



Technology Manual

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1.0 ACTIVITY: SAFETY AND HOUSEKEEPING

1.1 KNOWLEDGE OF ACTIVITY

Minimum Requirements for Safety

- Personnel are to be aware of what is required of them
- Areas of responsibility are defined and lines of communication are clear
- People take that responsibility seriously and take the appropriate action when they see or foresee a problem
- Be familiar with codes of practices and be able to implement them
- Review internal procedures (i.e. check lists) and use them
- Don't allow the use of scaffold or scaffolding practices on site that you would not be happy using yourself
- Think Safety and Work Safely

1.1.1 THINK SAFETY

To achieve “zero accident” site, the following precautions and protective equipment are necessary:

Personal Protective and Life Saving Equipment

Personal protective equipment (PPE) includes articles such as eye, face, head and extremity protection; protective clothing; respiratory devices; protective shields; and barriers for mechanical, chemical, or other workplace environmental hazards. Head protection. Protective helmets (hard hats) must be worn by employees who work in areas where there is a possibility of head injury from impact, falling or flying objects, or electricity. Hearing protection. Hearing protection must be worn when noise levels cannot be reduced by engineering or other means. Eye and face protection. Eye and face protection must be used to protect against physical, or chemical agents. Protection must be reasonably comfortable, fit snugly, and not unduly interfere with employee movement. Employees whose vision requires the use of spectacles, shall be protected by goggles Use eye goggles/ protective cover on face while hacking, welding, glass cutting, chipping or drilling operations	Respiratory protection. Construction sites must have a written plan for procedures to select and use respirators. Respirators must be regularly cleaned and disinfected, stored properly, and inspected. Users must be properly trained in selection, use, and maintenance of respirators. Safety belts and lifelines. If safety belts, lifelines, and lanyards have been used for in-service loading, they must immediately be removed for service in employee safeguarding. Ensure that these personnel at all times are secured to the building. Safety nets. Safety nets must be provided if workplaces are higher than 25 feet above the surface and where ladders, scaffolds or other safety equipment is impractical. Workers over or near water. Life jackets or buoyant work vests must be provided to employees where the danger of drowning exists. These must be inspected for defects before and after each use.
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- Workers below 18 years of age should not be allowed to work at site
- When workers on the construction site are exposed to vertical drops of 6 feet or more, provide fall protection in one of three ways before work begins:
 - Placing guardrails around the hazard area.
 - Deploying safety nets.
 - Providing personal fall arrest systems for each employee. The belts should be always tied above the person.

- Openings in the slab should be barricaded / closed at all levels. For high rise building use safety nets at appropriate locations. Clear the debris fallen on the net once in 2 days. Also, tighten the net, once in a fortnight.
- Do not allow work in vertical alignment at edges, stairwell, and lift well or other openings in the slab without close supervision.
- Secure working platform planks with ropes to the scaffolding. The thickness of the working platform if in wood should not be less than 2". Check the planks for splits.
- Place scaffolding on firm even ground and check periodically (twice a week). Get the scaffolding checked for potentially weaker zones and horizontal bracing. Supports through toilet ventilators get inadvertently removed while tiling and do not get replaced.
- Dowel rods should not be left naked at the body level. It is good practice to cover them with thick hessian cloth and POP.

TRENCHES

- Trenches 5 feet deep or greater require a protective system. Trenches 20 feet deep or greater require that a registered professional engineer design the protective system.

PROTECTIVE SYSTEMS FOR TRENCHES

- Sloping protects workers by cutting back the trench wall at an angle inclined away from the excavation.
- Shoring protects workers by installing wooden, aluminium, hydraulic or other types of supports to prevent soil movement.
- Shielding protects workers by using trench boxes or other types of supports to prevent soil cave-ins.

SAFETY INSTRUCTIONS

- Inspect trenches at the start of each shift, following a rainstorm or after any other hazardous event.
- Test for low oxygen, hazardous fumes and toxic gases before entering a trench.
- Keep heavy equipment and excavation spoils at least two feet away from the trench edge.
- Provide stairways, ladders, ramps or other safe means of access in all trenches 4 feet or deeper.
- Use strong and well-secured ladders for access. Maintain ladders free of oil, grease and other slipping hazards. Tie the top end of the ladder securely.
- Use industrial safety pin & plugs. Use insulated & safely secured electrical conduits for transmission.
- Periodically test the lifting machinery such as cranes and hoists, and lifting gear such as ropes and shackles.
- Inspection and rectification of access facilities such as scaffolds and ladders.
- Provide adequate artificial lighting wherever natural light is inadequate.
- Provide appropriate fire fighting equipment at potentially hazardous locations. Check fire-fighting equipment for date of expiry and ensure that all are conversant to use them.
- Remove wooden shavings from carpentry yard every day.
- Use face mask, hand gloves & eye protection while handling chemicals.
- Take measures to control the menace of mosquito, flies, rodents, snakes, termites, bees etc.
- Keep first aid kit and snake bite kit in the site for emergencies and train as many people as possible to use them.
- Avoid lady workers working in potentially dangerous locations like sloping roofs.

SAFETY TRAINING AND EDUCATION

- Conduct mock emergency drill once in a month to streamline the systems of fire fighting, attending a minor injury, or taking a person with serious injury to the nearest hospital.
- Educate workers on safe work practices on a regular basis. Emergency escape procedures, evaluation plans and emergency escape route shall be well-defined.
- Keep a uniform pace of work and train workers to be always on alert.
- Names of persons or departments who can be contacted in case of emergencies should be displayed.
- Use adequate safety signs around the site to warn workers of potential danger.
- Water sources like sumps to be covered or barricaded.
- Good housekeeping of materials through proper method of stacking avoids accidents.

1.1.2 HOUSEKEEPING

- Provide dustbin in common areas.
- Clean debris accumulated regularly. Keep the site clean at all times.
- Provide dust bins of capacity 150 litres per 5000sft of built up area.
- Collect debris at a common point (debris yard) that is easily accessible to a tractor cum trailer. Shift the debris on a daily basis.
- Stack materials required at site neatly, and away from heavy traffic areas.
- Dedicate a team for house keeping and supervise their works on a daily basis. After structure is completed, allocate one person per 20,000 Sft of floor area for house keeping. During the construction of structure allocate one person per 30,000 Sft of floor area for the same purpose.
- Preliminary cleaning is to be done by the concerned contractor/ tradesman. The housekeeping squad should do the general cleaning and carting of debris.
- Stack granite slabs properly on level ground using MS stands to maintain balance on both sides.
- Provide temporary doors with locks at entrances of apartments to reduce the area of liability for cleaning.
- In apartments, the sand shifted for masonry / Plastering or filling should be stacked in a remote corner of the room with blocks circumventing the edges. The spreading of sand due to human movement is avoided.
- Smoking, chewing tobacco is strictly prohibited at site.
- Impose heavy penalty as a deterrent if the person is found littering, doing nuisance at site or not observing safety regulations.
-

1.2 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

ENSURE THE FOLLOWING

1.2.1 PERSONNEL

- Wearing of safety helmets absolutely mandatory. Ensure entire construction site is **hard-hatted**.
- Safety/ warning boards at vantage points to ensure the above.
- Wearing of safety belts is compulsory.
- Wearing of safety goggles and ear plugs for people working on shearing / grinding machines.
- Wearing of gloves for all dangerous activities.
- Wearing of gum boots during concreting.
- Provision of stretcher and first aid kit on each site (for emergencies).

1.2.2 BARRICADING

- Trenches are barricaded at 1m from the edge and to a height of 1m.
- All staircases must be barricaded.
- All lift shafts must be barricaded immediately after deshuttering.
- Solid barricading in necessary areas with tape barricading done in additional areas.

1.2.3 LIGHTING

- Entire site should be floodlit with halogen lamps.
- Lighting on top priority on all staircase areas.
- Lighting of all cellars.
- Lighting in all material storage areas except where diesel and petrol is stored.

1.2.4 FIRE EXTINGUISHERS

- Fire extinguishers provided in
- Site office
- Diesel & Petrol (POL) storage areas
- Store for Wooden items/ Carpentry yard
- Paint storage areas
- Instruction manual of fire extinguishers on-site.
- Training of Project manager and at least 5 site supervisory personnel by suppliers.
- Expiry date of fire extinguishers and regular inspection to form a part of the Annual Maintenance Contract (AMC).

1.2.5 CLEANLINESS ON SITE

- Access roads to site and office always to be maintained free
- Stack all materials to a height of 1.5m only
- Stack cement bags up to 10 bags high only
- Stack all H-frames cleanly
- Clear all debris and debris yard at regular intervals
- Introduction of visible safety/ warning boards on site, such as below:

STOP

**WEARING OF HELMETS
MANDATORY ON SITE**

**DO NOT ENTER WITHOUT A
HELMET**

STAY AWAY

HOIST AT WORK

1.2.6 CHECK POINTS WITH THE PROJECT MANAGER

- Personnel working on grinding machines should use proper safety gear.
- Operations of electric saw cum planing machines should be protected sufficiently. Most electric saws' are delivered along with the planing devices. It is noticed that when the saw is in action, the planing devices are open and vice versa. This poses extreme danger to all operations.

Therefore, the following guidelines should be adhered to:

- Proper wooden/ metal cover to the saw blade at all times
 - Proper cover to planing device
 - When not in use, the cutting devices should be covered after duly cleaning them
- Provision of one fire extinguisher is essential

Check Lists

- Internal checklists are there for your use
- Internal checklists are there for safety
- Internal checklists are there for saving time
- Internal checklists are there for saving money

CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: SAFETY AND HOUSEKEEPING				
Project:				Date:
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
1	Is the general status of safety and orderliness in the area maintained?	☐	☐	
2	Are the workers wearing their helmets and safety belts when required?	☐	☐	
3	Are all openings (shafts, doors, balconies) and cut outs safely barricaded or covered?	☐	☐	
4	Is the staircase area barricaded?	☐	☐	
5	Is the toilet area inspected daily for cleanliness?	☐	☐	
6	Is the ladder access area on the floor safely accessible and the ladders checked for damage?	☐	☐	
7	Are all the floor tiles/ granite/ marble properly covered to avoid damages?	☐	☐	
8	Is the cleaning taking place on a daily and orderly manner?	☐	☐	
9	Are the debris being cleared on a daily basis and moved out of the site?	☐	☐	
10	Are the trenches and excavations properly barricaded?	☐	☐	
11	Is the construction material properly stacked or removed to a collection point?	☐	☐	
12	Is barricading provided especially in the staircase opening areas?	☐	☐	
13	Is there sufficient lighting provided on site (staircase, hoist)?	☐	☐	
14	Are warning and direction signboards readable and recognizable (clean and orderly fixed)?	☐	☐	
15	Is the scaffolding safely erected, anchored to the building and properly supported at bottom?	☐	☐	
16	Is it been ensured that an orderly and safe access route to the site and all floors exits?	☐	☐	
17	Have problems/ recommendations with regard to safety, cleanliness and orderliness on site been addressed?	☐	☐	

Checked by:

 Sign
 Name
 Date

Approved by:

 Sign
 Name
 Date

2.0 ACTIVITY: GROUND DEVELOPMENT

2.1 KNOWLEDGE OF ACTIVITY

2.1.1 MARKING AND SETTING OUT

1. The setting out process must provide an accurate base for the subsequent construction process. You must be aware of the potential errors attributable to the instruments you are using and the techniques required for minimizing these effects.
2. The degree of accuracy required will depend upon the nature of the work being carried out and it is important that you recognize what can be termed "Economy of Accuracy". There is no merit in setting out the line of a road for topsoil strip to 5 mm when 150 mm would be quite sufficient. It is obvious, however, that it is not acceptable to set out a structure to an accuracy of 20 mm when prefabricated units are being used that have a tolerance of 10 mm or less.
3. Work from the whole to the part and constantly check the correctness of your own work and that of others that is based on your information. Pegs can be moved, sight rails altered or used with the wrong size of traveller, etc., with dire results if this is not done.
4. Use detailed dimensions, or calculated ones, wherever possible and avoid scaling from the plan unless all else fails, but be sure to check overall dimensions against the site.
5. Always establish permanent control marks outside the area of operations at the very earliest stage, or much detailed work may have to be repeated and overall control of the project may be lost as works proceed.
6. The most important check is "proving" the site drawings, in principle this involves checking that the structures will fit into the site in the positions shown on the drawings. Make checks to existing and proposed roads, other buildings and existing permanent features.
7. Make sure that site personnel understand the significance and importance of all marks and pegs.
8. Closing a traverse in one direction say anti-clockwise and coming back to the point of origin (clockwise) is the correct way to check the work. Closing error should be within permissible limits.

2.1.2 EXCAVATION FOR BASEMENT AND FOOTING

1. Establish Temporary Bench Marks (TBM) all round the site. Locations are decided based on visibility and permanency of TBMs. Write the Reduced Levels (RL) on the TBM. TBM should be related to an OBM (Ordinance Bench Mark) taken from the Survey of India authorities.
2. Take grid levels at 5-meter interval before the start of mass excavation. If the terrain is sloping or rolling, closer grids of 3m may be required for greater accuracy.
3. Excavate in a phased manner after proper setting out of works.
4. Keep dewatering pumps available and discharge point accessible. Keep necessary information regarding water table, periods of rainfall and flooding of site and so on.
5. Shore slopes or step cut the sides as you excavate below 1.2 meters to ensure stability of sides.
6. The combination of machinery used in terms of output and efficiency should be matched. This will ensure minimum idling time of equipment.

