash brick masonry using fly ash bricks of size 25 cm. x 12 cm. x 8 cm. having crushing strength not less than 75 kg. Per Sqr. Cm. in cement mortar of mix (1:6) with ordinary portland cement (OPC) and screened & washed sand for mortar after immersing the bricks for 6 (Six) hours in water before use including splays cutting, circular moulding, corbelling, chamfering and similar such type of works, watering and curing etc. including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, scaffolding, sundries, T&P required for the works etc. complete in all respect as directed by the Engineer-in-charge		
A	Foundation & Plinth	Cum	8.22
B	GROUND FLOOR	Cum	9.81
C	FIRST FLOOR	Cum	3.19
10	Providing 16 mm. thick cement plaster (1:6) finished smooth to inside brick walls after racking out the joints including watering and curing with cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.		
A	GROUND FLOOR	Sqm	61.49
B	FIRST FLOOR	Sqm	16.58
11	Providing 6mm thick cement plaster in cement mortar of (1:4) to RCC surfaces such as ceilings of roof slabs, stairs, landings, chajja, shelves, columns, beams and lofts etc. including roughening/chipping, scraping and cleaning and finishing the plastered surface smooth using wooden floats, bars, etc. only to proper plumbs and level, making grooves, beads and drip coarse to give required ornamental finish as per drawing including cost of all materials, conveyance, loading and unloading, royalties, cost of all labour, scaffolding, staging, watering before plastering and curing, sundries and T&P, etc. complete as per direction of the Engineer-in-charge.		
A	**GROUND FLOOR**	sqm	12.66
B	FIRST FLOOR	sqm	42.09
12	Providing 12 mm. thick cement plaster (1:6) finished smooth to inside brick walls after racking out the joints including watering and curing with cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.		
A	GROUND FLOOR	sqm	53.42
B	FIRST FLOOR	sqm	47.42

13	**Providing vitrified tile flooring using Matt vitrified tiles having thickness of 8mm to 10mm conforming to IS 13756 of 600mm x 600mm / 600mm x 300mm Colour & Printed Series (homogeneous) of approved quality of Somany / Kajaria / Asian / Johnson or equivalent in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened and washed sharp sand for mortar and grouted with epoxy grout with required quantities of pigments of approved marks to match the shades of the vitrified tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, sundries, T&P required for the work, complete in all respect as per specification and direction of Engineer-in-charge.**		
A	GROUND FLOOR	sqm	7.56
14	Supplying , fitting and Fixing Matt finish full body vitrified tile in dado /skirting of 10MM thick, size 600mm x 600mm with water absorption less than 0.3 % of somany / Kajaria of approved make having base price of the tile Rs. 90 / sqft confirming to I.S.15622 laid on 12mm thick cement mortar (1:3) (1 cement : 3 coarse sand) and filling joints with white cement of approved quality including cost of all materials, labour, T&P etc. required for the work all complete as per direction of Architect. (At corridor & lobby area)		
A	GROUND FLOOR	sqm	1.65
15	Providing Granite stone prepolished 20mm thick of area above 0.40 Sqm in flooring of approved quality, colour and size in floors, treads on steps and landings in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened and washed sharp sand for mortar and grouted with neat white cement slurry jointing the tile with neat white cement slurry mixed with required quantities of pigments of approved marks to match the shades of the granite tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P required for the work etc. complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	0.68
16	Providing edge moulding to 18 mm thick granite stone counters, Vanities, steps etc., including machine polishing to edge to give high gloss finish including making three nos of groove over tread etc. complete including cost, coveyance, loading and unloading and ,es of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by the Engineer in charge.		
A	GROUND FLOOR	rnm	5.40

17	Providing and fixing in position wood plastic composite door frame with appropriate length of ETA Approved carbon steel galvanized (minimum 5 microns) double threaded 6.8 grade Polyamide PA 6 grade sleeve HRD C 10 anchor suitable for fastenings both on concrete & masonary/aerated blocks including cost of all materials, labours, T & P etc required for the work. complete in all respect as directed by the Architect/Engineer-in-charge		
A	GROUND FLOOR	rnm	5.85
26	Providing and fixing of 35mm thick WPC Door Shutter(Solid) with teak edge leaping to the periphery of the shutter with pilishing as per detailed drawing with including, all hardwares & fixtures, SS tower bolt(150mm),Door stopper,SS aldrop(250mm),SS handle(200mm length),ss handle (150mm length) & SS Butt hinges -125mm x 65mm x2.12mm .including cost, conveyance, loading, T&P required for the work etc. complete in all respect as directed by the Engineer-in-charge		
A	GROUND FLOOR	sqm	2.52
18	Supplying, fitting and fixing of M.S grills, Grill window (as per I.S. specification and as per approved drawings) in proper position in all floors and at all height including making holes to brick walls/ R.C.C structure/wood work etc. and making good to the damaged walls/ structures with cement concrete (1:2:4) with black hard crusher broken granite stone chips of 12mm to 20mm size (20mm size not to exceeds 25%) including watering and curing etc. complete in all respect as directed by the Engineer in charge (W.I. / M.S. windows grills, grill gates, collapsible gates with top and bottom rails, steel windows, steel doors, steel frames for doors and windows, staircase and parapet railings square bar along with required nos. of nails and screws and other required materials of approved quality and approved size shall be supplied by the contractor at his own cost.)		
A	GROUND FLOOR	KG	2197.65
19	Finishing wall surface of walls with wall putty (water based) of approved make and finished smooth and even surface to receive painting including cost of scaffolding staging charges with cost of all materials, labour T&P etc. complete the work as per the direction of engineer incharge.		
A	GROUND FLOOR	sqm	74.15
B	FIRST FLOOR	sqm	106.09
20	Providing Wall painting with cement primer(oil bound)one coat to the internal wall surface including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as per the direction of engineer incharge.		
A	GROUND FLOOR	sqm	74.15
B	FIRST FLOOR	sqm	106.09

21	Providing Wall painting with Oil bound distemper paint two and more coats to all New work to get an even shade including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as per the direction of engineer incharge.(interior)		
A	GROUND FLOOR	sqm	74.15
B	FIRST FLOOR	sqm	106.09
22	Painting to external surface of building with two coats of weather seal coat of approved shade and quality of approved design after cleaning by watering & removing the dirts etc. to the surface to be painted including watering, curing, cost, conveyance of all materials, cost of all labour, brushes, T&P etc. and necessary scaffolding work complete as directed by the Engineer-in-charge.		
A	GROUND FLOOR	sqm	53.42
B	FIRST FLOOR	sqm	47.42
23	Providing Wall painting with cement primer(water bound) one coat to the external wall surface including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects.		
A	GROUND FLOOR	sqm	53.42
B	FIRST FLOOR	sqm	47.42
24	Providing and painting two coats with synthetic enamel paint of approved quality and approved shade confirmming to ISI on steel work to give an even shade in all floors at all height over a coat of primer of approved quality and shade including sand papering and making the surface smooth with cost, coveyance, loading and unloading, of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by Engineer-in-charge.		
A	GROUND FLOOR	sqm	24.89
25	Providing approved primer of one coat to the Iron work including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as directed by Engineer-In-Charge.		
A	GROUND FLOOR	sqm	24.89
26	Providing 2.5 cm thick grading concrete(1:2:2) on roof slab using 6mm size hard granite chips including hoisting, lowering, laying, concrete with watering, curing in all floors with cost, conveyances, royality of all materials, all labour, labour cess, T&P etc. complete as per direction of the Engineer in charge		
A	FIRST FLOOR	Sqm	43.71

27	Providing & applying of pre constructional anti-termite treatment by drilling 12mm dia holes at distance of 30cm @ junction of wall & floor about 300mm apart deep enough to reach the soil below & chemical emulsion (PREMISE, IMIDACHLOPRIED 30.5SC OF BAYER MAKE mixed with 47.5ltr water) pumped these holes to soak the soil @ 1 ltr solution of each hole as per manufactures specification & the holes should be pluged the filling materials including cost of all materials, labour,conveyance, T&P , all taxes and hire charges of machinaries as per direction of Engineer-in-charge.	Sqm	22.68
28	Providing and fixing of UPVC sliding windows 2 track sliding-60 series/Top hung ventilator of any approved make ,duly manufactured using upvc reinforced profiles of 62mm x 60mm x 2.25mm for outer frame, 66mm x 38mm x 2.25mm for sliding shutter frames capable of mounting single glazing system,structurally reinforced with hot dip galvanised upto 50 microns of minimum thickness of 1.2 mm prefabricated and welded through fusion welding & the window sash shall be fitted with 5 mm thick clear float glass of reputed make duly fixed with EPDM weathering seal including the cost of all materials,necessary locking arrangements ,fittings,cost of labour,T&P ,etc complete as per direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	3.65
29	Waterproofing to the roof slab (a) Surface preparation : Cleaning the surface thoroughly by chipping the roof slabs using breakers, wire brush, mechanical grinder for making it free from all loose particles, dust etc. then total cleaning through air blower followed by water jetting and allowing the surface to dry. (b) Application : Supply and application of Nano Technology OrganoSilane based Zycosil + @ 1:20 (one part Zycosil + and 20 parts of clean water) to the saturation level on the entire flat surface and upto 300mm (1ft.) to the parapet walls and then allowing for drying 24 hrs., test the surface for hydrophobicity. Then application of 100% acrylic co-polymer Zycoprime+, cement and fine sand (100 mesh) mixed at a consistency of paste form and filling drainage pipes gaps. Then application of one coat of Zycoat mix of Zycoprime + and grey cement @ 1:1.5 ratio (1 part Zycoprime + and 1.5 part cement). 2ndcpat of Zycoat mix to be applied after the drying of first coat in the same procedure followed by sprinkling of sieved sand on the top of the slurry. Then allow it to dry followed by proper curing with water for at least two days. (c) Coving : Coving has to be done with Zycomix (a mortar prepared with Zycoprime+, cement and sand in the ratio of 1:5:15 and water as per workability to obtain a uniform paste). Finally cure with water to the entire treated roof and parapet wall for three days.		
a	**FIRST FLOOR**	SQM	43.71

30	GFRC Letter: Manufacturing, providing and installation of GFRC mouldings (Glass Fiber Reinforced Concrete) of approved make of thickness 230mm±5mm with pattern, design and colour of approved make to be fixed on/beteween RCC/ block work column or structural work with dry fixing method with all required T & P , manpower and all other material as required for completion of work in all respect.		
30.1	Per Letter (450mm(h) x 40mm (d) x 50mm (w))	Nos	20
30.2	OPTCL Logo	Nos	1
31	**Supply of the following materials:** a) First Aid Box - 1 set b) Shock Treatment Chart (Odia, Hindi & English) - 1 set c) Insulating mat - 6 sq. m. d) Danger Board - 1 set	Lot	1
	TOTAL CIVIL MAIN GATE, SECURITY SHED (C.1)		
PART -C.2	**ELECTRICAL FOR MAIN GATE, SECURITY SHED**		
1.1(a)	GROUP A :Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. ((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make	Nos.	2
B	GROUP B: Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. ((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make	Nos.	2
C	GROUP C: Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. ((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make	Nos.	4
(b)	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed PVC conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required. ((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make	Nos.	5

(c)	Recessed wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metalic PVC flexible conduit with modular type switch ,4 module 18SWG modular GI box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required. (Make of wire Finolex / Anchor / Havels / V Guard/KEl)	Nos.	2
(D)	Supplying and fixing of 4module GI box with cover on surface or in recess with suitable size of phenolic laminated sheet cover in front including providing and fixing 5 pin 15 / 16 amps socket outlet and 15 / 16 amps modular type switch, connection, painting etc as required.(Make-Anchor/crabtree/Legrand)	Nos.	2
1.2	Recessed wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metalic PVC flexible conduit with modular type switch ,6 module 18SWG modular GI box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required. (Make of wire Finolex / Anchor / Havels /KEI)	Nos.	2
1.3	Supply and fixing of 20 amp 240 V SPN industrial type socket outlet with 2 pole and earth metal encloser plug top along with 20 amp "C" series SP MCB in sheet steel enclosure on surface or in recess with chained metal cover for the socket outlet and complete connections, testing and commissionig etc. as required.(Make-Legrand (Mylink)/Siemens/Hager)	NO	1
1.4	Supplying and fixing of 100W,step type regulator, 2 Module without base and cover including connection etc as required.(Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)	Nos.	1
1.5	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	Nos.	2
1.6	Wiring to Telephone Socket Outlet from Junction Box with 0.5 mm2 Twin Pair Copper Conductor Telephone Wire run inside prelaid PVC Conduit complete including termination, testing etc complete as required and as per Direction of Engineer-In-Charge. (Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)	Mtrs.	60
1.7	Supply, delivery, installation and testing of TV Antenna Wires RG6 in PVC Pipe and making good the damages caused complete as required and as per Direction of Engineer-In-Charge. (Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)	Mtrs.	50
1.8	Supplying and fixing of RJ11 telephone jack single with shutter & RJ 45 computer jack with shutter, 2module modular base and cover including connection for telephone and LAN . (Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)	NO	1
1.9	Supplying and fixing T.V. antenna socket outlet piano type ISI marked on the existing switchboard / cover including connections etc as requird.	NO	1

19.1	Supply, delivery and laying of following sizes of 2 mm Wall thickness rigid PVC Conduit Concealed in Wall/ Column/ Roof Slab of the Building or mounted on surface along with other accessories and 18 SWG GI Fish Wire complete for Telephone / TV / Computer / Circuit or Sub main wiring as required & as per Direction of Engineer-In-Charge.		
(a)	20 mm dia.	Mtrs.	50
(b)	25 mm dia.	Mtrs.	60
2	Wiring for Circuits and Submain with following number & sizes of PVC insulated 1100 Volt Grade Multistranded Copper Conductor FRLS Wire run inside 2 mm thick PVC Conduit Pipe Recessed in Ceiling / Column / Walls of Building including supply of all materials such as wires, PVC Conduit, Junction Box & Pull Box etc. complete with making good the damages caused as required and as per Direction of Engineer-In-Charge. (Make of wire Finolex/Anchor/Havels/KEI)		
(a)	2 Nos. Single Core 1.5 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 1.5 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD (Make of wire Anchor/Havels/KEI)	Mtrs.	40
(b)	2 Nos. Single Core 2.5 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 1.5 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD (from LDB to Room & Power Point and Common Light Point looped).(Make of wire Anchor/Havels/KEI)	Mtrs.	30
(c)	2 Nos. Single Core 4.0 mm2 FRLS Copper Wire for Phase and Neutral and 1 No. Single Core 2.5 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD.(Make of wire Anchor/Havels/KEI)	Mtrs.	25
(e)	4 Nos. Single Core 16.0 mm2 FRLS Copper Wire for Phase and Neutral and 2 No. Single Core10 mm2 FRLS Copper Wire for Earth Continuity Conductor as per SLD.(Make of wire Anchor/Havels/KEI)	Mtrs.	10
3	**<u>BRANCH DISTRIBUTION BOARDS:</u>**		
3.1	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator). 12 way, Double doorMake:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE	Nos.	1

3.2	Supplying and fixing following way, Three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) 4 way, TPN DB Double door Make:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE	Nos.	1
3.3	Supplying and fixing following rating, 63 amp 4pole MCB , (Three phase and neutral), 415 V having a sensitivity current 10 KA in the existing MCB DB complete with connections, testing and commissioning etc. as required.	Nos.	1
3.4	Supplying and fixing Single pole 5 amps to 32 amps rating, 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.	Nos.	12
3.5	Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.	Nos.	2
6	**FITTINGS & FIXTURES:**		
6.1	Supply,Installation and testing of following types of LED Tube Fixtures Directly on Wall / Ceiling/ Structure of Building with all accessories such as Electronics Ballast, Lamps, Stove Enameled Box, Perplex Sheet Cover etc. complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge. Make-PHILIPS,WIPRO,LT,TRILUX, OSRAM,HALONIX		
(A)	Supply of Surface mounted indoor type 20 WATT LED Inverter LED Batten with Opal Diffuser, IP20, Battery back-up & Functioning as per Product TDS complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge(Make-Halonix Cat No LED INVERTER BATTEN HLB-08-20-CW-INV/WIPRO/CROMPTON/LT/PHILIPS	Nos.	2
(B)	Supply of 200 watt LED LED Bay Light of die cast aluminium housing with Lens embeded PC Cover, IP66 and efficacy of 120lm/W.with Aluminium die cast housing Luminaire with toughhned glass and unique lens system opal diffuser ,IP66 die cast aluminium housing with LED bay LIGHT 10KV SPD , complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge.Make-HALONIX:HLBLD-ML54-200-CWDL-R01-HL2 / PHILIPS/WIPRO,LT,BAJAJ,TRILUX, OSHRAM,	Nos.	4

C)	Supply of 400 watt LED FLOOD Light of die cast aluminium housing with Lens embeded PC Cover, IP66 and efficacy of 120lm/W.with Aluminium die cast housing Luminaire with toughhned glass and unique lens system opal diffuser ,IP66 die cast aluminium housing with LED bay LIGHT 10KV SPD , complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge.Make-HALONIX:HLFLD-ML27-400-CW-R01 / PHILIPS/WIPRO,LT,BAJAJ,TRILUX, OSHRAM,	Nos.	6
D)	Supply of 10 W Inverter LED Bulb in B-22 cap and with Opal Diffuser, IP20, Battery back-up & Functioning as per Product TDS Luminaire with LED complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge(Make-Make-HALONIX Cat No 10W B22 CW IP/PHILIPS/WIPRO/CROMPTON	Nos.	1
E)	Supply of 6 W LED Bulb in B-22 cap and with Opal Diffuser, Functioning as per Product TDS Luminaire with LED complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge	Nos.	1
6.2	Installation, testing and commissioning of pre-wired, fluorescent fitting / compact fluorescent fitting of all types, complete with all accessories and tube/lamp etc. directly on ceiling/ wall, including connections with 1.5 sq. mm FRLS PVC insulated, copper conductor, single core cable and earthing etc. as required.	Nos	4
6.3	Numbering of ceiling fan/ exhaust fan/ light fittings as required.	Nos.	6
7	Supply, delivery, installation and testing of following Sweeps of High Speed Energy Efficient A.C 1200 mm 48 '' Sweep Ceiling Fan 210 CMM Air Delivery.. GOOD BYE Anti Dust Super striker Ceiling Fan complete with Fan Blades, Down Rod, Canopies & Capacitor etc. including supply of Sundry Materials, making connection from the suitable point outlet but excluding cost of Fan Regulator complete as required and as per the Direction of Engineer-In-Charge.(Make-USHA , Halonix, Pansonic,Bajaj)	Nos.	1
8	**EARTHING:**		
8.1	Providing and fixing 25 mm x 5 mm Copper earth strip in 40 mm dia G.I. pipe surface or in recess as strip electrode for connections etc. as required.and making good the damages caused complete as required and as per direction of Engineer-in-charge	meter	10
8.2	Extra for using salt and charcoal for G.I or copper plate earth as required and making good the damages caused complete as required and as per direction of Engineer-in-charge	set	1
8.3	Providing and fixing 8 SWG COPPER wire on surface or in recess for loop earthing along with existing surface / recessed conduit / submain wiring / cable as required and making good the damages caused complete as required and as per direction of Engineer-in-charge	meter	10

8.4	Earthing with COPPER plate 600 mm x 600mm x 6 mm thick ISI marked including accessories and providing masonary with cover plate having loccking arrangement and watering pipe etc (But wih out charcoal and salt) as required.and making good the damages caused complete as required and as per direction of Engineer-in-charge	set	1
	CABLE		
9	Laying of one number of PVC insulated and PVC seathed / XLPE power cable of 1.1 KV grade of size excedding 25 sq.mm but not exceeding 100 sq.mm direct in ground in the same trench in one , sand cushioning, protective covering and refilling the trench etc. as required.	Mtr	50
10	Supply, Laying and Testing of following Size XLPE insulated 1.1 Kv alluminium armoued cable making good the damages caused as required complete as per Direction of Engineer-In-Charge. (Make: polycab,KEI)		
a)	4 mm2 3 Core Flexiable cooper Cable (flood light)	Mtrs.	100
11	Supply of all materials like cable lugs, gland etc as required & terminal of below mentioned cable complete as per required technical specifications & direction of EIC		
(a)	50 mm2 3 1⁄2 Core , Al Armoured , XLPE Cable	Nos	1
12	**Supplying of following Materials**		
a)	First Aid Box.	Set.	1
b)	Shock Treatment Chart (Odia / Hindi & English).	Set	1
c)	8 mm thick Rubber Mat.	Sqmtr.	6
e)	Danger Board.	Set	1
	TOTAL ELECTRICALS FOR MAI GATE, SECURITY SHED (C.2)		
	TOTAL MAIN GATE, SECURITY SHED (C.1+C.2)		

BOUNDARY WALL (GRILL TOP TYPE) (– Indicative Quantities for 1000 meter)

PART-D	BOUNDARY WALL	UOM	Approx Qty
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	Cum	656.1

2	Filling foundation trenches and plinth with excavated earth including laying the earth in layers not exceeding 23.5cm (9") thick ramming and watering with all leads and lifts including cost of all labour, T&P etc. complete as directed by the Engineer-in-charge.	Cum	218.7
3	Disposal of excess earth by mechanical means / manually including cost of loading, unloading, transporting & spreading to a level surface complete in all respects including cost of all labour, tools & plant etc. to complete the work		
a.	Upto 5 KM	Cum	437.4
4	Supplying, filling in foundation and plinth with sand including watering and ramming with cost, conveyance, royalties of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).		
a.	Ground floor	Cum	72.9
5	Providing & laying Plain Cement concrete (PCC) of proportion (1:3:6) in foundation and floors using 4cm (1½") size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6") thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and ,es of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	Cum	72.9
6	R.C.C. work of Grade- M 25 in following works using 20mm size & down graded hard black crusher broken granite stone chips of approved quality from approved quarry in specified proportion including centering & shuttering,hoisting, lowering, laying and compacting concrete, watering and curing and finishing the exposed surfaces smooth with cost, conveyance, royalties of all materials with all labour and T&P required for the work etc. complete in all respect as per the direction of engineer incharege but excluding the cost and conveyance of HYSD rods or Tor steel and binding wire of 18 to 20 gauge and labour charges for straightening, cutting, bending, binding and tying the grills and placing in proper position.		
A	Ground floor		
a.	Foundation & bases of column	Cum	121.5
b.	Plinth Beam	Cum	87.5
c.	Pedestal & Columns	Cum	109.3
d	rcc band	Cum	43.8
7	Reinforcement for RCC work including straightening, cutting, bending, placing in position HYSD and binding all complete. lifting and placing in position as per design complete including cost of bars , binding wires , including cost of all materials, labour, conveyance, loading and unloading,, royalties, sundries, tools and plants, etc. complete as per the direction of the Engineer-in-charge. (linear measurement will be taken and quantity will be calculated on standard weight for all heights)-Thermo Mechanically Treated bars		

a.	Ground floor	Cum	494.6
8	Providing Brick work with Fly ash bricks 25cm x 12cm x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1:6) (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloadining, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.		
a.	Ground floor	Cum	181.6
9	Providing 16 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and ,es of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge. (Inside)		
a.	Ground floor	Cum	2899.5
10	Painting to external building surface with weather coat two coats over a coat of primer of approved shade and quality of approved design after cleaning by watering & removing the dirts etc. to the surface to be painted including watering, curing, cost, conveyance of all materials, cost of all labour, brushes, T&P etc. and necessary scaffolding work complete as directed by the Engineer-in-charge.		
a.	Ground floor	Cum	2899.5
11	Supplying, fitting and fixing of M.S grills, grill gates with top and bottom rails, steel windows, steel doors, steel frames for doors and windows, staircase and parapet railing (as per I.S. specification and as per approved drawings) in proper position in all floors and at all height including making holes to brick walls/ R.C.C structure/wood work etc. and making good to the damaged walls/ structures with cement concrete (1:2:4) with black hard crusher broken granite stone chips of 12mm to 20mm size (20mm size not to exceeds 25%) including watering and curing etc. complete in all respect as directed by the Engineer in charge (W.I. / M.S. windows grills, grill gates, collapsible gates with top and bottom rails, steel windows, steel doors, steel frames for doors and windows, staircase and parapet railings square bar along with required nos. of nails and screws and other required materials of approved quality and approved size shall be supplied by the contractor at his own cost.)		
A	GROUND FLOOR	Cum	38195.5

12	Providing and painting two coats with synthetic enamel paint over a coat of primer to iron work of approved quality and approved shade confirmming to ISI on steel work to give an even shade in all floors at all height over a coat of primer of approved quality and shade including sand papering and making the surface smooth with cost, coveyance, loading and unloading, of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by Engineer-in-charge.		
A	GROUND FLOOR	Cum	54.6
	TOTAL BOUNDARY WALL(1200M) (D)		

TRANSIT HOUSE (E.1 to E.5)

E.1	**TRANSIT HOUSE CIVIL WORK (E.1)**	UOM	Approx Qty
1	Earthwork excavation in all kinds of soil as per drawing and technical specification including dressing and levelling the bed, sides and bottom and removing the excavated earth and depositing the same away from the work site within initial lead of 50m and initial lift of 1.5m, including cost, conveyance of all materials, all labour, T&P articles required for the work, including shoring, shuttering, propping and dewatering if required etc. complete in all respect as per direction of the Engineer-in-Charge.	Cum	209.65
2	Extra lift or 1.5m or part there of over the initial lift of 1.5m in all kinds of embankments and road works and ordinary earth work in general.	Cum	74.23
3	Cutting in disintegrated rock not requiring blasting to be removed by pick axes and crow bars and depositing materials within 50m initial lead and 1.5m initial lift including rough dressing as per direction and specification of the department including stacking the useful materials separately as ordered.	Cum	139.77
4	Back filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth, consolidating each deposited layer by ramming and watering, lead upto 50 m and lift upto 1.5m.	Cum	69.89
4	Carriage / disposal of excavated surplus earth from the worksite by mechanical means within a lead of 5Km including loading and unloading etc. complete. in all respect as per direction of Engineer-in-Charge.	Cum	279.53
5	Supplying, filling in foundation and plinth with sand in 22.5 cm (9”) thick layers including watering and ramming with cost, conveyance, royalties and taxes of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	Cum	345.30

6	Providing and lying Plain Cement Concrete of proportion (1:3:6) in foundation and floors using 4cm (1 1/2") 0 mm & down grade black hard crusher broken granite stone metal, washed and screened sharp sand of approved quality from approved quarry including hoisting, lowering, laying the concrete, ramming, watering and curing etc. complete to required thickness including cost of all materials, conveyance, loading, unloading,cost of labours, T&P, hire & running charges of concrete mixer, etc. all complete as per the direction of the Engineer -in -charge.	Cum	56.37
7	Providing & laying Plain cement concrete (1:2:4) using 12mm size black hard crusher broken granite chips of approved quality from approved quarry including hoisting, lowering and laying concrete in layers, watering, curing etc. complete including cost, conveyance, royalties and taxes of all materials with labour, cess and T&P etc. required for the work complete.		
	FIRST FLOOR	SQM	1.57
8	Providing and laying in position ready mixed M-25 grade concrete having compressive strength at 28 days test not less than 250 kg/ sq.cm for reinforced cement concrete work, using cement content as per approved design mix, manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for reinforced cement concrete work including pumping of R.M.C. from transit mixer to site of laying , including the cost of centering, shuttering finishing and excluding reinforcement including cost of admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, and hoisting, lowering, laying and compacting concrete, watering and curing and finishing the exposed surfaces smooth with cost, conveyance, royalties, of all materials with all labour,Labour cess and T&P required for the work improve workability without impairing strength and durability as per direction of the Engineer - in - charge.		
A	GROUND FLOOR		
a	Foundation & bases of column	cum	72.14
b	Plinth Beam	cum	13.07
c	Pedestal & Columns	cum	19.95
d	Roof Beam	cum	13.60
e	Lintel	cum	2.28
f	Chajja	sqm	15.45
g	R.C.C. floor and roof slab	cum	20.83
h	R.C.C. staircase	cum	3.43
B	FIRST FLOOR & HEAD ROOM		
a	Columns	cum	6.77
b	Roof Beam	cum	12.91

c	Lintel	cum	2.63
d	Chajja	sqm	3.44
e	R.C.C. floor and roof slabs	cum	23.14
f	R.C.C. staircase	cum	3.43
9	Cutting, straightening coiled or bent up M.S. rods, HYSD steel or Tor Steel welding or jointing if necessary, bending, binding, tying the grills as required for RCC works, and hoisting, lowering and placing in proper position according to approved designs and drawings including cost, conveyance, loading, unloading, M.S. rods, HYSD steel or Tor steel and binding wires of 18 to 20 gauge required for the work and cost of all labour, sundries, T&P and scaffolding complete in all respect as directed by the Engineer-in-Charge (payment will be made according to the actual weight of M.S. rod, HYSD steel or Tor steel consumed in the work and no separate payment will be made towards weight of binding wires which is to be borne by the contractor at his own cost).		
A	GROUND FLOOR	Qntl	187.46
B	FIRST FLOOR	Qntl	64.99
10	Fly Ash brick masonry using fly ash bricks of size 25 cm. x 12 cm. x 8 cm. having crushing strength not less than 75 kg. Per Sqr. Cm. in cement mortar of mix (1:6) with ordinary portland cement (OPC) and screened & washed sand for mortar after immersing the bricks for 6 (Six) hours in water before use including splays cutting, circular moulding, corbelling, chamfering and similar such type of works, watering and curing etc. including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, scaffolding, sundries, T&P required for the works etc. complete in all respect as directed by the Engineer-in-charge		
A	Foundation & Plinth	Cum	28.43
B	GROUND FLOOR	Cum	57.24
C	FIRST FLOOR & HEAD ROOM	Cum	61.31
11	Fly Ash brick masonry using fly ash bricks of size 25 cm. x 12 cm. x 8 cm. having crushing strength not less than 75 kg. Per Sqr. Cm. in cement mortar of mix (1:4) with ordinary portland cement (OPC) and screened & washed sand for mortar after immersing the bricks for 6 (Six) hours in water before use in Superstructure including splays cutting, circular moulding, corbelling, chamfering and similar such type of works, watering and curing etc. including cost, conveyance, loading, unloading, royaltiesof all materials, cost of all labour, scaffolding, sundries, T&P required for the works etc. complete in all respect as directed by the Engineer-in-charge		
A	GROUND FLOOR	cum	2.67
B	FIRST FLOOR & HEAD ROOM	cum	2.25

12	Providing 16 mm. thick cement plaster (1:6) finished smooth to inside brick walls after racking out the joints including watering and curing with cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.		
A	GROUND FLOOR	Sqm	402.87
B	FIRST FLOOR & HEAD ROOM	Sqm	454.42
13	Providing 6mm thick cement plaster in cement mortar of (1:4) to RCC surfaces such as ceilings of roof slabs, stairs, landings, chajja, shelves, columns, beams and lofts etc. including roughening/chipping, scraping and cleaning and finishing the plastered surface smooth using wooden floats, bars, etc. only to proper plumbs and level, making grooves, beads and drip coarse to give required ornamental finish as per drawing including cost of all materials, conveyance, loading and unloading, royalties, cost of all labour, scaffolding, staging, watering before plastering and curing, sundries and T&P, etc. complete as per direction of the Engineer-in-charge.		
A	GROUND FLOOR	sqm	175.35
B	FIRST FLOOR & HEAD ROOM	sqm	148.96
14	Providing 18mm C.P. in two coats underlayer 12mm C.P. 1:6 and top layer 6mm thick C.P. 1:6 finished even and smooth on masonry walls including racking out joints, scrapping and cleaning the surface and finishing the plastered surface smooth to proper plumbs and levels and providing grooves as shown in the drawing including cost of all materials, labour, conveyance, loading and unloading, royalty, scaffolding, watering, curing, sundries, tools and plants, etc., complete excluding GST as per the direction of the Engineer-in-charge.		
A	GROUND FLOOR	sqm	232.18
B	FIRST FLOOR & HEAD ROOM	sqm	235.56
17	Providing vitrified tile flooring using Matt vitrified tiles having thickness of 8mm to 10mm conforming to IS 13756 of 600mm x 600mm / 600mm x 300mm Colour & Printed Series (homogeneous) of approved quality of Somany / Kajaria / Asian / Johnson or equivalent in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened and washed sharp sand for mortar and grouted with epoxy grout with required quantities of pigments of approved marks to match the shades of the vitrified tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, sundries, T&P required for the work, complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	106.82
B	FIRST FLOOR & HEAD ROOM	sqm	102.19

18	Supplying , fitting and Fixing Matt finish full body vitrified tile in dado /skirting of 10MM thick, size 600mm x 600mm with water absorption less than 0.3 % of somany / Kajaria of approved make having base price of the tile Rs. 90 / sqft confirming to I.S.15622 laid on 12mm thick cement mortar (1:3) (1 cement : 3 coarse sand) and filling joints with white cement of approved quality including cost of all materials, labour, T&P etc. required for the work all complete as per direction of Architect.		
A	GROUND FLOOR	sqm	20.27
B	FIRST FLOOR	sqm	20.73
	Providing, fitting & fixing anti-skid ceramic floor tiles in flooring in toilets using special plain/ printed series anti-skid ceramic floor tile of premium grade (having minimum thickness 7 mm to 8 mm & size 300 mm x 300 mm confirming to IS 13755 of approved quality and shade of Somany/ Kajaria on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened & washed sharp river sand for mortar ceramic floor tiles with neat white cement slurry, mixed with required (tiles are to be immersed in the water for required time before use) quantities of pigments of approved marks to match the shades of the anti-skid ceramic floor tiles if required including cost, conveyance, loading, unloading, stacking, royalties of all material, cost of all labour, sundries, T&P required for the work, watering, complete in all respect as per specification excluding GST as per specification as directed by Engineer-in-charge. (Note- sample of tiles shall be approved before procurement and use)		
A	GROUND FLOOR	sqm	10.46
B	FIRST FLOOR	sqm	7.44
	Providing & Fixing tiles of size 30cm x 45 cm glazed ceramic wall tiles of premium grade of approved quality and shade having thickness 8mm to 10mm confirming to IS 13755 in dados skirting and risers of steps on 12mm thick cement plaster (1:3) to proper slope, line and level including cutting to required size and shape, fixing at corners and splays etc including filling the joints with neat white cement slurry mixed with pigments to match the shade of the tiles including cost, Conveyance, loading, unloading, stacking, royalities of all materials, cost of all labour,T&P, sundries, watering and curing for the required period for the work complete in all respect excluding GST as directed by the Engineer-in-charge.(Note- Sample of tiles shall be approved before procurement and use.) (All toilets wall)		
A	GROUND FLOOR	sqm	48.48
B	FIRST FLOOR	sqm	33.84

19	Providing Granite stone prepolished 20mm thick of area above 0.40 Sqm in flooring of approved quality, colour and size in floors, treads on steps and landings in all floors at all height on 20mm thick bed of cement mortar of mix (1:4) laid in proper slope and gradient with screened and washed sharp sand for mortar and grouted with neat white cement slurry jointing the tile with neat white cement slurry mixed with required quantities of pigments of approved marks to match the shades of the granite tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P required for the work etc. complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	21.77
B	FIRST FLOOR	sqm	17.39
20	Providing Granite stone prepolished 10mm thick in dado of approved quality, colour and size in dado, riser of steps and dado of landings in all floors at all height on 12mm thick bed of cement mortar of mix **(1:3)** with screened and washed sharp sand for mortar and grouted with neat white cement slurry jointing the tile with neat white cement slurry mixed with required quantities of pigments of approved marks to match the shades of the granite tile if required watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties of all materials, cost of all labour, T&P required for the work etc. complete in all respect as per specification and direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	4.88
B	FIRST FLOOR	sqm	4.88
21	Providing edge moulding to 18 mm thick granite stone counters, Vanities, steps etc., including machine polishing to edge to give high gloss finish including making three nos of groove over tread etc. complete including cost, coveyance, loading and unloading and ,es of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by the Engineer in charge.		
A	GROUND FLOOR	rnm	62.30
B	FIRST FLOOR	rnm	68.95
	Providing,Fixing 16m thick Kota stone in floors treads or steps and landing on 20mm thick cement mortar (1:4) (1cement : 4 course and) and filling joints with of approved quality including cost, conveyance, taxes, cost of all labour etc. complete.		
A	GROUND FLOOR	sqm	21.98
	Providing,Fixing 16m thick Kota stone in dado ,riser on 12mm thick cement mortar (1:3) (1cement : 3 course and) and filling joints with of approved quality including cost, conveyance, taxes, cost of all labour etc. complete.		
A	GROUND FLOOR	sqm	24.96

25	Providing and fixing in position wood plastic composite door frame with appropriate length of ETA Approved carbon steel galvanized (minimum 5 microns) double threaded 6.8 grade Polyamide PA 6 grade sleeve HRD C 10 anchor suitable for fastenings both on concrete & masonary/aerated blocks including cost of all materials, labours, T & P etc required for the work. complete in all respect as directed by the Architect/Engineer-in-charge		
A	GROUND FLOOR	rnm	28.85
B	FIRST FLOOR	rnm	93.10
26	Providing , fitting & fixing of 32mm thick flush door shutter with 32mm thick BWP block board and paisting 1 mm thick laminate to both sides with adhesive including fitting & fixing of all fixtures like godrej make ofice lock haveing model. No. 6548. Godrej make door clouser having model no- 2701. including cost of all materials, all labour, all T&P etc. required for the work complete in all respect as per the direction of the Engineer-in-Charge excluding G.S.T.		
A	GROUND FLOOR	sqm	11.64
B	FIRST FLOOR & HEAD ROOM	sqm	39.12
27	Supplying, fitting and fixing of M.S grills, Grill window (as per I.S. specification and as per approved drawings) in proper position in all floors and at all height including making holes to brick walls/ R.C.C structure/wood work etc. and making good to the damaged walls/ structures with cement concrete (1:2:4) with black hard crusher broken granite stone chips of 12mm to 20mm size (20mm size not to exceeds 25%) including watering and curing etc. complete in all respect as directed by the Engineer in charge (W.I. / M.S. windows grills, grill gates, collapsible gates with top and bottom rails, steel windows, steel doors, steel frames for doors and windows, staircase and parapet railings square bar along with required nos. of nails and screws and other required materials of approved quality and approved size shall be supplied by the contractor at his own cost.)		
A	GROUND FLOOR	KG	582.75
B	FIRST FLOOR & HEAD ROOM	KG	891.50
28	Finishing wall surface of walls with **wall putty (water based)** of approved make and finished smooth and even surface to receive painting including cost of scaffolding staging charges with cost of all materials, labour T&P etc. complete the work as per the direction of engineer incharge.		
A	GROUND FLOOR	sqm	578.22
B	FIRST FLOOR & HEAD ROOM	sqm	818.21
29	Providing Wall painting with **cement primer(oil bound)one coat** to the internal wall surface including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as per the direction of engineer incharge.		
A	GROUND FLOOR	sqm	578.22

B	FIRST FLOOR & HEAD ROOM	sqm	818.21
30	Providing Wall painting with Oil bound distemper paint two and more coats to all New work to get an even shade including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as per the direction of engineer incharge.(interior)		
A	GROUND FLOOR	sqm	578.22
B	FIRST FLOOR & HEAD ROOM	sqm	818.21
31	Painting to external surface of building with **two coats of weather seal coat** of approved shade and quality of approved design after cleaning by watering & removing the dirts etc. to the surface to be painted including watering, curing, cost, conveyance of all materials, cost of all labour, brushes, T&P etc. and necessary scaffolding work complete as directed by the Engineer-in-charge.		
A	GROUND FLOOR	sqm	232.18
B	FIRST FLOOR & HEAD ROOM	sqm	235.56
31	Providing Wall painting with **cement primer(water bound) one coat to the external wall surface** including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects.		
A	GROUND FLOOR	sqm	232.18
B	FIRST FLOOR & HEAD ROOM	sqm	235.56
32	Providing and painting **two coats with synthetic enamel paint** of approved quality and approved shade confirmming to ISI on steel work to give an even shade in all floors at all height over a coat of primer of approved quality and shade including sand papering and making the surface smooth with cost, coveyance, loading and unloading, of all materials, cost of all labour, sundries, T&P, scaffolding etc. required for the work and complete in all respect as directed by Engineer-in-charge.		
A	GROUND FLOOR	sqm	1.17
B	FIRST FLOOR & HEAD ROOM	sqm	1.79
33	Providing approved primer of one coat to the Iron work including cost of all materials, labour, Tools & Plant, Brushes etc. complete in all respects as directed by Engineer-In-Charge.		
A	GROUND FLOOR	sqm	1.17
B	FIRST FLOOR & HEAD ROOM	sqm	1.79
34	Providing 2.5 cm thick grading concrete(1:2:2) on roof slab using 6mm size hard granite chips including hoisting, lowering, laying, concrete with watering, curing in all floors with cost, conveyances, royality of all materials, all labour, labour cess, T&P etc. complete as per direction of the Engineer in charge		
A	FIRST FLOOR & HEAD ROOM	Sqm	214.38