7. Avoid excavation after sunset. Due to poor visibility errors may occur, even under artificial lights. Again it is not safe to work under poor lighting conditions.
8. Depth of excavation is to be constantly monitored with dumpy level in relation to the TBM located around the site.
9. Plan your works to balance cutting and filling. Re-handling of excavated earth is costly and should be minimized.
10. Structural consultant should inspect the site after the required depth of excavation is achieved i.e., the bearing stratum is exposed. Immediately after inspection the bottom level of excavation is sealed with blinding.
11. Hard rock removal can be done by compressed air jackhammer, wedging, chiselling etc. Do not resort to blasting as much as possible.
12. If blasting is necessary the work should be entrusted to a certified, license holding contractor. All necessary statutory clearances should be obtained. Controlled blasting should be resorted to. Put up adequate precautionary signage during the period of blasting. All blasting works should be completed before commencing RCC works.
13. Proper arrangement for dewatering should be made whenever the excavation crosses the existing water table level.
14. Ascertain location of permanent main services like UG cable OFC, water supply, telecom lines, sewage etc. Maintain and protect these lines throughout the phase of excavation and backfilling.

2.1.3 FILLING AND COMPACTION

1. Approved material shall be used for backfilling. Soil with liquid limit exceeding 65% and plasticity index exceeding 35% cannot be used. High clay soil is not preferred for backfilling.
2. Imported fill shall be selected - graded hard granular fill with 100% free stones larger than 100mm, up to 50% passing 5mm mesh and not more than 20% passing a 75 micron sieve.
3. Compaction is done in layers of 150mm. Choose the compaction equipment based on the nature of soil

TYPE OF COMPACTION	COHESIVE SOIL	WELL GRADED GRANULAR SOIL	UNIFORMLY GRADED SOIL
EQUIPMENT			
Smooth wheeled	Suitable	Suitable	Unsuitable roller
Pneumatic tyred	Suitable	Suitable	Unsuitable roller
Vibratory roller	Unsuitable	Suitable	Suitable
Vibratory compactor	Unsuitable	Suitable	Suitable

4. Soil with organic material, construction debris, susceptible for spontaneous combustion, soft clay, and moisture content greater than optimum value to be avoided as backfill material.
5. Insitu field densities of compacted material should be 95% of maximum dry density or as specified by the consultant. Test should be conducted 10m centre-to-centre and before the antitermite treatment is done. Sand replacement method can be used to ascertain insitu field density.
6. If removal and replacement of the weak strata with strong compact material is necessary, check the compatibility of the proposed fill material with the existing chemical ground conditions.

7. The checks that need to be made before work starts include the stability and levels of the original ground or foundations at the base or top of embankments, selection of suitable fill material and the stability and profiles of side slopes.
8. The stability of slopes to cuttings and embankments (in all weather conditions) is critical to safety on site. If in doubt, the Project-in-charge must be consulted and the decisions taken to be recorded.
9. Know your soil conditions before starting any large-scale earthmoving operations.
10. Unit of measurement of backfill material should be clear before the work starts.
11. For volumetric calculations cater for 30% quantity more of loose backfill to compacted volume.

2.1.4 ANTI-TERMITE TREATMENT

1. It is the treatment to structures to protect against attack by sub-terranean termites by suitable chemical measures. The work shall be carried out by specialist pest control agency and a guarantee for satisfactory performance of treatment for a minimum of 10 years.
2. Treatment shall be carried out according to the stipulations laid down by IS 6313 part II.
3. The chemical to be used is Chloropyrifos 20% EC with ISI certification.
4. Dilute one part of Chloropyrifos 20% EC with 20 parts of water to get 1% emulsion.
5. Trained personnel should handle the chemical and proper safety precautions like facemask, handgloves, goggles, rubber boots etc. should be used. Check the wind direction before spraying. Do not face the wind and spray.
6. For horizontal and vertical surface, the dosage rate is 7.5 litre/m².
7. For along the perimeter of building insert rod at intervals of 150mm and depth 300mm and pour the chemical directly into the hole.
8. The general idea is to give continuous barrier all along the building coming in contact with soil irrespective of the material i.e. PCC, RCC or stone masonry of concrete block or bricks.

2.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work.

2.2.1 BASIC TOOLS OF THE MARKING GANG ARE:

1. Theodolite
2. Dumpy levels
3. Staff and ranging rods
4. Steel Measuring tape – 3 & 30 m
5. Plumb bobs
6. Trowels
7. Masonry nails
8. Timber pegs
9. Spirit Levels

10. Wax marking crayons
11. Linen (Fibron) tape – 30m
12. Paint and brushes
13. Optical square

2.2.2 BASIC TOOLS OF THE EARTHWORK GANG ARE:

1. Trowels
2. Pick axe
3. Line dori
4. Plumb bobs Measurement Tape
5. Pencils
6. Spade
7. Hammers
8. Brushes and buckets
9. Right angles

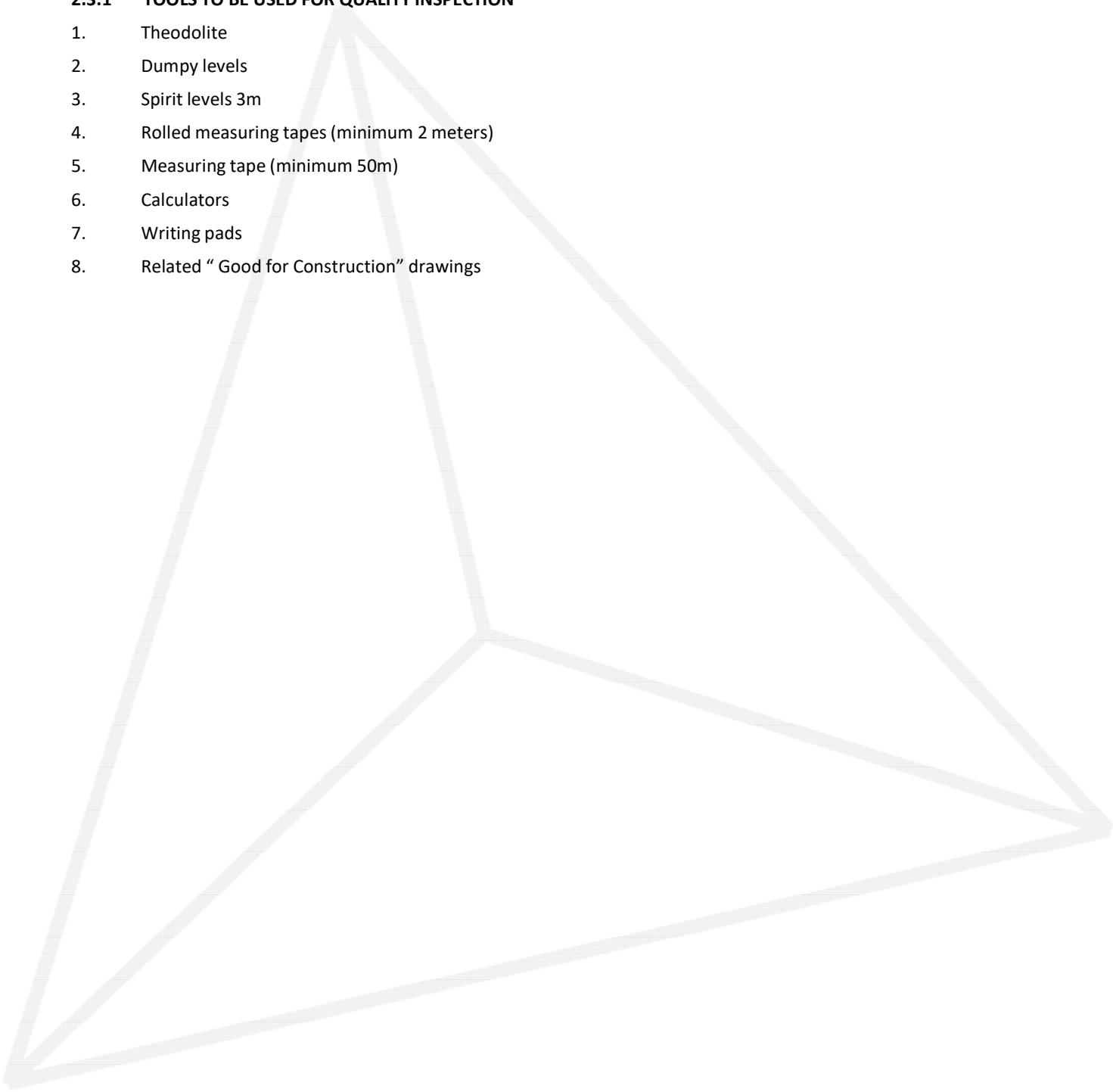
2.2.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. First check if the approved site plan exists.
2. The checks that need to be made before work starts include the stability and levels of the original ground or foundations at the base or top of embankments, selection of suitable fill material and the stability and profiles of side slopes.
3. Marking in conformance as per drawings. The centreline should be checked and certified by a marking supervisor from another site.
4. Ensure that correct area is excavated properly including the depth, length and breadth of the site using dumpy levels as per drawings. Checking of levels (random) using a dumpy level.
5. Wherever the depth of the trench is more than a meter, barricading all around the excavated site at a distance of one meter from the circumference.
6. If the slope of the excavated earth has a gradient more than 60 degrees, then ensure that the stepping /terracing is done to avoid any caving in of earth due to landslides.
7. Check up if the ground has been chemically treated for termites, or not.
8. All access routes to the sites have to be free and approachable at any point of time.
9. Visual examination of site and check for water table report. Check whether dewatering procedures have been applied on site.
10. If water table is high ensure retaining wall has been planned and the necessary waterproofing agent applied properly. **The waterproofing supervision job card should be attached.**

11. The detailed instructions should bear the signature of the consultant.

2.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Theodolite
2. Dumpy levels
3. Spirit levels 3m
4. Rolled measuring tapes (minimum 2 meters)
5. Measuring tape (minimum 50m)
6. Calculators
7. Writing pads
8. Related “ Good for Construction” drawings



CHECKLIST FOR QUALITY				
ACTIVITY: ANTI – TERMITE TREATMENT				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the area been levelled, rammed & well compacted?	[]	[]	
3	Is the treatment being carried out by a specialist agency?	[]	[]	
4	Is the chemical and method of application confirming to IS standards?	[]	[]	
5	Are the required tools and safety equipments available?	[]	[]	
CHECKS DURING EXECUTION				
6	Is the application being done by a trained personnel?	[]	[]	
7	Is the dosage of chemical on horizontal and vertical surfaces - 7.5 litre/m ² ?	[]	[]	
8	Has the chemical been poured along the perimeter of the building at specified intervals and depth?	[]	[]	
POST-EXECUTION CHECKS				
9	Has it been ensured that the treated area is protected by carrying out the relevant works ?	[]	[]	
10	Has it been ensured that the treated area is not exposed to atmosphere for a long duration?	[]	[]	

Checked by:

Sign

Name :

Date :

Approved by:

Sign

Name :

Date :

**CHECKLIST FOR QUALITY
ACTIVITY: SOLING**

Project:		Date:	
Location:			

NOTE:- Please ☐ appropriate box or enter readings as per requirements

Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Are the latest "Good for Construction" drawings available?	[]	[]	
3	Are safety measures required for the neighbouring construction activities?	[]	[]	
4	Has the filled material been properly compacted and rammed?	[]	[]	
5	Are the required tools available?	[]	[]	
CHECKS DURING EXECUTION				
6	Is the aggregate of proper grading being used?	[]	[]	
7	Does the soling aggregate used match the load to be carried?	[]	[]	
8	Has the point of height indicator been installed and if so, is the depth of soling adequate?	[]	[]	
9	Are the voids between the soling stones being filled with quarry dust?	[]	[]	
10	Has the level of soling being maintained?	[]	[]	

Checked by:

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Name :

Date :

Approved by:

Sign

Name :

Date :

CHECKLIST FOR QUALITY ACTIVITY: MARKING				
Project:		Date:		
Location :				
NOTE:- Please ☐ appropriate box or enter readings as per requirements				
Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name,date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Are the latest, approved centre line drawings available?	[]	[]	
3	Has the cleaning and levelling of the site been done?	[]	[]	
4	Has the demarcation of the plot and marking of the actual boundaries been done?	[]	[]	
5	Has the finalisation of all levels with reference to a fixed bench mark been done?	[]	[]	
6	Has the check for right angles been done?	[]	[]	
7	Are the grid pillars set out?	[]	[]	
8	Are the necessary tools available on-site?	[]	[]	
9	Has the boundary wall construction started?	[]	[]	
10	Is the area properly barricaded?	[]	[]	
CHECKS DURING EXECUTION				
11	Are the locations of footings on the specified gridlines as per drawing?	[]	[]	
12	Has the allowance for the excavation of footings shuttering been provided?	[]	[]	
13	Has the marking of structural members been properly supervised?	[]	[]	
POST-EXECUTION CHECKS				
14	Is the reinforcement and shuttering provided as per marking?	[]	[]	
15	Has the centre line distance between columns and the verticality been checked?	[]	[]	

Checked by:

Sign

Name :

Date :

Approved by:

Sign

Name :

Date :

CHECKLIST FOR QUALITY ACTIVITY: EXCAVATION				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Are the latest "Good for Construction" drawings available?	☐	☐	
3	Is the soil investigation report kept on-site?	☐	☐	
4	Have TBMs been established?	☐	☐	
5	Storage or intermediary storage identified for superficial mass of earth excavated?	☐	☐	
6	Are access routes available?	☐	☐	
7	Are trees present?	☐	☐	
8	Is it possible to deploy larger excavation machinery?	☐	☐	
9	Is a ramp for vehicular movement required?	☐	☐	
10	Has a grid line marking been done at appropriate spacing?	☐	☐	
11	Are safety measures required for the neighbouring construction activities?	☐	☐	
12	Is a First Aid kit available on site?	☐	☐	
13	Are all the requirements met for maintaining dewatering?	☐	☐	
14	Is it possible to employ water pumps?	☐	☐	
15	Does the depth to be excavated include the depth of the construction soling?	☐	☐	
16	Has the consultant inspected the site before commencement of work?	☐	☐	
17	Are the required tools available?	☐	☐	
CHECKS DURING EXECUTION				
18	Has the Block Level Register been maintained?	☐	☐	
19	Are the layout & alignment as per drawings?	☐	☐	
20	Has the required depth of cut been achieved?	☐	☐	
21	If excavation is beyond 1.25m are there steps provided?	☐	☐	
22	Has proper shoring and strutting been done in loose soils?	☐	☐	
23	Is the excavation barricaded at a distance of 1 meter?	☐	☐	
24	Has the point of height indicator been installed?	☐	☐	
25	Are the marking pillars safely barricaded or protected to avoid any disturbance of marking points?	☐	☐	
26	If blasting is necessary, is it being carried out by a certified, licensed contractor?	☐	☐	

Checked by:

Sign

Approved by:

Sign

Name :

Name :

Date :

Date :

CHECKLIST FOR QUALITY				
ACTIVITY: FILLING AND COMPACTION				
Project:		Date:		
Location:				
NOTE:- Please appropriate box or enter readings as per requirements				
Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Are the latest "Good for Construction" drawings available?	[]	[]	
3	Is the soil investigation report kept onsite?	[]	[]	
4	Are safety measures required for the neighbouring construction activities?	[]	[]	
5	Are all the requirements met for maintaining dewatering?	[]	[]	
6	Is it possible to employ water pumps?	[]	[]	
7	Does the depth of compaction account for soling?	[]	[]	
8	Are the required tools available?	[]	[]	
CHECKS DURING EXECUTION				
9	Is the compacting of the backfilled earth done by the appropriate method?	[]	[]	
10	Does the backfilling material meet the acceptable soil characteristics?	[]	[]	

Checked by:

Sign

Name :

Date :

Approved by:

Sign

Name :

Date :

3.0 ACTIVIT : MASONRY

3.1 KNOWLEDGE OF ACTIVITY

1. CHECKS PRIOR TO START OF WORK

2. Follow the latest "Good for Construction" drawings duly signed by the architect.
3. Check for any variations/deviations from the approved architectural and services drawings.
4. Use silt free (less than 5%) medium gritty clean sand for mortar.
5. Approved grade cement less than 1 month old should be used.
6. Ensure that all required tools, accessories and materials are available at the place of work.

3.1.2 CHECKS DURING SIZE STONE MASONRY

1. The stones should not be soaked in water prior to use. However, a light moistening with water may be done on the top and sides of the stones just before placing of stones in courses, so as to avoid absorption of water from the cement mortar and to ensure development of bond with the mortar.
2. Before commencing masonry work, the line out shall be carried out for the entire area using a steeltape. The dimensions shall be checked with respect to Architect's drawings and any discrepancy shall be brought to the notice of Architect.
3. The stone masonry shall be preferably laid in composite mortar with mix ratio as mentioned in specification and drawing.
4. The mortar proportions shall be either 1:4 or 1:6. The mortar when mixed shall have a slump of 75mm.
5. The thickness of mortar joints shall be 10 mm both horizontally and vertically. The mortar shall be spread over the entire top surface of the stone; (over the front and rear shells). Mortar shall not be spread so much ahead of the actual laying to avoid formation of a weak bond. The mortar shall be raked out from the joints with a trowel of each course and is laid to a depth of 10mm to 12 mm, so as to ensure good bond for the plaster.
6. The height of wall to be done in a day's work shall be restricted to 1 meter.
7. The first course of masonry shall be laid with great care, making sure that it is properly aligned, levelled and plumbed, as this will assist the mason in laying succeeding courses to obtain a straight and vertical wall.
8. The stones for this course shall first be laid dry, (that is without mortar) along a string tightly stretched between properly located corner stones of the wall in order to determine the correct position of the stones and their spacing. When the stones are set in proper position, the two corner stones shall be removed, a full mortar bed spread and these stones laid back in place truly level and plumb. The string shall then be stretched rightly along the faces of the two corner blocks and the faces of the inter-mediate ones adjusted to coincide with the line.
9. Thereafter each stone shall be removed and re-laid over a bed of mortar. After every three or four blocks have been laid, their correct alignment, level and verticality shall be carefully checked.
10. As each course is laid at the end / corner, it shall be checked for alignment and level or straight –edge to make certain that the faces of the stone are all in the same plane. This precaution is necessary to ensure truly straight and vertical walls.
11. When filling in the wall between the ends, a mason's line shall be stretched from end to end for each course and the top outside edge of each stone shall be laid to this line. The mortar joints in the masonry shall be cured for seven days. The walls shall only be lightly moistened during curing.

3.1.3 CARE AFTER MASONRY

1. After 7 days of curing of mortar joints drive a nail into the joint to test the strength of joints at random. Also look for colour variation in the mortar joints to identify problem areas.
2. Waterproofing plaster in case of retaining walls should be done for all external surfaces. Bitum touch-on and Thermocol protection is done before backfilling in layers and compacting.

3.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the masonry gang are:

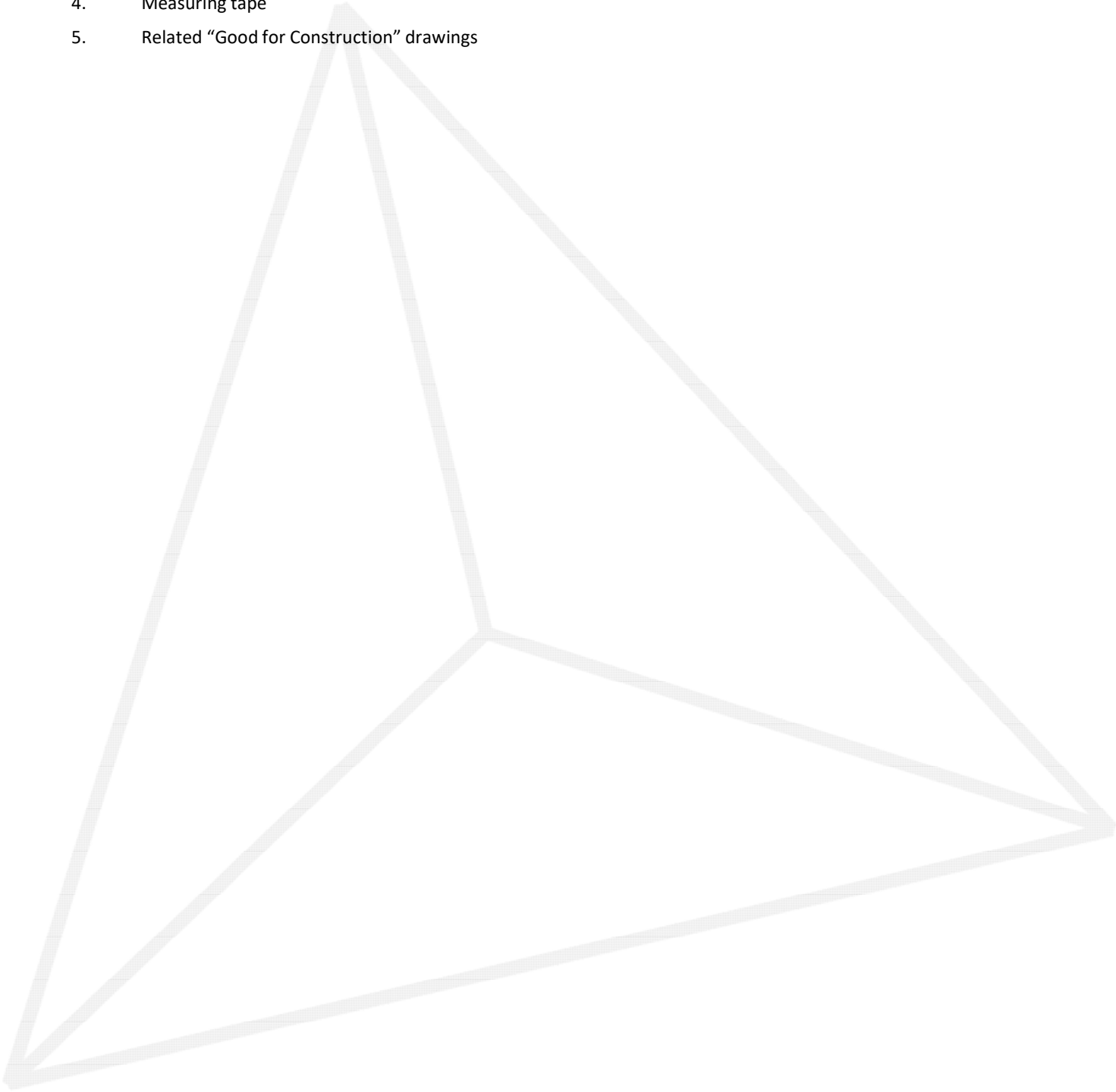
1. Trowels
2. Line dori
3. Sand Sieve
4. Tube levels
5. Plumb bobs
6. Measurement Tape
7. Spirit levels 1-2m
8. Aluminium straight edge
9. Right angle
10. Chipping Tools
11. Masons trowels
12. Masons hammer
13. Levelling threads
14. Masons brushes and buckets
15. Mortar boxes

3.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. The first course in masonry is the most important one.
2. Check if the erected wall is perfect – free from cracks.
3. Using the tape measure, ensure the diagonals are equal.
4. Check up if the corners are at right angles using the right angle template.
5. Check of joint thickness and strength after 7 days (nail test)
6. Check if proper storm water drains have been provided adjacent to peripheral / retaining SSM walls.
7. Waterproofing all around / along the building and external masonry walls 50cm above and 50cm below ground level.

3.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bobs
2. Spirit levels 3m 3.
3. Right angle
4. Measuring tape
5. Related “Good for Construction” drawings



CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: SIZE STONE MASONRY				
Project:				Date:
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Are the latest "Good for Construction" drawings available?	[]	[]	
3	Are the required number of dressed stones available?	[]	[]	
4	Have the stones been properly stacked?	[]	[]	
5	Has the required barricading and safety measures been taken?	[]	[]	
6	Is the area compatible with the drawings that are provided? Has the right depth of excavation been achieved?	[]	[]	
7	Are the stones wet and free from dust, oil and all forms of contaminations?	[]	[]	
8	Have the marking pillars been constructed and ready for reference?	[]	[]	
9	Are the required tools available?	[]	[]	
10	Is there any specific requirements of the client?	[]	[]	
11	Cement - is it of the approved grade and less than 1 month old?	[]	[]	
12	Sand - is it medium gritty, clean and silt-free (less than 5%)?	[]	[]	
CHECKS DURING EXECUTION				
13	Is the block work checked in vertical and horizontal directions?	[]	[]	
14	Is the mortar in proportion 1:5 on MS sheet using farma box?	[]	[]	
15	Has the thickness for joints been checked?	[]	[]	
16	Has raking and pointing of joints been done?	[]	[]	
17	Have weep holes been provided, if required?	[]	[]	
18	Has the procedure of not constructing more than 5 courses a day been followed?	[]	[]	
19	Is the masonry wall being erected to given specifications, to plumb and in line?	[]	[]	
POST-EXECUTION CHECKS				
20	Has the curing of masonry been done for atleast 7 days?	[]	[]	
21	Has waterproofing plaster in case of retaining walls done for all external surfaces?	[]	[]	
22	Has a nail been driven to test the strength of joint after 7 days of curing?	[]	[]	

Checked by:

 Sign
 Name
 Date

Approved by:

 Sign
 Name
 Date

4.0 ACTIVITY: FORMWORK

4.1 KNOWLEDGE OF ACTIVITY

1. Formwork is temporary support given to concrete until it gains strength to withstand its selfweight.
2. Formwork shall be so designed to support safely the worst combined effects of all loads within acceptable dimensional tolerance and without causing bulging or deflection. Formwork should be:
3. Strong enough to bear the self-weight of formwork, wet concrete, reinforcement, and dynamic effects of placing and compacting, construction traffic and wind load.
4. Water tight to avoid grout loss.
5. Easily removable without any damage and should be re-usable.
6. It should be dimensionally accurate and give the desired finish to the contact surface.
7. Always use staging of MS tubes with timber runners. The staging should be placed on hard even surface. If placed on ground compact it and use planks under the base plate to distribute load. Base plates should not be placed on concrete blocks or bricks, which are likely to get crushed when wet.
8. Staging shall be true, rigid and thoroughly braced, shuttered and propped.
9. To achieve desired rigidity ample studs, braces, bolts, spacer blocks and stay wire to be given to avoid distortion.
10. Check the shuttering work for vertical and horizontal alignment, level, surface cleanliness, water tightness, and ability to withstand loads without distortion.
11. Scaffolding: At the ground level, walk round the perimeter of the scaffold and check for o Subsidence of the ground o Cavities underneath sole plates o Dislocation of base plates
12. Rectify with adjustable base plates or fill with concrete.
13. Do not use Casarino poles/ Bamboo as struts or supports.

Guardrails and toe boards

Both guardrails and toe boards should be fixed to the inside of the outer standards and remain in position before decking is removed. Guardrails should be fitted at not less than 0.9m and not more than 1.15m above the decking. Toe boards should be at least 150mm high above the decking and the clear spacing between the guardrails and the boards should not exceed 0.75m.

Formwork oil

The formwork oil basically serves the purpose of a separation medium. It acts as an intermediary that avoids any damage to the concrete. It also helps keep the formwork clean and ensures easy maintenance. The application of oil should be done with the help of foam or a similar soft medium and should be applied within 48 hours prior to concreting.

- Machine oil or used oil is totally unsuitable and is unacceptable at any cost due to the chemical reaction this type of oil has on concrete. Clefts created will have a telling effect on the external and internal plastering, with the plastering tending to peel off.
- It is recommended to use formwork oil of a reliable manufacturer. There are also alternative sources available that serve the purpose, which maybe an expensive proposition e.g., Natural oils such as Rapeseed oil, Sunflower oil, etc.
- All spans in excess of 5 meters for beams and slabs should be kept within a pre camber of 2mm per 1 meter. For cantilever, give a camber at the end of span of 4mm per 1 meter.