35	Providing & applying of pre constructional anti-termite treatment by drilling 12mm dia holes at distance of 30cm @ junction of wall & floor about 300mm apart deep enough to reach the soil below & chemical emulsion (PREMISE, IMIDACHLOPRIED 30.5SC OF BAYER MAKE mixed with 47.5ltr water) pumped these holes to soak the soil @ 1 ltr solution of each hole as per manufactures specification & the holes should be pluged the filling materials including cost of all materials, labour,conveyance, T&P , all taxes and hire charges of machinaries as per direction of Engineer-in-charge.	Sqm	148.46
36	Providing and fixing of UPVC sliding windows 2 /3track sliding-60 series/Top hung ventilator of any approved make ,duly manufactured using upvc reinforced profiles of 62mm x 60mm x 2.25mm for outer frame, 66mm x 38mm x 2.25mm for sliding shutter frames capable of mounting single glazing system,structurally reinforced with hot dip galvanised upto 50 microns of minimum thickness of 1.2 mm prefabricated and welded through fusion welding & the window sash shall be fitted with 5 mm thick clear float glass of reputed make duly fixed with EPDM weathering seal including the cost of all materials,necessary locking arrangements ,fittings,cost of labour,T&P ,etc complete as per direction of Engineer-in-charge.		
A	GROUND FLOOR	sqm	23.31
B	FIRST FLOOR	sqm	35.66
37	Waterproofing to the roof slab (a) Surface preparation : Cleaning the surface thoroughly by chipping the roof slabs using breakers, wire brush, mechanical grinder for making it free from all loose particles, dust etc. then total cleaning through air blower followed by water jetting and allowing the surface to dry. (b) Application : Supply and application of Nano Technology OrganoSilane based Zycosil + @ 1:20 (one part Zycosil + and 20 parts of clean water) to the saturation level on the entire flat surface and upto 300mm (1ft.) to the parapet walls and then allowing for drying 24 hrs., test the surface for hydrophobicity. Then application of 100% acrylic co-polymer Zycoprime+, cement and fine sand (100 mesh) mixed at a consistency of paste form and filling drainage pipes gaps. Then application of one coat of Zycoat mix of Zycoprime + and grey cement @ 1:1.5 ratio (1 part Zycoprime + and 1.5 part cement). 2ndcpat of Zycoat mix to be applied after the drying of first coat in the same procedure followed by sprinkling of sieved sand on the top of the slurry. Then allow it to dry followed by proper curing with water for at least two days. (c) Coving : Coving has to be done with Zycomix (a mortar prepared with Zycoprime+, cement and sand in the ratio of 1:5:15 and water as per workability to obtain a uniform paste). Finally cure with water to the entire treated roof and parapet wall for three days.		

a	FIRST FLOOR	SQM	214.38
	Water proofing to the sunken slab (a) Surface preparation : Cleaning the surface thoroughly by wire brush, mechanical grinder for making it free from all loose particles, dust etc. then total cleaning through air blower followed by water jetting and then allowing the surface to dry. (b) Application before PCC : Supply and application of Nano Technology OrganoSilane based Zycosil+@ 1:20 (one part Zycosil+ and 20 parts of clean water) to the saturation level on the entire flat surface and upto to the height of the sunken slab casted and then allowing for drying 24 hrs., test the surface for hydrophobicity. (c) Coving : Coving has to be carried on with Zycomix (a mortar prepared with Zycoprime+, cement and sand in the ratio of 1:5:15 and water as per workability to obtain a uniform paste). This should be followed by application of Zycoat on the corner surface of the sunken slabs. The above Zycomix must be applied in the gaps of pipe joints in the sunken slabs followed by application of Zycoat. (Note : The above application " b & c" should be done before PCC) (d) Application after PCC: Supply and application of Nano Technology OrganoSilane based Zycosil+@ 1:20 (one part Zycosil+ and 20 parts of clean water) to the saturation level on the entire flat PCC surface and upto to 1 mtr height of the wall. This should be done on a sound PCC surface with sufficient curing and drying. Then application of one coat of Zycoat (1 part Zycoprime+ mixed with 1.5 part cement) on Zycosil+ treated surface followed by one coat of Elastocoat (mixing of 100% acrylic co-polymer high strength elongation of 200 - 250% Elastobar 1 part and grey cement 1 part) with the help of brush. Then allow it to dry followed by proper curing with water for at least 3 days.	sqm	7.44
	Providing & filling sunken slab with 40mm size brick bat with overburnt kiln burnt bricks including filling, compacting, watering , levelling the same as per the direction of Engg-in-Charge with all material,labour, scafolding, tools, plant etc for complete.	cum	1.12
	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdor floors such as footpath, courtyard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge		
	GROUND FLOOR	SQM	11.16

	Supplying, fitting and fixing in position 16mm thick chequred tile of approved make and quality, colour and size in all floors at all height on 25mm thick bed of cement mortar of mix (1:1) laid in proper slope and gradient with screened and washed sharp sand for mortar and with Portland Slag Cement (PSC) grouted with neat white cement slurry with required quantities of pigments of approved marks watering and curing for 21 days, including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, sundries, T&P required for the work complete in all respect as directed by the Engineer-in-charge		
	GROUND FLOOR		19.26
	TOTAL TRANSIT HOUSE CCIVIL WORK (E.1)		
E.2	**COVERED DRAIN FOR TRANSIT HOUSE**		
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	CUM	39.38
2	Supplying, filling in foundation and plinth with sand including watering and ramming with cost, conveyance, royalties of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	CUM	7.88
3	Providing & laying Plain Cement concrete (PCC) of proportion (1:3:6) in foundation and floors using 4cm (1½") size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6") thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and ,es of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	CUM	7.88
4	R.C.C. work of Grade- M 25 in following works using 20mm size & down graded hard black crusher broken granite stone chips of approved quality from approved quarry in specified proportion including hoisting, lowering, laying and compacting concrete, watering and curing and finishing the exposed surfaces smooth with cost, conveyance, royalties, taxes of all materials with all labour and T&P required for the work etc. complete in all respect but excluding the cost and conveyance of M.S./TMT/HYSD rods or Tor steel and binding wire of 18 to 20 gauge and labour charges for straightening, cutting, bending, binding and tying the grills and placing in proper position, centering & shuttering		
a)	R.C.C. floor and roof slabs, landings, balconies, projecting sun shades and chajjas upt 4.3m height	CUM	10.50

5	Reinforcement for RCC work including straightening, cutting, bending, placing in position HYSD and binding all complete. lifting and placing in position as per design complete including cost of bars , binding wires , including cost of all materials, labour, conveyance, loading and unloading,, royalties, sundries, tools and plants, etc. complete as per the direction of the Engineer-in-charge. (linear measurement will be taken and quantity will be calculated on standard weight for all heights)-Thermo Mechanically Treated bars	QNTL	5.25
6	Providing Brick work with Fly ash bricks 23cm x 11cm x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1:6) (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloadining, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.	CUM	15.75
7	Providing neat cement punning over plastered/ concrete surface including watering and curing complete with cost, coveyance, loading and unloading, royalties of all materials and cost of all labour, T&P and scaffolding required for the work etc. as directed by the Engineer in charge.	SQM	122.50
8	Providing 12 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and ,es of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	122.50
	Total COVERED DRAIN FOR TRANSIT HOUSE (E.2)		
E.3	**PLINTH PROTECTION FOR TRANSIT HOUSE**		
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	CUM	7.00
2	Supplying, filling in foundation and plinth with sand including watering and ramming with cost, conveyance, royalties of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	CUM	7.88

3	Providing & laying Plain Cement concrete (PCC) of proportion (1:4:8) in foundation and floors using 4cm (1½") size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6") thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and ,es of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	CUM	3.15
4	Providing & laying Plain cement concrete (1:2:4) using 12mm size black hard crusher broken granite chips of approved quality from approved quarry including hoisting, lowering and laying concrete in layers, watering, curing etc. complete including cost, conveyance, royalties of all materials with labour, cess and T&P etc. required for the work complete.	CUM	2.10
5	Providing Brick work with Fly ash bricks 23cm x 11cm x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1:6) (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloading, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.	CUM	8.40
6	Providing 12 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and ,es of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	35.00
	Total PLINTH PROTECTION FOR TRANSIT HOUSE (E.3)		
E.4	**TRANSIT HOUSE ELECTRICALS**		
	All the electrical work as mentioned below shall be complete in all aspect for proper, safe operation and as per instruction of site engineer including the cost of all material & accessories, T & P, labour as required.		
1.1(a)	**GROUP A :**Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm **FRLS** PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. **((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make**	Nos.	10
(b)	**GROUP B:** Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm **FRLS** PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. **((Make**	Nos.	10

	:Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make		
(c)	**GROUP C:** Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm **FRLS** PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable etc. as required. **((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make**	Nos.	20
(b)	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed PVC conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required. **((Make :Legrand(Myrius)/MK(elements)/Pansonic(Europa)/Hager(Insysta)/Eq make**	Nos.	10
(e)	Recessed wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metalic PVC flexible conduit with modular type switch ,4 module 18SWG modular GI box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required. **(Make of wire Finolex / Anchor / Havels / V Guard/KEl)**	Nos.	8
1.2	Supplying and fixing of 4module GI box with cover on surface or in recess with suitable size of phenolic laminated sheet cover in front including providing and fixing 5 pin 15 / 16 amps socket outlet and 15 / 16 amps modular type switch, connection, painting etc as required.**(Make-Anchor/crabtree/Legrand)**	Nos.	8
1.3	Recessed wiring for 5 / 6 amp socket outlet with 2 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor of ISI marked in recess 20 mm dia non-metalic PVC flexible conduit with modular type switch ,6 module 18SWG modular GI box and earthing point with 1 x 1.5 sq.mm FR PVC insulated single core multistrand copper conductor for loop earthing etc. as required. **(Make of wire Finolex / Anchor / Havels /KEI)**	Nos.	8
1.4	Supplying and fixing of 100W,step type regulator, 2 Module without base and cover including connection etc as required**.(Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)**	Nos.	8
1.5	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	Nos.	2
1.6	Wiring to Telephone Socket Outlet from Junction Box with 0.5 mm^2 Twin Pair Copper Conductor Telephone Wire run inside prelaid PVC Conduit complete including termination, testing etc complete as required and as per Direction of Engineer-In-Charge. **(Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)**	Mtrs.	80

1.7	Supply, delivery, installation and testing of TV Antenna Wires RG6 in PVC Pipe and making good the damages caused complete as required and as per Direction of Engineer-In-Charge. **(Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)**	Mtrs.	80
1.8	Supplying and fixing of RJ11 telephone jack single with shutter & RJ 45 computer jack with shutter, 2module modular base and cover including connection for telephone and LAN . **(Make :Legrand(Myrius)/MK(elements)/schneider(Zencelo)**	NO	4
1.9	Supplying and fixing T.V. antenna socket outlet piano type ISI marked on the existing switchboard / cover including connections etc as requird.	NO	4
19.1	Supply, delivery and laying of following sizes of 2 mm Wall thickness rigid PVC Conduit Concealed in Wall/ Column/ Roof Slab of the Building or mounted on surface along with other accessories and 18 SWG GI Fish Wire complete for Telephone / TV / Computer / Circuit or Sub main wiring as required & as per Direction of Engineer-In-Charge.		
(a)	20 mm dia.	Mtrs.	40
(b)	25 mm dia.	Mtrs.	45
2	Wiring for **Circuits** and **Submain** with following number & sizes of PVC insulated 1100 Volt Grade Multistranded Copper Conductor **FRLS** Wire run inside 2 mm thick PVC Conduit Pipe Recessed in Ceiling / Column / Walls of Building including supply of all materials such as wires, PVC Conduit, Junction Box & Pull Box etc. complete with making good the damages caused as required and as per Direction of Engineer-In-Charge. **(Make of wire Finolex/Anchor/Havels/KEI)**		
(a)	2 Nos. Single Core 1.5 mm^2 **FRLS** Copper Wire for Phase and Neutral and 1 No. Single Core 1.5 mm^2 **FRLS** Copper Wire for Earth Continuity Conductor as per SLD **(Make of wire Anchor/Havels/KEI)**	Mtrs.	200
(b)	2 Nos. Single Core 2.5 mm^2 **FRLS** Copper Wire for Phase and Neutral and 1 No. Single Core 1.5 mm^2 **FRLS** Copper Wire for Earth Continuity Conductor as per SLD (from LDB to Room & Power Point and Common Light Point looped).**(Make of wire Anchor/Havels/KEI)**	Mtrs.	150
(c)	2 Nos. Single Core 4.0 mm^2 **FRLS** Copper Wire for Phase and Neutral and 1 No. Single Core 2.5 mm^2 **FRLS** Copper Wire for Earth Continuity Conductor as per SLD.**(Make of wire Anchor/Havels/KEI)**	Mtrs.	100
(d)	4 Nos. Single Core 16.0 mm^2 **FRLS** Copper Wire for Phase and Neutral and 2 No. Single Core10 mm^2 **FRLS** Copper Wire for Earth Continuity Conductor as per SLD.**(Make of wire Anchor/Havels/KEI)**	Mtrs.	80
3	**BRANCH DISTRIBUTION BOARDS:**		

3.1	Supplying and fixing following way, Three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator) **4 way, TPN DB Double door Make:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE**	Nos.	2
3.2	Supplying and fixing following rating, 63 amp 4pole MCB , (Three phase and neutral), 415 V having a sensitivity current 10 KA in the existing MCB DB complete with connections, testing and commissioning etc. as required.**Make:LEGRAND(DX3)/SIEMENS(Betagaurd)/Schneider(Acti 9)/GE**	Nos.	2
3.3	Supplying and fixing 5 amps to 32 amps rating,Single pole 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.	Nos.	20
3.6	Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.	Nos.	5
4	**MAIN DISTRIBUTION BOARD**		
	Supplying, Installing, Testing and Energizing TYPE TESTED IEC61439 Panel Board made of 2 mm thick CRCA Sheet with Hinged Door duly Fabricated with required MS Angle and Channels of adequate size, duly treated and Powder Coated (shall have Hinged Door at the Front and Detachable Plates at Back if requirement and at Top / Bottom for Cable / Wire Entry / Exit as per the Direction of Engineer-In-Charge and approved GA Drawing with following provisions. **MAKE-L&T / LEGRAND / C&S)**		
	Main Panel Board: 100 Amp. 4P MCCB 36 KA (Thermal Magnetic Release) - 1No,125 AMP 4WAY AUTO CHANGOVER SWITCH 1 NO,Equiments: 4 Nos. 1250 Amp. Copper Bus Bar coated with PVC Heat Shrunk Sleeve (Colour Code). 1 No. VAF Digital Meter.3 Nos. RYB LED Indicator. 3 Nos.100 / 5 Amp. C.T. Operated. Outgoing:3 NOS 63 Amp 4p MCB 10 KA, 3 Nos 40 AMP 2P MCB 10 KA,1 Nos of sub Meter connection With spreadentinle & cable alloy 1no. Digital multi function meter semealess integration ,industry standard modbus rtu protccol HMI LCD display with following parameters displayed - Phase Current, Neutral Current, Ground Current, Voltage Line-to-Line, Voltage Line-to-Neutral, Frequency, Real Power (kW), Apparent Power (kVA), Power Factor, Energy (kW-Hours,	set	1
6	**<u>FITTINGS & FIXTURES:</u>**		
6.1	Supply,Installation and testing of following types of LED Tube Fixtures Directly on Wall / Ceiling/ Structure of Building with all accessories such as Electronics Ballast, Lamps, Stove Enameled Box, Perplex Sheet Cover etc. complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge. **Make-PHILIPS, ,WIPRO,LT,PANASONIC,BAJAJ,TRILUX, PAC,HALONIX/Eq make**		

(A)	Supply of Surface mounted indoor type 20 WATT LED Inverter LED Batten with Opal Diffuser, IP20, Battery back-up & Functioning as per Product TDS complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge(Make-Halonix Cat No LED INVERTER BATTEN HLB-08-20-CW-INV/WIPRO/CROMPTON/LT/PHILIPS	Nos.	10
(B)	Supply of 18 watt Surface mounted indoor type Round LED Luminaire with LED GLARE FREE opal diffuser ,IP20 Lamp complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge.	Nos.	15
C)	Supply 36 W LED premises LIGHT 6500 CCT complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge	Nos.	2
E)	Supply of 10 W LED Bulb in B-22 cap and with Opal Diffuser, Functioning as per Product TDS Luminaire with LED complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge	Nos.	5
F)	Supply of 6 W LED Bulb in B-22 cap and with Opal Diffuser, Functioning as per Product TDS Luminaire with LED complete assembly With supply of required T&P and making connection from the suitable point outlet as per the Direction of Engineer-In-Charge	Nos.	6
6.2	Installation, testing and commissioning of pre-wired, fluorescent fitting / compact fluorescent fitting of all types, complete with all accessories and tube/lamp etc. directly on ceiling/ wall, including connections with 1.5 sq. mm FRLS PVC insulated, copper conductor, single core cable and earthing etc. as required.	Nos	38
6.3	Numbering of ceiling fan/ exhaust fan/ light fittings as required.	Nos.	50
7	Supply, delivery, installation and testing of following Sweeps of High Speed Energy Efficient A.C 1200 mm 48 '' Sweep Ceiling Fan 210 CMM Air Delivery.. GOOD BYE Anti Dust Super striker Ceiling Fan complete with Fan Blades, Down Rod, Canopies & Capacitor etc. including supply of Sundry Materials, making connection from the suitable point outlet but excluding cost of Fan Regulator complete as required and as per the Direction of Engineer-In-Charge.**(Make-USHA , Halonix ,Bajaj)**	Nos.	8
7.1	Supply, delivery, installation & testing of following Sweep & Speed 230 mm EXHAUST FAN 1400 RPM. on Existing Sheet Metal Switch Board including loop connections and making good the damages caused complete as required and as per direction of Engineer-in-charge**(Make-USHA , Halonix ,Bajaj)**	Nos.	5
8	**EARTHING:**		

8.1	Providing and fixing 25 mm x 5 mm Copper earth strip in 40 mm dia G.I. pipe surface or in recess as strip electrode for connections etc. as required.and making good the damages caused complete as required and as per direction of Engineer-in-charge	meter	30
8.2	Extra for using salt and charcoal for G.I or copper plate earth as required and making good the damages caused complete as required and as per direction of Engineer-in-charge	set	2
8.3	Providing and fixing 8 SWG COPPER wire on surface or in recess for loop earthing along with existing surface / recessed conduit / submain wiring / cable as required and making good the damages caused complete as required and as per direction of Engineer-in-charge	Mtrs.	35
8.4	Earthing with COPPER plate 600 mm x 600mm x 6 mm thick ISI marked including accessories and providing masonary with cover plate having loccking arrangement and watering pipe etc (But wih out charcoal and salt) as required.and making good the damages caused complete as required and as per direction of Engineer-in-charge	set	2
	CABLE		
9	Laying of one number of PVC insulated and PVC seathed / XLPE power cable of 1.1 KV grade of size excedding 120 sq.mm but not exceeding 400 sq.mm direct in ground in the same trench in one , sand cushioning, protective covering and refilling the trench etc. as required.	Mtr	50
10	Supply, Laying and Testing of following Size XLPE insulated 1.1 Kv alluminium armoued cable making good the damages caused as required complete as per Direction of Engineer-In-Charge. **(Make: polycab,KEI)**		
a)	50 mm^2 3 1⁄2 Core , Al Armoured , XLPE Cable	Mtrs.	90
11	Supply of all materials like cable lugs, gland etc as required & terminal of below mentioned cable complete as per required technical specifications & direction of EIC		
(a)	50 mm^2 3 1⁄2 Core , Al Armoured , XLPE Cable	Nos	2
12	**Supplying of following Materials**		
a)	First Aid Box.	Set.	1
b)	Shock Treatment Chart (Odia / Hindi & English).	Set	1
c)	8 mm thick Rubber Mat.	Sqmtr.	12
d)	ABS type Fire Extinguisher of 4.5 Kg.	Set	2
e)	Danger Board.	Set	1
	TOTAL TRANSIT HOUSE ELECTRICALS-(E.4)		
E.5	**TRANSIT HOUSE PH WORK**		
A	**WATER SUPPLY & SANITARY WORKS**		

1	Providing, Supplying & Fixing of Rimless, Blind Installation wall Hung WC of CERA (CAT NO S1059102and Cistern-B1510121), (Size :520x360x390mm) with PP soft close slim seat cover (Cat. No. B1510121 Cajol seat cover), Hinges, Accessories with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	EACH	5.00
2	Providing, Supplying & Fixing of Toilet roll Holder with Stainless steel flap of CERA (CAT- F5001109) with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	EACH	5.00
3	Providing, Supplying & Fixing of Hand Shower (Health Faucet) with 8mm dia, 1.2m long flexible tube and wall hook of CERA (F8030103)with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	each	5.00
4	Providing, Supplying & Fixing of Stop cock, male end with wall flange of CERA(F1018201) will all fittings & fixtures complete including making good the damages including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architec/Engineer in charge.	each	5.00
5	Providing, Supplying & Fixing of 2 Way Bib cock with wall flange of CERA (F1018163) with all fittings & fixtures complete including making good the damages. including cost of all mateials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00
6	Providing, Supplying & Fixing Basin of CERA of size 515x410x195 mm (CAT-NO. S2040120) with full pedestal height 850MM (CAT NO. S2090113) with all fitings & fixtures complete including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/ Engineer in charge	EACH	5.00
7	Providing, Supplyin & Fixing of Basin inlet connection (angle valve) of CERA (F1018201) with all fittings & fixtures complete including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	EACH	5.00
8	Providing, Supplying & Fixing Glass Shelf 300X300mm long of CERA (F5005103) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	EACH	5.00
9	Providing, Supplying & Fixing pillar cock with aerator with long screws, shanks and back nuts of CERA (CAT-F2007101) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00

10	Providing, Supplying & Fixing standard sized Single Towel rail of 600mm long, stainless steel complete with Chromiun Plated brass brackets of CERA (F5003103) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all rescpects as per direction of Architect/ Engineer in charge.	each	5.00
11	Providing, Supplying & Fixing standard sized Chromium Plated brass towel ring(round) of CERA (F5003105) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royalitity etc. complete in all respects as per direction of Architect/Engineer in charge.	EACH	5.00
12	Providing, Supplying & Fixing Soap dish holder of CERA (F5007105) with all fittings & fixtures complete including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	EACH	10.00
13	Providing, Supplying & Fixing Towel Shelf 600mm long with lower hangers, stainless steel complete with Chromiun Plated brass brackets ofCERA (F5007101) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	EACH	5.00
14	Providing, Supplying & Fixing of Bib cock short body (with straight line model) with wall flange polished bright ofCERA (F2013151) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00
15	Providing, Supplying & Fixing of Long body Bib cock with wall flange polished bright of CERA (CAT-SQT-512KN) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00
16	Providing, Supplying & Fixing Overhead shower 70mm Round shape single flow (ABS Body Chorme plated with Gray face plate) with Rubit cleaning system (EOS-542A) and Shower arm 235mm long (Light weight) round shape for wall mounted showers with wall flange (ALE-536A) of CERAwith all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00
17	Providing, Supplying & Fixing of Concealed Stop cock, Heavy Body with Cap of CERA (F1018201) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00

18	Providing, Supplying & Fixing Double Coat hook ofCERA (F5003108) with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	each	5.00
19	Providing, Supplying & Fixing 600mm x 300mm bevelled edge mirror of superior glass mounted on 5mm thick A.C sheet or plywood sheet with all fittings & fixtures completer including making good the damages. including cost of all materials, labour, T&P, lead, royality etc. complete in all respects as per direction of Architect/Engineer in charge.	EACH	5.00
20	Providing & Fixing of PVC nahani trap with 125mm stainless steel grating with/ without hole for waste pipe in floors / at any location cost includes all materials, labour, tools,plant etc. complete in all respects.as per price list of ASTRAL	EACH	10.00
21	Providing, Supplying and Fixing Stainless Stell A ISI 304 (18/8) wash Kitchen sink conforming to IS 13983 with C.I. Brackets, stainless steel waste coupling, 32mm dia PVC waste pipe and stainless steel plug 40 mm including painting of fittings and brackets of Parryware (CAT-C856299) with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	EACH	1.00
22	Fixing of sink cock with swinging long swivel spout (wall mounted model) with Aerator of CERA(CAT-F1003251) with all fittings & fixtures complete including making good the damages . including cost of all materials, labour, T&P, lead, royality etc.complete in all respects as per direction of Architect /Engineer in charge.	EACH	1.00
23	Supplying all materials, labour, T&P and fitting and fixing U-PVC SWR soil waste ventilating pipes (type-A / ring fit type) with all PVC fittings of ASTRAL/AJAY/SUPREME make as per IS 13592 to walls with nails, bobbins and laying in trenches including all pipe fittings, jointing materials, tools plant, labour & all material, earthwork in excavation in all kinds of soil and refilling of trenches as per specification and direction of the engineer in charge.		
a)	160mm dia PVC (SWR) pipe class "A" (with wall thickness of 3.2mm to 3.8mm)	MTR	35.00
b)	110 mm dia PVC (SWR) pipe Class 'A' (with wall thick of 2.20 mm to 2.70 mm)	MTR	50.00
c)	75 mm dia PVC (SWR) pipe Class 'A' (with wall thick of 1.8 mm to 2.20 mm)	MTR	50.00
25	Providing all materials, labour and T&P for fixing of Upvc SWR fittings		
a	75 x 75 x 75mm single Tee with door	Each	8.00
b	110 x 110 x 110 mm single Tee with door	Each	8.00
c	75 x 75 x 75mm single Tee without door	Each	6.00
d	110 x 110 x 110 mm single Tee without door	Each	6.00
e	160 x 160x 110 mm Reducing Tee with door	Each	10.00

f	110 x 110 x 75 mm Reducing Tee with door	Each	10.00
g	75 mm x 87.50 Plane Bend	Each	15.00
h	110 mm x 87.50 Plane Bend	Each	15.00
i	75mm coupler	Each	15.00
j	110mm coupler	Each	30.00
k	75 mm vent cowl with SS Jali	Each	8.00
l	110 mm vent cowl with SS Jali	Each	8.00
m	75mm pipe clip	Each	50.00
n	110mm pipe clip	Each	50.00
o	160mm pipe clip	Each	50.00
p	110 mm x 75 mm Nahani Trap without Jali	Each	10.00
q	110 mm Square Gully Trap	Each	6.00
r	125 x 110mm WC Connector	Each	6.00
s	110mm WC Connector (Bend)	Each	6.00
t	110mm WC Connector (Straight)	Each	6.00
24	Providing and laying in trench cement concrete (1:4:8) with 40mm size hard granite metal in the following type of bedding for 150mm diameter including curing complete as per specification	MTR	100.00
25	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes of (ASTRAL/AJAY/SUPREME) confirming to ASTM F442 Specific-2 having thermal stability for hot & cold water supply SDR 11 , including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge.		
	Internal work		
V	GROUND FLOOR		
a	15 mm nominal outer dia Pipes	MTR	25.00
b	20 mm nominal outer dia Pipes	MTR	20.00
c	25 mm nominal outer dia Pipes	MTR	20.00
VI	FIRST FLOOR		
a	15 mm nominal outer dia Pipes	MTR	15.00
b	20 mm nominal outer dia Pipes	MTR	15.00
c	25 mm nominal outer dia Pipes	MTR	15.00
26	Providing all materials, labour, T&P for laying/fixing to wall or ceiling and floor uPVC solvent weld pipe Sch-80 as per ASTM-D-1785 and pipe fittings of following nominal bore with clamps including making good the wall, ceiling & floor all complete as per specification.		
	External work		
V	GROUND FLOOR		
e	40 mm nominal outer dia Pipes	MTR	30.00
VI	FIRST FLOOR		
e	40 mm nominal outer dia Pipes	MTR	20.00

f	50 mm nominal outer dia Pipes	MTR	50.00
27	Cutting grooves in pucca floors and walls for taking GI/PVC /CPVC pipes including making good the damages caused with cost of all material,labour, scafolding, tools, plant, royalty etc. complete in all respects.	MTR	50.00
28	Supplying all materials, jointing materials, labour and T&P and fixing of uPVC pressure fittings (Sch-80) as per ASTM-D 2467 (Make: ASTRAL)		
a	20 mm	EACH	15.00
b	25 mm	EACH	15.00
c	32 mm	EACH	15.00
d	40 mm	EACH	15.00
e	50 mm	EACH	15.00
29	Supplying all materials,labours,T&P and cutting holes through existing brickwork including making good the damages in cement mortar (1:4) for taking GI /CPVC /PVC pipes and fittings etc all complete as per PH specification and direction of Engineer-in-charge.	EACH	30.00
30	Supplying all materials,labour,T&P and fixing Rotational moulded polyethylene cylindrical vertical water storage tanks conforming to IS : 12701--1996 including cutting holes through the tank and fixing mild steel tubes and fittings and providing extra sockets and jam nuts, fixing ball valve etc, including hoisting upto a height of 5 metres above ground level and placing the tank to the required position and providing 1st class Fly ash brickwork in cement mortar (1:6) of 0.46m height in staging and in circular protection wall to support the tank, 12mm thick cement plaster (1:6) over brickwork, R.C.C slab of size 1.60mx1.60m and 0.10m thick, R.C.C beam of 0.25mx0.30m and 2.60m average length in cement concrete(1:2:4) using 12mm size h.g chips including centering and shuttering, watering, curing, conveyance of all materials to worksite etc all complete as per specification and direction of the Engineer in charge. Fixing 2000Ltr Roto-moulded water storage tank (Syntax Make) In first Floor	NO	1.00
	SUB TOTAL - WATER SUPPLY AND SANITARY WORK (E.5-A)		
B	**SEPTIC TANK & SOAK PIT**		
1	Earth work in excavation in all kinds of soil (Ordinary, hard soil & stoney earth soil) for foundation trenches within 50m. Initial lead and 1.5m initial lift including rough dressing and beaking clods to maximum 5 cm to 7 cm and laying in layers not exceeding 0.3 m in depth and as per specification approved by the department.	CUM	57.02
2	Extra lift of 1.5m or part there of over the initial lift of 1.5m in all kinds earth work (1st extra lift of 1.5mt (upto 7.5m)	CUM	51.84
3	Filling foundation trenches and plinth with excavated earth including laying the earth in layers not exceeding 23.5cm (9") thick ramming and watering with all leads and lifts including cost of all labour, T&P etc. complete as directed by the Engineer-in-charge.	CUM	11.40

4	Supplying, filling in foundation and plinth with sand in 22.5 cm (9”) thick layers including watering and ramming with cost, conveyance, royalties and taxes of sand with labour and T&P required for the work etc. complete (Measurement will be taken on finished compacted section only).	CUM	4.32
5	Providing & laying Plain Cement concrete (PCC) of proportion (1:3:6) in foundation and floors using 4cm (1½”) size clean hard black crusher broken granite stone metal of approved quality and from approved quarry including hoisting, lowering and laying concrete in layers not exceeding 15 cm. (6”) thick to the required level ramming, watering, curing etc. complete including cost, conveyance, royalties and taxes of all materials with all labour, cess and T&P required for the work etc. complete in all respect.	CUM	4.32
6	Cutting, straightening coiled or bent up M.S. rods, HYSD steel or Tor Steel welding or jointing if necessary, bending, binding, tying the grills as required for RCC works, and hoisting, lowering and placing in proper position according to approved designs and drawings including cost, conveyance, loading, unloading, M.S. rods, HYSD steel or Tor steel and binding wires of 18 to 20 gauge required for the work and cost of all labour, sundries, T&P and scaffolding complete in all respect as directed by the Engineer-in-Charge (payment will be made according to the actual weight of M.S. rod, HYSD steel or Tor steel consumed in the work and no separate payment will be made towards weight of binding wires which is to be borne by the contractor at his own cost).	CUM	2.88
7	Providing strong, rigid, leveled, and plumbed centering and shuttering to required shape and size , for floors with ply or steel centering materials with all necessary bracing and tiles and supports with leveling centering covered with plastic sheet with provisions necessary holes and pockets for electrical conduits, pipes, P.H. pipes, for hooks or boxes, switch and board insert plates, clamps and extension bars etc., including dismantling the same after the required interval from the date of casting including cost of all materials, labour, conveyance, loading and unloading, taxes, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., complete as per the direction of the Engineer-in-charge.		
a.	R.C.C. floor and roof slabs, landings, balconies, projecting sun shades and chajjas upto 4.3m height	SQM	28.80
8	Reinforcement for RCC work including straightening, cutting, bending, placing in position and binding all complete. lifting and placing in position as per design complete including cost of bars , binding wires , including cost of all materials, labour, conveyance, loading and unloading, taxes, royalties, sundries, tools and plants, etc. complete as per the direction of the Engineer-in-charge. (linear measurement will be taken and quantity will be calculated on standard weight for all heights)-Thermo Mechanically Treated bars	QNTL	2.88

9	Providing Brick work with Fly ash bricks 25cm x 12m x 8cm size having crushing strength not less than 75 kg/cm2 with dimensional tolerance +/ - 2 percent in cement mortar (1 cement: 6 sand), with all necessary projection, splay cutting, circular moulding, corbelling, etc., including cost of all materials, labour, conveyance, loading ,and unloadining, taxes, royalties, scaffolding, watering, curing, sundries, tools and plants, etc., as per the direction of the Engineer-in-charge.		
	Foundation & Plinth	CUM	25.99
10	Providing 16 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:6) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and taxes of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	107.58
11	Providing neat cement punning over plastered/ concrete surface including watering and curing complete with cost, coveyance, loading and unloading, royalties and taxes of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. as directed by the Engineer in charge.	SQM	107.58
12	Providing 6 mm. thick cement plaster in all floors at all height with cement mortar of mix (1:4) with portland slag cement (PSC) finished smooth to inside rough surface of brick masonry walls after racking out joints including watering and curing rounding of corners etc. complete with cost, coveyance, loading and unloading, royalties and taxes of all materials and cost of all labour, T&P, sundries and scaffolding required for the work etc. with providing grooves as directed by the Engineer in charge.	SQM	28.80
13	Supplying & Fixing of Manhole cover (heavy duty) 450mm x 450mm water tight type including frame cost includes all material,labour, tax,lead tools & plant etc. complete	NO	2.00
14	Supplying all materials,labours,T&P and constructing 1.22m dia and 2.1m depth soakway pit with precast RCC rings joined loose,gravel backing in the rear of well steining,precast RCC cover slab in cement concrete (1:2:4) using 12mm size hg chips fitted with iron lifting handles including cutting hole in the rings for inlet pipe,earthwork in open well excavation in all kinds of soil and refilling of cavity around the pit & painting the iron works, watering, curing, conveyance of all materials to worksite, payment of royalty, taxes etc all complete as per approved specification and direction of Engineer-in-charge	NO	1.00
	Total - SEPTIC TANK & SOAKPIT (E.5-B)		
	TOTAL TRANSIT HOUSE PH WORK (E.5 = E.5-A+E.5-B)		
	TRANSIT HOUSE TOTAL (E.1+E.2+E.3+E.4+E.5)		

INDICATIVE DRAWINGS OF VARIOUS CIVIL WORKS

Please note that the following enclosed civil drawings and are only indicative and *not restrictive.* Actual design may differ as per actual site condition and additional requirements specified in the LOA, Price Schedule/BOQ and/or contract.

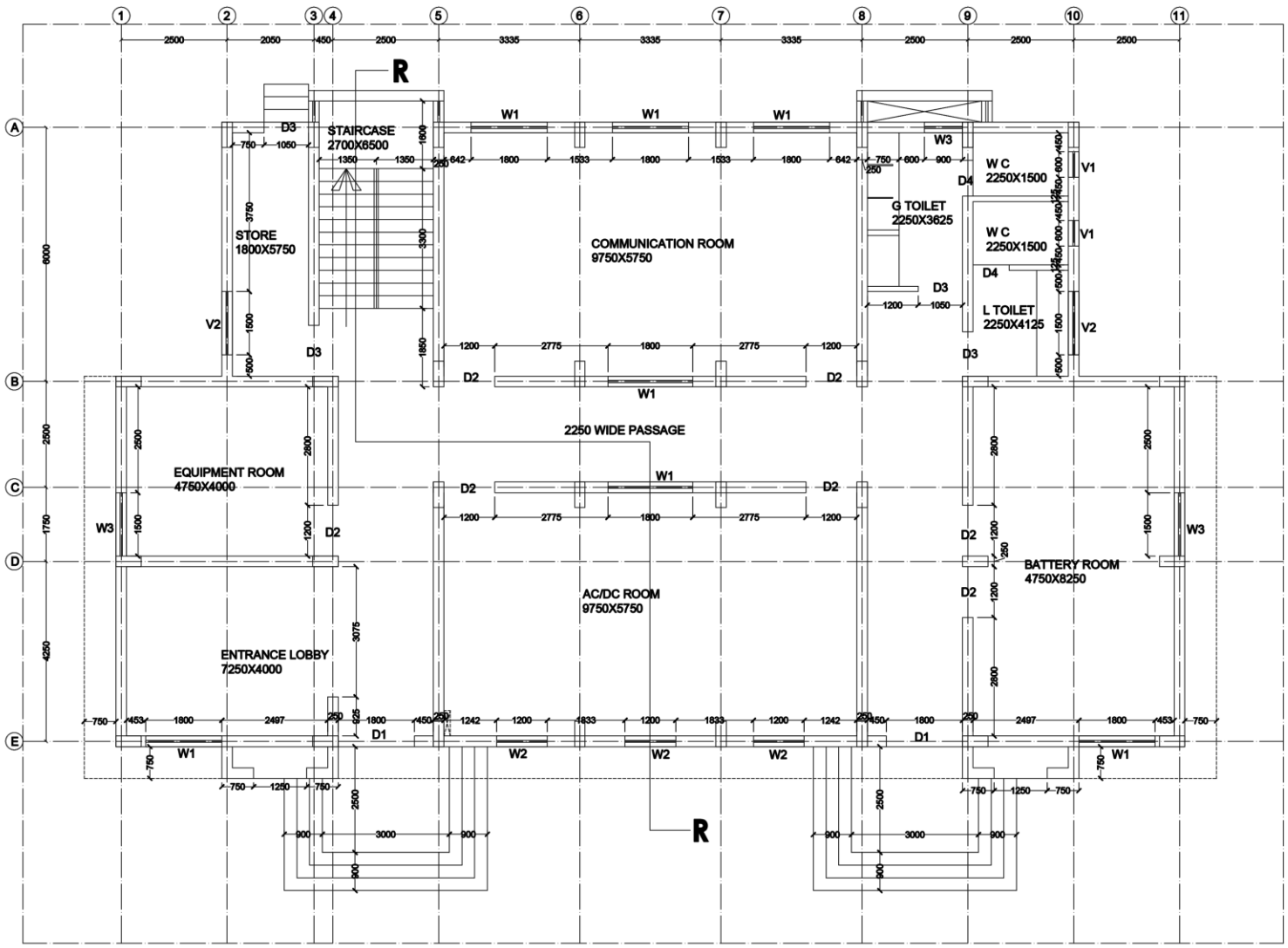
Additional materials may be required to complete the work in full shape. Bidder is requested to quote considering any other materials which may be required for completing the respective works in full shape as per site condition without any additional cost to OPTCL.

Work shall be executed as per approved drawing during detail engineering.

Bidder shall adhere to additional requirements as specified in the BOQ.