- The quality of finished concrete is dependent on the quality of formwork.
- Erection of casing and shifting of formwork shall be done under the personnel supervision of a competent foreman.
- Striking time for formwork is as follows under normal conditions.
Walls, Columns, Starters etc – 24 hours
Slab (span < 6mts) – 7 days
Beam (span < 6mts) – 14 days
Beam (span > 6mts) – 21 days
Props to cantilever – 28 days
- For balcony and other rib beams, duct beams support should be continuous for at least 3 floors. Due to weather conditions if the concrete is not sufficiently hardened, the striking time to be extended after discussing with the project in charge.
- Obtain the 7th day cube test result before the removal of formwork.

4.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the shuttering gang are:

1. Shuttering material - Props, Cup locks, C-clamps, Base plates, U-heads, Tie rods, Acro-spans, Runners, Jacks and Column boxes
2. Hammer
3. Line dori
4. Hand saw
5. Spirit levels
6. Tube levels
7. Plumb bobs
8. Measurement Tape
9. Aluminium straight edge
10. Right angle
11. Chipping Tools
12. Crowbar

4.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check the shuttering work for surface cleanliness, water tightness, and ability to withstand loads without distortion. Stability, safety, dimensional correctness, levels and alignment are the key factors.
2. Check for plumb and parallelism using 1m / 2m spirit level to the formwork at various points.
3. All formwork in the periphery of the building to be plumb.
4. For all required cut outs and shaft openings:
 - Are as per drawings
 - Inner right angles at all 4 corners checked using right angle template
 - Check of diagonals using a measuring tape
 - Curved Cornices – checked visually and using a compass spirit level

5. In case of slab formwork, supports to be perfect. The formwork should be supported by wooden wedges and not fixed by nails (because the wedges are movable and provide manoeuvrability)
6. All supports to plinth beams should be provided with a runner, as load distribution is uniform.
7. All window bands to be cast using plaster hooks.

4.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Measuring tape
2. Spirit levels 2 -3m
3. Compass spirit level
4. Aluminium straight edge 2 -3m
5. Right angle template
6. Dumpy level
7. Theodolite
8. Related “ Good for Construction” drawings

**CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: FORMWORK**

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
2	Are the latest "Good for Construction" drawings available?	☐	☐	
3	Is adequate quantity of shuttering material available?	☐	☐	
4	Has the required barricading and safety measures been taken?	☐	☐	
5	Are safety measures required for the neighbouring construction activities?	☐	☐	
6	Is the area compatible with the drawings that are provided?	☐	☐	
7	Has the shuttering material been properly cleaned before use?	☐	☐	
8	Is the foam strip around the column starter in place to avoid slurry leakages?	☐	☐	
9	Does the level of the slab and beam shuttering correspond to the levels given in the drawing?	☐	☐	
10	Has the shuttering been checked for proper fixing and sufficient support for concreting?	☐	☐	
11	Is the shuttering checked for vertical and horizontal alignment?	☐	☐	
12	Are the required tools available?	☐	☐	
13	Are the beam bottoms of inverted beams fixed at right angles?	☐	☐	
14	Are all the required cut outs and shaft openings in place and checked for correct measurement?	☐	☐	
15	Have the peripheral areas and cut outs been provided with sufficient cover blocks?	☐	☐	
16	Is the brown tape in place and the oil properly applied?	☐	☐	
17	Is the deshuttering time as per specification and done in an orderly and safe manner?	☐	☐	
18	Has the consultant inspected the formwork before concreting?	☐	☐	

Checked by:
Sign

Approved by:
Sign

Name :

Name :

Date :

Date :

5.0 ACTIVITY: REINFORCEMENT

5.1 KNOWLEDGE OF ACTIVITY

5.1.1 GENERAL INSTRUCTIONS

1. Start reinforcement works with proper "Good for Construction" drawings and general specifications as issued by the consultant.
2. Make a stage-wise BBS (Bar Bending schedule) on the computer before indenting for steel.
3. IS codes such as IS 456, IS 1786, IS 2502, SP 34 should be available at site office at any given time for ready reference.
4. Earmark the reinforcement work yard and stack yard. Care should be taken to ensure accessibility for trailers and availability of sufficient working space.
5. In case of extreme site constraints, the cutting and bending can be done elsewhere and transported to site.

MATERIALS

1. Mild steel bar should comply with IS 432.
2. Cold worked steel high strength deformed bars should comply with IS 1786.
3. Steel weighment should be done at site by the storekeeper by taking it to the nearest weigh bridge.
4. Stack steel 300 mm clear of ground on SSM walls.
5. Stack steel - Grade wise, consignment wise, diameter wise and length wise.
6. Protect stored steel from rusting, oil, grease and distortion.
7. Ensure Mill Certificate is delivered with each load.
8. Binding wire shall be 16 - gauge soft annealed iron wire or 18 gauge GI annealed wire.
9. Collect the rings used for bundling rods in bags and store them.
10. Cut pieces/ scrap should be stored separately in an enclosed area with dunnage.
11. If steel is going to be exposed to weather for a long time, give cement wash to protect it from corrosion.
12. Surface rusting is good as it ensures proper bonding and should not be a cause of worry.
13. Steel is tested for its chemical and physical properties. Chemical tests check for the Carbon, Sulphur and Phosphorous content, while the physical tests check the Ultimate tensile strength,
14. Elongation, Bend and Re-bend test.
15. Test frequency should be as per ISO procedure manual of SDPL.

5.1.3 CUTTING BENDING AND PLACING REINFORCEMENT

1. Cut the rods economically to reduce wastage as per the BBS. Start laying rods only after shuttering is totally cleaned and oiled and checked for levels etc.
2. Pitted, deformed, defective, corroded, cracks; splits on bend bars should not be used and rejected, removed from site.
3. Neither the size nor length of the bars should vary with respect to drawings.
4. Tolerance for cutting of reinforcement = +75 or -25mm
5. Bending Tolerance = +0 or -10mm
6. Bar spacing = + or - 10mm
7. Take extreme care while bending steel already cast partially in concrete so as not to damage the
8. concrete around the bars.
9. All laps should be 50d or as specified.

10. Laps are staggered and not more than 33% of bars shall be lapped in a particular section.
11. Mechanical splicing and welding of rods should be done only after proper details and instructions are available from the structural consultant.
12. At time of concreting, reinforcement shall be free from mud, oil, grease, mortar dropping, mill scale or other foreign matter.
13. Give spacer blocks in CM 1:2 and cured for at least 7 days immersed in water.
14. Give spacers as per specifications. Generally 15mm for slab, 25mm for beam and 40mm for the footing is provided. It depends on the maximum size of aggregate, the reinforcement size and the element concreted.
15. Proper end bearing of rods with required development length are the main points to check.
16. Chairs should be placed as last operation before concreting to avoid distortion of top rod due to traffic.
17. Check if dowels for columns, beams and slabs are given correctly and is of required minimum length.
18. For slab reinforcement, the structural consultant should check and certify each work before concreting.
19. Highlight areas of reinforcement congestion and get the bar arrangement revised to facilitate easy flow of concrete all around.
20. Spacer bars shall maintain vertical distance between successive layers of bars.
21. Binding wire ends after tying should be turned inside and should not stick out to the surface.
22. Work should be neat, correct as per drawing and specification. A separate engineer with prior experience in reinforcement works is required to supervise works.
- 23.

5.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of thereinforcement gang are:

1. Binding wire
2. Twisters and tongs
3. Long handle Steel cutters
4. Crowbar
5. Measurement Tape
6. Levers of varying sizes
7. Marking stick and chalk
8. Chipping tools
9. Hammer

5.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Steel Mill Certificate is delivered with each load
2. Adherence to reinforcement detail as per drawings in
 - Sunken areas
 - Inverted Beams
 - Columns
3. Cover blocks for the above
4. Check overlapping wherever possible
5. Check Binding wires – whether joints are properly bound
6. Check for chairs and their disturbance due to movement of labour
7. Columns to be checked for plumb. Check for plumb by holding the spirit level to the formwork atvarious points.
8. Protruding reinforcement in the balcony and other areas to be checked for parallelism using spiritlevels before and after concreting. Supports need to be checked.
9. Dowels to be checked for adequate number and strength. Wherever walkways, or staircases orbalconies are connected, dowels to be inspected by the structural consultant before concreting.

5.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bob
2. Spirit levels – 1.5m – 2m levels
3. Measuring tape
4. Screw gauge
5. Related “Good for Construction” drawings

CHECKLIST FOR QUALITY				
ACTIVITY: REINFORCEMENT				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
2	Are the latest "Good for Construction" drawings available?	[]	[]	
3	Is the area prepared for starting reinforcement (shuttering complete, cleaned, oiled, and taped)?	[]	[]	
4	Are test results of bars available at site before starting the fabrication work?	[]	[]	
5	Has the required barricading and safety measures been taken?	[]	[]	
6	Is the area to be reinforced compatible with the drawings that are provided?	[]	[]	
7	Are the required tools available at site to ensure correct work?	[]	[]	
8	Is the reinforcement kept ready on wooden runners to keep them clean?	[]	[]	
9	Is the reinforcement free from oil, mud, grease and other forms of contamination?	[]	[]	
10	Is the overlapping ensured and the laps are staggered?	[]	[]	
11	Has the anchoring been checked?	[]	[]	
12	Are the dowels for columns, beams and slabs in place and checked for proper length?	[]	[]	
13	Are the required hooks fixed and is the chair height for the upper layer of reinforcement correct?	[]	[]	
14	Is the reinforcement done as per specification and drawing?	[]	[]	
15	Are cover blocks provided and fixed in a systematically correct manner and as per specifications?	[]	[]	
16	Have beam and column joints checked for sufficient cover blocks?	[]	[]	
17	Is the lock set properly mixed and the reinforcement turned into the fresh lock set?	[]	[]	
18	Has the consultant inspected the reinforcement before the concreting has started?	[]	[]	
19	Has adequate lap lengths been provided for all the column bars?	[]	[]	
20	Is the steel scrap and the rings used for bundling collected in a safe place to avoid any accidents?	[]	[]	

Checked by:
Sign

Approved by:
Sign

Name :

Name :

Date :

Date :

6.0 ACTIVITY: CONCRETING

6.1 KNOWLEDGE OF ACTIVITY

6.1.1 INGREDIENTS CEMENT

1. Use appropriate grade of cement as recommended by the consultant and confirming to IS 456:2000.
2. Manufacturers test certificate should accompany each consignment and cement should be consumed within 1 month of their manufacturing date.
3. Cement should be stored properly in stacks not more than 10 bags, clear from the walls by 1 meter and protected at all time from moisture. However, do not wrap the bag with polythene sheets, sweating may occur.
4. Identify each lot / consignment of cement and follow a first in first out (FIFO) method of issue of bags.
5. Each consignment of cement should be tested in-house for consistency, setting time, and strength.

AGGREGATE FOR CONCRETE

1. For RCC works coarse aggregates confirming to IS 383 and IS 2386 having maximum size of 20mm and down.
2. It should be obtained from crushed granite, trap, and basalt quarry. It should be chemically inert, rounded or angular in shape and free from dust, foreign matter and not thin, porous, laminated or flaky.
3. Fine aggregate shall be gritty sand with FM range between 2.6 to 3.2, silt content should not be more than 5% and there should be no traces of salt. Aggregate with specific gravity less than 2.6
4. should not be used.
5. If dirty, wash sand before use. Sand should be clear of organic materials.

WATER

1. Water should be clean, fresh and free from oil, acid, alkali and organic matter.
2. Potable water is considered good for concreting and curing.
3. IS 456:2000 gives permissible limits of solids.

ADMIXTURES

1. Use of admixture / additive should be done only after obtaining technical clearances from
2. technical consultant.
3. Dosage, point of application, the desired results should be clearly understood.
4. Accelerators, retarders, plasticizers, integral-waterproofing compound are the additives commonly used.
5. Expiry date of the chemical should be checked before use.

6.1.2 MIXING OF CONCRETE

IN-SITU MIXING

1. Ensure adequate stock of all ingredients of concrete i.e., cement, aggregate, water and any admixture if used for the day's work.
2. Use calibrated farma (calibration done once in a month) for measurement or in case of weigh batching, use a weigh batcher machine.
3. Charge the rotating drum with 25% of required water to rotate 3-4 times.
4. Generally 20 to 25 litres is recommended for 1 bag of cement. The water cement ratio is kept 0.4 to 0.5. The moisture content of aggregates has to be checked at frequent intervals

5. Load the hopper with $\frac{1}{2}$ the coarse aggregate followed by $\frac{1}{2}$ the fine aggregate. Above this the entire quantity of cement should be spread. Then half the quantity of fine aggregate followed by balanced coarse aggregate should be loaded. This type of sandwiching is done to avoid spilling of cement while discharging into the drum. Immediately after loading the drum balance quantity of water is added.
6. The drum should be rotated for at least $1\frac{1}{2}$ to 2 minutes. The rotation of the drum is about 15 to 20 revolutions per minute.
7. If plasticizer is used, one litre of water should be held back. Add requisite quantity of plasticizer to the water and mix it thoroughly. This mixture is poured into the drum after the drum has rotated for about one minute. The drum should be rotated for at least 1 minute after adding the plasticizer mixture to ensure proper dispersion.

Minimum cement content per cum of concrete is as given below:

Grade	Characteristic strength after 7 days (N/mm ²)	Characteristic strength after 28 days (N/mm ²)	Minimum cement content per Cum	Minimum cement content per Cum
M10	7	10	220	kgs
M 15	10	15	280	kgs
M 20	13.5	20	320	kgs
M 25	17	25	360	kgs
M 30	20	30	390	kgs

8. No grade below M 20 shall be used for RCC works.
9. Concrete should be placed in position and compacted within half an hour of mixing of the same.
10. Always keep a supervisor on the mixer to monitor the works.
11. Use large bandlies, wheelbarrows, hoist machine to expedite transporting process. Wet the surface of the carrier to avoid moisture loss due to adsorption.
12. Be careful to avoid segregation and wastage during transportation. In case of segregation, remix the concrete before placing.
13. Concrete by vision should be homogeneous in colour, well graded, fluffy and it should form a shape of ball when rounded in

6.1.3 BATCHING PLANT MIX (RMC)

1. Preference for ready-mix concrete from reputed companies possessing automated batching plant, of at least 30 cum per hour capacity supported by adequate number of transit mixers.
2. The logistics should be worked out so as to receive at least 1 load of 6 cum every 10 to 15 minutes.
3. Check the empty transit mixer for preset concrete in the drum. Preset quantity affects the quantum of concrete received.
4. Concrete should be received with a delivery challan and data cycle sheet showing grade, quantity, water cement ratio, slump, cement content, time of manufacturing, dosage of additive added, weight of various ingredients of concrete.
5. Go through the cycle data before accepting the concrete.
6. Do not accept concrete after 3 hours of mixing.
7. Do not recharge the concrete by adding additive, water, cement without prior permission from the project in-charge.
8. Slump recommended for RMC mix is 100mm to 125mm
9. Place the concrete pump on horizontal, hard even surface and keep the approach area free of materials to facilitate easy manoeuvrability of transit mixers. The approach should not slope towards the concrete pump.
10. The horizontal section of pipe should be at least 7 metres before the vertical bend is put.
11. Reduce the length of pipe to the minimum to reduce frictional losses and excessive strain on the pump.
12. The pipeline should be independently supported on vertical segment and not on the shuttering.

13. The vibrations due to pumping should not affect or displace shuttering works.
14. Pump rich slurry (one bag) before pumping concrete to lubricate the inner surface of the pipes.
15. In case of intermittent supply keep the current transit mixer unloading in progress until the next mixer arrives at site. This avoids choking of pipeline due to non-pumping for long duration. Avoid reverse stroke to clear a choke. The fluid gets flushed out and the problem gets compounded.
16. Do not bend the flexible end pipe by more than 135° while concreting.
17. In constricted areas do not unload directly from the pipe. Use bandly and mumty to shift and place concrete in such areas.
18. Be excessively careful while passing the ball while clearing the concrete in the pipeline after the day's work is over. Due to negligence somebody could get hurt.
19. Employ professional hands for connecting pipeline. They will do a neater and faster job without any safety problems.
20. Leave the pipeline, under the pump and adjacent areas clean of concrete dumping after the work is completed.

6.1.4 PLACING AND COMPACTION

1. Do not use chutes longer than 4.5m or inclined at more than 45° to horizontal to pour concrete.
2. Place cement concrete to the required depth and vibrate it until entrapped air inside concrete is released.
3. Pour concrete first into beams and then over the slab portion.
4. BOND NEW CONCRETE TO PREVIOUSLY POURED CONCRETE.
 - If the previous pour was less than 4 hours prior, the laitance film and porous layer shall be removed from the surface of previous pour.
 - If the previous pour was more than 4 hours prior but less than 30 days old observe the above process and expose aggregate with wire mesh and wash with clean water.
5. If the joint is more than a month old use bonding agents as per specification of the manufacturer.
6. If the beam is more than 500mm deep, concrete it in layers.
7. Columns, beam, slab level of concrete top should be pre-marked before start of concreting works.
8. Check the slab level during concreting with line dori method and also the levelling instrument.
9. Use appropriate needles for vibration depending on the aggregate size, reinforcement spacing and element to concrete. For big footings use 60mm needle, for slabs use 40mm needle, and for starters and precast lintels use 25mm needle. Vibrators should operate for a speed not less than 10,000 rpm. Ensure that just adequate vibration is only done. Over vibration is very bad.
10. Use wooden runner to ram so as to form slurry on top of the concrete surface.
11. Clean the shuttering works of all spilled concrete immediately after concreting.
12. Leave vertical construction joints after consultation with the structural engineer.
13. Match the vibrators, masons to the rate of concreting.
14. All surfaces of shuttering shall be moistened before placing of concrete to reduce water loss due to absorption.
15. Slab should be sprayed with water after covering with hessian cloth 3 hours after concreting, i.e. initial setting is over and ensure that hessian cloth will remain wet till ponding of water.
 - Pond water to a depth of 25mm using bunds the next day and keep water standing for 7 days at a stretch.
 - In case ponding is not possible, cover it with hessian cloth and keep it moist throughout.

16. DO NOT IGNORE CURING OF SLAB TO FACILITATE MARKING OF COLUMNS FOR THE UPPER SLAB.
17. The beam bottoms should be cleaned using high-pressure cleaners.

6.1.5 COLUMNS, WALLS AND STARTER

1. Remove the shuttering the next day and wrap with moist hessian cloth after spraying the column with water to reduce the heat of hydration.
2. The columns and walls should be cured for a minimum of 7 days.
3. Starters are to be cured for 3 days

6.1. TESTING OF CONCRETE

SLUMP TEST

1. Conduct slump cone test, one during the start, one at midday and one towards the close of day's work.
2. Again any load under suspect can be checked for slump on case-to-case basis.

CUBE TEST

1. The sample is made at point of discharge of mixture.
2. Take 3 samples after 7 days and 3 samples after 28 days strength.
3. Every 100 cum or 10 batches of concrete (whichever is smaller) should be represented by a
4. sample of test cubes.
5. For concrete manufactured at site, there must be representative samples for the day's work and for different elements like footing, slab, column and wall.
6. Test results should be discussed with the project in-charge even if the results are satisfactory.
7. In case of cube failure, the element to be identified and non-destructive test to be conducted.
 - Cube results of the RMC supplier for the same batch may be checked.

6.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the concreting gangare:

1. Trowels
2. Shovels
3. Line dori
4. Gum boots
5. Vibrator
6. Dumpy levels
7. Spirit levels 1-3m
8. Measuring tape
9. Masons trowels
10. Floating trowels
11. Screed finishing darby
12. Steel trash tracks

13. Hammer
14. Levelling trowels
15. Wheelbarrow
16. Long handle Aluminium leveller
17. Masons brushes and buckets
18. High pressure water cleaners

6.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1 Personnel

- Ensure all personnel are wearing gumboots and rubber gloves
- Ensure personnel are wearing safety belts during concreting at heights or on periphery of structures

2. Before Concreting

- Ensure base plates have been cleaned and sealed with sealing tape so that there is no leakage of slurry
- All reinforcements are in place especially chairs.
- All cover blocks damaged during reinforcement laying are replaced.
- All sunken areas (sunken beams, toilets and cut-out areas) have been properly cleaned of dust and oily substances using high-pressure water cleaners

3. During Concreting

- Ensure proper grade of concrete as recommended by the consultant is employed
- Ensure proper expansion joints as per working drawings and protected
- Check slab and beam for parallelism using spirit levels before and after concreting
- Check the top surface of fresh concrete for evenness
- Ensure sufficient compaction using correct needle size of vibrator

4. After Concreting

- Curing carried out as per guidelines
- Columns are covered with a damp hessian / jute cloth for 7 days
- Slabs – water level is maintained during ponding
- If honeycombing seen after de-shuttering, immediate touch up without delay
- Ensure the cube test results are available at the end of the term indicated

6.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

- Dumpy levels to check finished slab level
- Spirit levels 1-3m
- Measuring tape
- Plumb bob
- All related “Good for Construction” drawings

CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: PLAIN CEMENT CONCRETE P.C.C

Project:		Date:	
Location:			
NOTE:- Please ☒ appropriate box or enter readings as per requirements			
Sl. No.	To be checked	YES	NA
1	Name, date and number of the drawing		
PRE-POUR CHECKS			
2	Are the latest "Good for Construction" drawings available?	☐	☐
3	Have the required barricading and safety measures been taken?	☐	☐
4	Are the required number of cement bags available on site? (or adequate quantity of RMC been ordered)	☐	☐
5	Are the required tools available at site to ensure correct work?	☐	☐
6	Have the vibrators been checked before start of the concrete?	☐	☐
7	Are calibrated farma available for measurement (weigh batcher in case of weigh batching).	☐	☐
8	Is the platform and scaffolding material secure?	☐	☐
9	Is the necessary shuttering and reinforcement complete and in place?	☐	☐
10	Has the shuttering material been properly aligned using appropriate equipment?	☐	☐
11	Are spare hessain cloth or tarpaulin sheet available as protection from the elements?	☐	☐
12	Have the dimensions and orientation of the excavated pit been checked?	☐	☐
13	Has the pit been cleaned by removing all the loose materials?	☐	☐
14	Has the excavated pit watered and rammed for better compacted strata?	☐	☐
15	Is the surface level of the pit even?	☐	☐
16	Does the shuttering box fit in position?	☐	☐
17	Has the pit been button marked?	☐	☐
18	Has the anti-termite treatment been done?	☐	☐
19	Has the strata been checked and approved by the concerned authority?	☐	☐
CHECKS DURING EXECUTION			
20	Are all the labourers wearing gum boots while concreting?	☐	☐
21	Is the right grade of concrete being used?	☐	☐
22	Has the level of P.C.C been maintained?	☐	☐
23	Has the levelling and finishing of P.C.C done?	☐	☐
POST-POUR CHECKS			
24	Has it been ensured that hessain cloth is provided and curing done?	☐	☐
25	Has it been ensured that no loose earth has fallen on the P.C.C bed?	☐	☐

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

**CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: CONCRETING OF COLUMNS**

Project:		Date:	
Location:			
NOTE:- Please ☒ appropriate box or enter readings as per requirements			
Sl. No.	To be checked	YES	NA
1	Name, date and number of the drawing		
PRE-POUR CHECKS			
2	Are the latest "Good for Construction" drawings available?	☐	☐
3	Have the required barricading and safety measures been taken?	☐	☐
4	Are the required number of cement bags available on site? (or adequate quantity of RMC been ordered)	☐	☐
5	Are the required tools available at site to ensure correct work?	☐	☐
6	Have the vibrators been checked before start of the concrete?	☐	☐
7	Are calibrated farma available for measurement (weigh batcher in case of weigh batching)?	☐	☐
8	Is the platform and scaffolding material secure?	☐	☐
9	Is the necessary shuttering and reinforcement complete and in place?	☐	☐
10	Has the shuttering material been properly aligned using appropriate equipment?	☐	☐
11	Is the dimensional accuracy of shuttering material correct?	☐	☐
12	Have markings been made on the column dowels for concrete level?	☐	☐
13	Is the test report of cement and steel available at site office?	☐	☐
14	Has the aggregate been checked? (In case of Site – Mix)	☐	☐
15	Has the diameter and spacing of reinforcement been checked?	☐	☐
16	Have inserts through columns, if required been placed?	☐	☐
17	Has the verticality of properly supported column box been checked?	☐	☐
18	Are spare hessain cloth or tarpaulin sheet available as protection from the elements?	☐	☐
19	Has the sequence of concreting been planned and sufficient labour deployed?	☐	☐
CHECKS DURING EXECUTION			
20	Are all the labourers wearing gum boots while concreting?	☐	☐
21	Is the concrete been properly compacted with a vibrator or manually?	☐	☐
22	If the depth to be concreted is more than 500 mm, then is concreting being done in layers?	☐	☐
23	Is the right grade of cement and water-cement ratio been followed?	☐	☐
24	Are the markings on the column dowels done and a line dori being used to maintain correct concrete level?	☐	☐
25	Have the admixtures, if any been added?	☐	☐
26	Has the slump cone test been conducted on fresh concrete?	☐	☐
27	Have test cubes been cast (site lab)?	☐	☐
POST-POUR CHECKS			
28	Is curing been ensured?	☐	☐
29	Has deshuttering been done carefully without damaging the concrete surface?	☐	☐

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: CONCRETING OF BEAMS AND SLABS

Project:		Date:	
Location:			
NOTE:- Please ☒ appropriate box or enter readings as per requirements			
Sl. No.	To be checked	YES	NA
1	Name, date and number of the drawing		
PRE-POUR CHECKS			
2	Are the latest "Good for Construction" drawings available?	☐	☐
3	Have the required barricading and safety measures been taken?	☐	☐
4	Are the required number of cement bags available on site? (or adequate quantity of RMC been ordered)	☐	☐
5	Are the required tools available at site to ensure correct work?	☐	☐
6	Have the vibrators been checked before start of the concrete?	☐	☐
7	Are calibrated farma available for measurement (weigh batcher in case of weigh batching)?	☐	☐
8	Is the platform and scaffolding material secure?	☐	☐
9	Is the necessary shuttering and reinforcement complete and in place?	☐	☐
10	Has the shuttering material been properly aligned using appropriate equipment?	☐	☐
11	Is the dimensional accuracy of shuttering material correct?	☐	☐
12	Have markings been made on the column dowels for concrete level?	☐	☐
13	Is the test report of cement and steel available at site office?	☐	☐
14	Has the aggregate been checked? (In case of Site – Mix)	☐	☐
15	Has the diameter and spacing of reinforcement been checked?	☐	☐
16	In case of screed-concrete, have bull marks been installed	☐	☐
17	Are spare hessian cloth or tarpaulin sheet available as protection from the elements?	☐	☐
18	Has the sequence of concreting been planned and sufficient labour deployed?	☐	☐
CHECKS DURING EXECUTION			
19	Are all the labourers wearing gum boots while concreting?	☐	☐
20	Is the concrete been properly compacted with a vibrator or manually?	☐	☐
21	If the depth to be concreted is more than 500 mm, then is concreting being done in layers?	☐	☐
22	Is the right grade of cement and water-cement ratio been followed?	☐	☐
23	Are the markings on the column dowels done and a line dori being used to maintain correct concrete level?	☐	☐
24	Have the admixtures, if any been added?	☐	☐
25	Has the slump cone test been conducted on fresh concrete?	☐	☐
26	Have test cubes been cast (site lab)?	☐	☐
POST-POUR CHECKS			
27	Is curing been ensured?	☐	☐
28	Has deshuttering been done carefully without damaging the concrete surface?	☐	☐
29	Have high pressure water cleaners been used to clean the beam bottoms of inverted beams?	☐	☐