CONTROL ROOM BUILDING

INDICATIVE DRAWING



GROUND FLOOR PLAN

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
1. ONLY WRITTEN DIMENSIONS ARE TO FOLLOWED
2. ALL DIMENSIONS ARE IN MILIMETRE UNLESS OTHERWISE SPECIFIED.
3. DOUBTS AND DESCRIPANCIES SHOULD BE CLARIFIED FROM THIS OFFICE BEFORE IMPLEMENTATION
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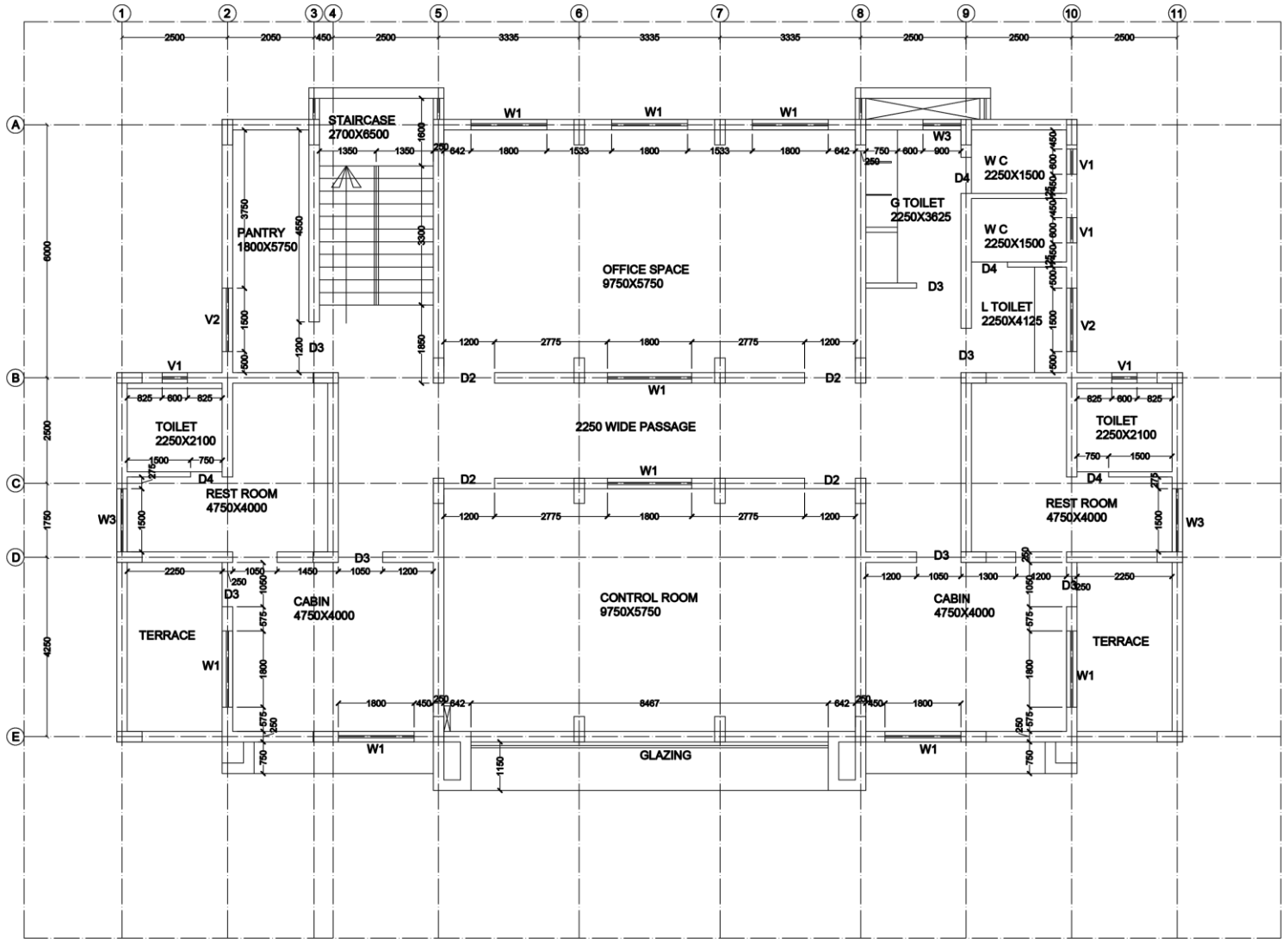
CONTENTS
GROUND FLOOR PLAN

SCALE NTS
SHEET NO. AR-01
DATE 15 12 2022



FIRST FLOOR PLAN

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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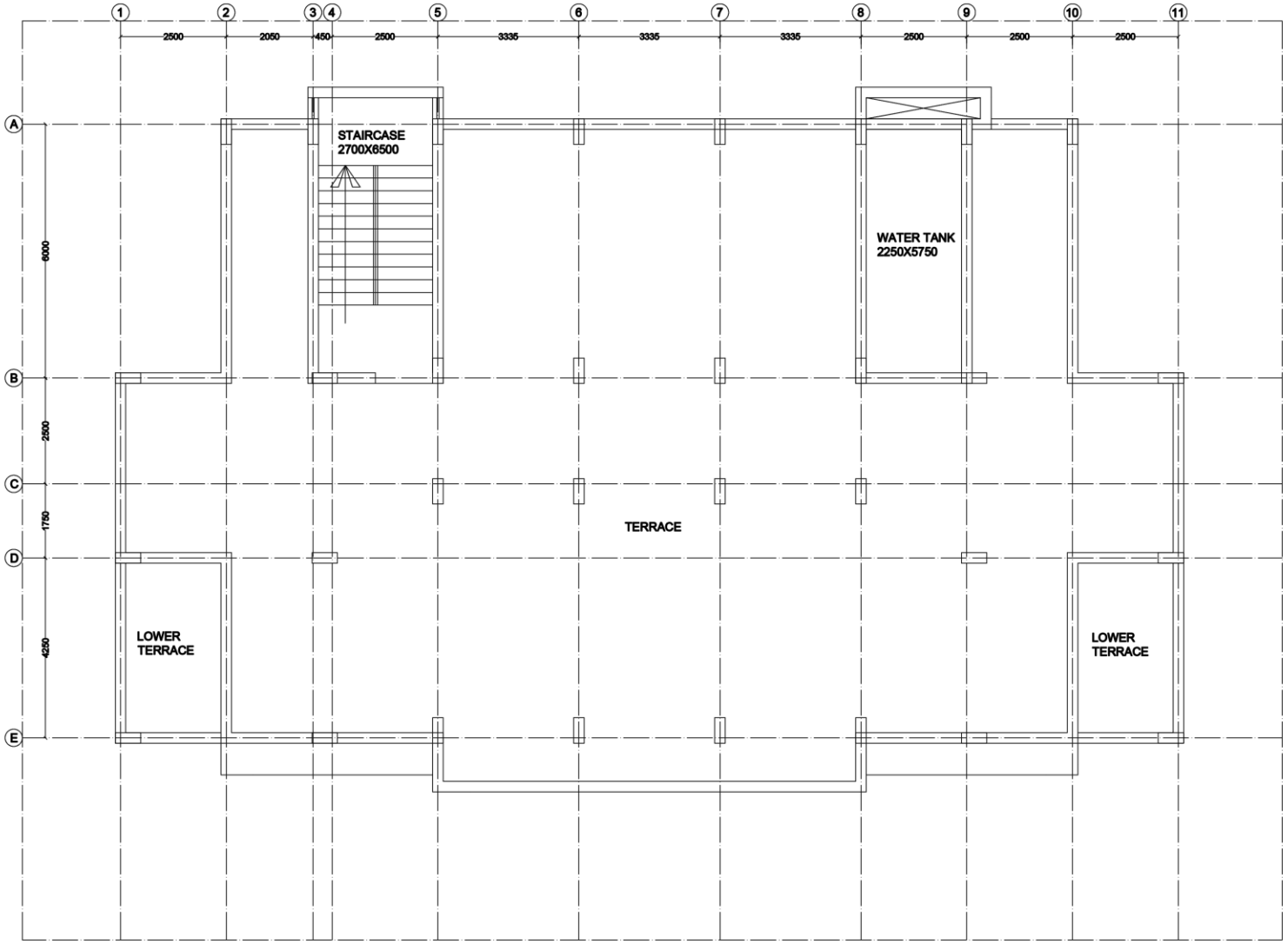
CONTENTS
FIRST FLOOR PLAN

SCALE NTS
SHEET NO. AR-02
DATE 15 12 2022



TERRACE FLOOR PLAN

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X800	VENTILATOR
V2	1500X800	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES

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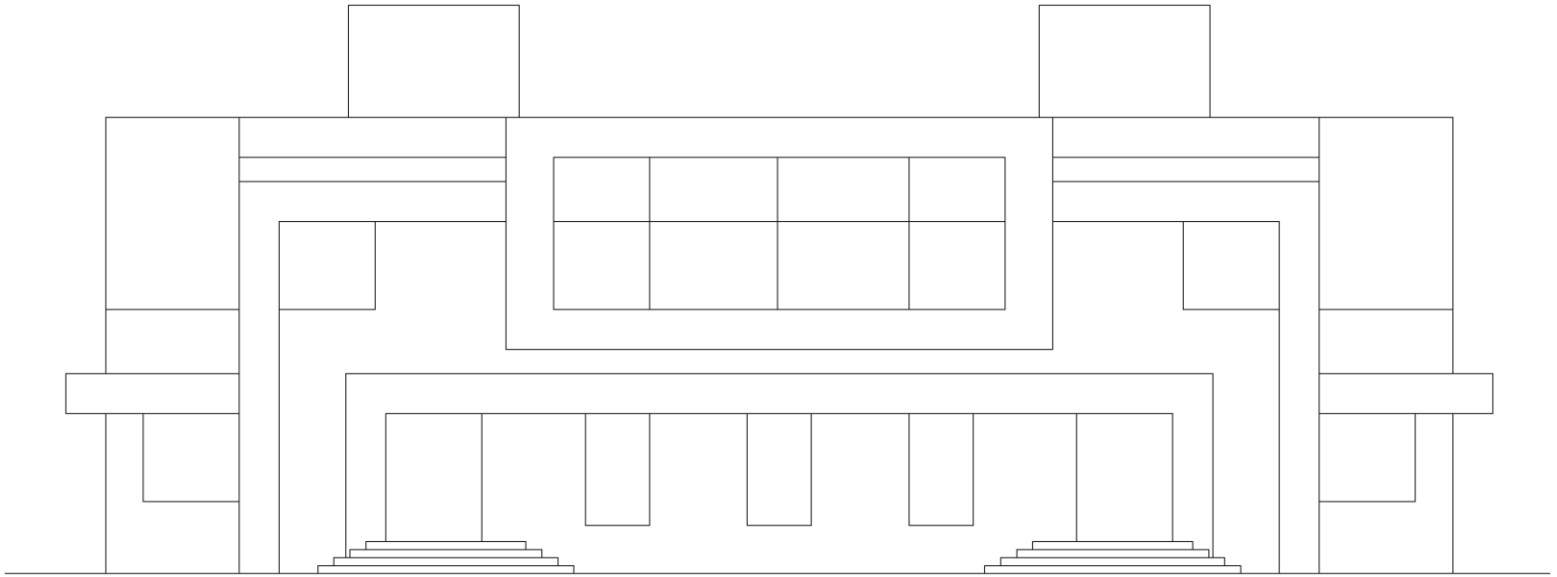
TERRACE FLOOR PLAN

SCALE NTS
SHEET NO. AR-03
DATE 15 12 2022



FRONT ELEVATION

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES

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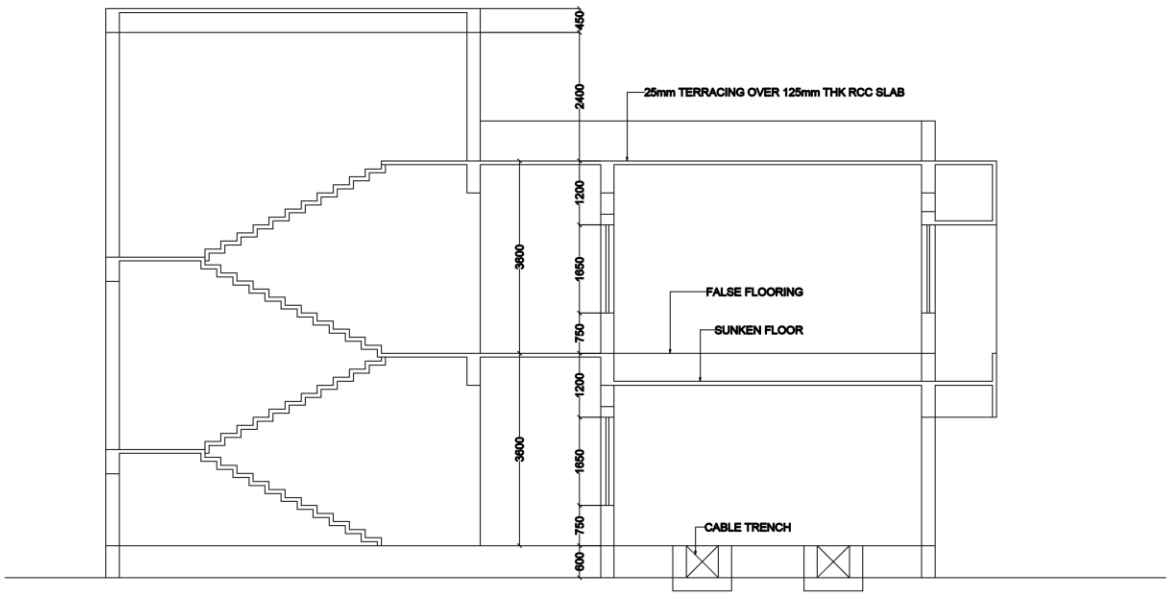
FRONT ELEVATION

SCALE NTS
SHEET NO. AR-04
DATE 15 12 2022



SECTION ON R-R

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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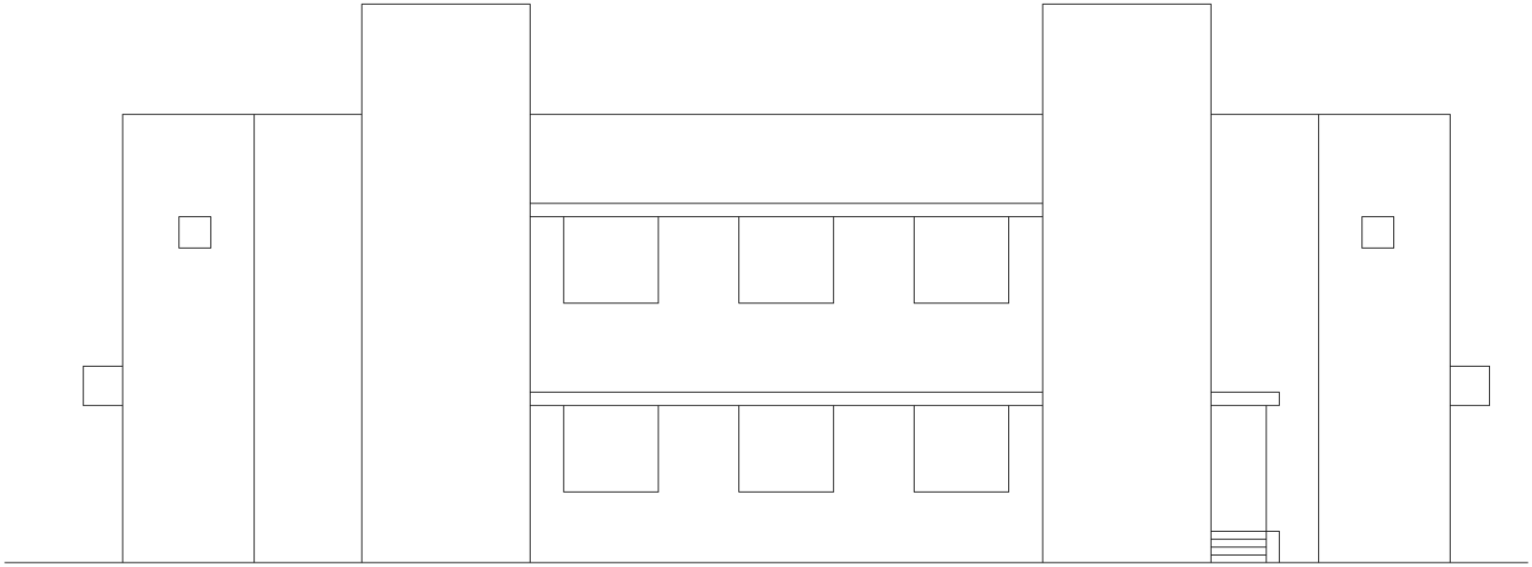
CONTENTS
SECTION ON R-R

SCALE NTS
SHEET NO. AR-05
DATE 15 12 2022



REAR ELEVATION

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

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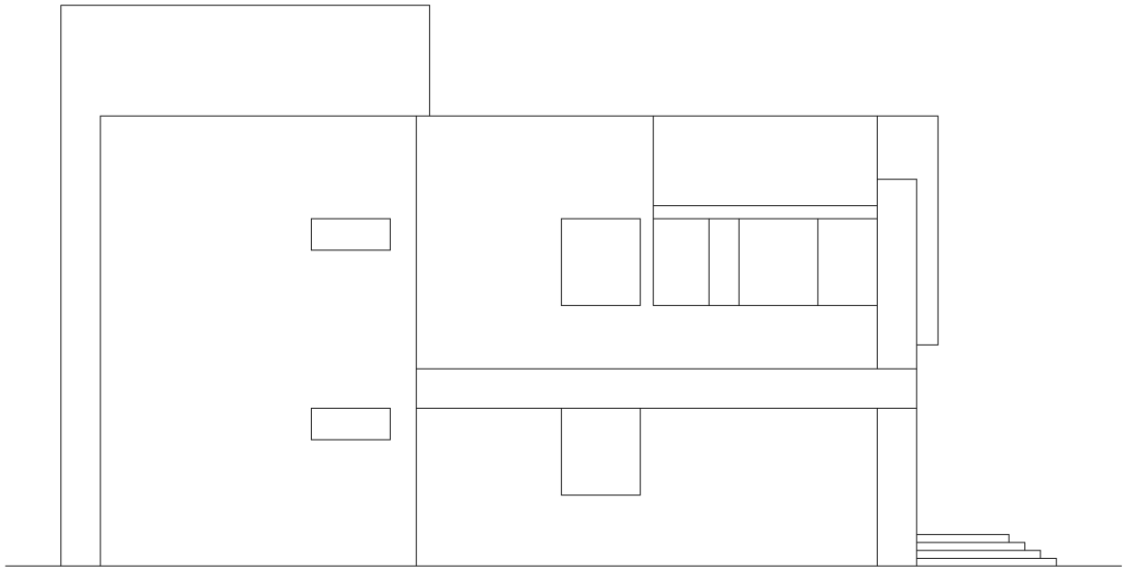
REAR ELEVATION

SCALE NTS
SHEET NO. AR-06
DATE 15 12 2022



RIGHT SIDE ELEVATION

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X800	VENTILATOR
V2	1500X600	VERNTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

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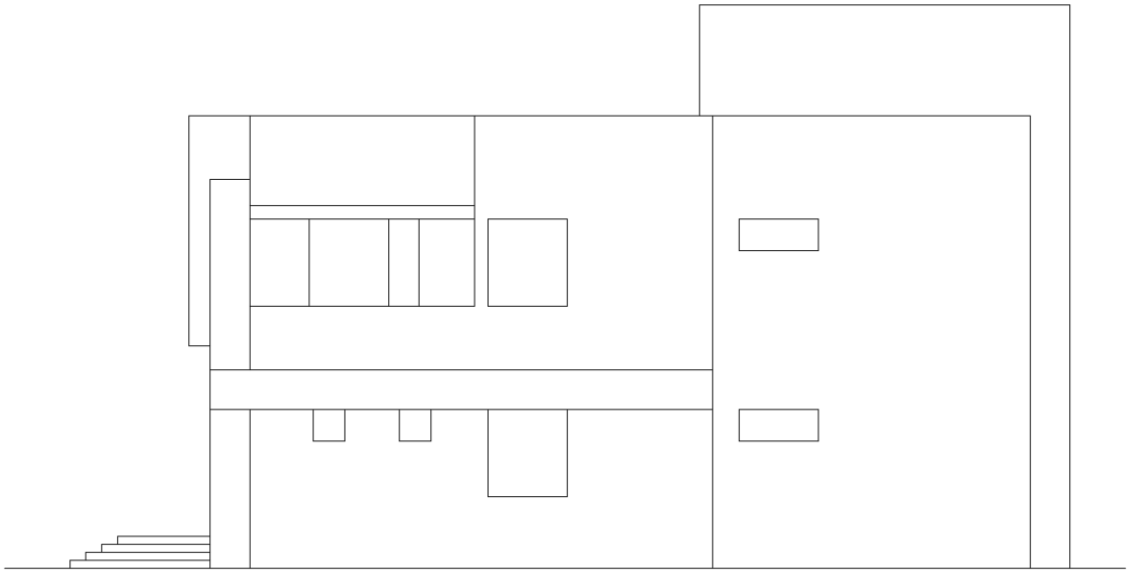
CONTENTS

RIGHT SIDE ELEVATION

SCALE NTS
SHEET NO. AR-07
DATE 15 12 2022



LEFT SIDE ELEVATION

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

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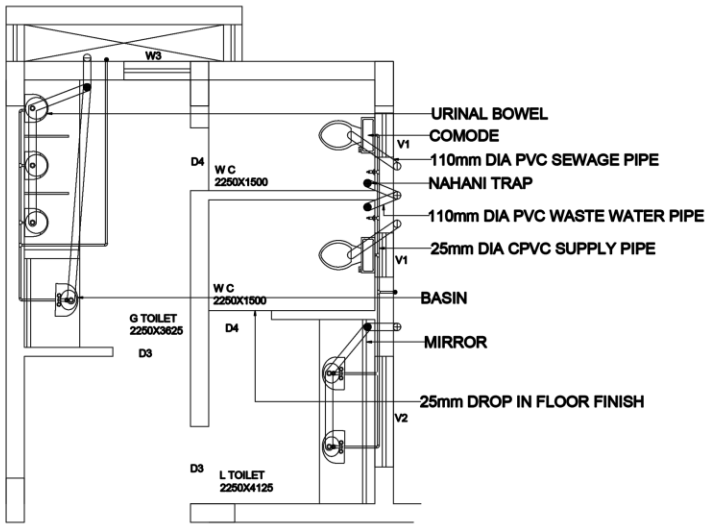
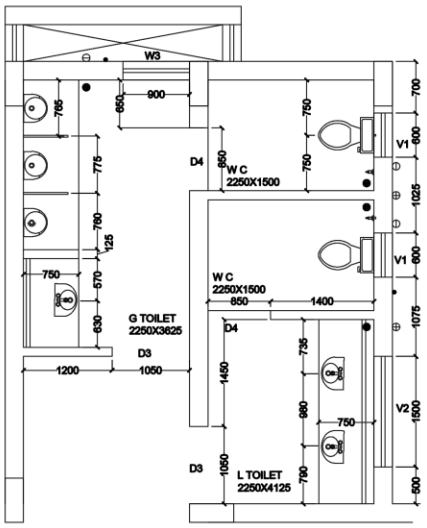
CONTENTS

LEFT SIDE ELEVATION

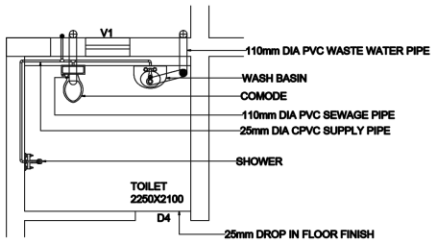
SCALE NTS
SHEET NO. AR-08
DATE 15 12 2022



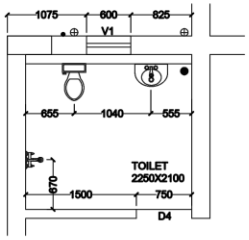
COMMON TOILET PLAN (SERVICES)



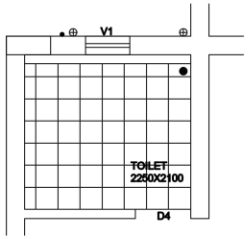
COMMON TOILET PLAN (WORKING)



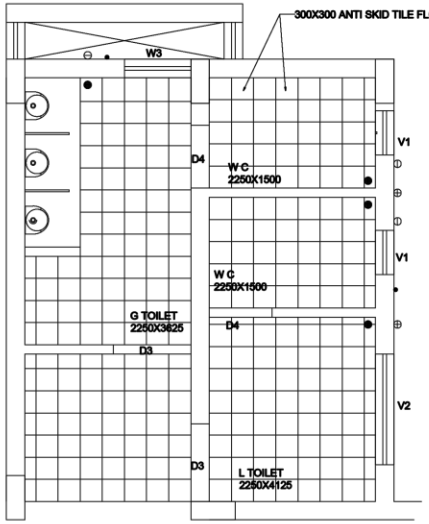
REST ROOM TOILET (SERVICES)



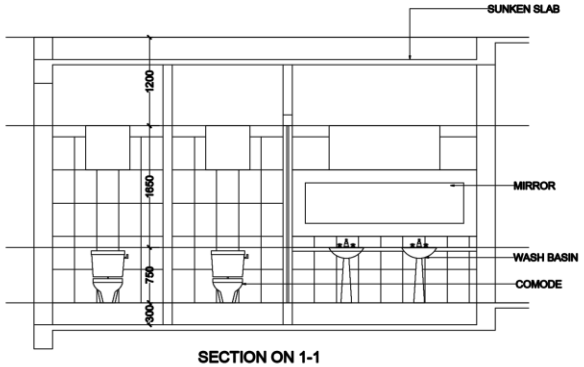
REST ROOM TOILET (WORKING)



REST ROOM TOILET (FLOORING)



COMMON TOILET PLAN (WORKING)



SECTION ON 1-1

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X800	VENTILATOR
V2	1500X800	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

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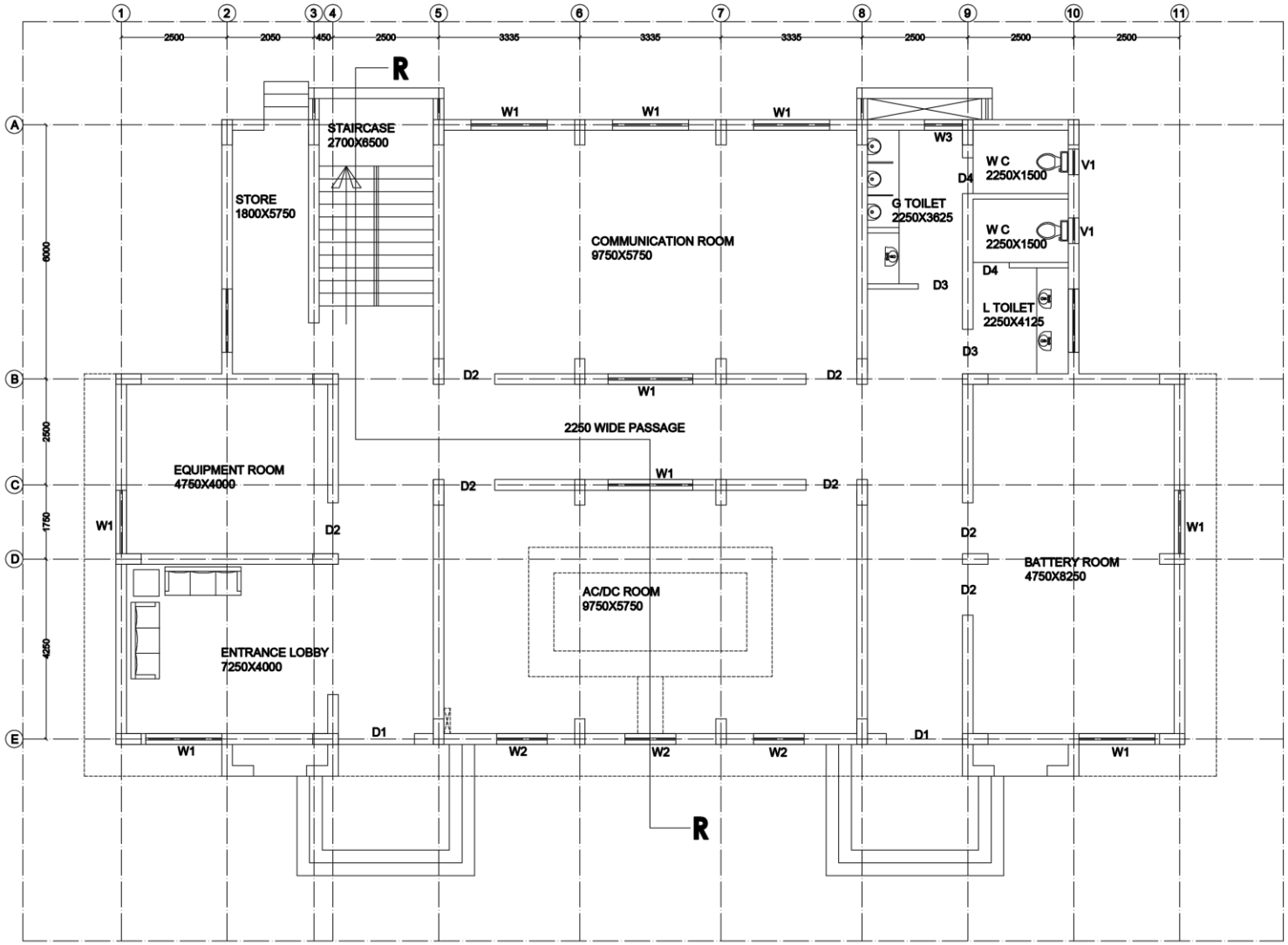
CONTENTS
DETAIL OF TOILET

SCALE NTS
SHEET NO. DETAIL -01
DATE 15 12 2022



GROUND FLOOR PLAN

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X800	VENTILATOR
V2	1500X800	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
1. ONLY WRITTEN DIMENSIONS ARE TO FOLLOWED
2. ALL DIMENSIONS ARE IN MILIMETRE UNLESS OTHERWISE SPECIFIED.
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REGD NO. CA/94/17260

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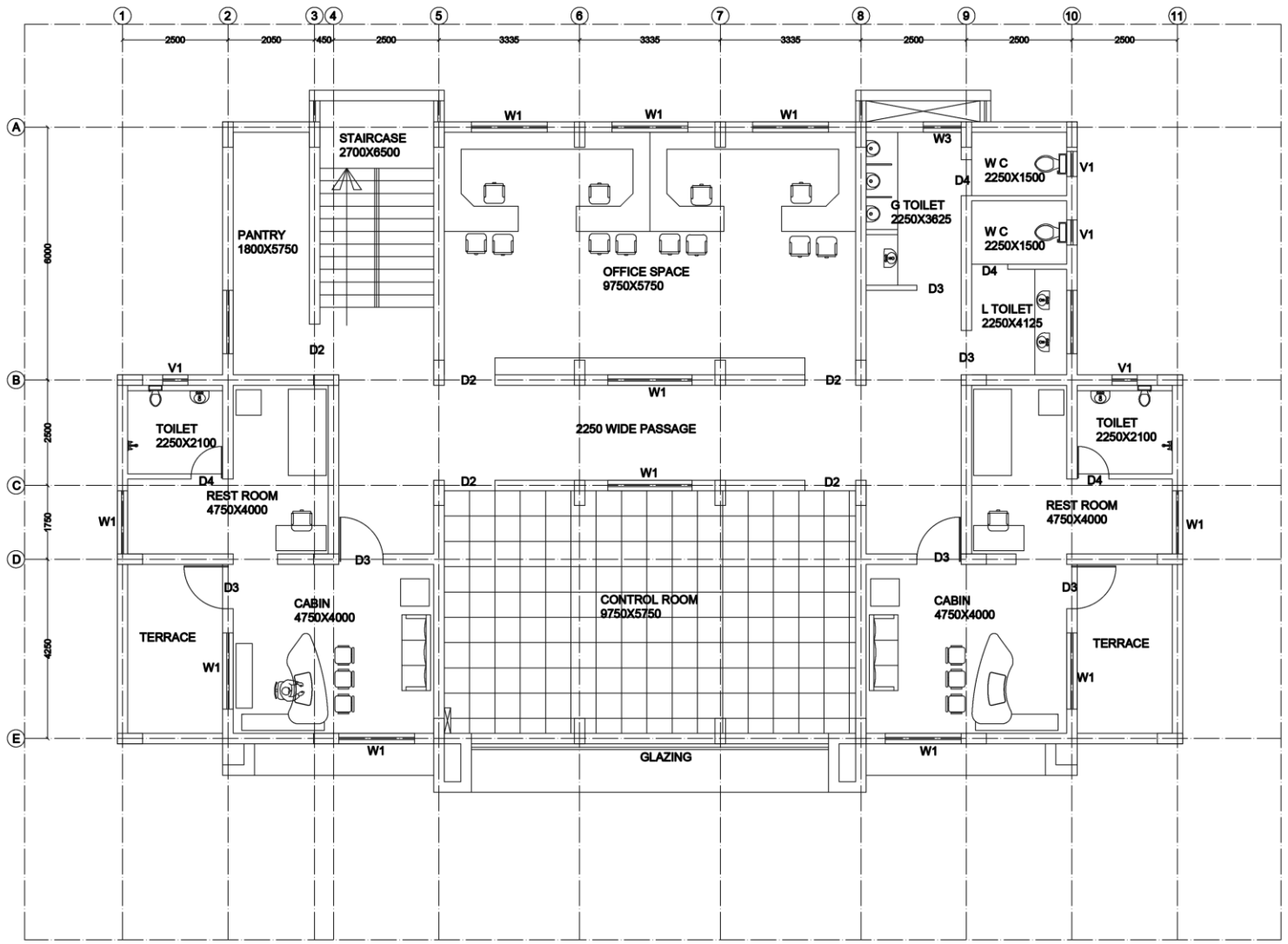
205,JAYADEV VIHAR, BHUBANESWAR

CONTENTS
GROUND FLOOR PLAN

SCALE NTS
SHEET NO. INT-01
DATE 15 12 2022



FIRST FLOOR PLAN

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X800	VENTILATOR
V2	1500X800	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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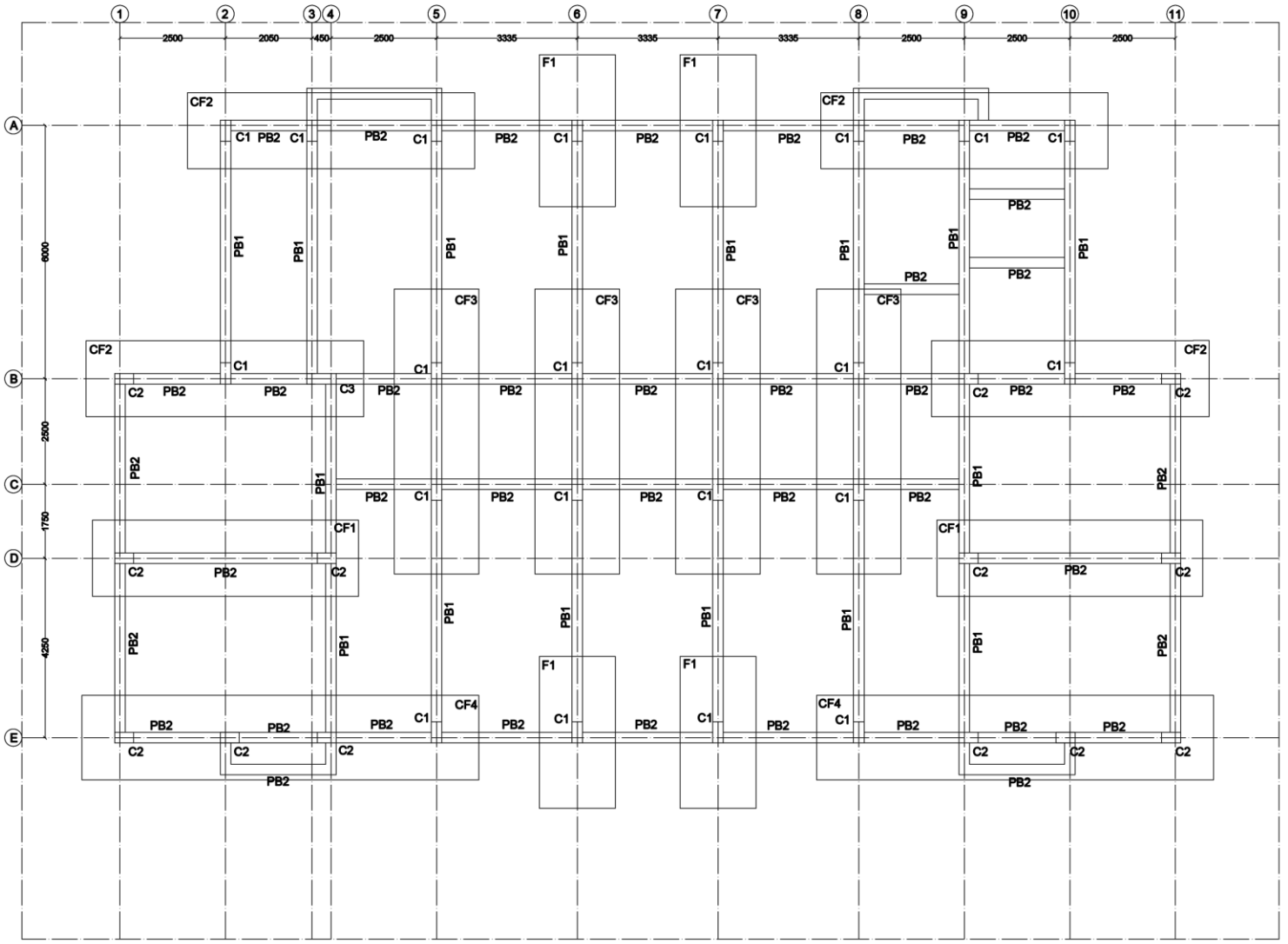
CONTENTS
FIRST FLOOR PLAN

SCALE NTS
SHEET NO. INT-02
DATE 15 12 2022



FOOTING & PLINTH BEAM LAYOUT PLAN

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES

1. ONLY WRITTEN DIMENSIONS ARE TO FOLLOWED
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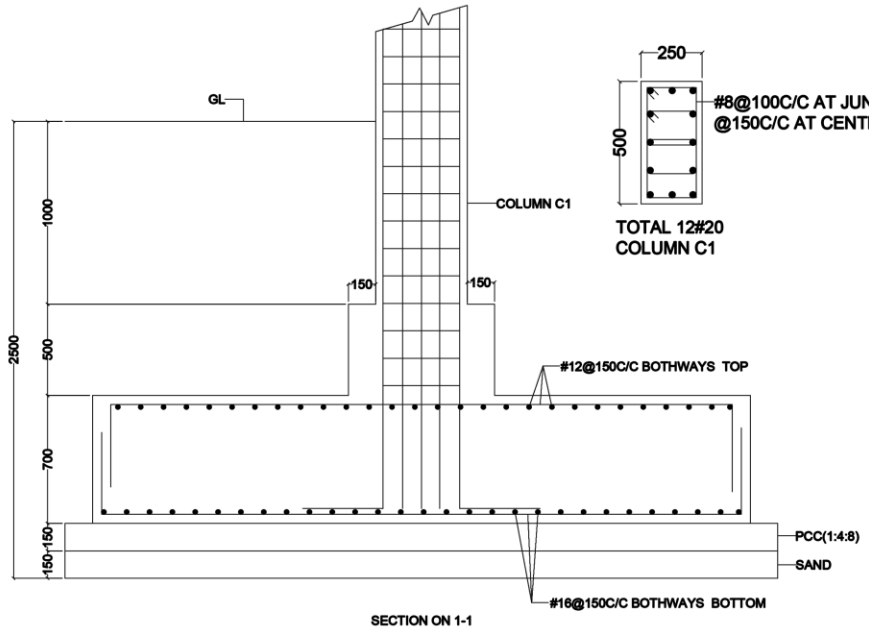
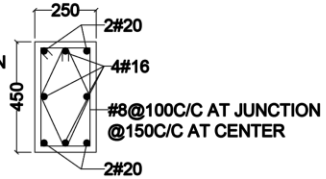
CONTENTS
FOOTING & PLINTH BEAM LAYOUT PLAN

SCALE NTS
SHEET NO. ST-01
DATE 15 12 2022



SECTION ON 1-1

TOTAL 12#20
COLUMN C1



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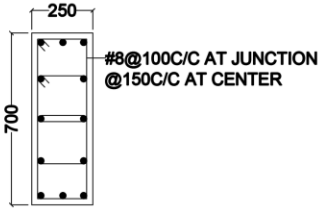
COLUMN C2



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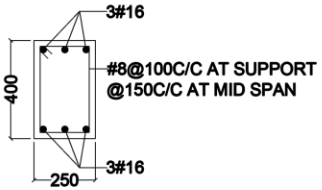
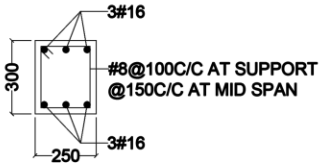
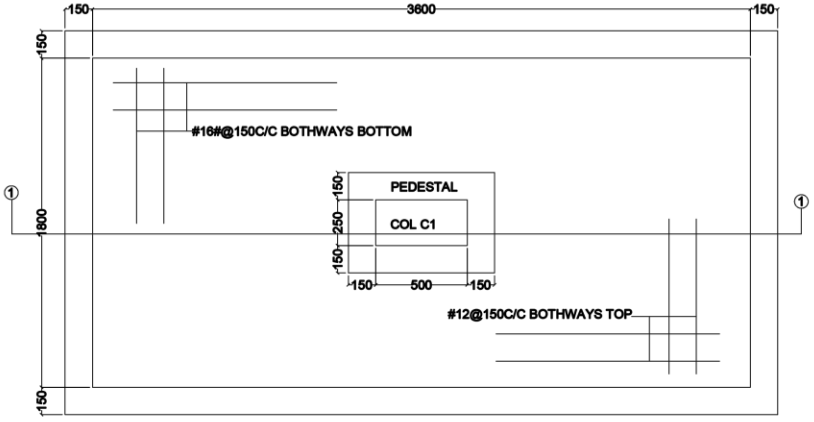


PLINTH BEAM PB1(250X400)



PLINTH BEAM PB2(250X300)



PLAN OF FOOTING F1

STRUCTURAL NOTES

1. Only written dimensions are to be followed.
2. Refer relevant architectural drawings before execution of work.
3. Clear cover to main reinforcement shall be as under
   a)Footing:50mm b)Column:40mm
   c)Beam:30mm d)Slab:20mm
4. Mix of concrete shall be as follows
   a)Footing: M25 b)Column:M25
   c)Beam:M25 d)Slab:M25
5. Steel in use of Fe 500d where % of elongation should be more than 14%
6. The structural design of foundation has been done for 3 stroyed building.
7. The bearing capacity of soil is being considered as 150KN/sqm
8. Development length of bars in beams shall be 57x dia
9. Avoid lapping at column & beam joints
10. Minimum stripping time of framework shall be 24 hours for column & 21 days for slab & beams.
11. All construction joints must shall be made vertical.
12. No structural damage/cutting is permissible without prior approval of designer.