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

**CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: CONCRETING OF FOOTINGS**

Project:		Date:	
Location:			
NOTE:- Please ☒ appropriate box or enter readings as per requirements			
Sl. No.	To be checked	YES	NA
1	Name, date and number of the drawing		
PRE-POUR CHECKS			
2	Are the latest "Good for Construction" drawings available?	☐	☐
3	Have the required barricading and safety measures been taken?	☐	☐
4	Are the required number of cement bags available on site? (or adequate quantity of RMC been ordered)	☐	☐
5	Are the required tools available at site to ensure correct work?	☐	☐
6	Have the vibrators been checked before start of the concrete?	☐	☐
7	Are calibrated farma available for measurement (weigh batcher in case of weigh batching)?	☐	☐
8	Is the platform and scaffolding material secure?	☐	☐
9	Is the necessary shuttering and reinforcement complete and in place?	☐	☐
10	Has the shuttering material been properly aligned using appropriate equipment?	☐	☐
11	Is the dimensional accuracy of shuttering material correct?	☐	☐
12	Have markings been made on the column dowels for concrete level?	☐	☐
13	Is the test report of cement and steel available at site office?	☐	☐
14	Has the aggregate been checked? (In case of Site – Mix)	☐	☐
15	Has the diameter and spacing of reinforcement been checked?	☐	☐
16	Are spare hessian cloth or tarpaulin sheet available as protection from the elements?	☐	☐
CHECKS DURING EXECUTION			
17	Are all the labourers wearing gum boots while concreting?	☐	☐
18	Is the concrete been properly compacted with a vibrator or manually?	☐	☐
19	If the depth to be concreted is more than 500 mm, then is concreting being done in layers?	☐	☐
20	Is the right grade of cement and water-cement ratio been followed?	☐	☐
21	Are the markings on the column dowels done and a line dori being used to maintain correct concrete level?	☐	☐
22	Have the admixtures, if any been added?	☐	☐
23	Have test cubes been cast (site lab)?	☐	☐
POST-POUR CHECKS			
24	Is curing been ensured?	☐	☐
25	Has deshuttering been done carefully without damaging the concrete surface?	☐	☐

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

7.0 ACTIVITY: BLOCK WORK

7.1 KNOWLEDGE OF ACTIVITY

7.1.1 CHECKS PRIOR TO START OF WORK

1. Follow the latest "Good for Construction" drawings duly signed by the architect.
2. Check for any variations/deviations from the approved architectural and services drawings.
3. All concrete surfaces of beams and columns coming in contact with block work is to be hacked(80 indents per sq.ft. and each indent is considered to be 1 cm long)
4. Use cement mortar slurry of 1:2 on the hacked surface to create a roughened surface for proper bonding,3 days prior to start of block work. Cure the roughened surface for these 3 days, by spraying water.
5. Aluminium templates provided by SGMPL should be available at site to ensure correct door / window openings.
6. For non-load bearing walls use solid / hollow 4 N/mm² compressive strength blocks or as specified by structural consultant. For load bearing walls use solid / hollow 7 N/mm² compressive strength blocks or as specified by structural consultant.
7. Use silt free (less than 5%) medium gritty clean sand for mortar.
8. Approved grade cement not more than 30 days should be used. The date of manufacture is put on the bag.
9. Ensure that all required tools, accessories and materials are available at the place of work.
10. Finished floor level should be button marked on structural slab. Lintels, chajjas and sills to be cast with respect to finished floor level.
11. For bonding of block work to columns, wall ties shall be cast into columns at a vertical spacing not greater than 500mm and should be aligned with the horizontal mortar band.

7.1.2 CHECKS DURING BLOCK WORK

1. Place the marker course of block (1st course) after checking the vertical & horizontal alignment. Get it checked by the architect.
2. If hollow blocks are used fill the lowest (1st course) with concrete 1:3:6 using 12mm jelly to give a firm base for chipping to fix skirting.
3. Mix mortar in proportion of 1:5 on MS sheet, using Farma box for measuring sand and a measuring can to standardize quantum of water to get a consistent mix. Mix well for uniformity.

Mix mortar in small manageable quantities and use it within ½ an hour.
4. Mortar joints should not be more than 10 mm for both vertical and horizontal joints. The joints should be neatly pointed using an Aluminium Straight edge or German pointing trowel.
5. Do not construct more than 1 metre height in a day.
6. Give concrete band of 1:2:4 with 8 mm steel (2 Nos.) in a 100 mm thick wall at every 1 metre height.
7. Do not place the topmost block under the beam until the immediate upper floor blockwork is raised up to the beam bottom, less one course.
8. In the top floor, build the parapet wall and do the waterproofing and screed concrete before placing and packing the last course.

9. Adjuster course in concrete 1:2:4 should be laid two in courses below the beam and not above the topmost course.
10. Use hollow blocks at the location of electrical conduit and raise the conduit along with the blockwork.
11. Dowel blocks to be left for further extension of block masonry.
12. Continuous horizontal chasing should be avoided. Chase blockwork using chasing machines.
13. Start chasing after at least 21 days of blockwork construction
14. For tiled surfaces it is a better option to chase after rough plaster is done and cured for 21 days.
15. All nibs adjacent to columns and less than 200mm, should be cast in RCC at site using M20 grade of concrete and curing for 7 days by covering with hessian clothes.
16. For mortar joints more than 10mm, packing of chasing for pipes, junction box etc. should be done in P.C.C. 1:2:4 using 12mm jelly and cured for minimum 3 days.
17. Write down the date of work in paint on the blockwork and monitor the curing accordingly.
18. Cure the blockwork by spraying water on the mortar joints only for at least 7 days.
19. Cast the cut lintel, sill, and chajja by giving a maximum bearing of 200mm and with bed block.
20. In the case of lintel, sill, and chajja over large openings, place them as end-to-end beam type.
21. If bearing cannot be given as required, lockset the reinforcement of lintel into the column for a depth of 4d for cast in situ works.
22. Check chajjas and sills for toppling effect. If suspect, build counterweight courses for lintel, sill, and chajjas.
23. Continuous vertical mortar joints should be staggered and vertical movement joints to be given every 12 metres.

7.1.3 CARE AFTER BLOCK WORK

1. Do not entertain excessive chasing as it disturbs the mortar joints causing hairline cracks and weakening the work.
2. Do not soak the blocks with water while curing. The moisture absorbed by the blocks will be released subsequently causing volumetric variations and shrinkage cracks.
3. The interface between block and concrete is the most critical zone and needs special care. This is due to incompatibility between two heterogeneous materials. Before plastering, these zones should be given special treatment. **(Discussed separately under plastering)**
4. After 7 days curing of mortar joints drive a nail into the joint to test the strength of joints at random. Also look for colour variation in the mortar joints to identify problem areas.

7.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the masons are:

1. Trowels
2. Line dori
3. Sand Sieve
4. Tube levels
5. Plumb bobs
6. Measurement Tape
7. Spirit levels 1-2m

8. Aluminium straight edge
9. Right angle
10. Chipping Tools
11. Masons trowels
12. Masons hammer
13. Levelling threads
14. Masons brushes and buckets
15. Mortar boxes
16. Water Barrel

7.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. First measure if the given area is to plan as per correct and updated drawings
2. The blockwork should be neat and clean visually
3. The first course in block-work is the most important one. Using the spirit levels, check if the erected wall is perfect – the surface should be free of undulations, and cracks.
4. Using the tape measure, ensure the diagonals are equal.
5. Check if the mesh used at required joints are properly placed & plastered.
6. Using the 3-meter Spirit levels and aluminium flats check if the erected surface is parallel. Check plumb at door and window openings
7. Measure openings at various points for uniformity. If in doubt, crosscheck with diagonals.
8. Check if the corners are at right angles using the right angle template.
9. Ensure door and window aluminium templates are always readily available.
10. The joints should be of uniform thickness. Check joint thickness and strength after 7 days (nail test)
11. Always use blocks of the same height and dimensions [Two different sizes have been observed of 190mm and 200-205mm respectively]

7.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Measuring tape
2. Spirit levels - 3m
3. Right angle template
4. Related “Good for Construction” drawings

CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: BLOCKWORK				
Project:		Date:		
Location:				
NOTE:- Please ☐ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Are the latest "Good for Construction" drawings available?	[]	[]	
3	Are the required number of blocks available? (both load bearing and non-load bearing)	[]	[]	
4	Surface preparation:			
	Has the hacking at contact surfaces of column & beam been done?	[]	[]	
	Has cement mortar slurry been applied over the hacked surface and cured for 3 days?	[]	[]	
5	Have aluminium templates used for door/window openings?	[]	[]	
6	Are the required tools available?	[]	[]	
7	Are there any specific requirements of the client?	[]	[]	
8	Cement - is it of the approved grade and less than 1 month old?	[]	[]	
9	Sand - is it medium gritty, clean and silt-free (less than 5%)?	[]	[]	
10	Is the finished floor level button marked on structural slab?	[]	[]	
11	Are the markings for reference lines on pillars done?	[]	[]	
12	Have the wall ties been cast into columns at a vertical spacing (<500 mm)?	[]	[]	
CHECKS DURING EXECUTION				
13	Is the blockwork checked in vertical and horizontal directions?	[]	[]	
14	Is the marker/ lowest course of hollow blocks filled with concrete 1:3:6 (12 mm jelly)?	[]	[]	
15	Is the mortar in proportion 1:5 on MS sheet using farma box?	[]	[]	
16	Has the check for diagonals & dimensions been done?	[]	[]	
17	Has the thickness for joints been checked?	[]	[]	
18	Has raking and pointing of joints been done?	[]	[]	
19	Is the RCC band for 100mm walls done?	[]	[]	
20	Has the procedure of not constructing more than 5 courses a day been followed?	[]	[]	
21	Has the top course been packed below the concrete beam?	[]	[]	

	POST-EXECUTION CHECKS			
22	Has the curing of blockwork done for atleast 7 days?	[]	[]	
23	Has care been taken of not entertaining excessive chasing?	[]	[]	
24	Has a nail been driven to test the strength of joint after 7 days of curing?	[]	[]	

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8.0 ACTIVITY: HACKING

8.1 KNOWLEDGE OF ACTIVITY

1. All surfaces in concrete should be cleaned of dried mortar and loose particles.
2. Spattering of cement due to overspill [Spill over during concreting of slab on to beam by means of a boompump]. All spattered cement should be removed using chipping tools.
3. Beam soffit and column side coming in contact with masonry needs to be hacked and rough cement sand mixture applied and cured for at least 3 days before starting masonry works.
4. All concrete surfaces of columns, beams, ceilings to be plastered and contact surfaces of the blockwork need to be hacked.
5. Concrete surfaces should be hacked (80 indents per sq.ft) before plastering. Each indent should be 1cm long.
6. Hacking is preferred to be cross-stitched instead of an aligned pattern.

8.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the mason gang are:

1. Hacking hammer
2. Chipping tools
3. Safety goggles
4. Face mask

8.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Visually inspect the hacked surfaces and ensure 80 indents per sq.ft. of concrete surface.
2. Hacking should be uniform in nature.
3. Ensure hacked area is cleaned of debris and spattered cement immediately.

CHECKLIST FOR ON-SITE INSPECTIONACTIVITY: HACKING				
Project:		Date:		
Location:				
NOTE:- Please use ☐ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NO	Remarks
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Is the surface cleaned off from dried mortar and loose particles?	[]	[]	
3	Have proper scaffolding arrangement been done with requisite safety measures ?	[]	[]	
4	Are the required tools available?	[]	[]	
CHECKS DURING EXECUTION				
5	Have 80 indents/sqft.each of 1cm long done?	[]	[]	
POST-EXECUTION CHECKS				
6	Has hacking been done on concrete columns, beams, ceiling and all contact surfaces of blockwork?	[]	[]	

Checked by: Approved by:

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Date Date

9.0 ACTIVITY: EXPANDED METAL FIXING

9.1 KNOWLEDGE OF ACTIVITY

1. Nail rhombus mesh rolls over the blockwork and concrete junctions with steel nails/wooden plug and nails.
2. Plastering mesh should be fixed rigidly before plastering on the junction between concrete and masonry surface. This strip has to be plastered and cured for minimum of 3 days before the entire wall is plastered.
3. The GI expanded wire mesh shall be fixed over the junction with 1½" lay wire nails. The nails shall be driven into the RCC beams / columns after drilling a hole and over brick / block masonry directly. The nails shall be staggered and folded to secure the mesh reinforcement.
4. Cement mortar of 1:3 proportion shall be laid over the mesh to a thickness not exceeding plastered wall thickness and imprint shall be made over it to create bond with the plastering to be done. This will be cured for three days prior to commencing plastering.
5. Metal meshes of 300/ 500mm are fixed with sufficient overlap. The difference in the height of blocks that varies from 185-200mm, leading to varying heights of adjustor courses. Hence it is recommended to employ a 300/ 500mm wire mesh which ever is suitable.

9.2 TOOLS TO BE USED BY TRADESMEN

9.3 Required tools must be available at site to ensure correct work. Basic tools of the mason gang are:

1. Masons hammer
2. Masons Trowels
3. Sand sieve
4. Safety goggles
5. Measuring tape

9.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Ensure metal meshes are properly stretched and nailed, with sufficient overlap.
2. Plastering on these surfaces to be done precisely with no protruding surfaces/ edges.
3. Ensure right width of plastering mesh has been used depending on the height of the adjustor course.
4. Establish if proper curing has been done
5. Inspection to be done after a week to ensure no cracks at joints/ plaster.

CHECKLIST FOR ON-SITE INSPECTIONACTIVITY: EXPANDED METAL FIXING				
Project:		Date:		
Location:				
NOTE:- Please use ☐ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
1	Name,date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the area been prepared for executing the work?	[]	[]	
3	Has the packing between beam and top most level of blockwork complete?	[]	[]	
4	Has hacking been done on the beam?	[]	[]	
5	Is the mesh of the required size and thickness?	[]	[]	
6	Are the required tools and safety equipments(scaffolding) available?	[]	[]	
CHECKS DURING EXECUTION				
7	Is the mesh evenly distributed between the beam and blockwork?	[]	[]	
8	Is the mesh provided throughout the length of the wall?	[]	[]	
9	If overlapping has to be done, has an overlap of 10 cms been provided?	[]	[]	
POST-EXECUTION CHECKS				
10	Is the mesh rigid?	[]	[]	

Approved by:

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Name Date

Checked by:

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Name Date

10.0 ACTIVITY: CORNER BEADS

10.1 KNOWLEDGE OF ACTIVITY

1. Metal corner beads to be fixed before internal plastering to maintain the skirting in level. On all exposed corners, angle bends shall be fixed to provide smooth rounded external angle.
2. Angle bends shall be initially fixed over plaster dabs in neat cement plaster paste on both sides of the external angle and by pressing the bead into the dabs. Place the straight edge against both sides of the bead to check for straightness and upright. Plumb bob shall also be used to ensure vertical plumb.
3. The curved edge of the bead should project the finished surface of plaster slightly to form a smooth external curve. After completing the alignment after 48 hours of curing the bead shall be filled with 1:2 cement sand mortar, and cured for 2 days prior to commencing the plaster for these walls.
4. All tiled corners shall be provided with the proprietary PVC corner strips and tiling started beyond the strip.

10.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the mason gang are:

1. Trowels
2. Plumb bobs
3. Measurement Tape
4. Spirit levels 1-2m
5. Sand sieve
6. Aluminium straight edge
7. Masons brushes and buckets
8. Mortar boxes

10.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Ensure the corner bead is plumb, use spirit levels and plumb bob along with the bull marking
2. Ensure the corner bead is well packed with absolutely no gaps
3. Ensure the cement mortar is cured for 3 days
4. Ensure the corner bead is flawless with no cracks or dents around the installed bead

10.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bobs
2. Spirit levels 1-2m

CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: CORNER BEADS				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the area been prepared for executing the work?	[]	[]	
3	Has the bull marking been done?	[]	[]	
4	No damages on the corner beads	[]	[]	
5	Is the blockwork at right angles?	[]	[]	
6	Are the required tools and safety equipments(scaffolding) available?	[]	[]	
CHECKS DURING EXECUTION				
7	Is the corner bead plumb ?	[]	[]	
8	Is the packing between corner beads and blockwork done with rich cement mortar 1:2 ?	[]	[]	
POST-EXECUTION CHECKS				
9	Is the button mark and corner beads in line and at right angles?	[]	[]	
10	Has curing been done for 2 days?	[]	[]	
11	Are the corner beads rigid?	[]	[]	

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11.0 ACTIVITY: PLUMBING WORKS

11.1 KNOWLEDGE OF ACTIVITY

11.1.1 INTERNAL WORKS - WATER LINES

1. Internal pipe work in Toilets and Kitchen to be concealed and carried out as per working drawings.
2. As per the heights mentioned in plumbing drawings, mark the line on walls by chalk in proper alignment and plumb

3. Start chasing of line using a chasing machine or chisel and hammer. The chasing should be done keeping the following points in mind.
 - Depth Should not be more than pipe size
 - Width Sufficient to accommodate the pipe line
 - Alignment Straightness should be considered
 - Height For all fittings height as given in Drawing
4. Check Class / Specifications of Materials.
 - High Pressure threaded Blue UPVC Pipes of Schedule 80 to be used for cold water pipes made of ASTM IS-1785 and threaded as per IS 1239 (Part I)
 - Class 1 Copper pipes as per BS 2871 Part 1 and fittings as BS 864 Part II should be used for Hot Water.
 - G.I. Fittings should be used for cold water – pipe work as per IS 1239 (Part II)
5. Prepare pipe-skeleton and check all joints for proper tightness. Only approved make pipes, pipe fittings and accessories including jointing materials should be used.
6. Groove chasing should not exceed 30 mm after rough plaster for cold water supply line and cold feed line and 50 mm for hot water supply lines.
7. While threading UPVC pipe at site, ensure square cut of pipe ends, chamfer the ends with a file, insert proper size wooden plug in the pipe end and then carry out threading. The sharp edges of gripping vice and other handling tools should be muffed with a suitable packing to prevent damage of pipe surface.
8. The joints should be made with hand tightening of the fitting over pipe and covered with proper layer of Teflon tape. To make the joint permanent, one to two turns over the hand tightened joint is sufficient. Avoid over tightening as this may damage both the pipe and fittings.
9. Special care should be taken while connecting UPVC pipe with G.I Fittings. High quality shellac should be used for jointing.
10. Water tightness of line to be checked using pressure testing equipment. All other openings should be plugged except end portions to which pressure gauge machine is connected.
11. The pressure reading should be above 7 kg/cm² (80 PSI); and there should not be even a single drop of water coming out of the joints during testing. The duration of the test is 24 hours.
12. Apply bitumen paint over the G.I pipe work.
13. All the bore pieces projecting out should be minimum 200 mm from plastered surface.
14. Cover the skeleton including fittings with good quality Hessian cloth and tie it properly for cold water pipework.
15. Fix the skeleton in wall using 40 mm plumbing nails at a distance of 230 mm on alternate side.
16. Do the pressure testing once more after fixing in position and ensure no leakage.
17. Keep a gap of 10 mm between all pipes and fittings to accommodate thermal expansion and contraction of pipes for longer life of the system.
18. Horizontal lines within bathrooms should be cement encased and tested before compacting of sunken floor to avoid any accidental damages.
19. Curing should be done over the plaster for at least 7 days.

Installation Guide for Copper Pipes (Hot Water Lines)

1. Make sure that you have the correct size fittings and tube.
2. Prepare the end of the tube by cutting to the correct length with a tube cutter or fine bladed hacksaw. The ends of the tube must be cut square to the axis and be especially careful not to damage the ends of the tube. After cutting the tube, you will notice some rough edges around the outside and inside of the tube. This is called burr and should be removed with a file or sharp blade.
3. Clean the outside surface of the tube that will eventually go into the socket of the fitting, along with the inside surface of the fitting.
4. Apply water soluble flux to the tube and fitting by smearing a thin film of FLOW FLEX flux around the outer ends of the tube that have been cleaned and to the inside of the cleaned socket of the fitting. This is best done with a small brush to avoid applying too much and to prevent contact with the skin.
5. Insert the tube into the fitting and push home until the stop is reached and wipe off any excess flux with a clean cloth.

For Integral Solder Ring Fittings (Inbuilt):

6. Apply heat to the assemble joints to be made, using a conventional blow Lamp torch or similar appliance that emits flame that is clean, blue and soot-free. Once a complete ring of solder has appeared around the mouth of the fitting, turn off the heat. The complete silver coloured ring of solder is proof of a sound joint.

For End feed Fittings:

7. Apply the flame to the fitting, to heat tube and solder cup of fitting, until solder melts when placed at the joint of tube and fitting. Allow the joint to cool without disturbance.
8. Remove the flame and feed solder into the joint at one or two points until a ring of solder appears at the end of the fitting. The correct amount of solder is approximately equal to 1 ½ the diameter of the fitting ¾" long solder for 15mm fitting etc.
9. Wipe off any excess flux and residues, with wiping cloth after the joints cooled.

11.1.2 INTERNAL WORKS - UPVC TRAPS

INSTALLATION:

1. Determine correct location of 'P' / 'Q' / 'S' Traps and set it on a firm base located relative to the floor finish by pouring concrete on a slab.
2. Bedding can be carried out by pouring concrete around 'P' / 'Q' / 'S' Trap; ensuring that outlet of Trap is left clear on concrete.
3. Apply rubber lubricant on W.C. connector ring as well as on outer side of WC pan
4. The outlet can be inserted in the socket end of pipe / fittings (as the case may be) and joint can be solvent cemented to make a leak proof joint.

JOINTING INSTRUCTIONS:

1. Make sure the spigot end and inside of the socket is clean and the sealing ring is placed evenly in the socket.
2. When cutting pipes, make sure they are cut square. Chamfer the end cut to an angle of 15° with a medium file. Cutting of pipes should be straight, as diagonal cutting leads to leakages
3. A correct depth of entry of the spigot into the socket is required to allow thermal movement. To achieve this, push spigot fully into the socket (remove sealing ring at this time) and make a mark on the spigot. Withdraw the spigot by 10 mm & mark the spigot with the bold line. This bold mark indicates the correct depth of entry to allow the necessary expansion gap.

4. Smear rubber lubricant evenly on the chamfered spigot and the sealing ring. Then insert the spigot into socket with light twisting motion. Pull out the pipe to allow 10 mm expansion gap.
5. Maximum Support Distance in Meter:

Size in mm	40	50	75	110	160
Horizontal	0.4	0.5	0.75	1.1	1.6
Vertical	1.2	1.5	2.00	2.00	2.00

11.1.3 EXTERNAL PIPE WORK

1. Spacing of inspection chambers and manholes should be such that cleaning of sewer lines can be done easily.
2. Inlets and outlets of chambers and manholes are to be plugged during progress of the work. It should remain plugged till completion of the sewer lines up to disposal so as to avoid blockage / choke-up of sewer pipeline.
3. Ensure gully's/channels of inspection chambers/manholes are given a smooth curve if sewer lines are intersecting at right angles.
4. Bottom of gully's/channels should be laid in slope at inlet to outlet of chambers and should be finished smooth.
5. All sewer pipes, traps and other fittings should be free from cracks, holes and burrs etc., and to be checked before being put into use.
6. Outflow of chamber should have 25 mm (1") drop than inflow of chamber.
7. Joints of sewer pipes to be plugged with cotton yarn (packing rassi) before applying cement slurry over joints.
8. Heavy-duty chamber covers are to be used in parking and on road whereas light duty covers may be used for other places. The covers used in manholes in sewer lines shall invariably bear the word, 'SEWER' on the top and those used for storm water drains shall bear the word 'STORM'.

11.1.4 SOIL WASTE & RAIN WATER (S.W.R) DRAINAGE SYSTEM

JOINING INSTRUCTIONS:

1. Use only rubber lubricant for joining SWR pipes & fittings, where rubber ring is used.
2. Avoid misalignment of vertical SWR pipe stacks and incorrect spacing of pipe clips.
3. All entry to main stacks should be protected with water seal trap, wherever there is mixing of soil & waste lines.
4. Keep a gap of 10 mm between all UV stabilized SWR pipes and fittings to accommodate thermal expansion and contraction of pipes for longer life of the system.
5. Smoke test should be avoided and test plug / socket plug should be used for testing the lines.
6. Horizontal lines within bathrooms should be cement encased and tested before compacting of sunken floors to avoid any accidental damages.
7. When cutting pipes make sure they are cut square. Chamfer the end cut to an angle of 15° with a medium file.
8. A correct depth of entry of the spigot into the socket is required to allow the thermal movement. To achieve this, push spigot fully into the socket (remove sealing ring at this time) and make a mark on the spigot. Withdraw the spigot by 10 mm & mark the spigot with a bold line. This bold mark indicates the correct depth of entry to allow the necessary expansion gap.
9. Smear rubber lubricant evenly on the chamfered spigot and the sealing ring. Then insert the spigot into socket with light twisting motion. Pull out the pipe to allow 10 mm expansion gap.

10. Tubes installed underground, laid on floors or in other inaccessible places must be able to withstand twice the maximum working pressure.
11. While laying big pipelines, provision should be made for expansion joints, air vents and proper anchorage. In case of longer runs, provide air valves at all higher points of ground and the size of the valves should be $\frac{1}{4}$ th of the main line.
12. For large diameter and higher class pipes (6 kg / cm² and above) always use heavy-duty solvent cement. Within 24 hours, the rigid PVC pipes are ready for use.

TESTING NON-PRESSURE INSTALLATION ABOVE GROUND:

The SWR drainage system can be put to use immediately after installation, as no waiting time is required for joints to be set and dried. However for testing, seal hermetically all openings below the top of the section to be tested. The water level shall then be raised to a height of not less than 3 meter above the highest point of the section being tested. Every joint shall be carefully examined for leaks.

11.1.5 DUCT & HIGH LEVEL PIPE WORK

1. Pipe work in ducts and voids shall be supported from specially designed mild steel brackets and cantilevers with swinging hangers. Roller type supports and 'U' bolt clips shall be used.
2. The brackets shall be provided and fixed to the sidewalls, beams and ceilings, where a bracket or support carries more than one pipe of different sizes, the spacing of the brackets or supports shall be that specified for the smallest size of pipe.
3. All pipes must be kept at least 150 mm from lighting and power cables or conduits.
4. Pipes shall be spaced in ducts and below floors in a manner, which will permit subsequent access to any pipe for maintenance or removal without disturbance to the remaining pipes.
5. All piping shall be grouped wherever practical and shall be erected to present a neat appearance. Pipes shall be parallel to each other and fixed at right angles to structural members and shall give maximum possible headroom. All pipe drops shall be truly vertical.
6. All pipes must be supported in such a manner so as to allow free movement for expansion and contraction and graded to the required levels for air elimination and drainage.

11.1.6 RETICULATED LPG SYSTEM

1. The Gas Cylinder bank provided, is equipped with a manifold to which the cylinders are connected. Each point of connection of the cylinder to the manifold has got a Non Return Valve to take care of any emergency arising out of failure of the Cylinder Pigtail.
2. To take care of excess Pressure build up in the pipeline after the regulator, an Over Pressure Shut Off system coupled with the Regulator is provided.
3. As far as the pipeline is concerned, there will be no threaded joints in the pipeline. The pipeline would be necessarily DC Socket welded and hydro tested in line with the code requirement.
4. Moreover, leak detectors may also be installed in the Gas Cylinder bank, which would give an audiovisual indication once the LPG level in the enclosure increases beyond safe limits.