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
1. ONLY WRITTEN DIMENSIONS ARE TO FOLLOWED
2. ALL DIMENSIONS ARE IN MILIMETRE UNLESS OTHERWISE SPECIFIED.
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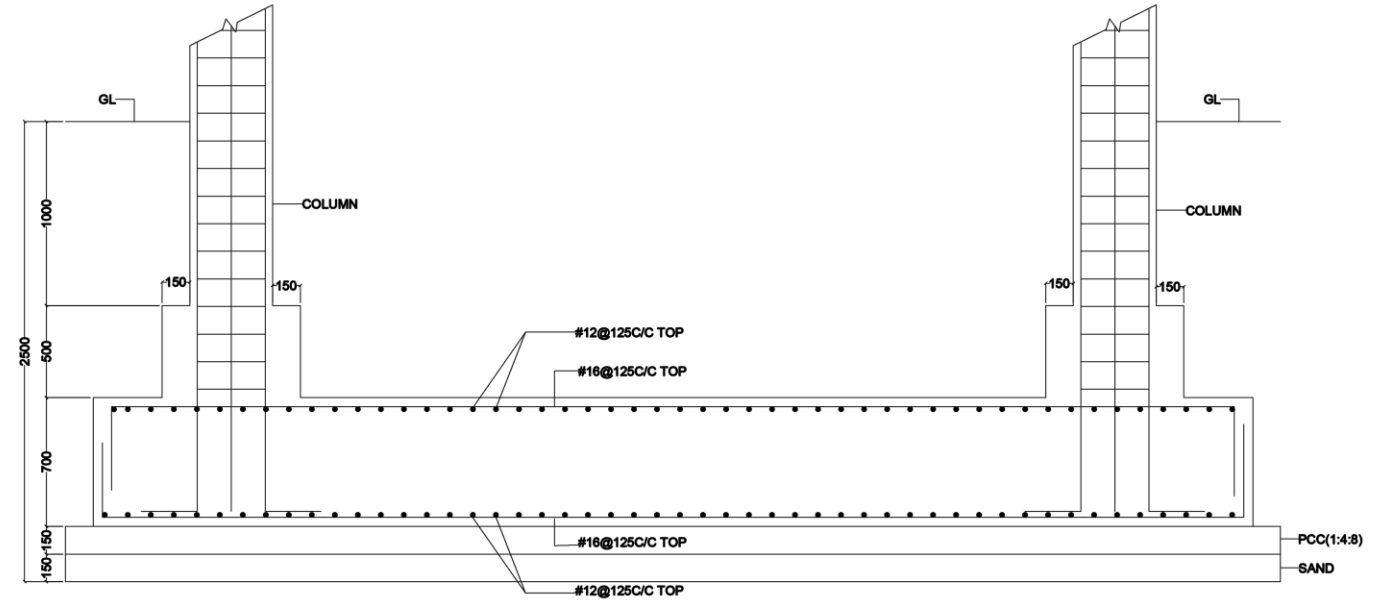
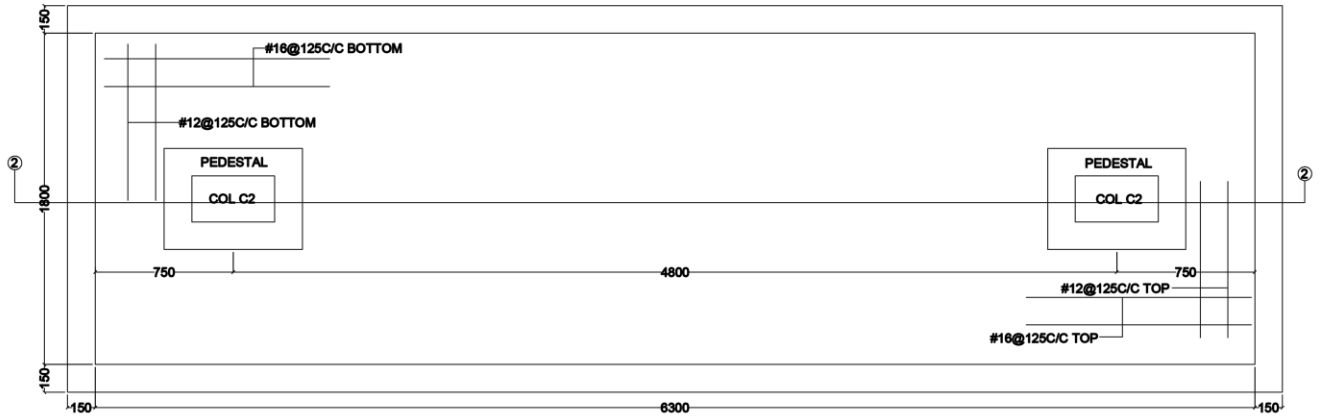
ARCHITECTS:ENGINEER:PLANER
205,JAYADEV VIHAR, BHUBANESWAR

CONTENTS
DETAIL OF FOOTING

SCALE NTS
SHEET NO. ST-02
DATE 15 12 2022



SECTION ON 2-2



PLAN OF COMBINE FOOTING CF1

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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ARCHITECTS:ENGINEERS:PLANER
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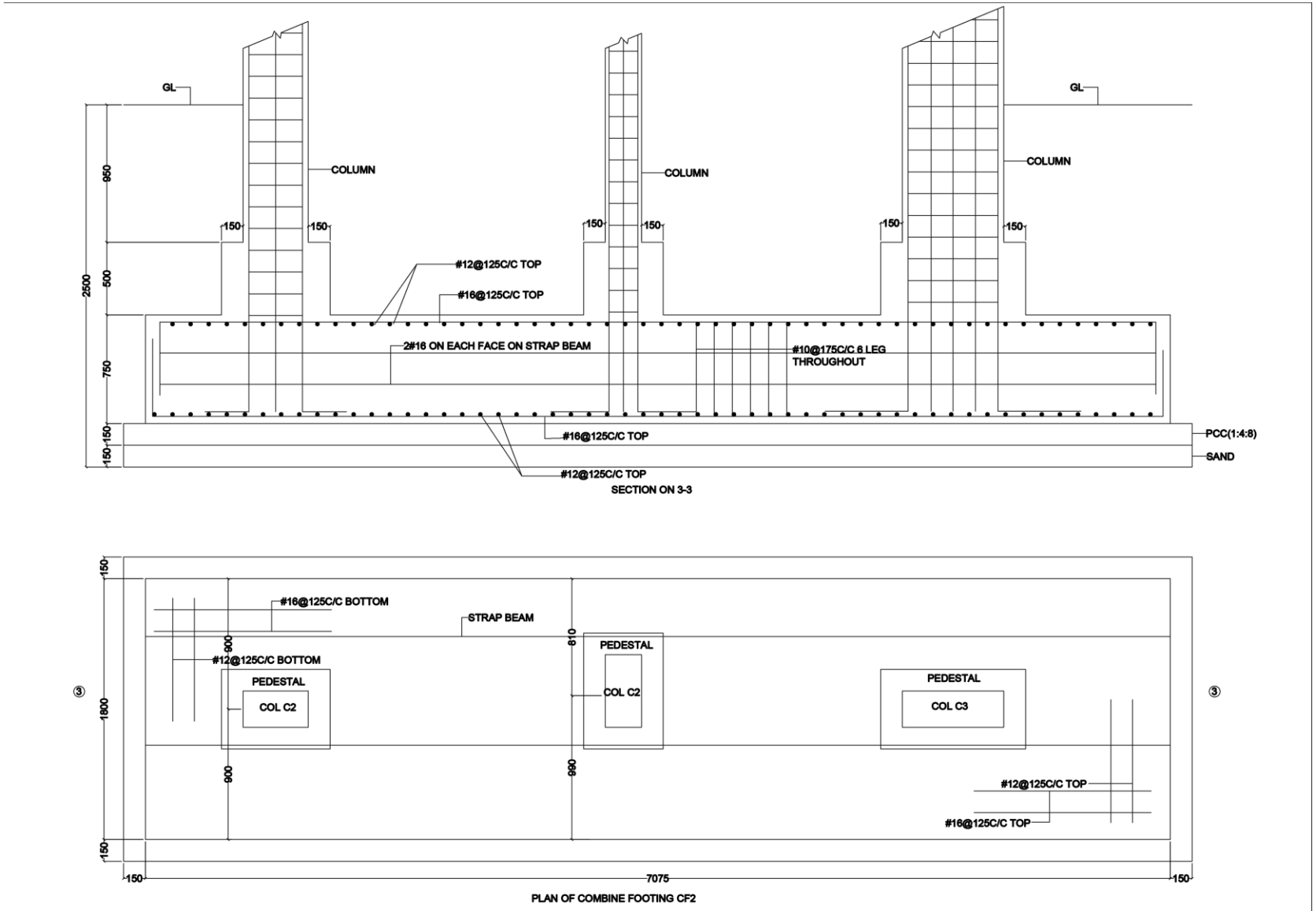
CONTENTS
DETAIL OF FOOTING

SCALE NTS
SHEET NO. ST-03
DATE 15 12 2022



PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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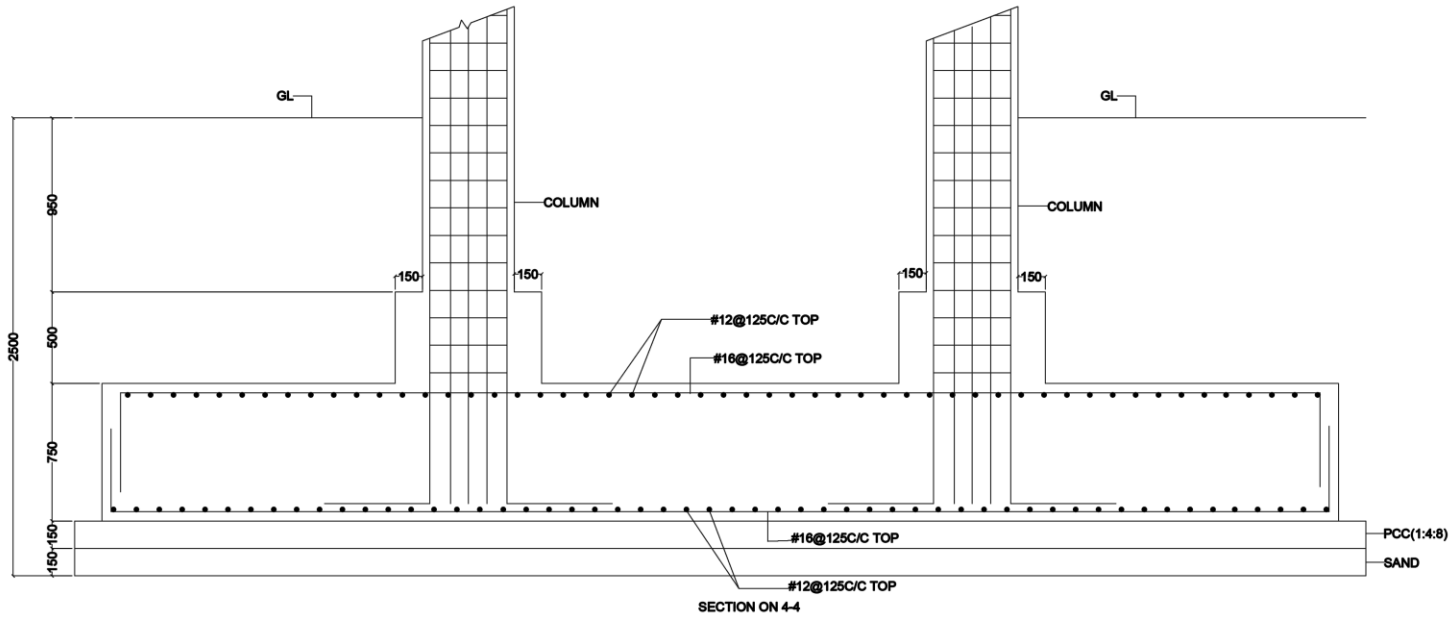
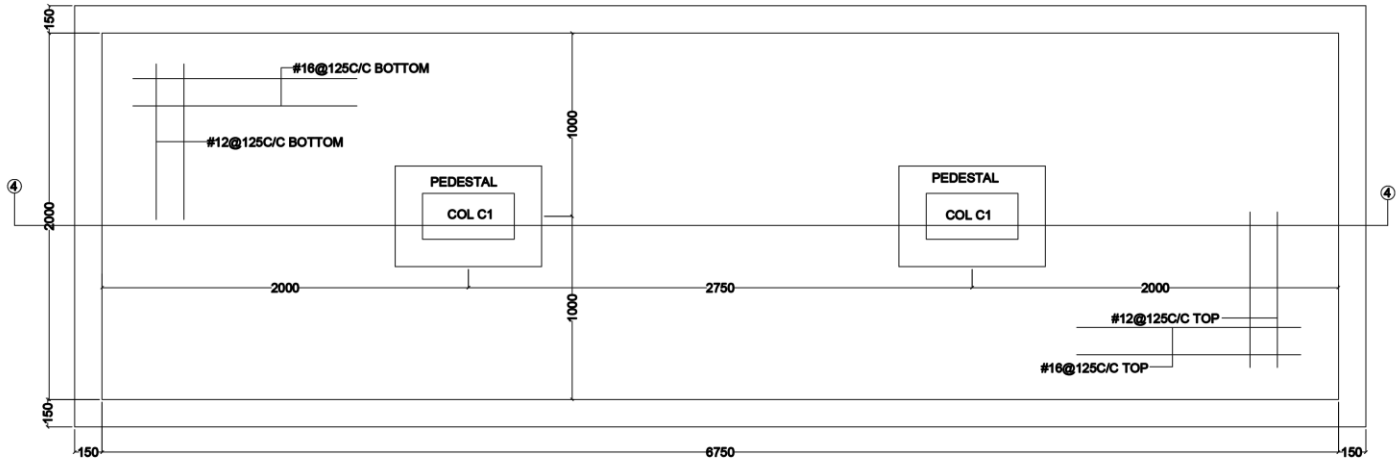
CONTENTS
DETAIL OF FOOTING

SCALE NTS
SHEET NO. ST-04
DATE 15 12 2022



SECTION ON 4-4



PLAN OF COMBINE FOOTING CF3

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES

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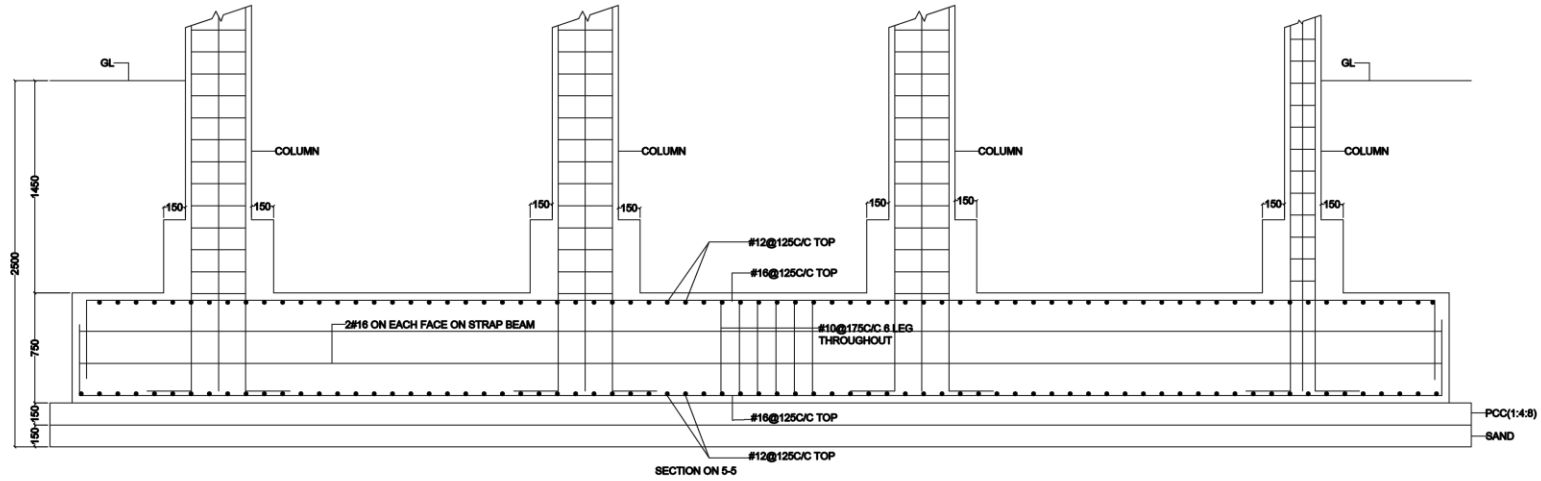
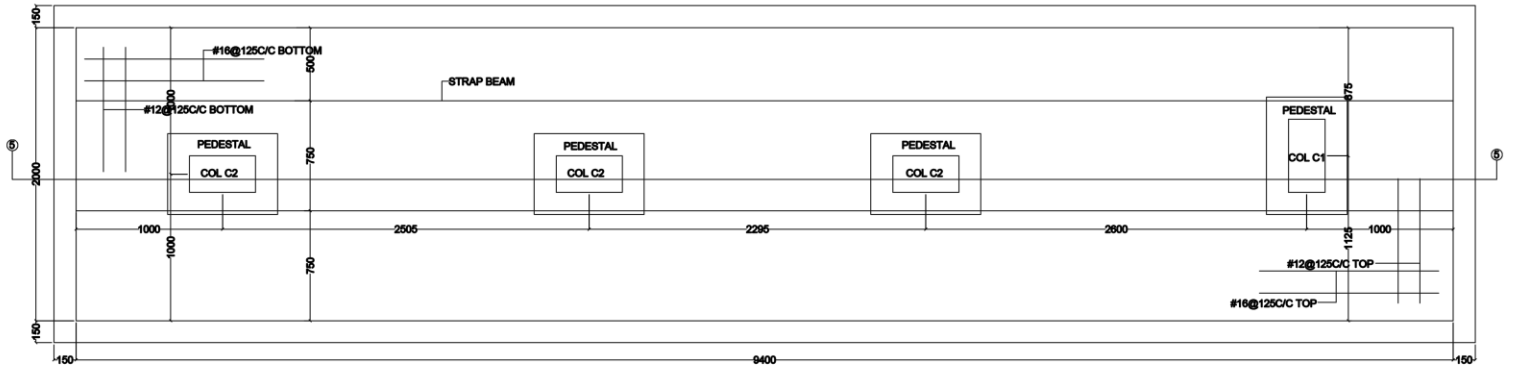
CONTENTS

DETAIL OF FOOTING

SCALE NTS
SHEET NO. ST-05
DATE 15 12 2022



SECTION ON 5-5



PLAN OF COMBINE FOOTING CF4

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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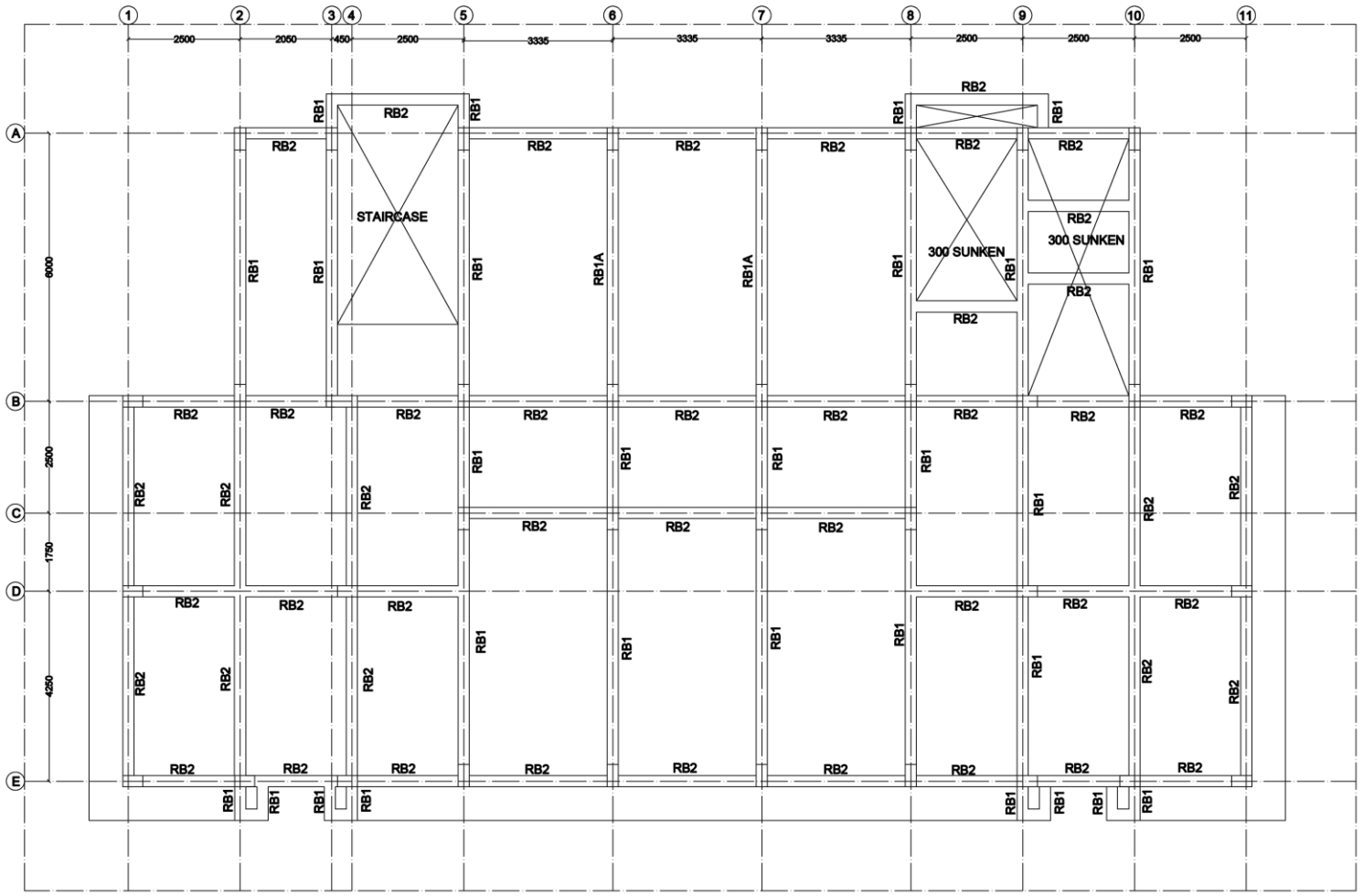
CONTENTS
DETAIL OF FOOTING

SCALE NTS
SHEET NO. ST-06
DATE 15 12 2022



GROUND FLOOR BEAM LAYOUT PLAN

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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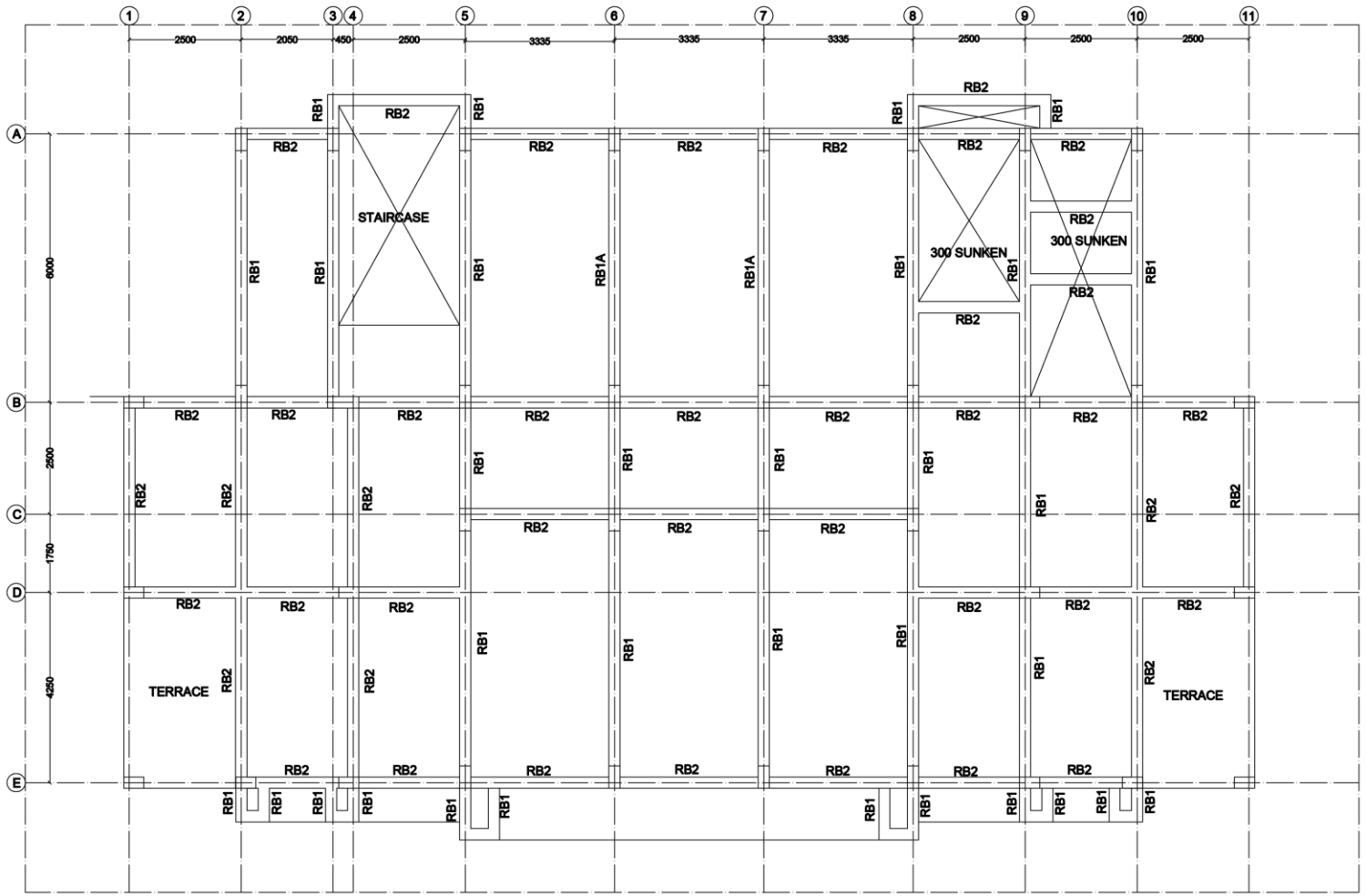
CONTENTS
GROUND FLOOR BEAM LAYOUT PLAN

SCALE	NTS
SHEET NO.	ST-07
DATE	15 12 2022



FIRST FLOOR BEAM LAYOUT PLAN

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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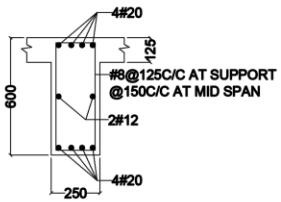
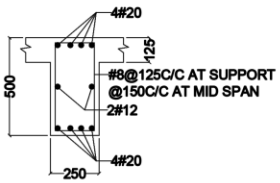
CONTENTS
FIRST FLOOR BEAM LAYOUT PLAN

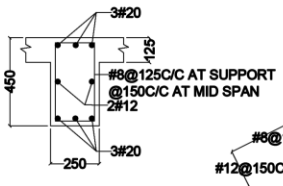
SCALE NTS
SHEET NO. ST-08
DATE 15 12 2022



ROOF BEAM RB1(250X600)



ROOF BEAM RB1A(250X500)



ROOF BEAM RB2(250X450)

MAIN SLAB

THICKNESS-125mm
MAIN STEEL-#10@150C/C
DISTRIBUTION-#8@150C/C

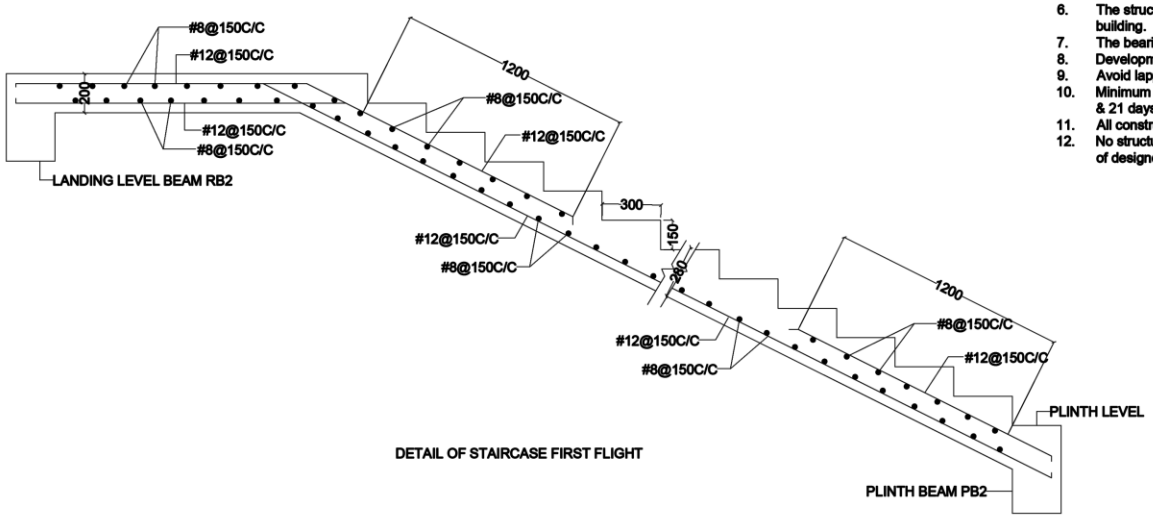
SUNKEN SLAB

THICKNESS-150mm
MAIN STEEL-#10@1125C/C
DISTRIBUTION-#10@125C/C

SLAB LEVEL BEAM RB2

LANDING LEVEL BEAM RB2

DETAIL OF STAIRCASE SECOND FLIGHT



LANDING LEVEL BEAM RB2

DETAIL OF STAIRCASE FIRST FLIGHT

STRUCTURAL NOTES

1. Only written dimensions are to be followed.
2. Refer relevant architectural drawings before execution of work.
3. Clear cover to main reinforcement shall be as under
   a)Footing:50mm b)Column:40mm
   c)Beam:30mm d)Slab:20mm
4. Mix of concrete shall be as follows
   a)Footing: M25 b)Column:M25
   c)Beam:M25 d)Slab:M25
5. Steel in use of Fe 500d where % of elongation should be more than 14%
6. The structural design of foundation has been done for 3 stroyed building.
7. The bearing capacity of soil is being considered as 150KN/sqm
8. Development length of bars in beams shall be 57x dia
9. Avoid lapping at column & beam joints
10. Minimum stripping time of framework shall be 24 hours for column & 21 days for slab & beams.
11. All construction joints must shall be made vertical.
12. No structural damage/cutting is permissible without prior approval of designer.

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES

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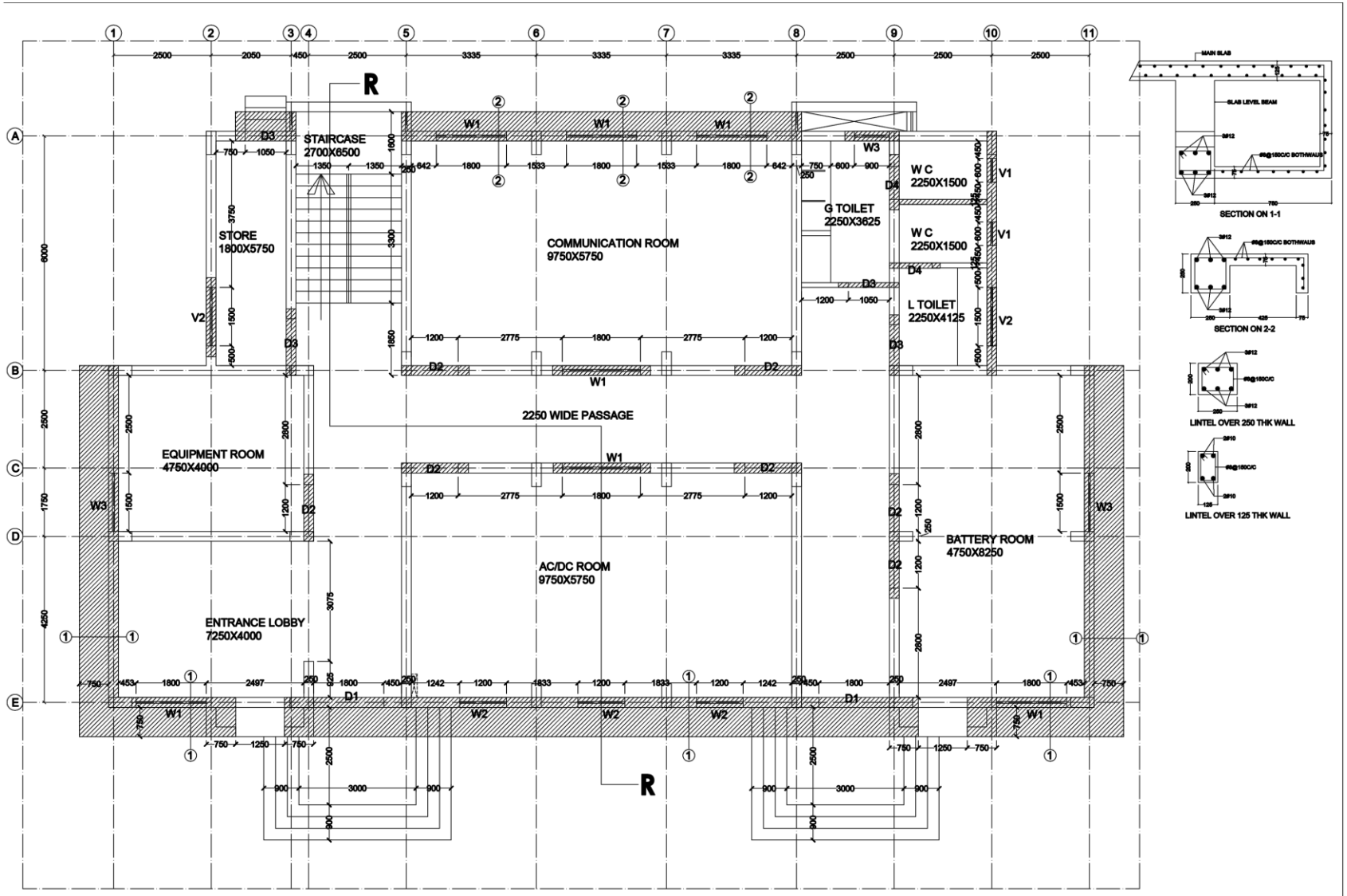
CONTENTS

DETAIL OF SLAB BEAM AND STAIRCASE

SCALE NTS
SHEET NO. ST-09
DATE 15 12 2022



GROUND FLOOR PLAN (LINTEL LEVEL)

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	850X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X600	VENTILATOR
V2	1500X600	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES

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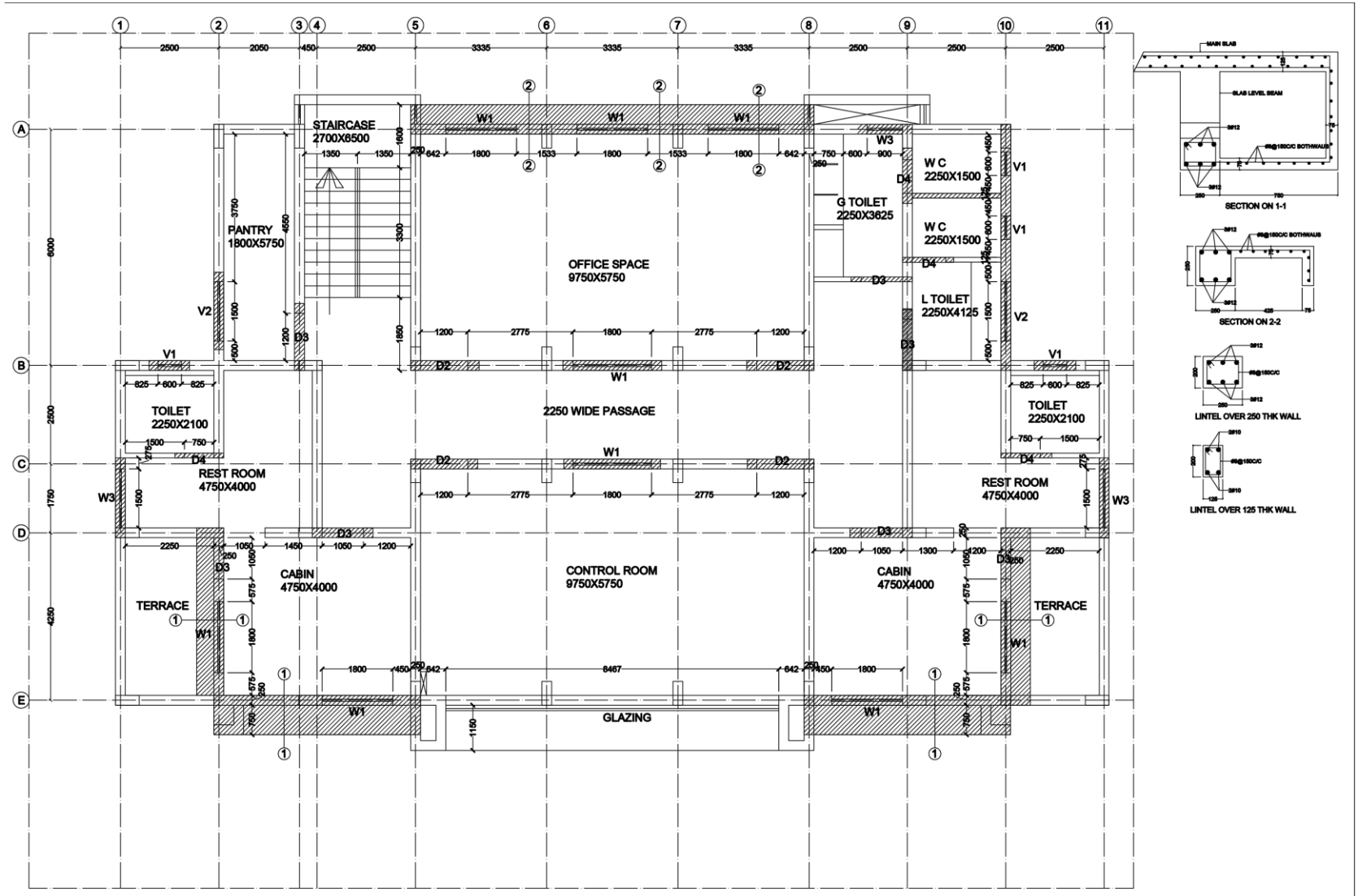
ARCHITECTS/ENGINEER/PLANER
205,JAYADEV VIHAR, BHUBANESWAR

CONTENTS
GROUND FLOOR PLAN (LINTEL LEVEL)
SCALE NTS
SHEET NO. ST-10
DATE 15 12 2022



FIRST FLOOR PLAN (LINTEL LEVEL)

PROPOSED CONTROL ROOM FOR OPTCL
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS		
D1	1800X2400	DOOR
D2	1200X2400	DOOR
D3	1050X2400	WINDOW
D4	800X2400	DOOR
W1	1800X1650	WINDOW
W2	1200X1650	WINDOW
V1	600X800	VENTILATOR
V2	1500X800	VENTILATOR

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

NOTES
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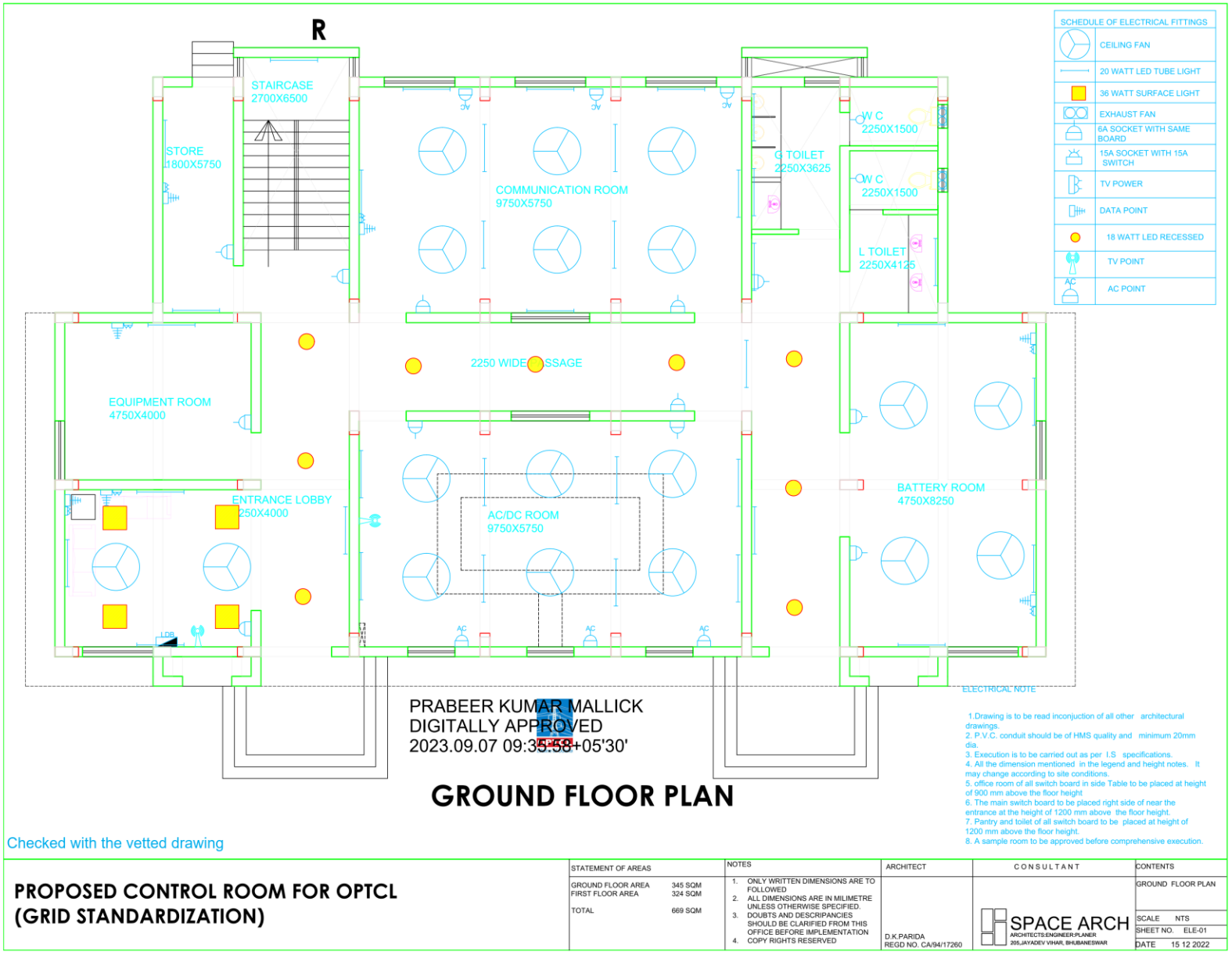
CONSULTANT
SPACE ARCH
ARCHITECTS/ENGINEERS/PLANER
205,JAYADEV VIHAR, BHUBANESWAR

CONTENTS
FIRST FLOOR PLAN (LINTEL LEVEL)
SCALE NTS
SHEET NO. ST-11
DATE 15 12 2022



GROUND FLOOR PLAN

Checked with the vetted drawing

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

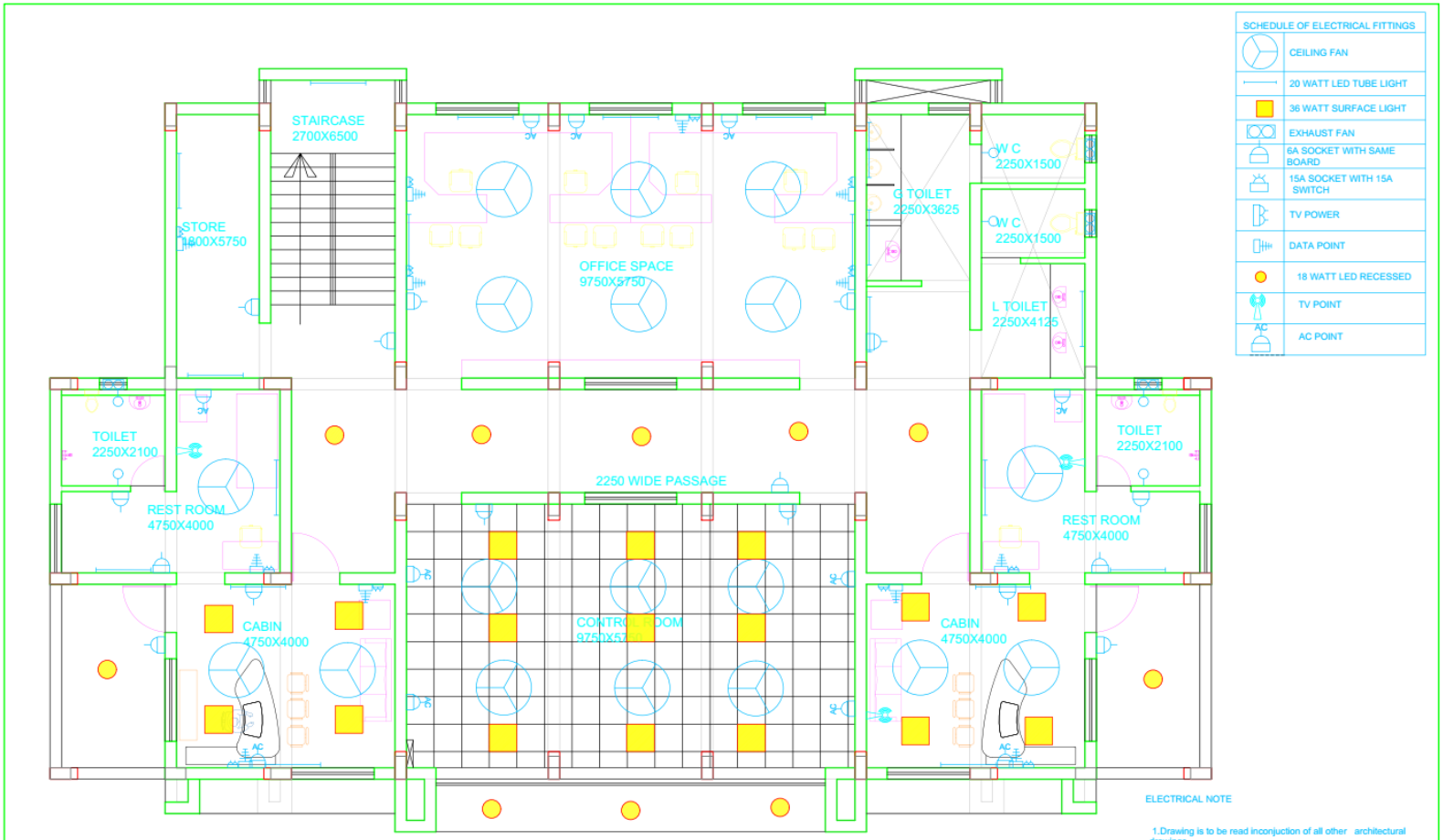
NOTES
1. ONLY WRITTEN DIMENSIONS ARE TO FOLLOWED
2. ALL DIMENSIONS ARE IN MILIMETRE UNLESS OTHERWISE SPECIFIED.
3. DOUBTS AND DESCRIPANCIES SHOULD BE CLARIFIED FROM THIS OFFICE BEFORE IMPLEMENTATION
4. COPY RIGHTS RESERVED

ARCHITECT
D.K.PARIDA
REGD NO. CA/94/17260

CONSULTANT
SPACE ARCH
ARCHITECTS:ENGINEER:PLANER
205,JAYADEV VIHAR, BHUBANESWAR

CONTENTS
GROUND FLOOR PLAN

SCALE NTS
SHEET NO. ELE-01
DATE 15 12 2022



FIRST FLOOR PLAN

PRABEER KUMAR MALLICK
DIGITALLY APPROVED
2023.09.07 09:35:43 +05'30'

ELECTRICAL NOTE

1.Drawing is to be read inconjuction of all other architectural drawings.
2. P.V.C. conduit should be of HMS quality and minimum 20mm dia.
3. Execution is to be carried out as per I.S specifications.
4. All the dimension mentioned in the legend and height notes. It may change according to site conditions.
5. office room of all switch board in side Table to be placed at height of 900 mm above the floor height
6. The main switch board to be placed right side of near the entrance at the height of 1200 mm above the floor height.
7. Pantry and toilet of all switch board to be placed at height of 1200 mm above the floor height.
8. A sample room to be approved before comprehensive execution.

Checked with the vetted drawing

PROPOSED CONTROL ROOM FOR OPTCL (GRID STANDARDIZATION)

STATEMENT OF AREAS	
GROUND FLOOR AREA	345 SQM
FIRST FLOOR AREA	324 SQM
TOTAL	669 SQM

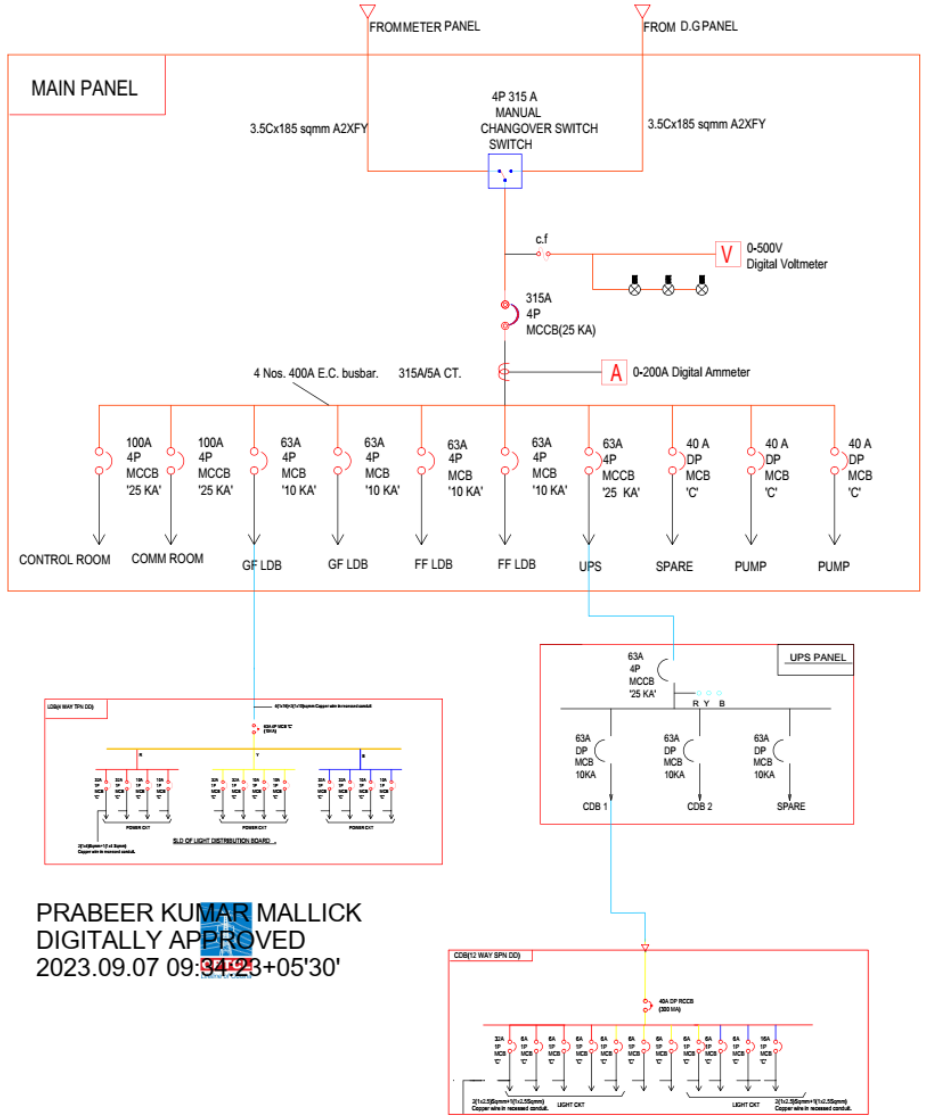
NOTES
1. ONLY WRITTEN DIMENSIONS ARE TO FOLLOWED
2. ALL DIMENSIONS ARE IN MILIMETRE UNLESS OTHERWISE SPECIFIED.
3. DOUBTS AND DESCRIPANCIES SHOULD BE CLARIFIED FROM THIS OFFICE BEFORE IMPLEMENTATION
4. COPY RIGHTS RESERVED

ARCHITECT
D.K.PARIDA
REGD NO. CA/94/17260

CONSULTANT
SPACE ARCH
ARCHITECTS/ENGINEER/PLANER
285,JAYADEV VIHAR, BHUBANESWAR

CONTENTS
FIRST FLOOR PLAN

SCALE NTS
SHEET NO. ELE-02
DATE 15 12 2022



PRABEER KUMAR MALLICK
DIGITALLY APPROVED
2023.09.07 09:34:23+05'30'

Checked with the vetted drawing

NOTES:

1. THIS DRAWING IS THE PROPERTY OF M/s SPACE ARCH, REPRODUCTION OR DUPLICATION OF THE DRAWING IN PART OR WHOLE IS NOT PERMITTED.
2. COPY RIGHTS RESERVED.
3. ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
4. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
5. TREAD IS 300,RISER IS 150 AND HEAD ROOM HT. IS 2400
6. NORMAL HEIGHT OF EACH FLOOR IS 3300
7. ANY DOUBT AND DISCREPANCIES SHOULD BE CLARIFIED FROM THE OFFICE BEFORE IMPLEMENTATION.
8. FOR ALL OTHER DETAIL REFER OTHER SHEETS.
9. ANY MODIFICATIONS OR CHANGES SHALL BE INTIMATED.

BUILDING TYPE / WORK -
CONTROL ROOM

DRAWING TITLE -	DRAWING NUMBER -
SLD ELECTRICAL CONTROL ROOM	ELE-03

SCALE -
DESIGNED BY -
DATE -

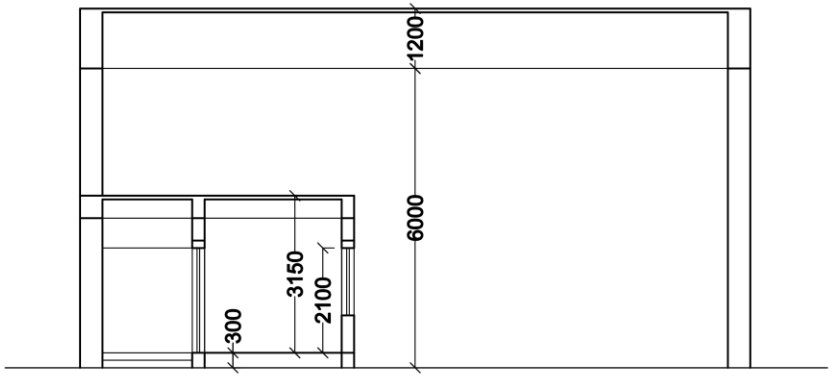
Architects -

ARCHITECT
D.K.PARIDA
REGD NO. CA/94/17260

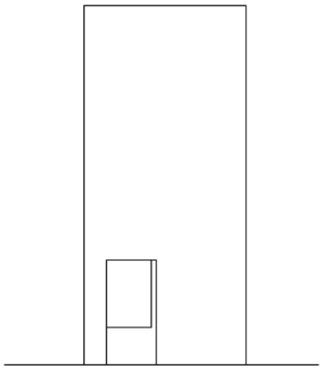
SECURITY SHED CUM GATE COMPLEX & BOUNDARY WALL (GRILL TOP TYPE)

INDICATIVE DRAWING

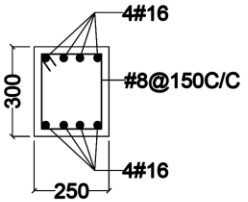
ALT-01



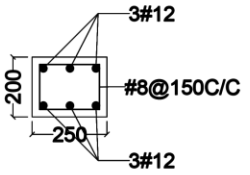
SECTION ON R-R



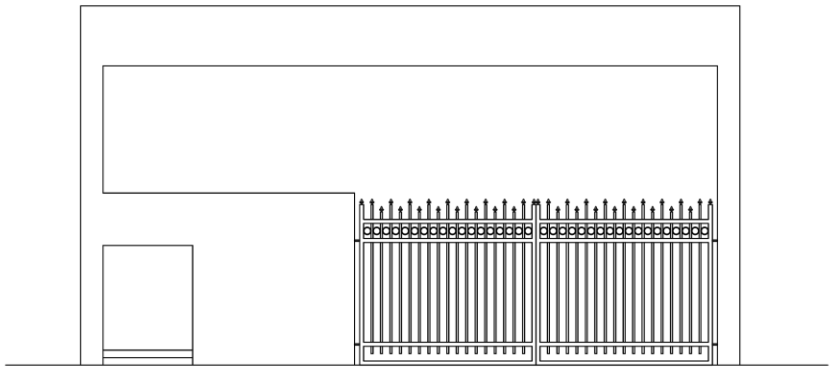
LEFT SIDE ELEVATION



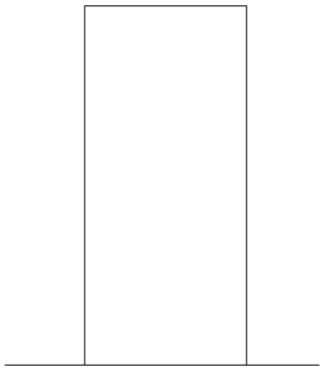
LINTEL BEAM LB1



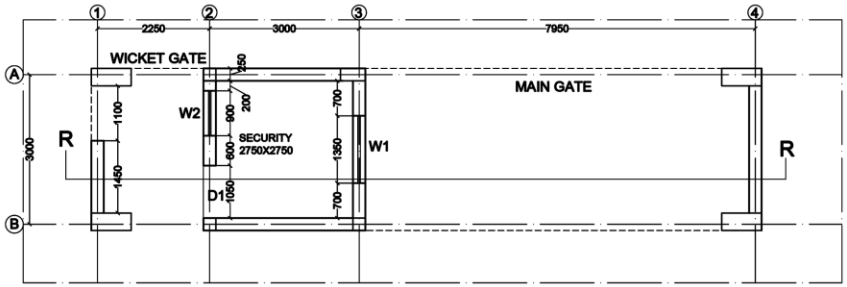
LINTEL OVER
250 THK WALL



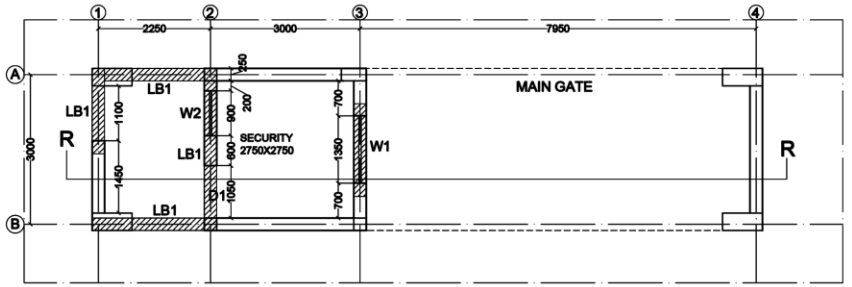
FRONT ELEVATION



RIGHT SIDE ELEVATION



GATE COMPLEX PLAN

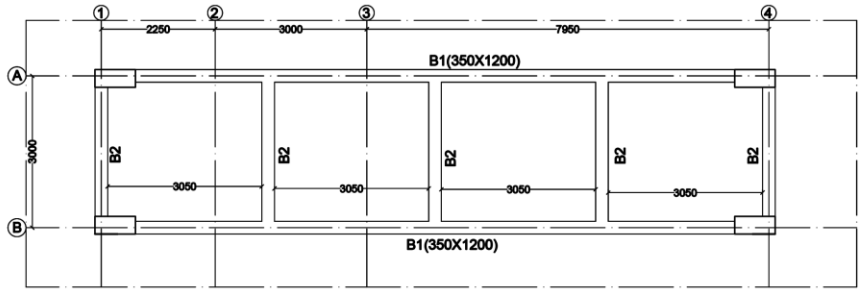


GATE COMPLEX PLAN(LINTEL LEVEL)

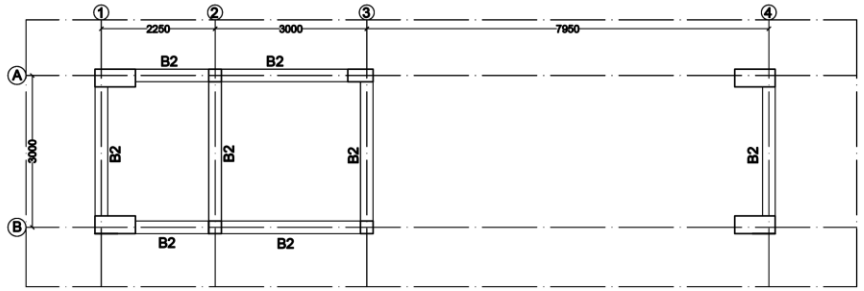
PROPOSED GATE COMPLEX FOR OPTCL GRID STANDARDIZATION

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

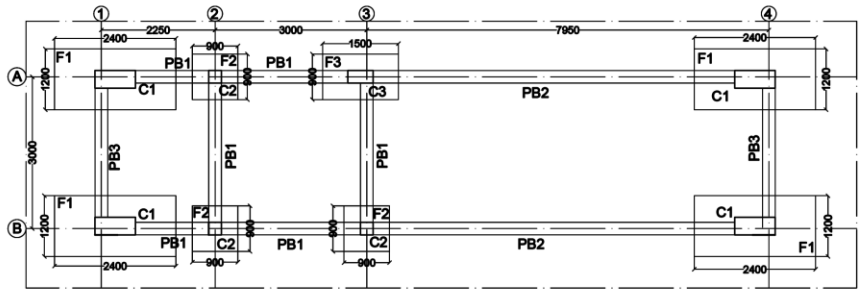
SCHEDULE OF OPENINGS	ARCHITECT	CONSULTANT	CONTENT
D1 1000X2100 V1 1000X1500 W2 900X1500	D.K.PARIDA REGD NO. CA/94/17295	SPACE ARCH ARCHITECTS ENGINEERS PLANNER SRILAYADEV VIHAR, BHUBANESWAR	GATE COMPLEX SHEET NO AR-01



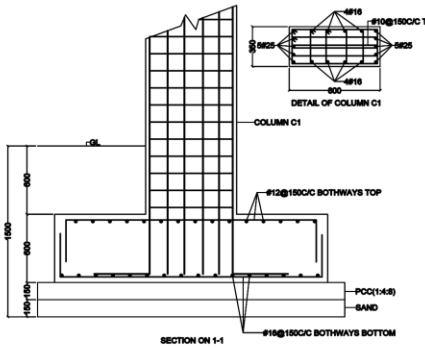
SLAB & BEAM LAYOUT PLAN (LEVEL+7200)

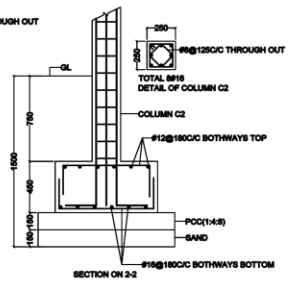


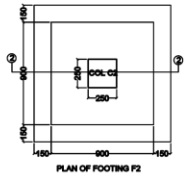
SLAB & BEAM LAYOUT PLAN (LEVEL+3450)

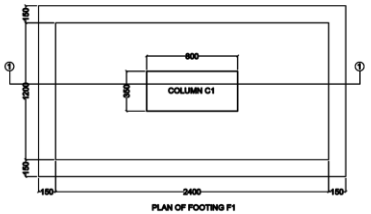


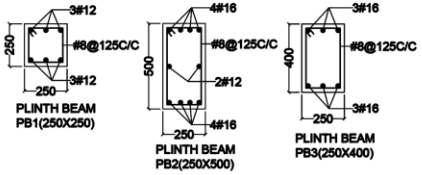
FOOTING AND PLINTH BEAM LAYOUT PLAN

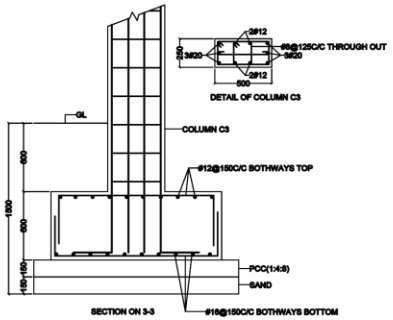


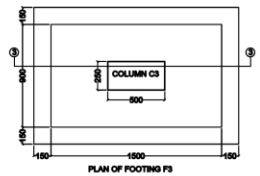


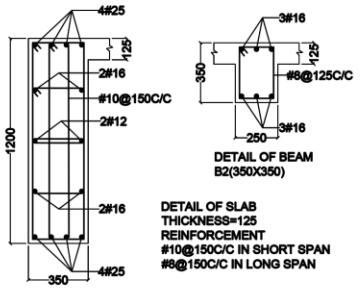








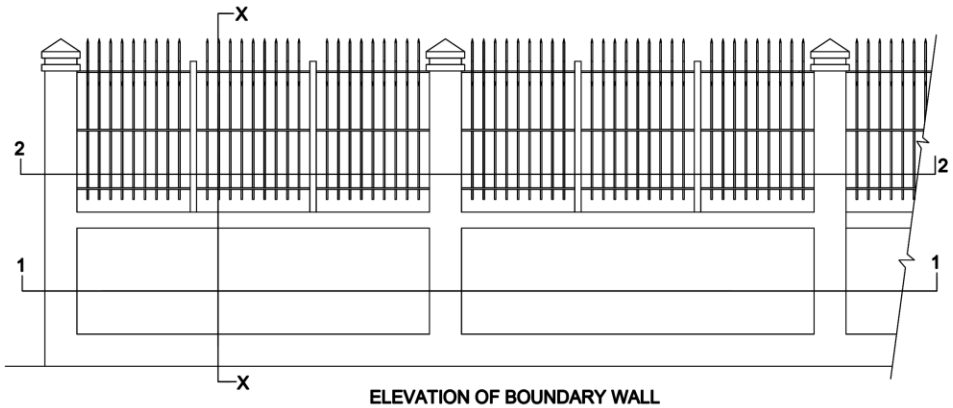




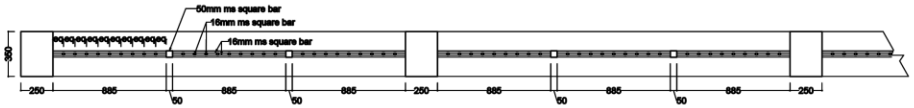
PROPOSED GATE COMPLEX FOR OPTCL GRID STANDARDIZATION

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

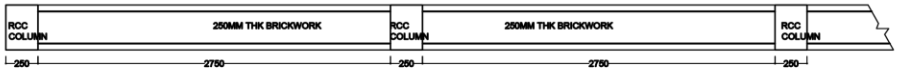
SCHEDULE OF OPENINGS	ARCHITECT	CONSULTANT	CONTENT
D1 1000X2100 W1 1200X1500 W2 600X1500	D.K.PARIDA REGD NO. CA/94/17280	SPACE ARCH ARCHITECTS ENGINEERS PLANNERS 106,JAYADEV VIHAR, BHUBANESWAR	GATE COMPLEX SHEET NO ST-01



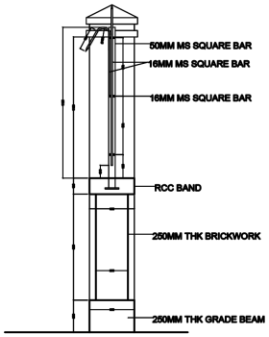
ELEVATION OF BOUNDARY WALL



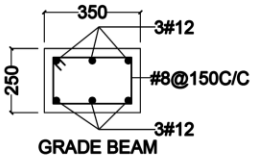
PLAN OF BOUNDARY WALL AT 2-2



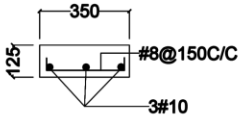
PLAN OF BOUNDARY WALL AT 1-1



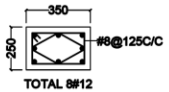
SECTION ON X-X



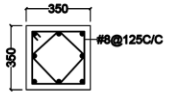
GRADE BEAM



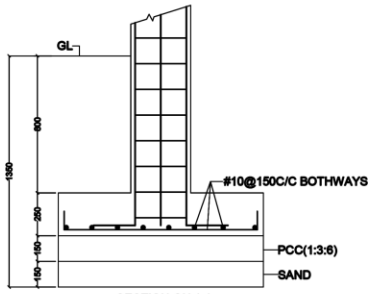
RCC BAND



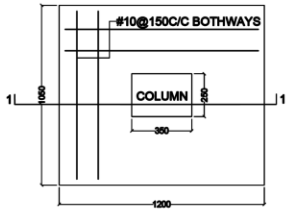
TOTAL 8#12
R.C.C. COLUMN



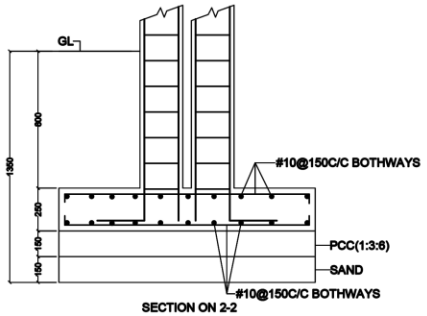
TOTAL 8#12
R.C.C. COLUMN
(CORNER COLUMN)



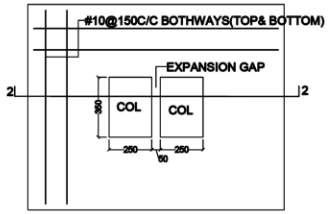
SECTION ON 1-1



PLAN OF COLUMN FOOTING



SECTION ON 2-2



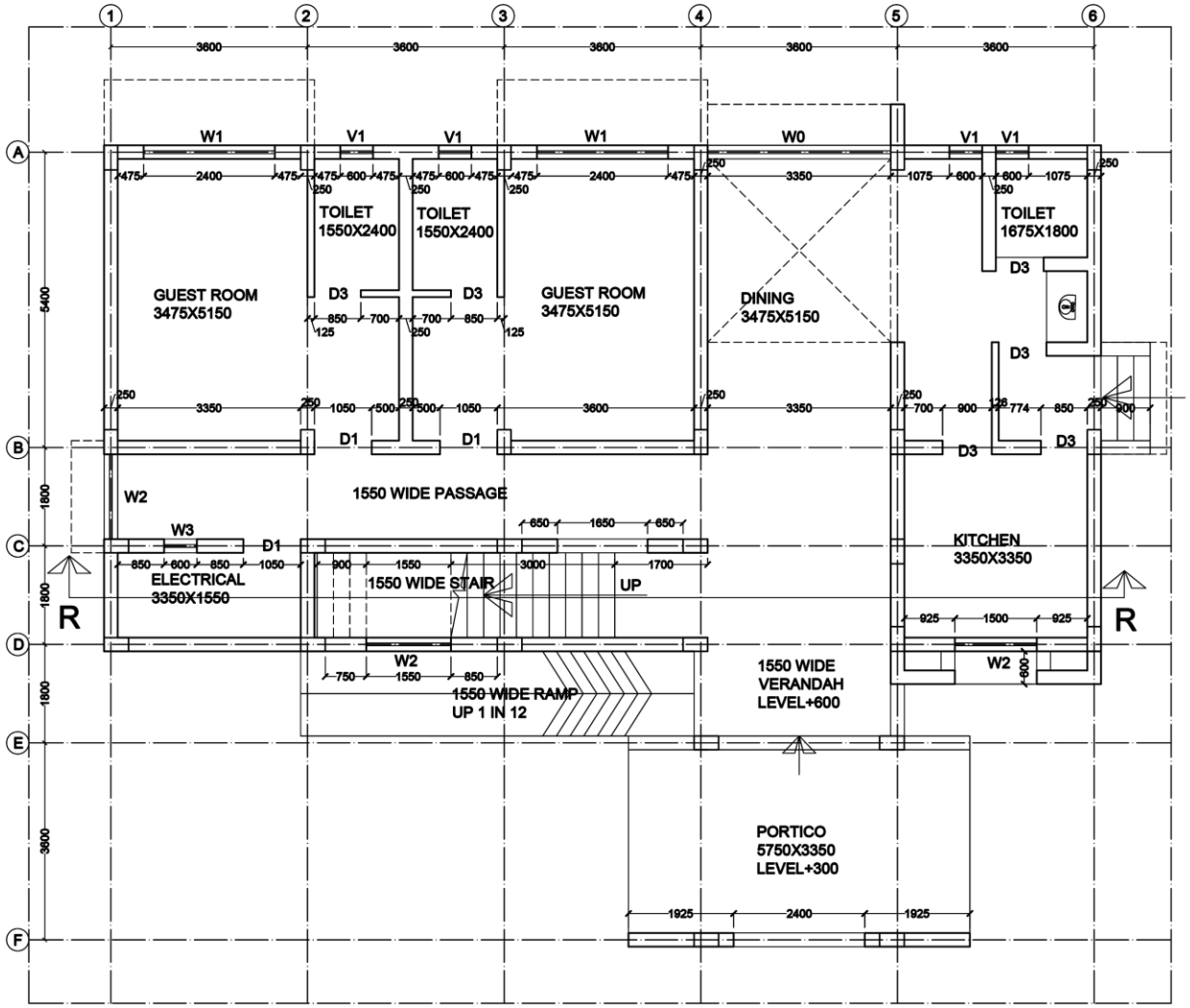
PROPOSED GATE COMPLEX FOR OPTCL GRID STANDARDIZATION

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha

SCHEDULE OF OPENINGS	ARCHITECT	CONSULTANT	CONTENT
D1 1600X2100 W1 1500X1500 W2 1000X1500	D.K.PANDA REGD NO. CA/94/17269	SPACE ARCH ARCHITECTS-ENGINEERS-PLANNER BALAYADEV VIHAR, BHUBANESWAR	DETAIL OF BOUNDARY WALL SHEET NO ST-02

TRANSIT HOUSE

INDICATIVE DRAWING



GROUND FLOOR PLAN

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

CLIENT -
GOVERNMENT OF ODISHA

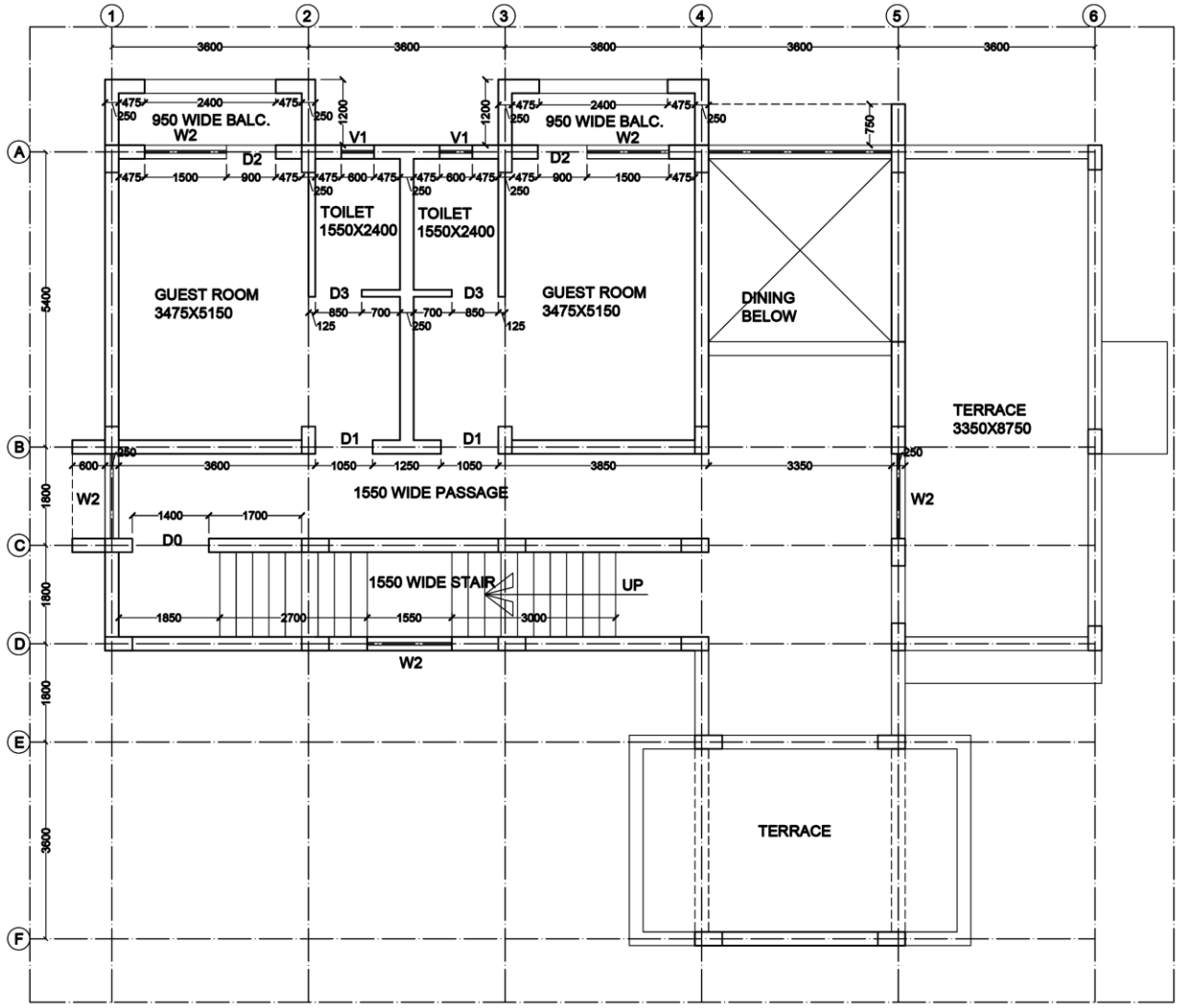
IMPLEMENTING AGENCY -
OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
GROUND FLOOR PLAN	AR-01

SCALE -
DESIGNED BY -
DATE -

Architects -
SPACE ARCH
ARCHITECTS-ENGINEERS-PLANNER
206,JAYADEV VIHAR, BHUBANESWAR
AR. D.K.PARIDA
REGD NO. CA/94/17280



FIRST FLOOR PLAN

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

CLIENT -
GOVERNMENT OF ODISHA

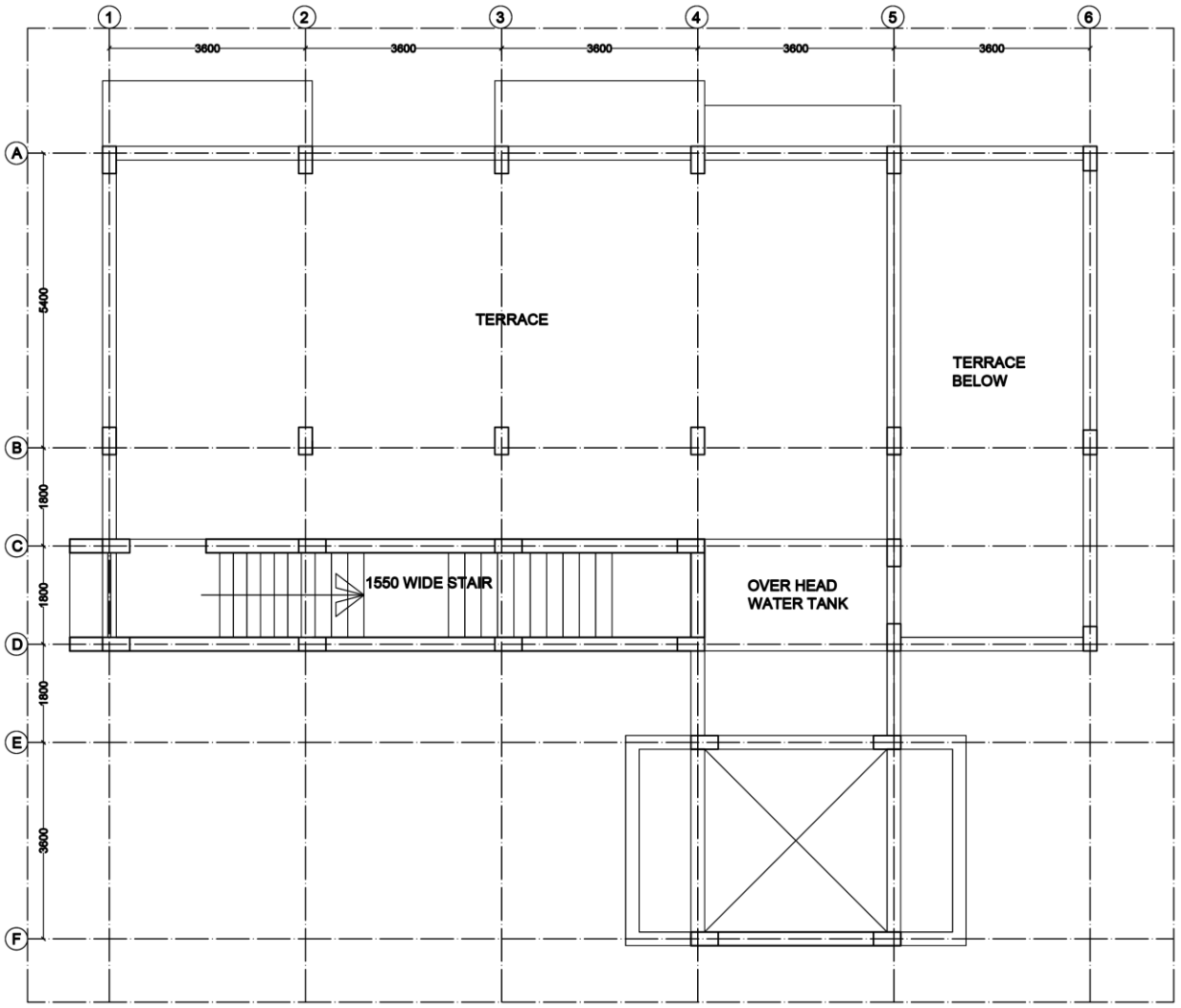
IMPLEMENTING AGENCY -
OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
FIRST FLOOR PLAN	AR-02

SCALE -
DESIGNED BY -
DATE -

Architects -
SPACE ARCH
ARCHITECTS-ENGINEERS-PLANNER
206,JAYADEV VIHAR, BHUBANESWAR
AR. D.K.PARIDA
REGD NO. CA/84/17260



TERRACE FLOOR PLAN

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

CLIENT -
GOVERNMENT OF ODISHA

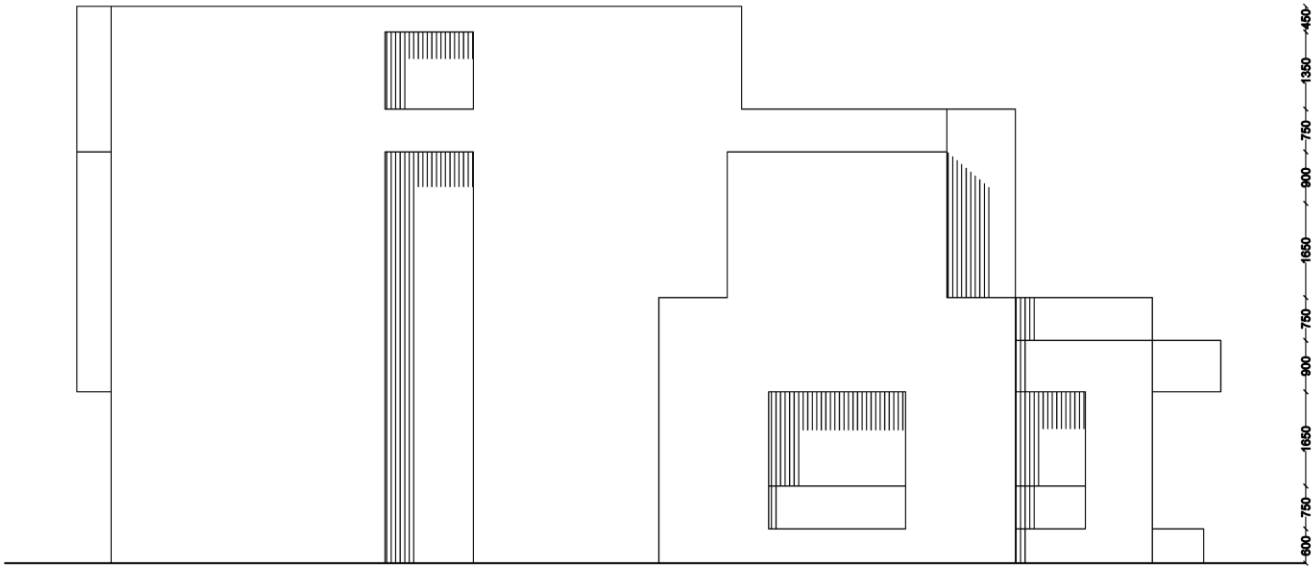
IMPLEMENTING AGENCY -
OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

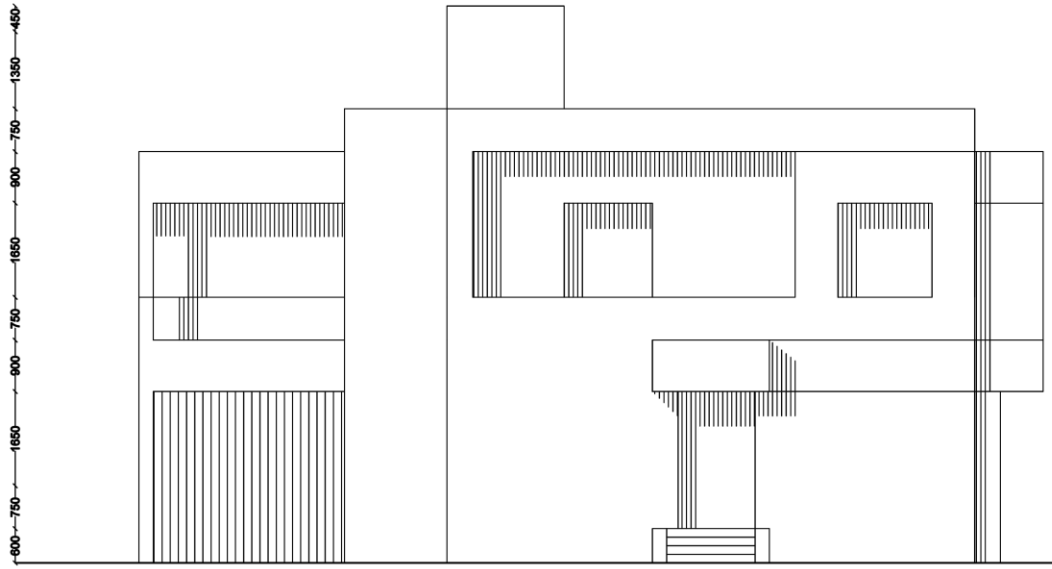
DRAWING TITLE -	DRAWING NUMBER -
TERRACE FLOOR PLAN	AR-03

SCALE -
DESIGNED BY -
DATE -

Architects -
SPACE ARCH
ARCHITECTS ENGINEER-PLANER
256,JAYADEV VIHAR, BHUBANESWAR
AR. D.K.PARIDA
REGD NO. CA/84/17280



FRONT ELEVATION



RIGHT SIDE ELEVATION

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

1. READ THIS DRAWING IN CONJUNCTION WITH RELEVANT ARCHITECTURAL DRAWINGS. ANY DISCREPANCY IF FOUND SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.
2. ALL DIMENSIONS ARE IN MM & LEVELS IN MILLIMETERS.
3. DO NOT SCALE ANY DIMENSION.
4. CONFIRM LOCATION OF WALLS WITH RELEVANT ARCH. DRGS.
5. FOR R.C.C. WORK USE MIX M25 CONFORMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
6. THE REINFORCEMENT SHALL BE COLD TWISTED DEFORMED BARS OR T.M.T BARS HAVING YIELD STRENGTH NOT LESS THAN 500 N/mm AND CONFORMING TO I.S. 1786 - 1979.
7. THE CLEAR COVER TO THE REINFORCEMENT SHALL BE AS FOLLOWS :
   (a) FOUNDATION : 50 M surfaces in contact with earth
   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
   (d) SLABS : 20 MM
   (e) CHAJJAS/CANOPY : 20 MM
   (f) R.C.C WALL : 25 MM

   NORMAL COVER IS THE DEPTH OF CONCRETE COVER TO ALL STEEL REINFORCEMENT INCLUDING LINKS/ TIES/ STIRRUPS.
8. GRADE OF CONCRETE FOR ALL R C C WORK IS M25
9. NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED AT ANY SECTION, LAPS CLOSE TO THE MID SPAN IN BOTTOM BARS & CLOSE TO SUPPORTS IN TOP BARS SHALL BE AVOIDED.
10. INDICATES TOP BARS
    INDICATE BOTTOM BARS
    OPENING IN STRUCTURAL ELEMENT
11. ALL R.C.C. TO BE MACHINE MIXED, VIBRATED AND CURED THOROUGHLY AS PER I.S. 456 - LATEST.
12. ALL FOOTING ARE CENTRALLY PLACED WITH RESPECTED TO THE CENTRE LINE OF COLUMN.
13. REINFORCEMENT SHALL BE PROVIDED IN TWO LAYERS WHEREVER FOUND NECESSARY WITH SPACER BAR TO BE PROVIDED BETWEEN TWO LAYERS OF REINFORCEMENT AS PER IS:456.

14. ALL DIMENSIONS MUST BE CHECKED WITH ARCHITECT'S DRGS. & IN CASE OF ANY DISCREPANCY ACHITECTS DRGS, SHALL PREVAIL.
15. ALL CONSTRUCTION JOINTS SHALL BE APPROVED BY CONSULTANT ON THE BASIS OF SCHEME PREPARED BY CONTRACTOR.
16. TOP AND BOTTOM EXTRA BARS IN BEAMS TO EXTEND BEYOND THE FACE OF SUPPORT AS SHOWN IN DRG UNLESS OTHERWISE SHOWN.
17. THE FIRST STIRRUPS IN BEAMS SHALL BE AT A DISTANCE OF 50MM FROM THE JOINT FACE THE SPECIAL CONFINING BE PROVIDED REINFORCEMENT SHALL THROUGH THE JOINT AT THE GIVEN SPACING IN COLUMNS.
18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS 8ϕ @200 c/c (0")

    8ϕ@200C/C(0")
20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:2:4
22. A SAFE BEARING CAPACITY 150 kN/sqm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW N.G.L.
23. ALL SUSPENSION OR CONSTRUCTION WORKS SHALL BE DONE BY ENGINEER IN CHARGE.
24. ANY DISCREPANCY IN EXECUTION OF WORK AGAINTS OR NOT DONE AS PER STRUCTURAL DRAWING WILL BE TOTALLY RESPONSIBLE OF ENGINEER IN CHARGE.

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
FRONT & RIGHT SIDE ELEVATION	AR-04

SCALE -

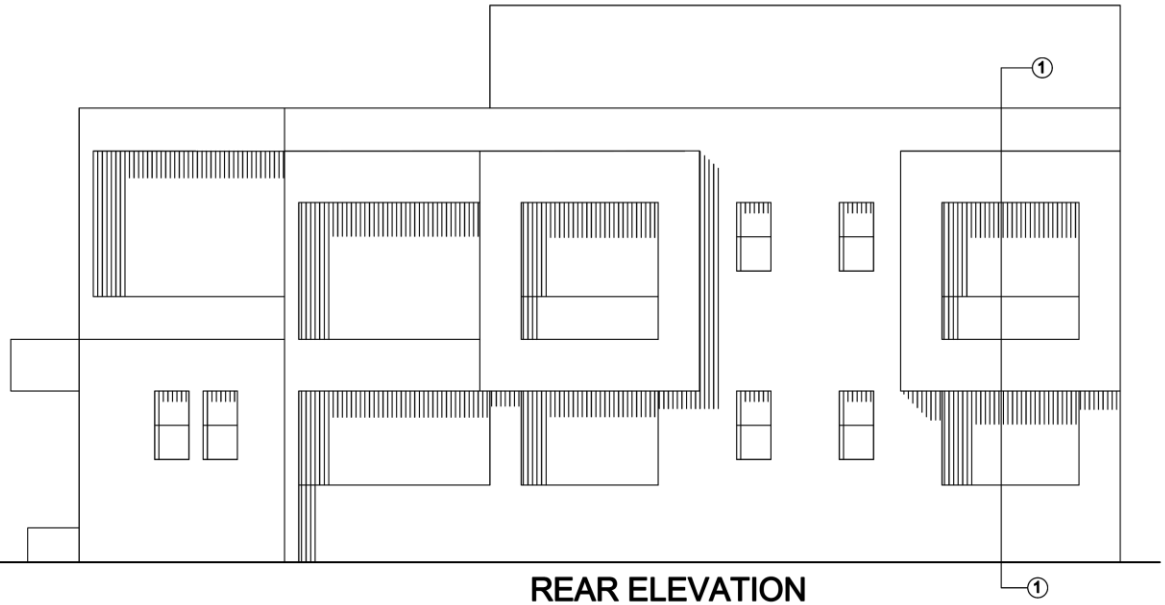
DESIGNED BY -

DATE -

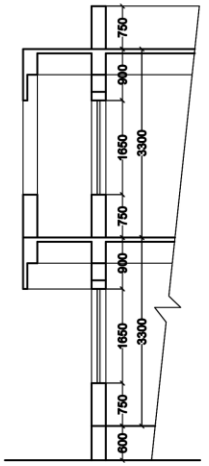
Architects -

SPACE ARCH
ARCHITECTS-ENGINEER-PLANER
206,JAYADEV VIHAR, BHUBANESWAR

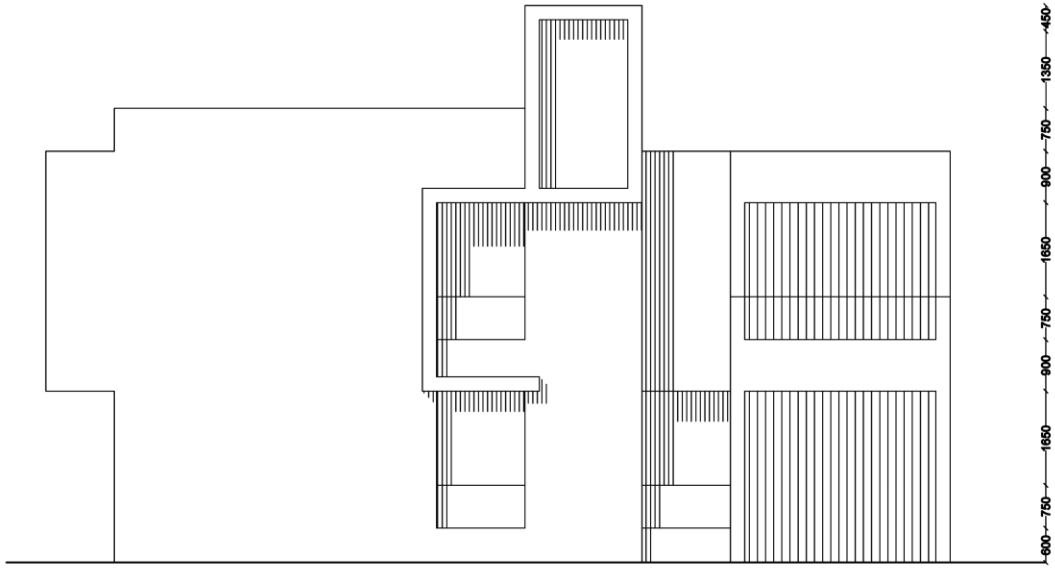
AR. D.K.PARIDA
REGD NO. CA/84/17260



REAR ELEVATION



PART SEC. ON 1-1



LEFT SIDE ELEVATION

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

1. READ THIS DRAWING IN CONJUNCTION WITH RELEVANT ARCHITECTURAL DRAWINGS. ANY DISCREPANCY IF FOUND SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.
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4. CONFIRM LOCATION OF WALLS WITH RELEVANT ARCH. DRGS.
5. FOR R.C.C. WORK USE MIX M25 CONFIRMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
6. THE REINFORCEMENT SHALL BE COLD TWISTED DEFORMED BARS OR T.M.T BARS HAVING YIELD STRENGTH NOT LESS THAN 500 N/mm AND CONFORMING TO I.S. 1786 - 1979.
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   (a) FOUNDATION : 50 M surfaces in contact with earth
   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
   (d) SLABS : 20 MM
   (e) CHAJJAS/CANOPY : 20 MM
   (f) R.C.C WALL : 25 MM

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13. REINFORCEMENT SHALL BE PROVIDED IN TWO LAYERS WHEREVER FOUND NECESSARY WITH SPACER BAR TO BE PROVIDED BETWEEN TWO LAYERS OF REINFORCEMENT AS PER IS:456.

14. ALL DIMENSIONS MUST BE CHECKED WITH ARCHITECT'S DRGS. & IN CASE OF ANY DISCREPANCY ACHITECTS DRGS, SHALL PREVAIL.
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18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS 8ϕ @200 c/c (0")

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20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
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22. A SAFE BEARING CAPACITY 100 kN/sqm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW N.G.L.
23. ALL SUSPENSION OR CONSTRUCTION WORKS SHALL BE DONE BY ENGINEER IN CHARGE.
24. ANY DISCREPANCY IN EXECUTION OF WORK AS/IS/TS OR NOT DONE AS PER STRUCTURAL DRAWING WILL BE TOTALLY RESPONSIBLE OF ENGINEER IN CHARGE.

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
REAR & LEFT SIDE ELEVATION	AR-05

SCALE -

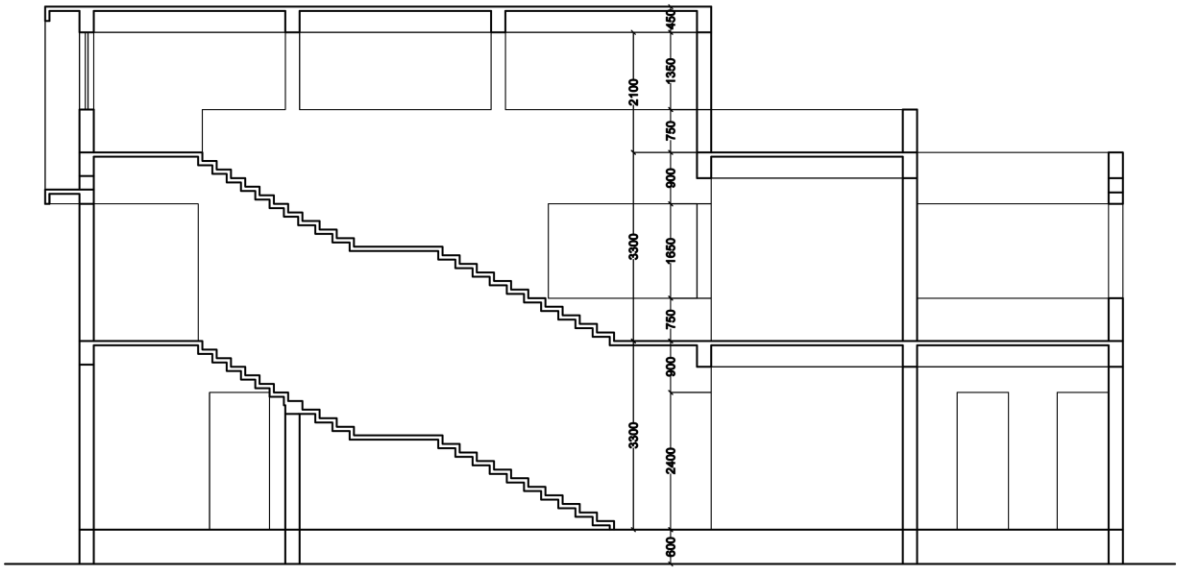
DESIGNED BY -

DATE -

Architects -

SPACE ARCH
ARCHITECTS-ENGINEER-PLANER
206,JAYADEV VIHAR, BHUBANESWAR

AR. D.K.PARIDA
REGD NO. CA/84/17260



SECTION ON R-R

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

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   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
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18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS @0.6 @300 c/c (6")

    #M(300C/C6")
20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:3:6
22. A SAFE BEARING CAPACITY 100 SHkgm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW N.G.L.
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CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
SECTION ON R-R	AR-06

SCALE -

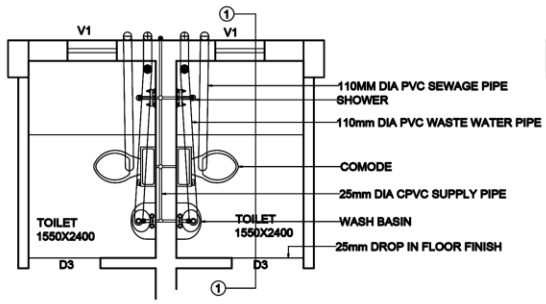
DESIGNED BY -

DATE -

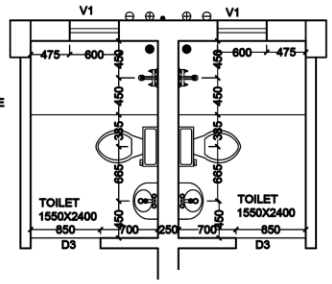
Architects -

SPACE ARCH
ARCHITECTS-ENGINEER-PLANER
206,JAYADEV VIHAR, BHUBANESWAR

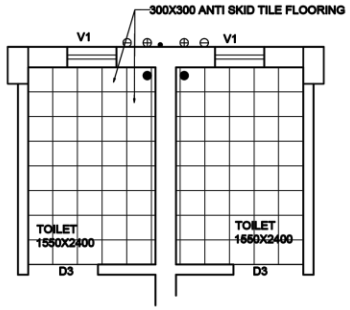
AR. D.K.PARIDA
REGD NO. CA/84/17280



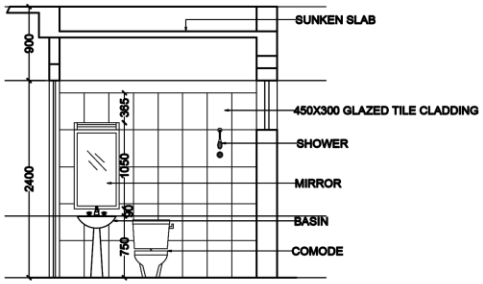
GUEST ROOM ATTACHED
TOILET (SERVICES)



GUEST ROOM ATTACHED
TOILET (WORKING)



GUEST ROOM ATTACHED
TOILET (FLOORING)



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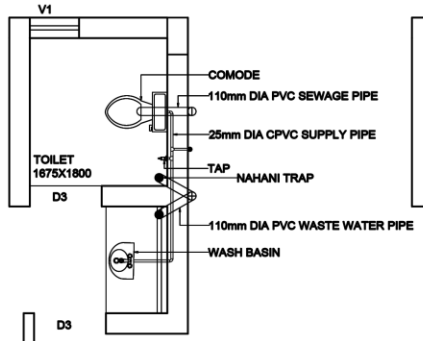
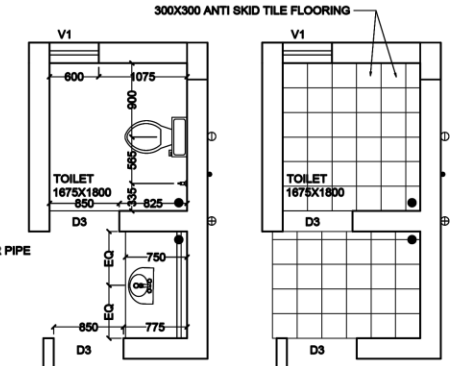


DINING ROOM TOILET
(SERVICES)



DINING ROOM TOILET
(WORKING)

DINING ROOM TOILET
(FLOORING)

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)

SCHEDULE OF OPENINGS

D0	1400X2400	DOOR
D1	1050X2400	DOOR
D2	900X2400	DOOR
D3	850X2400	DOOR
W0	3350X1650	WINDOW
W1	2400X1650	WINDOW
W2	1500X1650	WINDOW
W3	600X1650	WINDOW
V1	600X600	VENTILATOR

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
DETAIL OF TOILET	DETAIL -01

SCALE -

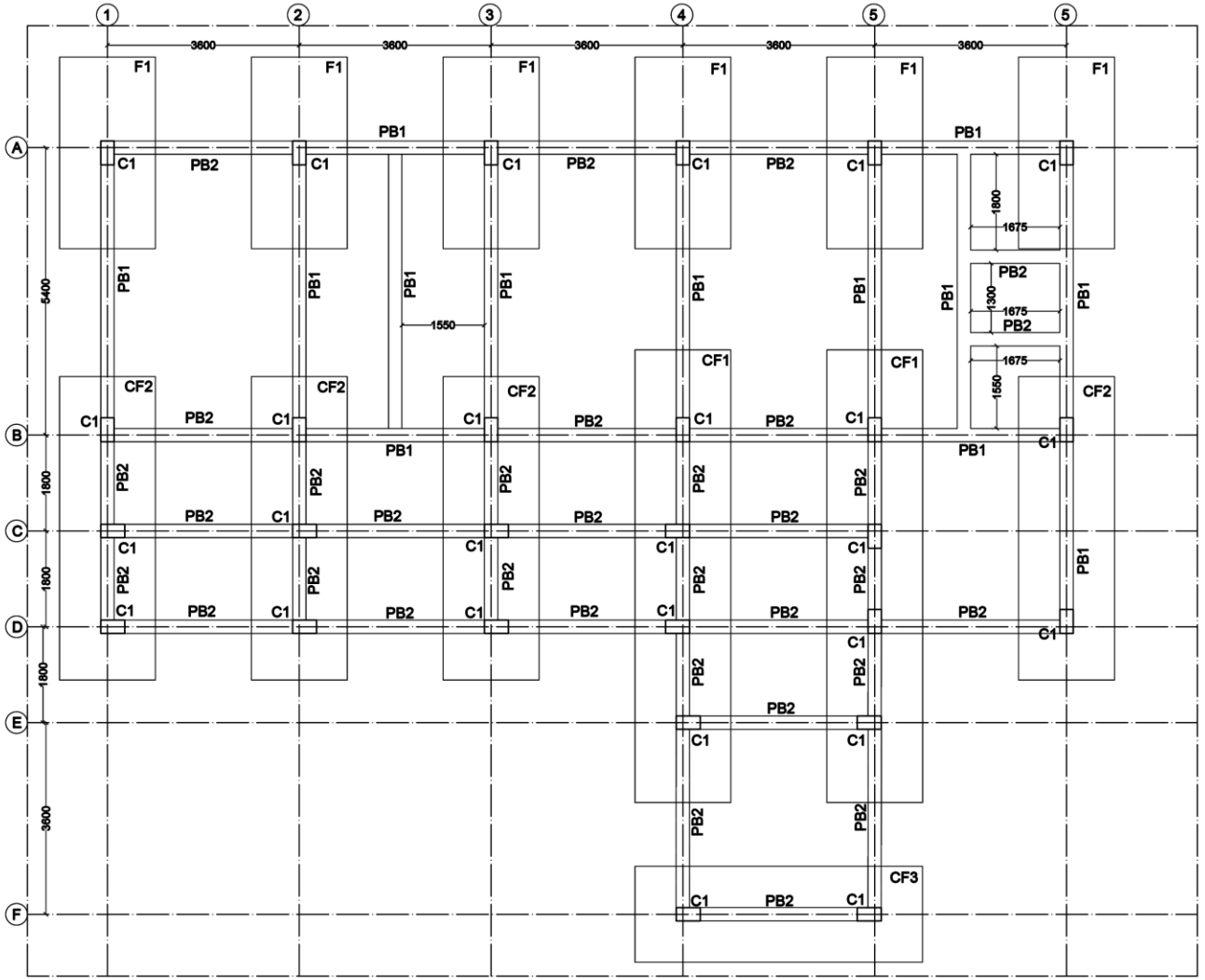
DESIGNED BY -

DATE -

Architects -

SPACE ARCH
ARCHITECTS-ENGINEERS-PLANER
206,JAYADEV VIHAR, BHUBANESWAR

AR. D.K.PARIDA
REGD NO. CA/84/17260



FOOTING & PLINTH BEAM LAYOUT PLAN

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

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   (d) SLABS : 20 MM
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SPACER BAR

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19. PROVIDE DIST STEEL OVER EXTRA TOP BARS #8@200C/C (6")
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21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:3:6
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24. ANY DISCREPANCY IN EXECUTION OF WORK ASSISTS OR NOT DONE AS PER STRUCTURAL DRAWING WILL BE TOTALLY RESPONSIBLE OF ENGINEER IN CHARGE.

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
FOOTING & PLINTH BEAM LAYOUT PLAN	ST-01

SCALE -

DESIGNED BY -

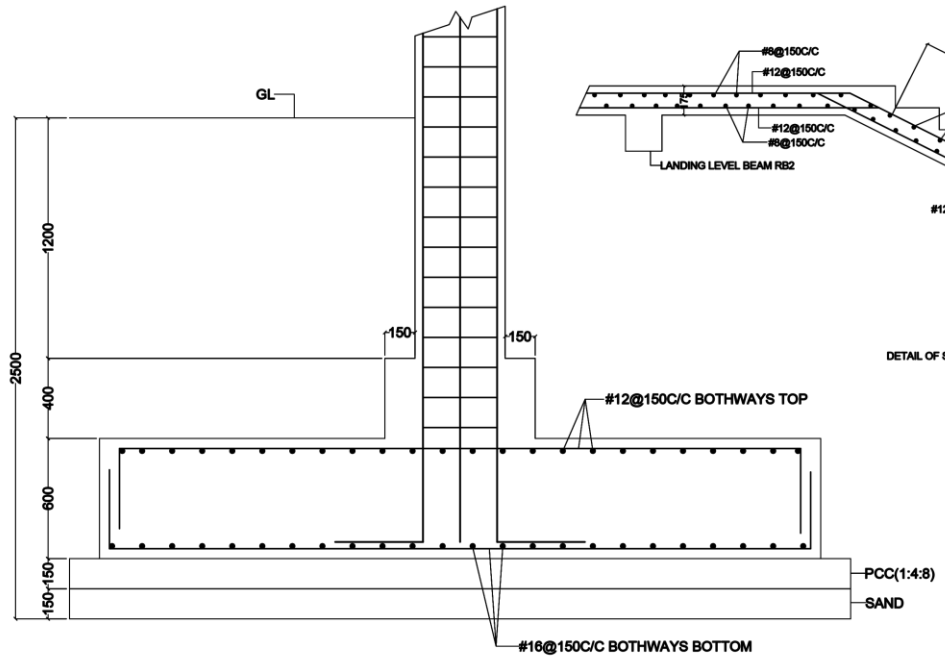
DATE -

Architects -

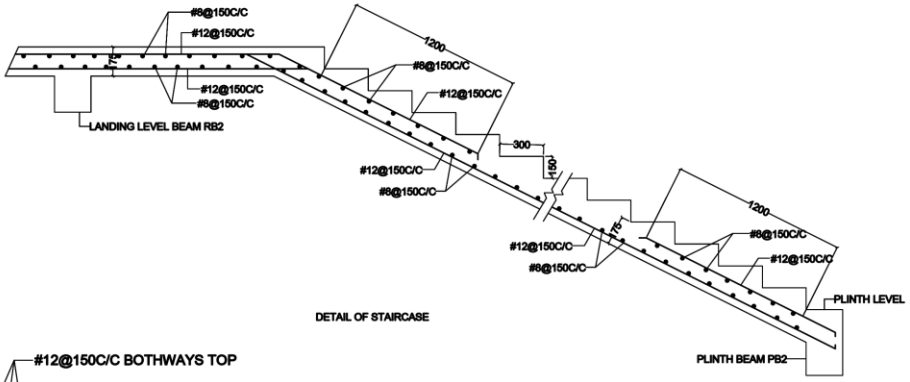
SPACE ARCH
ARCHITECTS-ENGINEER-PLANER
206,JAYADEV VIHAR, BHUBANESWAR

AR. D.K.PARIDA
REGD NO. CA/84/17280

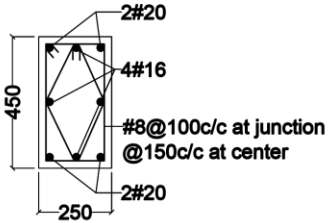
14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha



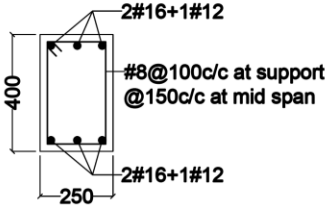
SECTION ON 1-1



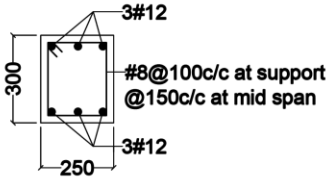
DETAIL OF STAIRCASE



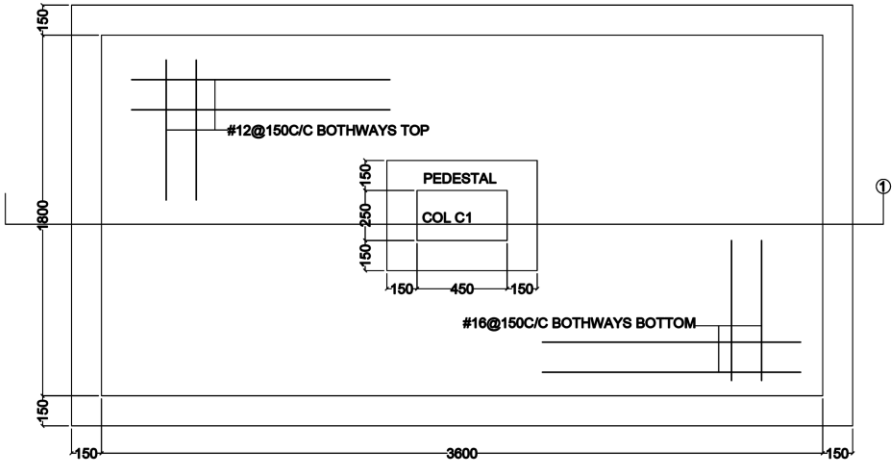
COLUMN C1



PLINTH BEAM PB1(250X400)



PLINTH BEAM PB2(250X300)



PLAN OF FOOTING F1

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

1. READ THIS DRAWING IN CONJUNCTION WITH RELEVANT ARCHITECTURAL DRAWINGS. ANY DISCREPANCY IF FOUND SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.
2. ALL DIMENSIONS ARE IN MM & LEVELS IN MILLIMETERS.
3. DO NOT SCALE ANY DIMENSION.
4. CONFIRM LOCATION OF WALLS WITH RELEVANT ARCH. DRGS.
5. FOR R C C. WORK USE MIX M25 CONFIRMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
6. THE REINFORCEMENT SHALL BE COLD TWISTED DEFORMED BARS OR T.M.T BARS HAVING YIELD STRENGTH NOT LESS THAN 500 N/mm AND CONFORMING TO I.S. 1786 - 1979.
7. THE CLEAR COVER TO THE REINFORCEMENT SHALL BE AS FOLLOWS :
   (a) FOUNDATION : 60 M surfaces in contact with earth
   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
   (d) SLABS : 20 MM
   (e) CHAJJA/SCANOPY : 20 MM
   (f) R.C.C WALL : 35 MM

   NORMAL COVER IS THE DEPTH OF CONCRETE COVER TO ALL STEEL REINFORCEMENT INCLUDING LINKS/ TIES/ STIRRUPS.
8. GRADE OF CONCRETE FOR ALL R C C WORK IS M25
9. NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED AT ANY SECTION. LAPS CLOSE TO THE MID SPAN IN BOTTOM BARS & CLOSE TO SUPPORTS IN TOP BARS SHALL BE AVOIDED.
10. — — — — — INDICATES TOP BARS
    — — — — — INDICATES BOTTOM BARS
    OPENING IN STRUCTURAL ELEMENT
11. ALL R.C.C. TO BE MACHINE MIXED, VIBRATED AND CURED THOROUGHLY AS PER I.S. 456 - LATEST.
12. ALL FOOTING ARE CENTRALLY PLACED WITH RESPECTED TO THE CENTRE LINE OF COLUMN.
13. REINFORCEMENT SHALL BE PROVIDED IN TWO LAYERS WHEREVER FOUND NECESSARY WITH SPACER BAR TO BE PROVIDED BETWEEN TWO LAYERS OF REINFORCEMENT AS PER IS:456.

SPACER BAR

14. ALL DIMENSIONS MUST BE CHECKED WITH ARCHITECT'S DRGS. & IN CASE OF ANY DISCREPANCY ACHITECTS DRGS, SHALL PREVAIL.
15. ALL CONSTRUCTION JOINTS SHALL BE APPROVED BY CONSULTANT ON THE BASIS OF SCHEME PREPARED BY CONTRACTOR.
16. TOP AND BOTTOM EXTRA BARS IN BEAMS TO EXTEND BEYOND THE FACE OF SUPPORT AS SHOWN IN DRG UNLESS OTHERWISE SHOWN.
17. THE FIRST STIRRUPS IN BEAMS SHALL BE AT A DISTANCE OF 50MM FROM THE JOINT FACE THE SPECIAL CONFINING BE PROVIDED REINFORCEMENT SHALL THROUGH THE JOINT AT THE GIVEN SPACING IN COLUMNS.
18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS #8@200 c/c (0") #8@100C/C(0")
20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:2:5
22. A SAFE BEARING CAPACITY 100 kN/sqm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW H.G.L.
23. ALL SUSPENSION OR CONSTRUCTION WORKS SHALL BE DONE BY ENGINEER IN CHARGE.
24. ANY DISCREPANCY IN EXECUTION OF WORK ASBSITE OR NOT DONE AS PER STRUCTURAL DRAWING WILL BE TOTALLY RESPONSIBLE OF ENGINEER IN CHARGE.

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
DETAIL OF COLUMN, FOOTING AND STAIRCASE	ST-02

SCALE -

DESIGNED BY -

DATE -

Architects -

SPACE ARCH
ARCHITECTS-ENGINEER-PLANER
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14.03.2022
Professor
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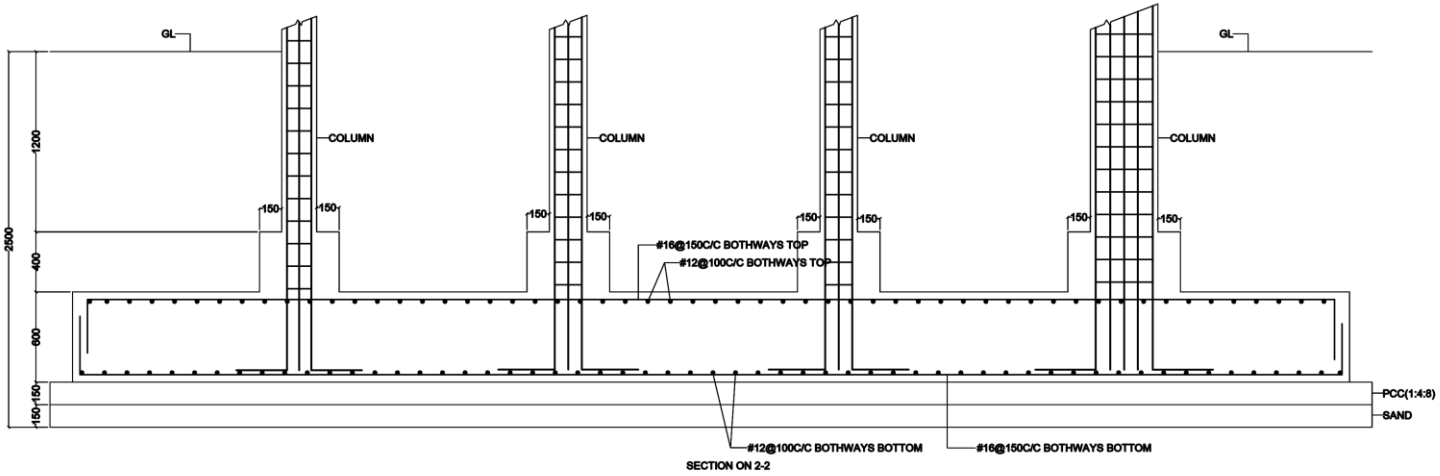

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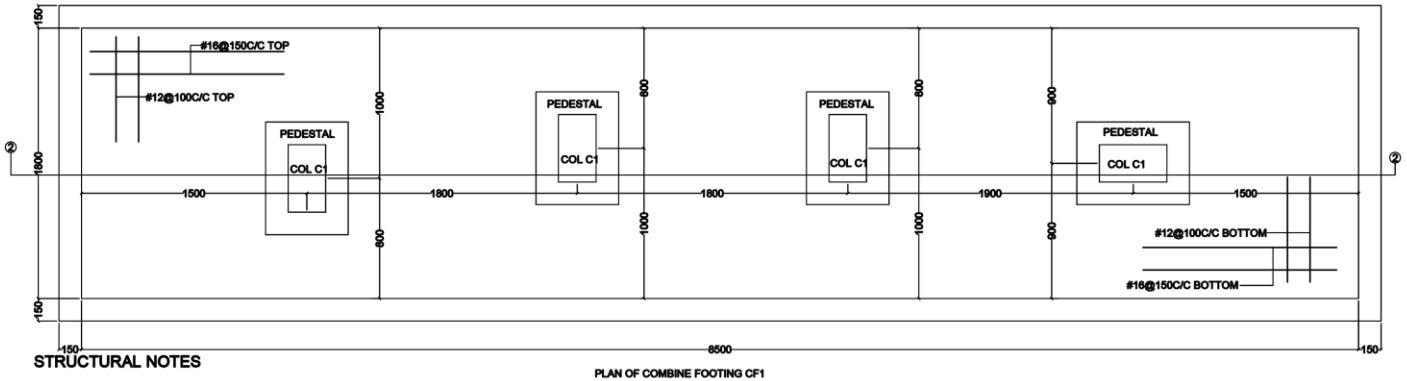

PLAN OF COMBINE FOOTING CF1

STRUCTURAL NOTES

1. Only written dimensions are to be followed.
2. Refer relevant architectural drawings before execution of work.
3. Clear cover to main reinforcement shall be as under
   a)Footing:50mm b)Column:40mm
   c)Beam:30mm d)Slab:20mm
4. Mix of concrete shall be as follows
   a)Footing: M25 b)Column:M25
   c)Beam:M25 d)Slab:M25
5. Steel in use of Fe 500d where % of elongation should be more than 14%
6. The structural design of foundation has been done for 3 stroyed building.
7. The bearing capacity of soil is being considered as 150KN/sqm
8. Development length of bars in beams shall be 57x dia
9. Avoid lapping at column & beam joints
10. Minimum stripping time of framework shall be 24 hours for column & 21 days for slab & beams.
11. All construction joints must shall be made vertical.
12. No structural damage/cutting is permissible without prior approval of designer.

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

1. READ THIS DRAWING IN CONJUNCTION WITH RELEVANT ARCHITECTURAL DRAWINGS. ANY DISCREPANCY IF FOUND SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.
2. ALL DIMENSIONS ARE IN MM & LEVELS IN MILLIMETERS.
3. DO NOT SCALE ANY DIMENSION.
4. CONFIRM LOCATION OF WALLS WITH RELEVANT ARCH. DRGS.
5. FOR R C C. WORK USE MIX M25 CONFIRMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
6. THE REINFORCEMENT SHALL BE COLD TWISTED DEFORMED BARS OR T.M.T BARS HAVING YIELD STRENGTH NOT LESS THAN 500 N/mm AND CONFORMING TO I.S. 1786 - 1979.
7. THE CLEAR COVER TO THE REINFORCEMENT SHALL BE AS FOLLOWS :
   (a) FOUNDATION : 60 M surfaces in contact with earth
   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
   (d) SLABS : 20 MM
   (e) CHAJJA/SCANOPY : 20 MM
   (f) R.C.C WALL : 35 MM
   NORMAL COVER IS THE DEPTH OF CONCRETE COVER TO ALL STEEL REINFORCEMENT INCLUDING LINKS/ TIES/ STIRRUPS.
8. GRADE OF CONCRETE FOR ALL R C C WORK IS M25
9. NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED AT ANY SECTION. LAPS CLOSE TO THE MID SPAN IN BOTTOM BARS & CLOSE TO SUPPORTS IN TOP BARS SHALL BE AVOIDED.
10. — — — — — INDICATES TOP BARS
    — — — — — INDICATES BOTTOM BARS
    OPENING IN STRUCTURAL ELEMENT
11. ALL R.C.C. TO BE MACHINE MIXED, VIBRATED AND CURED THOROUGHLY AS PER I.S. 456 - LATEST.
12. ALL FOOTING ARE CENTRALLY PLACED WITH RESPECTED TO THE CENTRE LINE OF COLUMN.
13. REINFORCEMENT SHALL BE PROVIDED IN TWO LAYERS WHEREVER FOUND NECESSARY WITH SPACER BAR TO BE PROVIDED BETWEEN TWO LAYERS OF REINFORCEMENT AS PER IS:456.

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16. TOP AND BOTTOM EXTRA BARS IN BEAMS TO EXTEND BEYOND THE FACE OF SUPPORT AS SHOWN IN DRG UNLESS OTHERWISE SHOWN.
17. THE FIRST STIRRUPS IN BEAMS SHALL BE AT A DISTANCE OF 50MM FROM THE JOINT FACE THE SPECIAL CONFINING BE PROVIDED REINFORCEMENT SHALL THROUGH THE JOINT AT THE GIVEN SPACING IN COLUMNS.
18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS #8@200C/C(8T) #8@100C/C(8T)
20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:2:5
22. A SAFE BEARING CAPACITY 150 kN/sqm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW H.G.L.
23. ALL SUSPENSION OR CONSTRUCTION WORKS SHALL BE DONE BY ENGINEER IN CHARGE.
24. ANY DISCREPANCY IN EXECUTION OF WORK AMSITE OR NOT DONE AS PER STRUCTURAL DRAWING WILL BE TOTALLY RESPONSIBLE OF ENGINEER IN CHARGE.

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
DETAIL OF FOOTING	ST-03

SCALE -	
DESIGNED BY -	
DATE -	

Architects -

SPACE ARCH
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Professor
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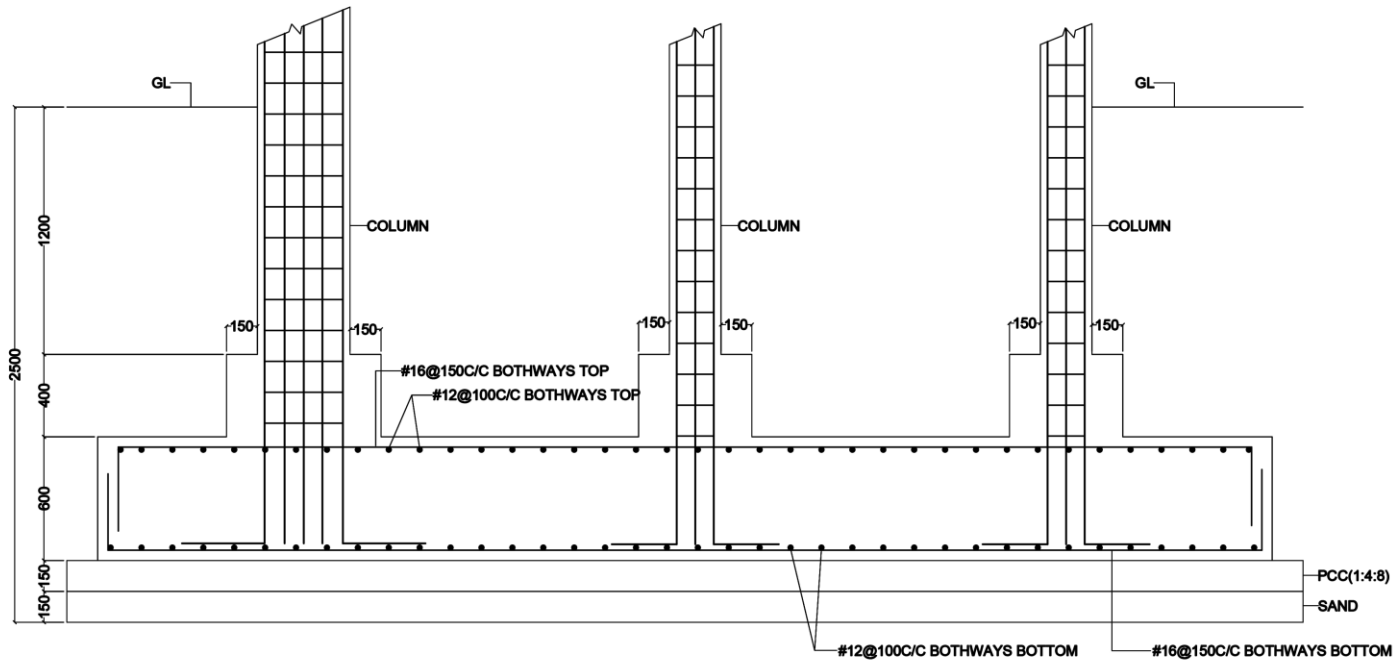

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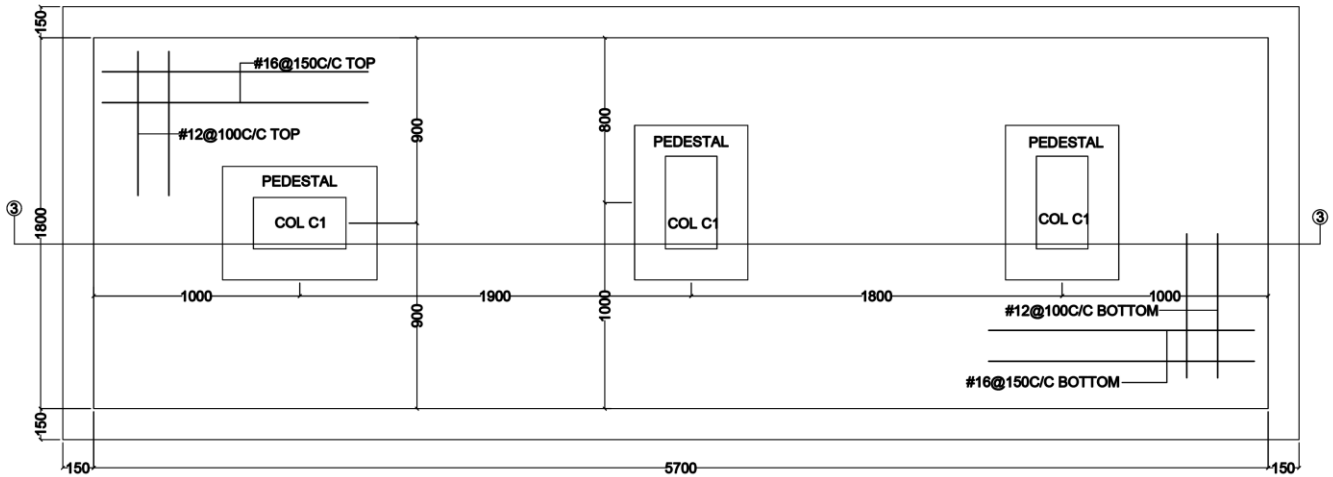

PLAN OF COMBINE FOOTING CF2

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

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2. ALL DIMENSIONS ARE IN MM & LEVELS IN MILLIMETERS.
3. DO NOT SCALE ANY DIMENSION.
4. CONFIRM LOCATION OF WALLS WITH RELEVANT ARCH. DRGS.
5. FOR R C C. WORK USE MIX M25 CONFIRMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
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7. THE CLEAR COVER TO THE REINFORCEMENT SHALL BE AS FOLLOWS :
   (a) FOUNDATION : 60 M surfaces in contact with earth
   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
   (d) SLABS : 20 MM
   (e) CHAJJA/SCANOPY : 20 MM
   (f) R.C.C WALL : 35 MM
   NORMAL COVER IS THE DEPTH OF CONCRETE COVER TO ALL STEEL REINFORCEMENT INCLUDING LINKS/ TIES/ STIRRUPS.
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    — — — — — INDICATE BOTTOM BARS
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18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS #8 @300 c/c (5")
    #8@300C/C(5")
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CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
DETAIL OF FOOTING	ST-04

SCALE -

DESIGNED BY -

DATE -

Architects -

SPACE ARCH
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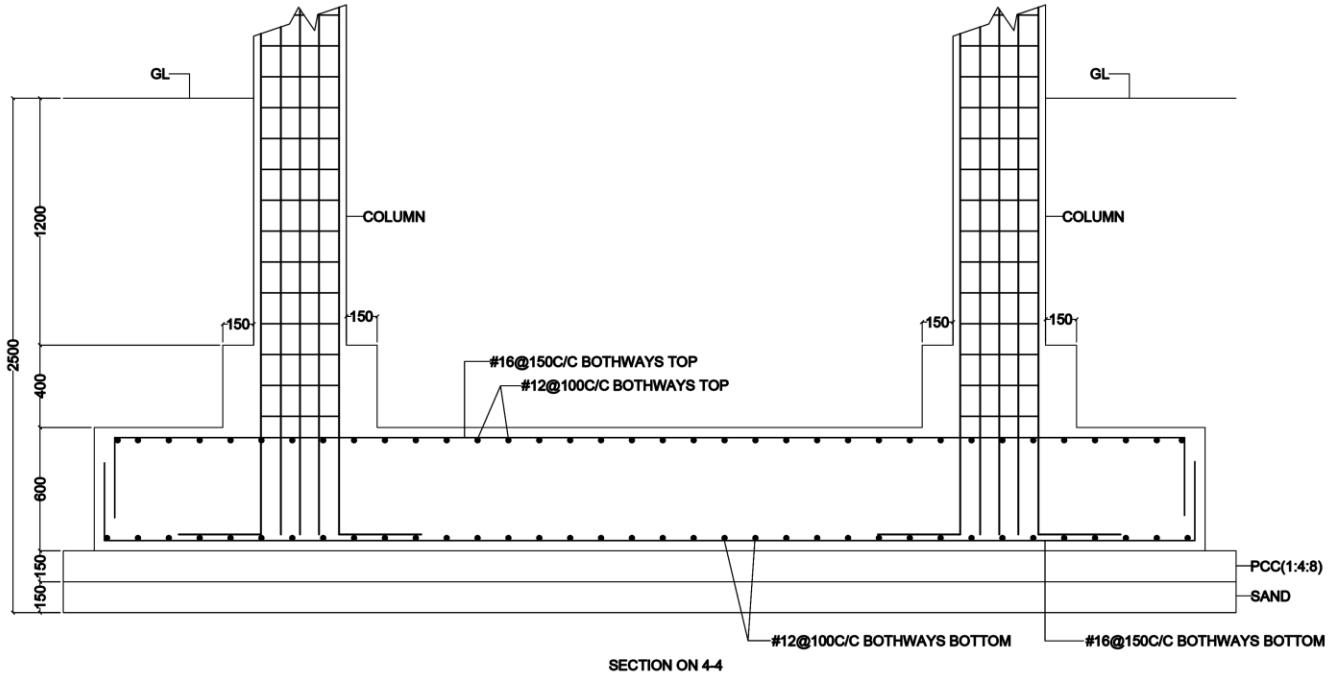

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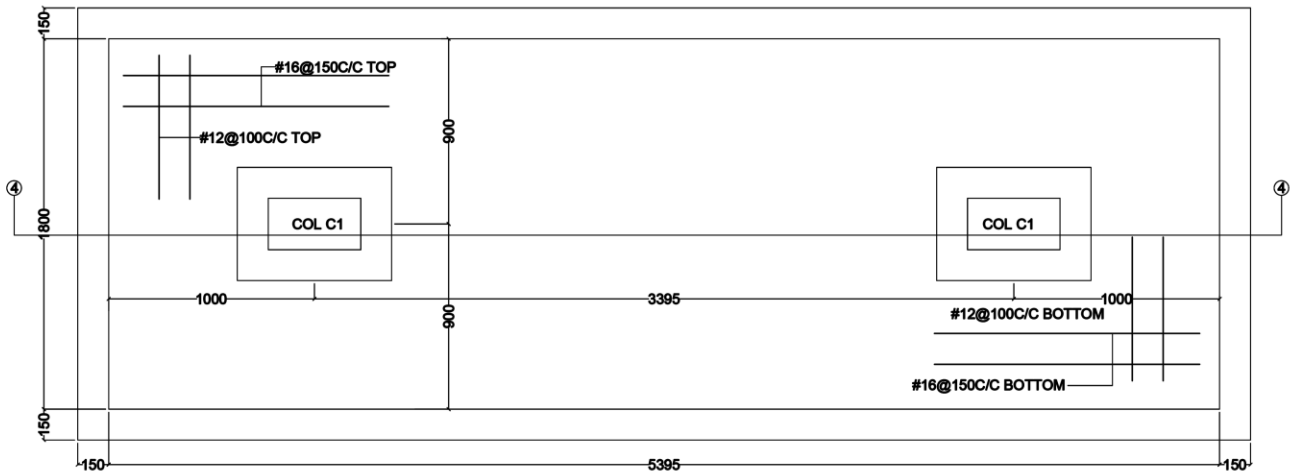

PLAN OF COMBINE FOOTING CF3

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)

GENERAL NOTES

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5. FOR R.C.C. WORK USE M20 MIX CONFORMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
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   (d) SLABS : 20 MM
   (e) CHAJJAS/CANOPY : 20 MM
   (f) R.C.C WALL : 25 MM

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    ——— INDICATE BOTTOM BARS
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18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS #8 @200 c/c (6")

    #8@200C/C(6")
20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:3:6
22. A SAFE BEARING CAPACITY 100 kN/sqm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW H.G.L.
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CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -

TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
DETAIL OF FOOTING	ST-05

SCALE -

DESIGNED BY -

DATE -

Architects -

SPACE ARCH
ARCHITECTS-ENGINEER-PLANER
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REGD NO. CA/84/17280

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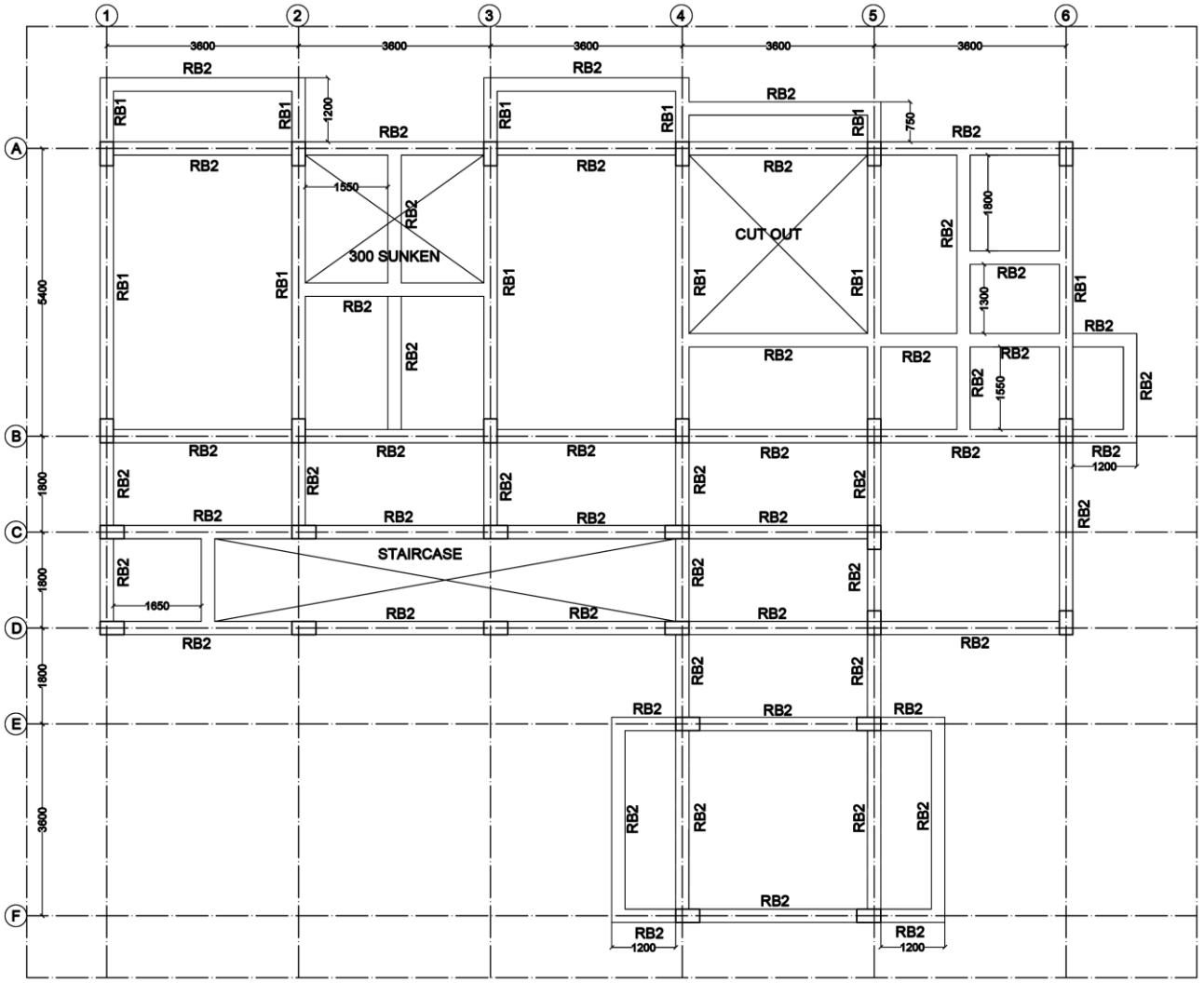
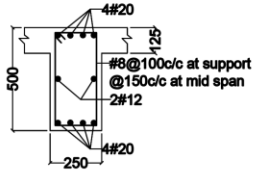
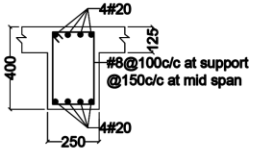


GROUND FLOOR BEAM LAYOUT PLAN

OPTCL TRANSIT HOUSE (GRID STANDARDIZATION)



ROOF BEAM RB1(250X500)



ROOF BEAM RB2(250X400)

DETAIL OF MAIN SLAB

THICKNESS-125mm
REINFORCEMENT
#8@125C/C BOTHWAYS

DETAIL OF SUNKEN SLAB

THICKNESS-150mm
REINFORCEMENT
#10@125C/C BOTHWAYS

CLIENT -
GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -
OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
GROUND FLOOR ROOF BEAM LAYOUT PLAN	ST-06

SCALE -
DESIGNED BY -
DATE -

Architects -

SPACE ARCH
ARCHITECTS-ENGINEER-PLANNER
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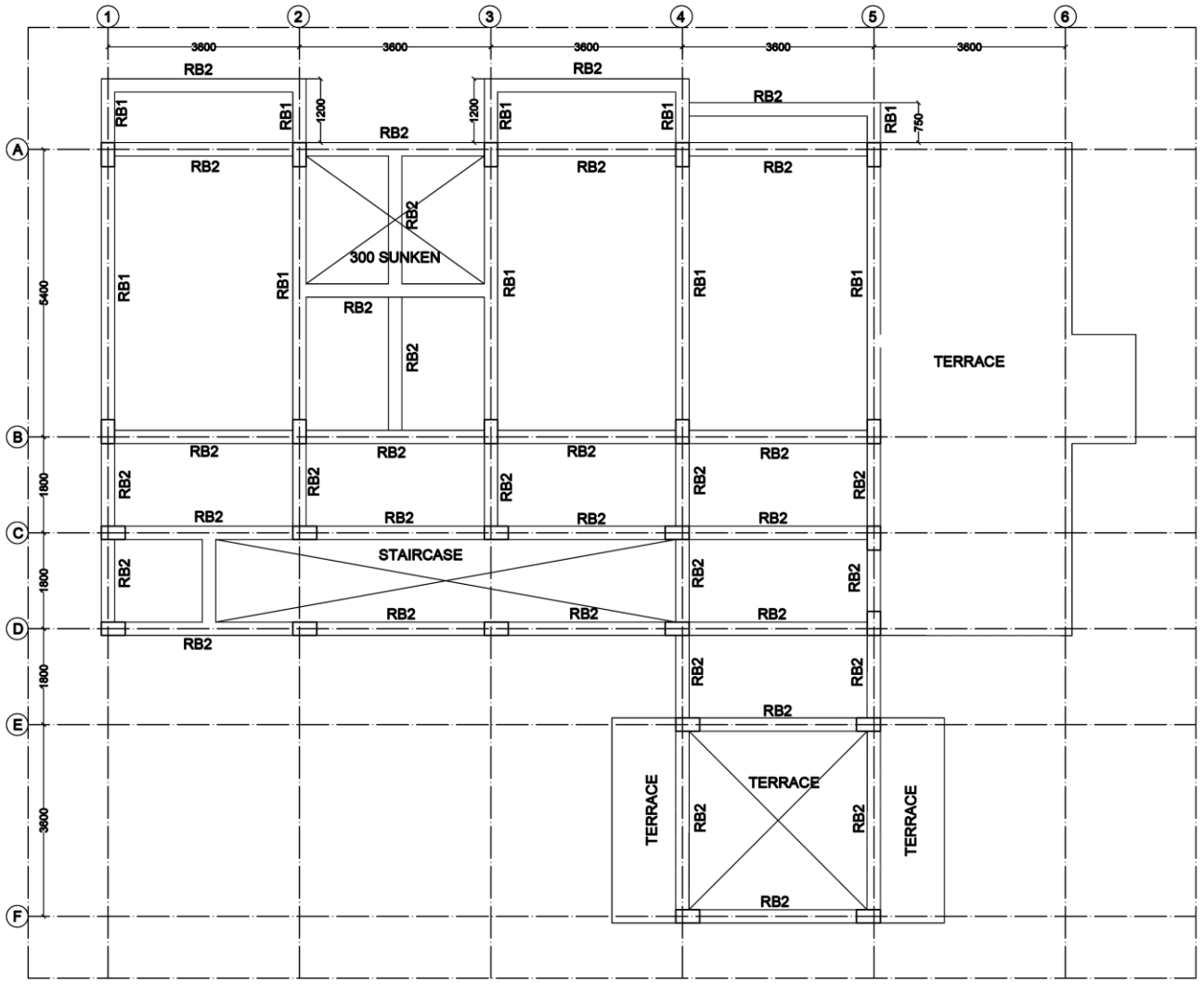
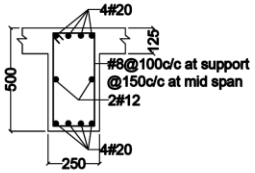
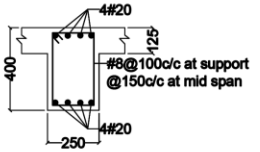


FIRST FLOOR BEAM LAYOUT PLAN

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)



ROOF BEAM RB1(250X500)



ROOF BEAM RB2(250X400)

DETAIL OF MAIN SLAB

THICKNESS-125mm
REINFORCEMENT
#8@125C/C BOTHWAYS

DETAIL OF SUNKEN SLAB

THICKNESS-150mm
REINFORCEMENT
#10@125C/C BOTHWAYS

CLIENT -
GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -
OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
FIRST FLOOR ROOF BEAM LAYOUT PLAN	ST-07

SCALE -
DESIGNED BY -
DATE -

Architects -

SPACE ARCH
ARCHITECTS ENGINEER-PLANER
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REGD NO. CA/84/17280

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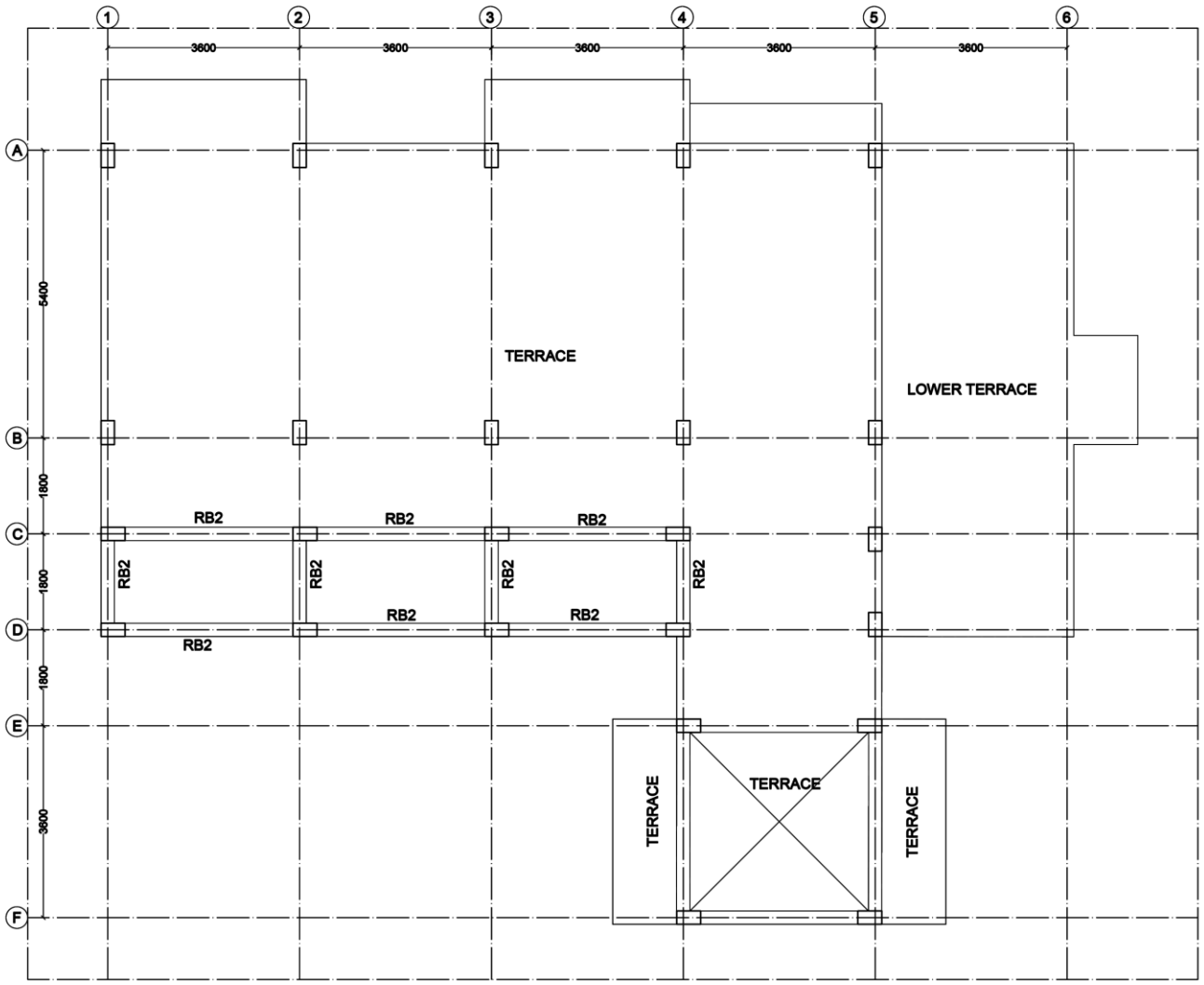
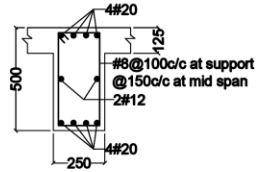
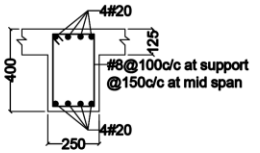


HEAD ROOM FLOOR BEAM LAYOUT PLAN

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)



ROOF BEAM RB1(250X500)



ROOF BEAM RB2(250X400)

DETAIL OF MAIN SLAB

THICKNESS-125mm
REINFORCEMENT
#8@125C/C BOTHWAYS

DETAIL OF SUNKEN SLAB

THICKNESS-150mm
REINFORCEMENT
#10@125C/C BOTHWAYS

CLIENT -
GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -
OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
HEAD ROOM FLOOR ROOF BEAM LAYOUT PLAN	ST-08

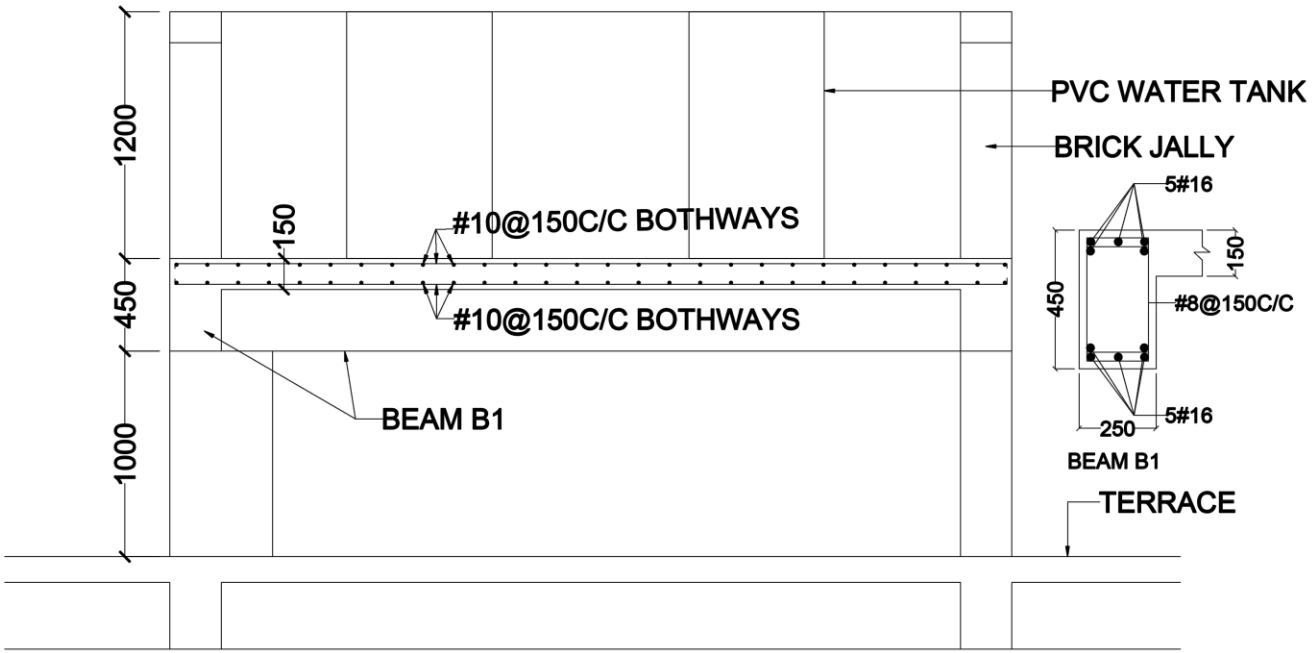
SCALE -
DESIGNED BY -
DATE -

Architects -

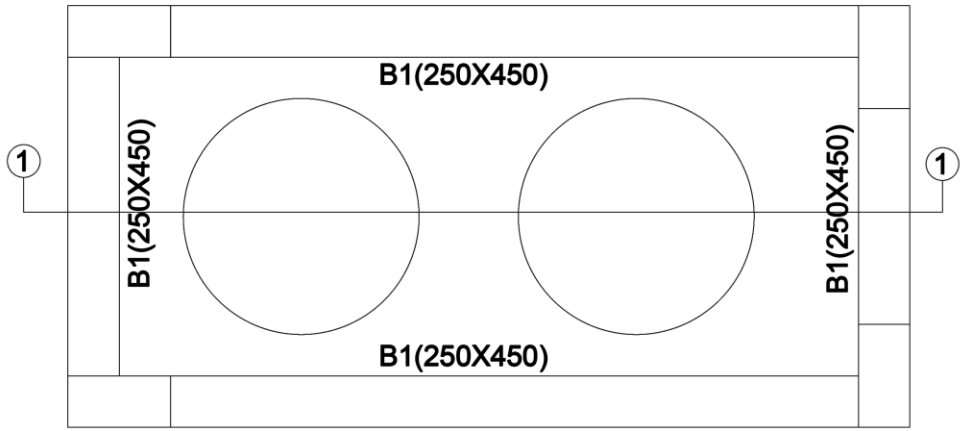
SPACE ARCH
ARCHITECTS-ENGINEER-PLANNER
206,JAYADEV VIHAR, BHUBANESWAR

AR. D.K.PARIDA
REGD NO. CA/84/17260

14.03.2022
Professor
Civil Engineering Department
IGIT Sarang, Odisha



SECTION ON 1-1



PLAN OF WATER TANK

OPTCL TRANSIT HOUSE
(GRID STANDARDIZATION)

GENERAL NOTES

1. READ THIS DRAWING IN CONJUNCTION WITH RELEVANT ARCHITECTURAL DRAWINGS. ANY DISCREPANCY IF FOUND SHALL BE BROUGHT TO THE NOTICE OF THE CONSULTANT.
2. ALL DIMENSIONS ARE IN MM & LEVELS IN MILLIMETERS.
3. DO NOT SCALE ANY DIMENSION.
4. CONFIRM LOCATION OF WALLS WITH RELEVANT ARCH. DRGS.
5. FOR R.C.C. WORK USE MIX M25 CONFIRMING TO IS 456 : 2000 OR AS SPECIFIED IN RESPECTIVE DWG.
6. THE REINFORCEMENT SHALL BE COLD TWISTED DEFORMED BARS OR T.M.T BARS HAVING YIELD STRENGTH NOT LESS THAN 500 N/mm AND CONFORMING TO I.S. 1786 - 1979.
7. THE CLEAR COVER TO THE REINFORCEMENT SHALL BE AS FOLLOWS :
   (a) FOUNDATION : 50 M surfaces in contact with earth
   (b) COLUMNS : 40 MM
   (c) BEAMS (top and bottom) : 25 MM side cover 25mm
   (d) SLABS : 20 MM
   (e) CHAJJA/SCANOPY : 20 MM
   (f) R.C.C WALL : 25 MM
   NORMAL COVER IS THE DEPTH OF CONCRETE COVER TO ALL STEEL REINFORCEMENT INCLUDING LINKS/ TIES/ STIRRUPS.
8. GRADE OF CONCRETE FOR ALL R C C WORK IS M25
9. NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED AT ANY SECTION, LAPS CLOSE TO THE MID SPAN IN BOTTOM BARS & CLOSE TO SUPPORTS IN TOP BARS SHALL BE AVOIDED.
10. INDICATES TOP BARS
    INDICATE BOTTOM BARS
    OPENING IN STRUCTURAL ELEMENT
11. ALL R.C.C. TO BE MACHINE MIXED, VIBRATED AND CURED THOROUGHLY AS PER I.S. 456 - LATEST.
12. ALL FOOTING ARE CENTRALLY PLACED WITH RESPECTED TO THE CENTRE LINE OF COLUMN.
13. REINFORCEMENT SHALL BE PROVIDED IN TWO LAYERS WHEREVER FOUND NECESSARY WITH SPACER BAR TO BE PROVIDED BETWEEN TWO LAYERS OF REINFORCEMENT AS PER IS:456.

14. ALL DIMENSIONS MUST BE CHECKED WITH ARCHITECT'S DRGS. & IN CASE OF ANY DISCREPANCY ACHITECTS DRGS, SHALL PREVAIL.
15. ALL CONSTRUCTION JOINTS SHALL BE APPROVED BY CONSULTANT ON THE BASIS OF SCHEME PREPARED BY CONTRACTOR.
16. TOP AND BOTTOM EXTRA BARS IN BEAMS TO EXTEND BEYOND THE FACE OF SUPPORT AS SHOWN IN DRG UNLESS OTHERWISE SHOWN.
17. THE FIRST STIRRUPS IN BEAMS SHALL BE AT A DISTANCE OF 50MM FROM THE JOINT FACE THE SPECIAL CONFINING BE PROVIDED REINFORCEMENT SHALL THROUGH THE JOINT AT THE GIVEN SPACING IN COLUMNS.
18. ALL ANGLES ARE RIGHT ANGLES UNLESS OTHERWISE SPECIFIED.
19. PROVIDE DIST STEEL OVER EXTRA TOP BARS 8ϕ @200 c/c (0")
    8ϕ@200C/C(0")
20. BLACK COTTON SOIL IF ENCOUNTERED IN FDN PITS SHALL BE FULLY REMOVED.
21. ALL LOOSE POCKETS OF SOIL BELOW FOUNDATION SHALL BE FILLED WITH P.C.C. 1:2:4
22. A SAFE BEARING CAPACITY 100 kN/sqm HAS BEEN CONSIDERED FOR FOUNDATION AT THE DEPTH OF 2.0M BELOW N.G.L.
23. ALL SUSPENSION OR CONSTRUCTION WORKS SHALL BE DONE BY ENGINEER IN CHARGE.
24. ANY DISCREPANCY IN EXECUTION OF WORK ASBSTS OR NOT DONE AS PER STRUCTURAL DRAWING WILL BE TOTALLY RESPONSIBLE OF ENGINEER IN CHARGE.

CLIENT -

GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -

OPTCL, ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -	DRAWING NUMBER -
OVER HEAD WATER TANK	ST-09

SCALE -

DESIGNED BY -

DATE -

Architects -

SPACE ARCH
ARCHITECTS:ENGINEER:PLANER
206,JAYADEV VIHAR, BHUBANESWAR

AR. D.K.PARIDA
REGD NO. CA/84/17260

14.03.2022
Professor
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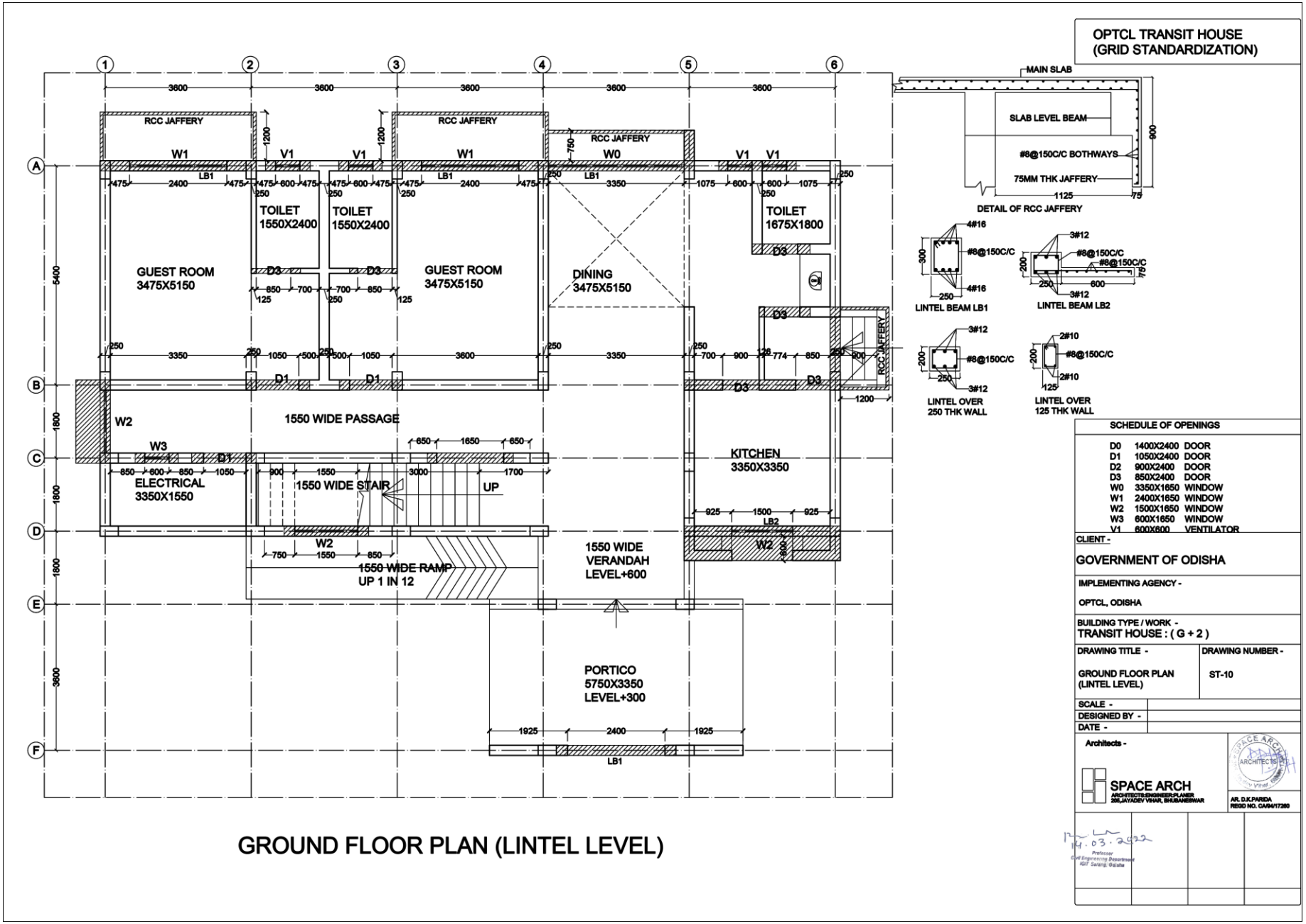
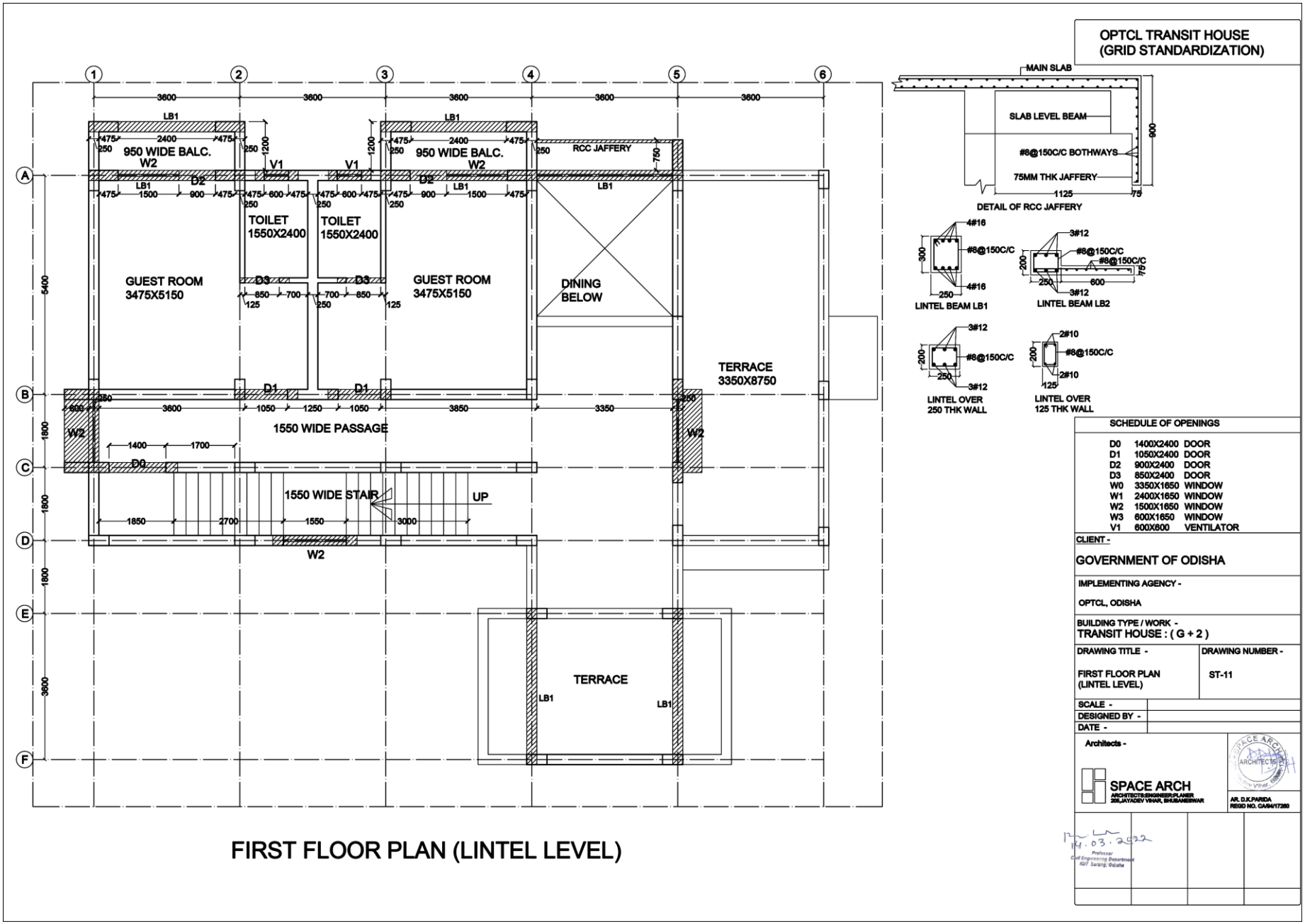
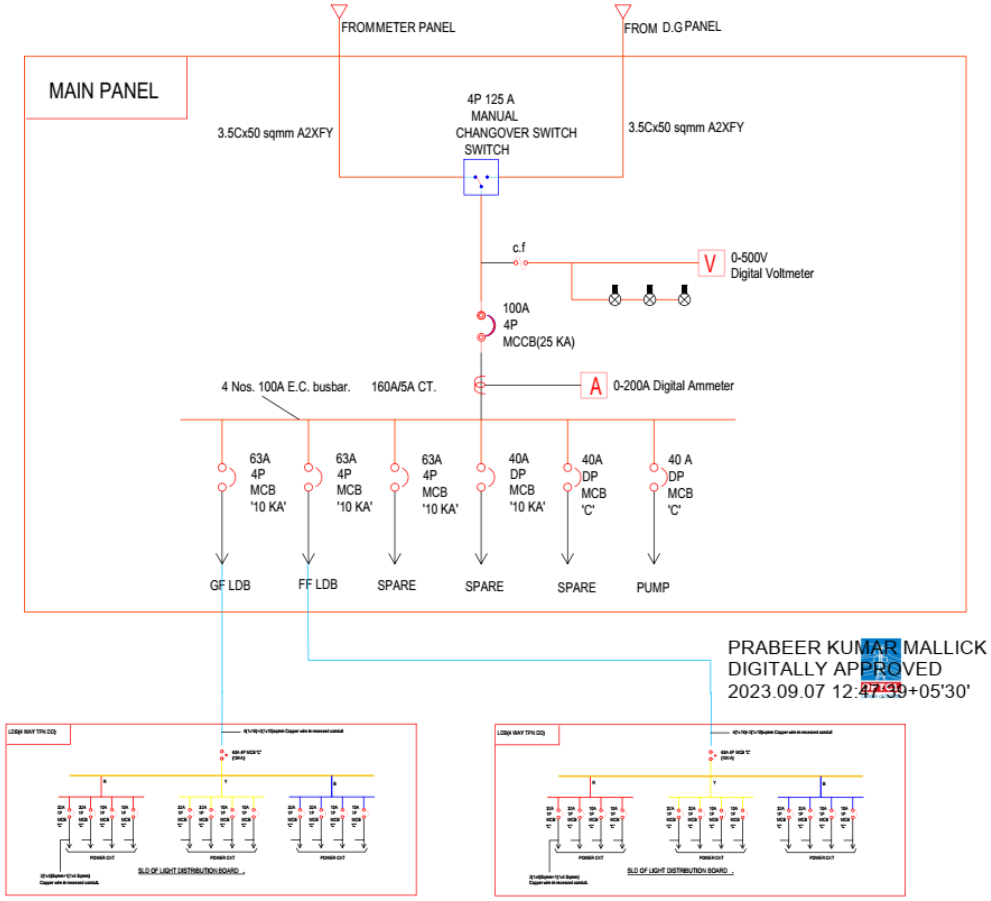


GROUND FLOOR PLAN (LINTEL LEVEL)



FIRST FLOOR PLAN (LINTEL LEVEL)



NOTES:

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2. COPY RIGHTS RESERVED.
3. ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
4. ALL DIMENSION ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
5. TREAD IS 300,RISER IS 150 AND HEAD ROOM HT. IS 2400
6. NORMAL HEIGHT OF EACH FLOOR IS 3300
7. ANY DOUBT AND DISCREPANCIES SHOULD BE CLARIFIED FROM THE OFFICE BEFORE IMPLEMENTATION.
8. FOR ALL OTHER DETAIL REFER OTHER SHEETS.
9. ANY MODIFICATIONS OR CHANGES SHALL BE INTIMATED.

CLIENT -
GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -
OPTCL ,ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE

DRAWING TITLE -
SLD ELECTRICAL
TRANSIT HOUSE

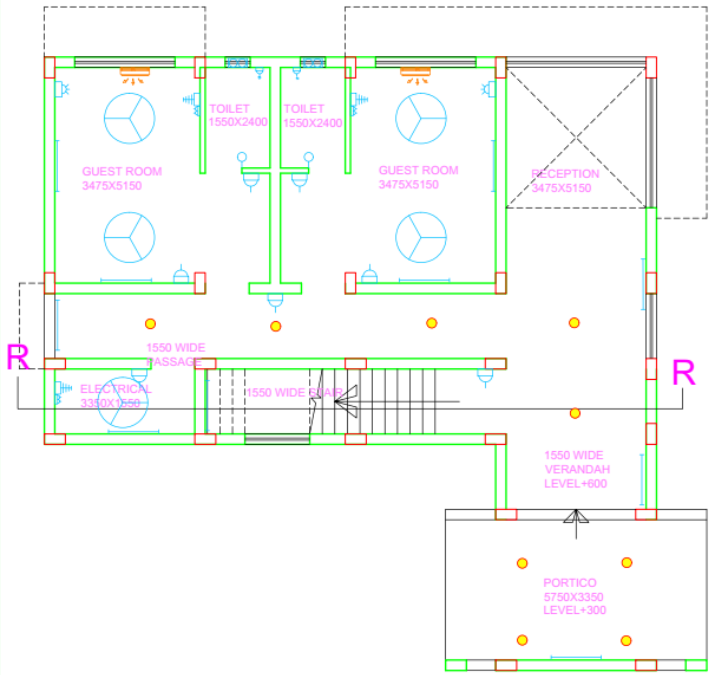
DRAWING NUMBER -
ELE-02

SCALE -

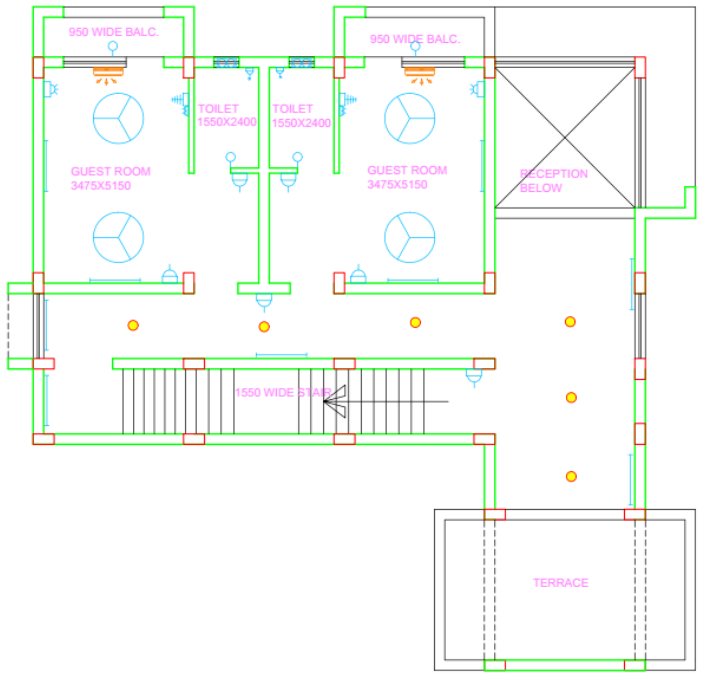
DESIGNED BY -

DATE -

Architects -
SPACE ARCH
ARCHITECTS ENGINEERS PLANNER
AR. D.K.PARIDA
REGD NO. CA/94/17269



GROUND FLOOR PLAN



FIRST FLOOR PLAN

PRABEER KUMAR MALLICK
DIGITALLY APPROVED
2023.09.07 12:47:04 +05'30'

STATEMENT OF AREAS

GROUND FLOOR AREA	166 SQM
FIRST FLOOR AREA	142 SQM
TOTAL	308 SQM

OPTCL TRANSIT HOUSE

SCHEDULE OF ELECTRICAL FITTINGS

	CEILING FAN
	20 WATT LED TUBE LIGHT
	18 WATT LED RECESSED
	EXHAUST FAN
	6A SOCKET WITH SAME BOARD
	15A SOCKET WITH 15A SWITCH
	TV POWER
	TV ANTENA
	18 WATT LED RECESSED
	GRYSER POINT
	AC POINT

ELECTRICAL NOTE

1.Drawing is to be read inconjuction of all other architectural drawings.
2. P.V.C. conduit should be of HMS quality and minimum 20mm dia.
3. Execution is to be carried out as per I.S specifications.
4. All the dimension mentioned in the legend and height notes. It may change according to site conditions.
5. BED room of all switch board in side Table to be placed at height of 900 mm above the floor height
6. The main switch board to be placed right side of near the entrance at the height of 1200 mm above the floor height.
7. Pantry and toilet of all switch board to be placed at height of 1200 mm above the floor height.
8. A sample room to be approved before comprehensive execution.

CLIENT -
GOVERNMENT OF ODISHA

IMPLEMENTING AGENCY -
OPTCL ,ODISHA

BUILDING TYPE / WORK -
TRANSIT HOUSE : (G + 2)

DRAWING TITLE -
GROUND & FIRST FLOOR PLAN
ELECTRICAL PLAN

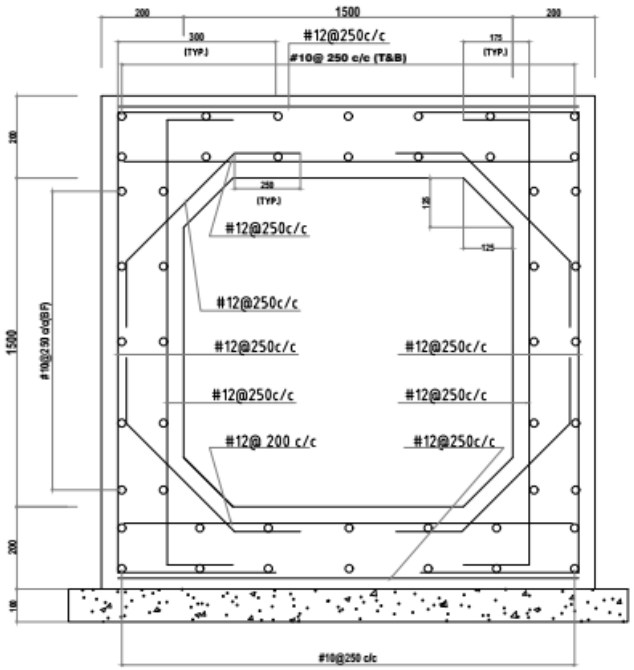
DRAWING NUMBER -
ELE-01

SCALE -
DESIGNED BY -
DATE -

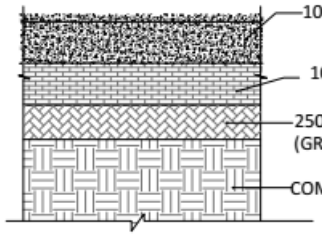
Architects -
SPACE ARCH
ARCHITECTS/ENGINEER/PLANER
38/LAYADEV VIHAR, BHUBANESWAR
AR. D.K.PARIDA
REGD NO. CA/94/17260

BOX CULVERT

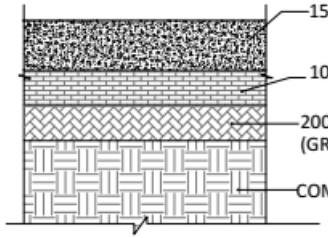
INDICATIVE DRAWING



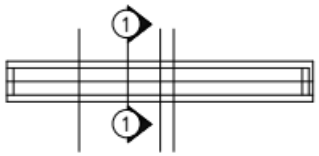
SECTION OF BOX-CULVERT



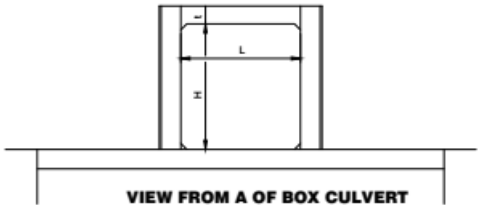
TYPICAL SHOULDER OF CARRIAGE WAY SECTION (CONCRETE ROAD)



TYPICAL INTERNAL CARRIAGE WAY SECTION (CONCRETE ROAD)



PLAN OF BOX-CULVERT



VIEW FROM A OF BOX CULVERT

CHECKED BY	SIGN	DATE

NOTES:

1. The grade of concrete to be used in the construction is M25.
2. The grade of Steel to be used in the Construction is FE500D.
3. Clear cover for different elements shall be as follows unless until specified:
   Foundation: 50mm(2"), Column: 40mm(1 1/2"), Beam : 25mm(1") , Slab: 20mm (3/4")
4. Lap of bars shall be staggered and the length may be equal to 50d , d=dia. of the bar used.
5. This Drawing shall be read in conjunction with all other drawings.

JOB No.:	NAME	SIGN	DATE
DSN			
DRN			
CHD			
APD			

TITLE: **CC Road & Box-Culvert drawings**

SCALE

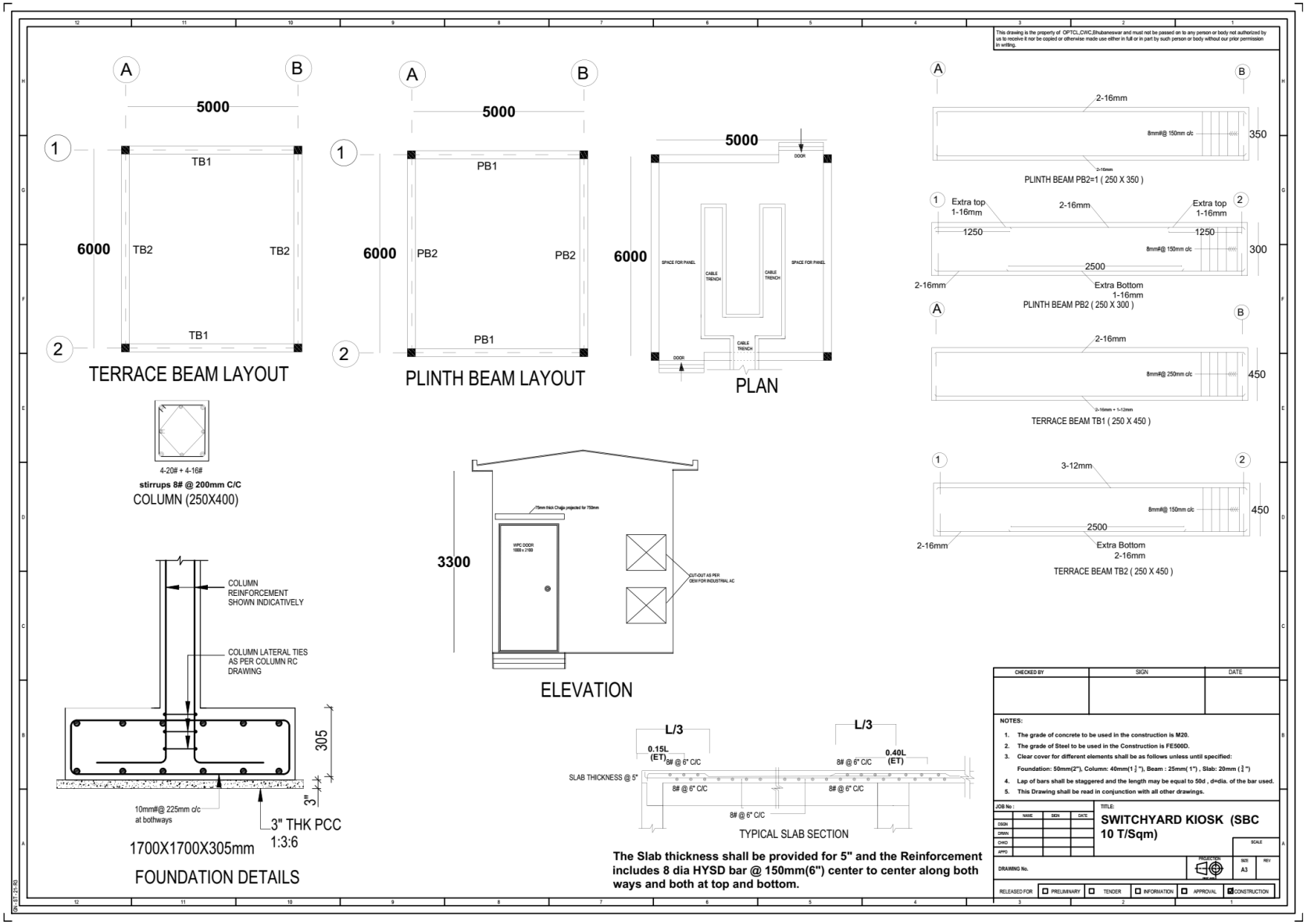
DRAWING No.

SIZE A4 REV

RELEASED FOR ☐ PRELIMINARY ☐ TENDER ☐ INFORMATION ☐ APPROVAL ☒ CONSTRUCTION

SWITCHYARD KIOSK

INDICATIVE DRAWING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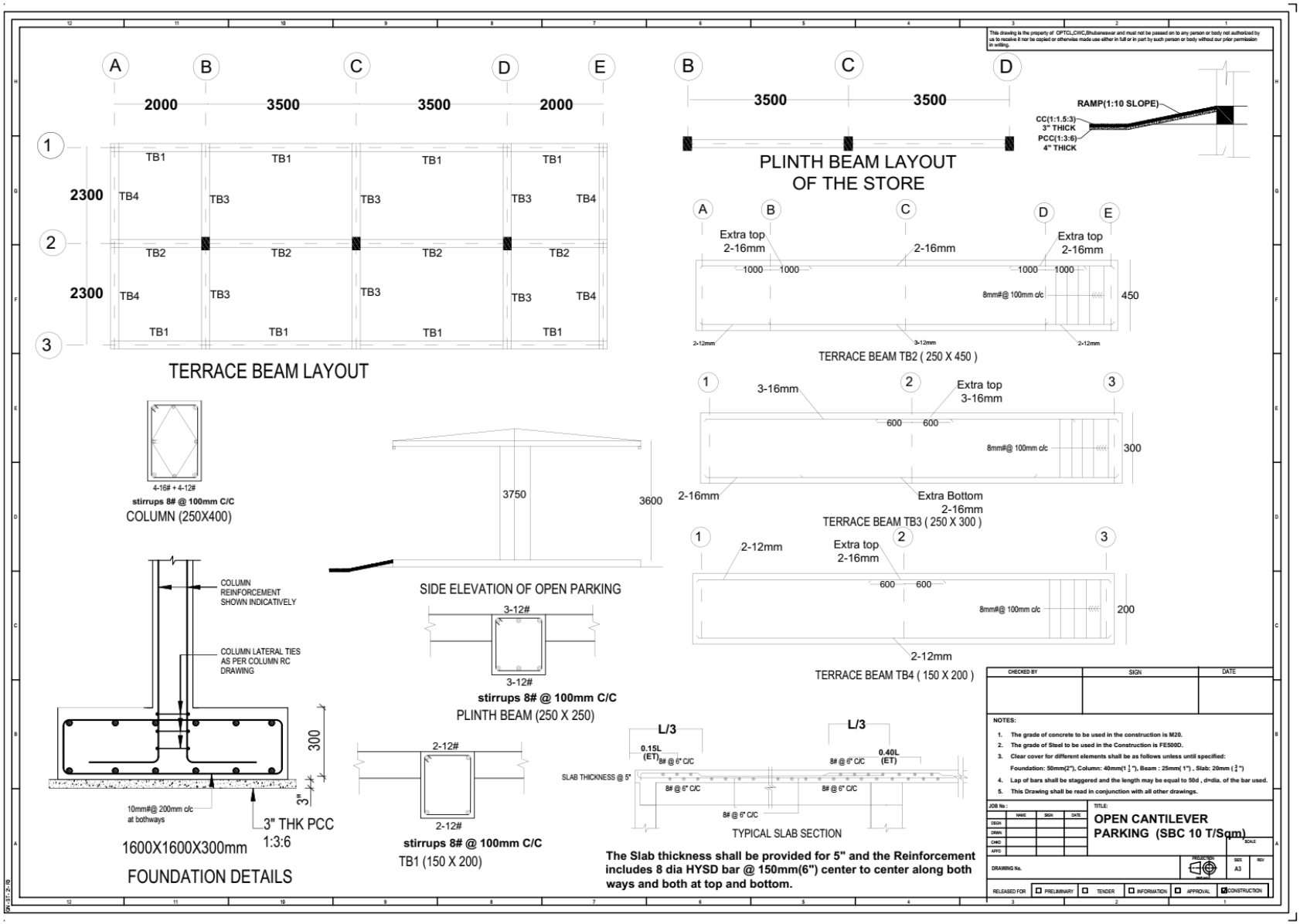
5000
6000
TB1
TB2
TERRACE BEAM LAYOUT
PB1
PB2
PLINTH BEAM LAYOUT
DOOR
SPACE FOR PANEL
CABLE TRENCH
PLAN
2-16mm
8mm#@ 150mm c/c
350
PLINTH BEAM PB2=1 (250 X 350)
Extra top 1-16mm
1250
2500
Extra Bottom 1-16mm
300
PLINTH BEAM PB2 (250 X 300)
8mm#@ 250mm c/c
450
TERRACE BEAM TB1 (250 X 450)
3-12mm
TERRACE BEAM TB2 (250 X 450)
4-20# + 4-16#
stirrups 8# @ 200mm C/C
COLUMN (250X400)
3300
WPC DOOR 1000 x 2100
CUT-OUT AS PER OEM FOR INDUSTRIAL AC
ELEVATION
COLUMN REINFORCEMENT SHOWN INDICATIVELY
COLUMN LATERAL TIES AS PER COLUMN RC DRAWING
305
3"
10mm#@ 225mm c/c at bothways
3" THK PCC 1:3:6
1700X1700X305mm
FOUNDATION DETAILS
L/3
0.15L (ET)
0.40L (ET)
8# @ 6" C/C
SLAB THICKNESS @ 5"
TYPICAL SLAB SECTION
The Slab thickness shall be provided for 5" and the Reinforcement includes 8 dia HYSD bar @ 150mm(6") center to center along both ways and both at top and bottom.
CHECKED BY
SIGN
DATE
NOTES:
1. The grade of concrete to be used in the construction is M20.
2. The grade of Steel to be used in the Construction is FE500D.
3. Clear cover for different elements shall be as follows unless until specified:
Foundation: 50mm(2"), Column: 40mm(1 ½ "), Beam : 25mm(1") , Slab: 20mm (¾ ")
4. Lap of bars shall be staggered and the length may be equal to 50d , d=dia. of the bar used.
5. This Drawing shall be read in conjunction with all other drawings.
JOB No :
TITLE:
SWITCHYARD KIOSK (SBC 10 T/Sqm)
DESIGN
DRAWN
CHKD
APPD
SCALE
DRAWING No.
SIZE A3
REV
RELEASED FOR
PRELIMINARY
TENDER
INFORMATION
APPROVAL
CONSTRUCTION

PARKING SHED

INDICATIVE DRAWING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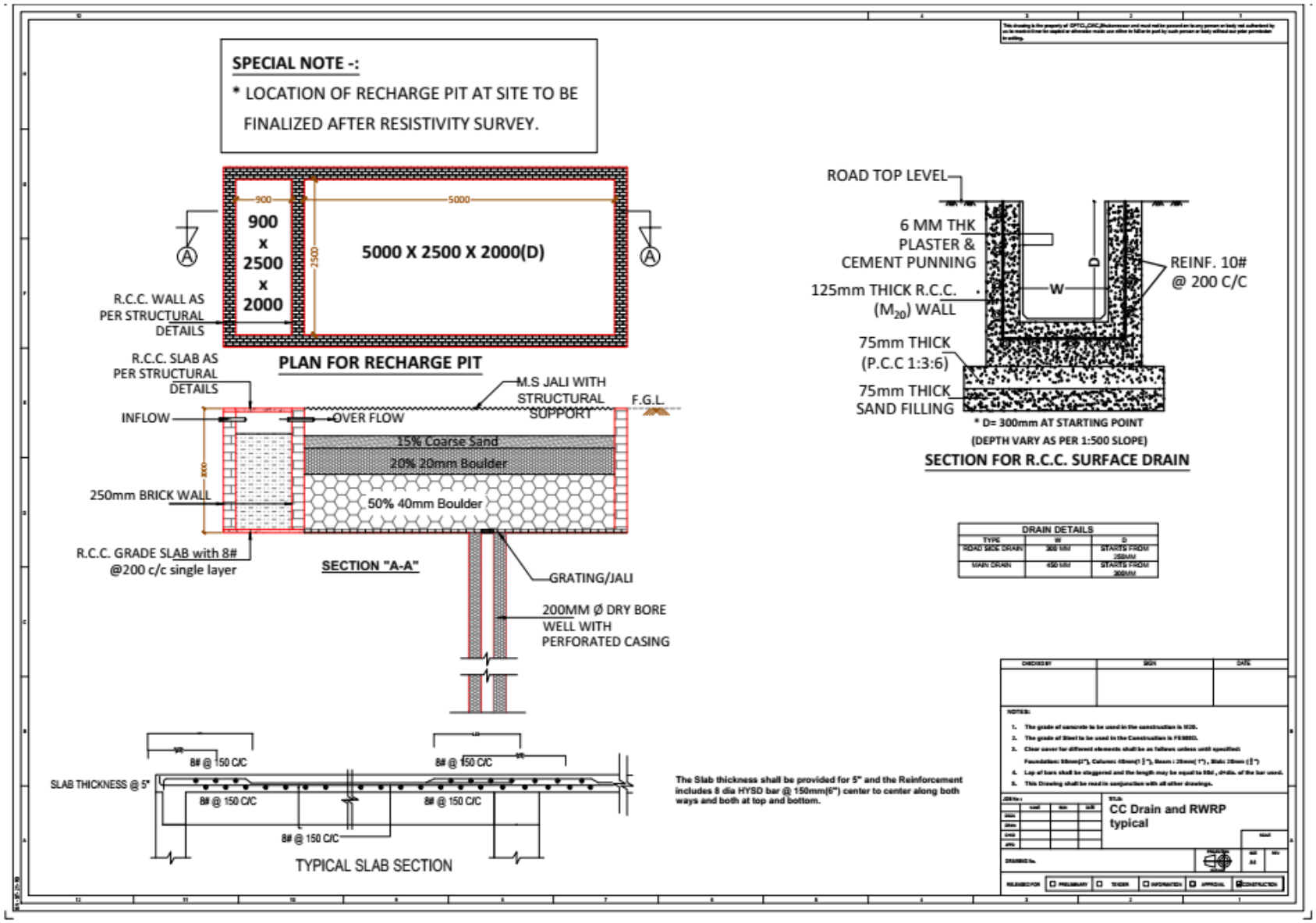
A B C D E
2000 3500 3500 2000
1 2 3
2300 2300
TB1 TB2 TB3 TB4
TERRACE BEAM LAYOUT
B C D
3500 3500
PLINTH BEAM LAYOUT OF THE STORE
RAMP(1:10 SLOPE)
CC(1:1.5:3) 3" THICK
PCC(1:3:6) 4" THICK
Extra top 2-16mm
2-16mm
1000 1000
8mm#@ 100mm c/c
450
2-12mm
3-12mm
TERRACE BEAM TB2 (250 X 450)
3-16mm
Extra top 3-16mm
600 600
300
2-16mm
Extra Bottom 2-16mm
TERRACE BEAM TB3 (250 X 300)
2-12mm
Extra top 2-16mm
200
TERRACE BEAM TB4 (150 X 200)
4-16# + 4-12#
stirrups 8# @ 100mm C/C
COLUMN (250X400)
3750
3600
SIDE ELEVATION OF OPEN PARKING
COLUMN REINFORCEMENT SHOWN INDICATIVELY
COLUMN LATERAL TIES AS PER COLUMN RC DRAWING
300
3"
10mm#@ 200mm c/c at bothways
3" THK PCC 1:3:6
1600X1600X300mm
FOUNDATION DETAILS
3-12#
stirrups 8# @ 100mm C/C
PLINTH BEAM (250 X 250)
2-12#
stirrups 8# @ 100mm C/C
TB1 (150 X 200)
L/3
0.15L (ET)
0.40L (ET)
8# @ 6" C/C
SLAB THICKNESS @ 5"
TYPICAL SLAB SECTION
The Slab thickness shall be provided for 5" and the Reinforcement includes 8 dia HYSD bar @ 150mm(6") center to center along both ways and both at top and bottom.
CHECKED BY
SIGN
DATE
NOTES:
1. The grade of concrete to be used in the construction is M20.
2. The grade of Steel to be used in the Construction is FE500D.
3. Clear cover for different elements shall be as follows unless until specified:
Foundation: 50mm(2"), Column: 40mm(1½"), Beam : 25mm(1"), Slab: 20mm (¾")
4. Lap of bars shall be staggered and the length may be equal to 50d , d=dia. of the bar used.
5. This Drawing shall be read in conjunction with all other drawings.
JOB No :
TITLE:
OPEN CANTILEVER PARKING (SBC 10 T/Sqm)
DESIGN
DRAWN
CHKD
APPD
NAME
SIGN
DATE
SCALE
DRAWING No.
SIZE A3
REV
RELEASED FOR
PRELIMINARY
TENDER
INFORMATION
APPROVAL
CONSTRUCTION

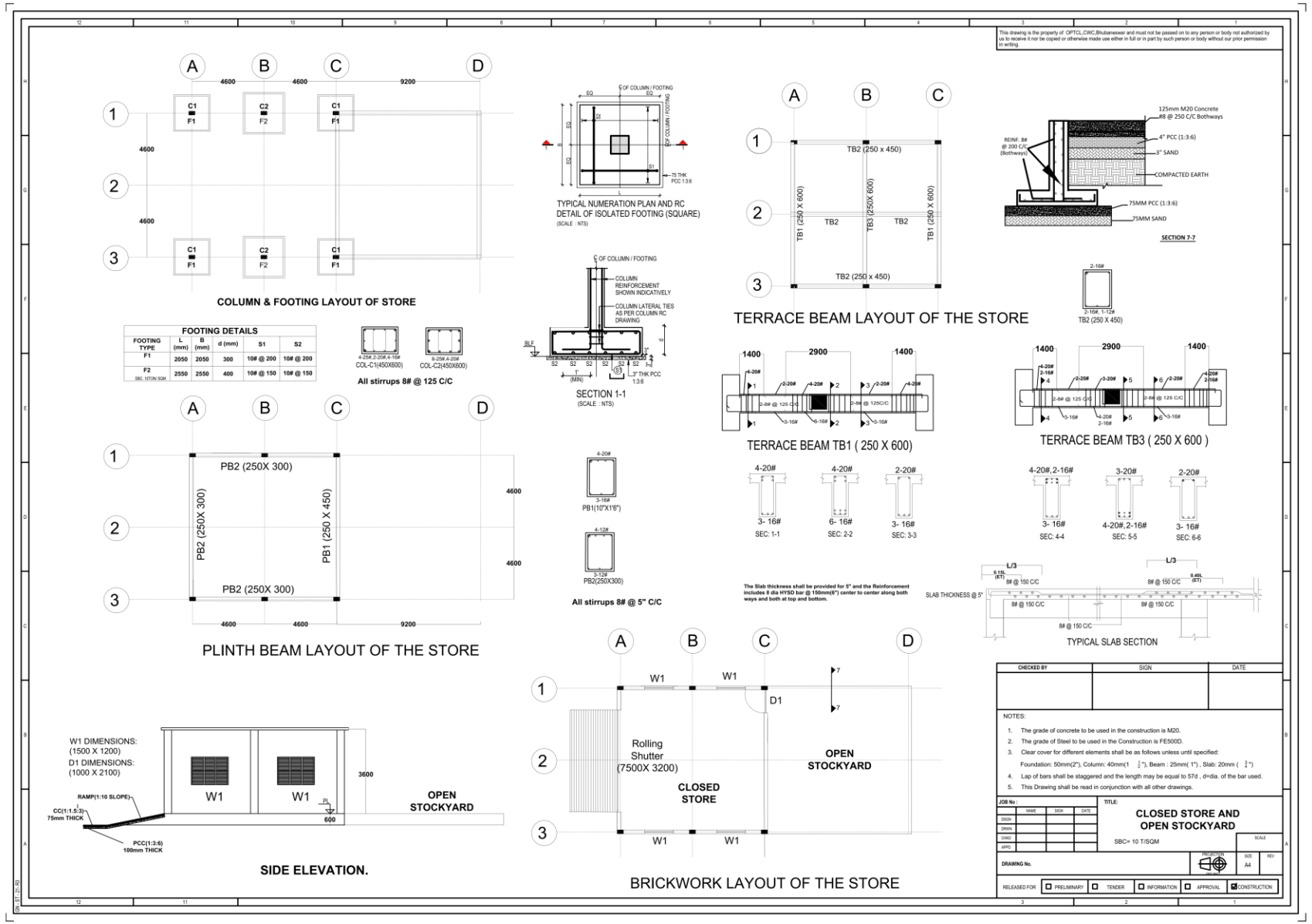
DRAIN & RAIN WATER RECHARGE PIT

INDICATIVE DRAWING


SPECIAL NOTE -:
* LOCATION OF RECHARGE PIT AT SITE TO BE FINALIZED AFTER RESISTIVITY SURVEY.
900 x 2500 x 2000
5000 X 2500 X 2000(D)
R.C.C. WALL AS PER STRUCTURAL DETAILS
PLAN FOR RECHARGE PIT
R.C.C. SLAB AS PER STRUCTURAL DETAILS
M.S JALI WITH STRUCTURAL SUPPORT
F.G.L.
INFLOW
OVER FLOW
15% Coarse Sand
20% 20mm Boulder
50% 40mm Boulder
250mm BRICK WALL
R.C.C. GRADE SLAB with 8# @200 c/c single layer
SECTION "A-A"
GRATING/JALI
200MM Ø DRY BORE WELL WITH PERFORATED CASING
8# @ 150 C/C
SLAB THICKNESS @ 5"
TYPICAL SLAB SECTION
The Slab thickness shall be provided for 5" and the Reinforcement includes 8 dia HYSD bar @ 150mm(6") center to center along both ways and both at top and bottom.
ROAD TOP LEVEL
6 MM THK PLASTER & CEMENT PUNNING
125mm THICK R.C.C. (M_{20}) WALL
REINF. 10# @ 200 C/C
75mm THICK (P.C.C 1:3:6)
75mm THICK SAND FILLING
* D= 300mm AT STARTING POINT
(DEPTH VARY AS PER 1:500 SLOPE)
SECTION FOR R.C.C. SURFACE DRAIN
DRAIN DETAILS
TYPE
ROAD SIDE DRAIN
MAIN DRAIN
STARTS FROM 250MM
STARTS FROM 300MM
NOTES:
1. The grade of concrete to be used in the construction is M20.
2. The grade of Steel to be used in the Construction is FE500D.
3. Clear cover for different elements shall be as follows unless until specified:
4. Lap of bars shall be staggered and the length may be equal to 50d , d=dia. of the bar used.
5. This Drawing shall be read in conjunction with all other drawings.
CC Drain and RWRP typical

STORE SHED & OPEN STOCKYARD

INDICATIVE DRAWING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COLUMN & FOOTING LAYOUT OF STORE
FOOTING DETAILS
FOOTING TYPE | L (mm) | B (mm) | d (mm) | S1 | S2
F1 | 2050 | 2050 | 300 | 10# @ 200 | 10# @ 200
F2 SBC: 10TON/SQM | 2550 | 2550 | 400 | 10# @ 150 | 10# @ 150
COL-C1(450X600)
COL-C2(450X600)
All stirrups 8# @ 125 C/C
TYPICAL NUMERATION PLAN AND RC DETAIL OF ISOLATED FOOTING (SQUARE)
(SCALE : NTS)
SECTION 1-1
(SCALE : NTS)
TERRACE BEAM LAYOUT OF THE STORE
TB2 (250 x 450)
TB1 (250 X 600)
TB3 (250X 600)
TB2 (250 X 450)
125mm M20 Concrete
#8 @ 250 C/C Bothways
4" PCC (1:3:6)
3" SAND
COMPACTED EARTH
75MM PCC (1:3:6)
75MM SAND
SECTION 7-7
TERRACE BEAM TB1 (250 X 600)
TERRACE BEAM TB3 (250 X 600)
SEC: 1-1
SEC: 2-2
SEC: 3-3
SEC: 4-4
SEC: 5-5
SEC: 6-6
PLINTH BEAM LAYOUT OF THE STORE
PB2 (250X 300)
PB1 (250 X 450)
PB1(10"X18")
PB2(250X300)
All stirrups 8# @ 5" C/C
The Slab thickness shall be provided for 5" and the Reinforcement includes 8 dia HYSD bar @ 150mm(6") center to center along both ways and both at top and bottom.
TYPICAL SLAB SECTION
SLAB THICKNESS @ 5"
W1 DIMENSIONS:
(1500 X 1200)
D1 DIMENSIONS:
(1000 X 2100)
RAMP(1:10 SLOPE)
CC(1:1.5:3)
75mm THICK
PCC(1:3:6)
100mm THICK
OPEN STOCKYARD
SIDE ELEVATION.
Rolling Shutter
(7500X 3200)
CLOSED STORE
OPEN STOCKYARD
BRICKWORK LAYOUT OF THE STORE
CHECKED BY
SIGN
DATE
NOTES:
1. The grade of concrete to be used in the construction is M20.
2. The grade of Steel to be used in the Construction is FE500D.
3. Clear cover for different elements shall be as follows unless until specified:
Foundation: 50mm(2"), Column: 40mm(1 1/2"), Beam : 25mm(1"), Slab: 20mm (3/4")
4. Lap of bars shall be staggered and the length may be equal to 57d , d=dia. of the bar used.
5. This Drawing shall be read in conjunction with all other drawings.
JOB No :
TITLE:
CLOSED STORE AND OPEN STOCKYARD
SBC= 10 T/SQM
DRAWING No.
SIZE A4
RELEASED FOR
PRELIMINARY
TENDER
INFORMATION
APPROVAL
CONSTRUCTION