11.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the plumbing gangare:

1. Chisel
2. Pipe Wrench
3. Chain Wrench
4. Sledge Hammer
5. Screw Driver
6. Bench Vice
7. Pipe Vice
8. Die Set
9. Hammer Drilling M/C
10. Mini Angle Grinding M/C
11. Drill
12. Chasing Machine
13. Spirit Level
14. Hammer Drill Bit
15. Grinding Wheel
16. File
17. Measuring Tape
18. Pressure Testing Machine

11.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check the direction of flow vis-à-vis the installation of pipes
2. The water has to flow into the sleeve. Check for leakage and subsequently establish whether due to faulty sealing [Insufficient application of adhesive]
3. Check for slopes installed using spirit levels
4. Ensure all joints are waterproofed to ensure leak proof pipes

11.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Spirit levels
2. Plumb bob
3. Measuring tape
4. Related "Good for Construction" service drawings

CHECK LIST FOR QUALITY ACTIVITY: PLUMBING (SWR Drainage)

Project:		Date:	
Location :			
NOTE:- Please use ☐ appropriate box or enter readings as per requirements			
Sl. No.	ITEM	YES	NA
1	Name, date and number of the drawing		
PRE-EXECUTION CHECKS			
2	Has it been ensured that only rubber lubricant is used for joining SWR pipes & fittings?	[]	☐
3	Has provision been made for expansion joints, air vents and proper anchorage for laying of big pipelines?	[]	☐
4	Has heavy-duty solvent cement used for large diameter and higher class pipes (6 kg / cm ² and above)?	[]	☐
CHECKS DURING EXECUTION			
5	Has a gap of 10 mm between all UV stabilized SWR pipes and fittings kept to accommodate thermal expansion and contraction of pipes?	[]	☐
6	Have the horizontal lines within bathrooms cement encased?	[]	☐
7	Has it been ensured that cutting pipes are cut square and chamfered at the end cut to an angle of 15 degree with a medium file?	[]	☐
8	Has rubber lubricant smeared evenly on the chamfered spigot and the sealing ring, also allow 10 mm for expansion gap?	[]	☐
POST-EXECUTION CHECKS			
9	Has the misalignment of vertical SWR pipe stacks and incorrect spacing of pipe clips avoided?	[]	☐
10	Has the entry to main stacks protected with water seal trap, wherever there is mixing of soil & waste lines?	[]	☐
11	Has smoke test been avoided and test plug / socket plug been used for testing the lines?	[]	☐
12	Has it been ensured that tubes installed underground, laid on floors or in other inaccessible places are able to withstand twice the maximum working pressure?	[]	☐

Checked by: Approved by:

Sign Sign _____

Name

Date

Name

Date

CHECK LIST FOR QUALITY				
ACTIVITY: PLUMBING WORKS (Internal Works)				
Project:		Date:		
Location:				
NOTE:- Please ☐ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	Y E S	N A	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the correct location of 'P'/'Q'/'S' traps determined and set it on a firm base located relative to the floor finish?	[]	[]	
3	Are the cutting of pipes straight and square?	[]	[]	
4	Has it been ensured that the spigot end and inside of the socket is clean and the sealing ring is placed evenly in the socket?	[]	[]	
CHECKS DURING EXECUTION				
5	Has rubber lubricant applied on W.C. connector ring as well as on the outer side of WC pan?	[]	[]	
6	Has rubber lubricant smeared evenly on the chamfered spigot and the sealing ring?	[]	[]	
POST-EXECUTION CHECKS				
7	Has bedding been carried out by pouring concrete around 'P'/'Q'/'S' traps?	[]	[]	
8	Is the joint solvent cemented to make a leak proof joint?	[]	[]	

CHECK LIST FOR QUALITY				
ACTIVITY: PLUMBING WORKS (Installation Guide)				
Project:			Date:	
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has it been ensured that correct size fittings and tubes are present?	[]	[]	
3	Is the end of the tube prepared by cutting it to the correct length?	[]	[]	
CHECKS DURING EXECUTION				
4	Is the outside surface of the tube cleaned, that will eventually go into the socket of the fitting?	[]	[]	
POST-EXECUTION CHECKS				
5	Has the rough edges around the outside and inside of the tube been removed with a file or sharp blade?	[]	[]	

Checked by: **Approved by:**

Sign Name Date

Sign

Name

Date

CHECK LIST FOR ON-SITE QUALITY				
ACTIVITY: PLUMBING (External Works)				
Project:			Date:	
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Have all the sewer pipes, traps and other fittings free from cracks, holes and burrs etc., and is checked before being put into use?	[]	[]	
CHECKS DURING EXECUTION				
3	Is the bottom of gully's/channels laid in slope at inlet to outlet of chambers and finished smooth?	[]	[]	
POST-EXECUTION CHECKS				
4	Are the spacing of inspection chambers and manholes such that cleaning of sewer lines can be done easily?	[]	[]	
5	Are the inlets and outlets of chambers and manholes plugged during progress of the work?	[]	[]	
6	Has it been ensured that gully's/channels of inspection chambers/manholes have been given a smooth curve if sewer lines are intersecting at right angles?	[]	[]	
7	Have the joints of sewer pipes been plugged with cotton yarn (packing rassi) before applying cement slurry over joints?	[]	[]	

Checked by:

Sign _____

Date _____

Approved by:

Name _____

CHECK LIST FOR ON-SITE QUALITY				
ACTIVITY: PLUMBING WORKS (Internal Water Piping)				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the line on walls done by chalk in proper alignment, plumb and as per the heights mentioned in plumbing drawings?	☐	☐	
3	Has chasing been done keeping the following points in mind?	☐	☐	
	Depth should not be more than pipe size	☐	☐	
	Width sufficient to accommodate the pipe line	☐	☐	
	Alignment and straightness should be considered	☐	☐	
	Height for all fittings should be as per given drawing	☐	☐	
4	Has the check for class / specifications of materials done?	☐	☐	
5	Has it been ensured that the groove chasing does not exceed 30 mm after rough plaster for cold water supply line and cold feed line and 50 mm for hot water supply lines?	☐	☐	
6	Are the required tools available?	☐	☐	
7	Are there any specific requirements of the client?	☐	☐	
POST-EXECUTION CHECKS				
8	Has the pipe-skeleton been prepared and the joints checked for proper tightness?	☐	☐	
9	Is the skeleton, including fittings covered with good quality Hessian cloth and tied properly for cold water pipe work?	☐	☐	
10	Is the skeleton fixed in wall using 40 mm plumbing nails at a distance of 230 mm on alternate side?	☐	☐	
11	Are proper sized wooden plugs inserted in the pipe end and then has the threading carried out ?	☐	☐	
12	Are the internal pipe works in toilets and kitchen concealed and carried out as per working drawings?	☐	☐	
13	Are the sharp edges of gripping vice and other handling tools muffed with a suitable packing to prevent damage of pipe surface?	☐	☐	
14	Are the joints made with hand tightening of the fitting over pipe and covered with proper layer of Teflon tape?	☐	☐	
15	Has special care been taken while connecting UPVC pipe with G.I. Fittings?	☐	☐	
16	Has water tightness of line been checked using pressure testing equipment?	☐	☐	
17	Has bitumen paint been applied over the G.I pipe work?	☐	☐	
18	Has it been ensured that the bore pieces projecting out should be of minimum 200 mm from plastered surface?	☐	☐	
19	Has a gap of 10 mm been kept between all pipes and fittings to accommodate thermal expansion and contraction of pipes for longer life of the system?	☐	☐	
20	Are all the horizontal lines within bathrooms cement encased and tested before compacting of sunken floor to avoid any accidental damages?	☐	☐	
21	Has curing been done over the plaster for at least 7 days?	☐	☐	

Checked by:

Sign _____
 Name _____
 Date _____

Approved by:

Sign _____
 Name _____
 Date _____

12.0 ACTIVITY: ELECTRICAL WORKS

12.1 KNOWLEDGE OF ACTIVITY

12.1.1 METHOD OF CONDUITING, BOX FIXING & INTERNAL WIRING:

1. Carry out the work as per the latest approved drawings confirmed by the concerned Project Engineer. All electrical conductors shall be of sufficient size and current rating for the purposes for which they are to be used.
2. Use medium / heavy gauge rigid PVC Conduit: 20 / 25 / 32 mm diameter, 2mm thick black colour and of ISI approved make, as indicated in drawing.
3. Conduits should be laid between the reinforcement of slab and properly fastened to the reinforcement with binding wires.
4. Care should be taken to see that the conduits are held in position and the cement grout does not enter the conduits while concreting and no conduits get damaged due to movement of labourers on the slab before pouring and during pouring for inspection of conduits & joints. For the floor conduiting care should be taken that conduiting is done only just before the flooring works starts.
5. Vertical conduits in wall chase to be properly fixed in position at the location indicated in the drawing. Horizontal runs of conduits in wall to be avoided as far as possible. In hollow blocks, horizontal chases are not permitted.
6. Bends in conduit pipes should not be sharp. In embedded Conduiting, bends made with bending spring with large radius should be used. The maximum bending radius allowed in any conduit is 2.5 times the diameter of the conduit. The use of readymade bends should be avoided as far as possible.
7. Switch boxes to be recessed in the wall in such a way that it should be projecting 1-3 mm from wall plaster. The thickness of plaster shall be ascertained with button or bull marks and confirmed by site engineer. The boxes may project a maximum of 1-3 mm. Further, the wall finish such as lime rendering or punning, Glazed Tiles / Marble / Granite, etc. are to be confirmed with concerned Project Engineer. The finish will determine the projection. The idea is to ensure the box projects 0.5mm beyond the painted surface and the edges do not break while the wire is drawn.
8. Cover all the boxes with thermocol and masking tape / dummy plates to avoid damages during plastering. These covers should be removed only at the time of wiring.
9. Pass GI pull wires of 16-gauge inside the conduits with additional loop length of 15cm as draw wire.
10. The wiring cables to be of ISI approved make, PVC insulated, stranded copper and 1100V grade.
Use following cross section for wiring.

6 Sqmm	-	Sub mains (or as per drawing)
4 Sqmm	-	Power Circuit
2.5 Sqmm	-	Lighting Circuit
		Earthing for Sub mains
1.5 Sqmm	-	Light point wiring, 5A socket outlets & fan circuits
		Earthing for Power Circuits
1 Sqmm	-	Earthing for light point wiring, 5A socket outlets & Fan Circuits.
11. **Red, Yellow, and Blue** for phases, **Black** for Neutral and **Green** for earth – colour coding for wires must be followed.
12. Expansion coupler shall be used when conduit passes through building expansion joint. One end of the expansion coupler shall not be glued.

13. Earthing

- At every light point earthing terminal should be provided and connected to the earth continuity conductor. The resistance of any point of the earth continuity system to the main earth electrode should not be more than 0.5 ohm.
- Every electrical circuit and sub-circuit shall be protected against excess current by circuit breakers. No circuit breaker other than a linked circuit breaker shall be inserted in a conductor connected with earth.
- Where metal works other than current carrying conductors is liable to become charged with electricity, the metal works shall be earthed in such a manner as to ensure immediate electrical discharge without danger.
- The neutral conductor shall be insulated throughout and at no point it should be connected to the earthing system.
- All earth connections shall be visible for inspection and shall be carefully made; if they are poorly made or inadequate for the purpose for which they are intended, loss of life and property or serious personal injury may result.
- Joints in the earthing should be invariably done by means of welding except in such locations where intermittent disconnection of joints is necessitated for testing purpose or for the earthing connection to the body of the equipment etc.
- Use fully insulated tools while handling electric wires and equipment.

Mounting Height of Electrical Accessories

Light switch	-	1250 mm above Finished Floor Level (F.F.L.)
Bell Push	-	1250 mm above Finished Floor Level (F.F.L.)
Socket Outlet	-	300 mm above Finished Floor Level (F.F.L.)
TV/Telephone Outlets	-	300 mm above Finished Floor Level (F.F.L.)
Bedside Accessories	-	600 mm above Finished Floor Level (F.F.L.)
Socket Outlets in the Kitchen	-	1140 mm above Finished Floor Level (F.F.L.) and (+300mm from Counter Top)
Cooker Control unit	-	1140 mm above Finished Floor Level (F.F.L.) and (+300mm from Counter Top)
Wall Lights	-	2200 mm above Finished Floor Level (F.F.L.)
15 A in Utility for Washing Machine	-	900 mm above Finished Floor Level (F.F.L.)
Connection Unit for Exhaust Fan	-	2300 mm above Finished Floor Level (F.F.L.)

12.1.2 EXTERNAL CABLE LAYING:

Cable laying involves two steps

Trenching.

Cable Pulling / Laying.

TRENCHING:

Trenches are dug as per requirement of cable sizes and other atmospheric conditions before digging route has to be finalized. The areas to be avoided for cable laying are near sewage line, Ground containing ashes, Slag, Clinker, Fertilized Solid & Electrolytic Corrosion, which will affect the life of cables.

Standard Depth of Trenches:

- Up to 1.1 KV = 450 to 750mm.
- Up to 11KV = 750 to 900mm.

CABLE LAYING:

Before laying, the direction in which the cable is to be pulled should first be decided. If it is a new cable no special precautions are necessary, but if it is laid parallel to the existing cable, the core sequence to be synchronized. Pulling force for Copper & Aluminium cables with steel tape armour when pulled is as follows:

- Copper - 7 Kg / sqmm of total conductor area
- Aluminium - 2 Kg / sqmm of total conductor area

Also bending radius should be taken in to consideration.

Rating	Single-Core Unarmoured	Multi-Core armoured
Up to 11 KV	15 D	12 D
Up to 22 KV	20 D	15 D
Up to 33 KV	25 D	20 D

D - Overall diameter of the cable

Where the cables have to be laid below ground level a trench shall be made and a layer of sand be provided at the bottom for the cable to lie on. One more layer is provided after laying the cable and a cable marking tape should be provided over it before doing the back filling.

A minimum horizontal clearance of 150mm should be provided between the cables whenever number of cables is more than one. Where cables pass through holes or metal works precaution shall be taken to prevent abrasions of the cables on any sharp edges.

12.1.3 HIGH VOLTAGE HV/ EXTRA HIGH VOLTAGE EHV DISTANCE CLEARANCE:

It is desirable that Extra High Voltage (EHV) lines do not pass above or adjacent to any building or part of building. If this cannot be avoided, it shall have on the basis of maximum sag, vertical clearance of not less than

- For HV line up to and including 33 KV - 3.7m
- For EHV lines - 3.7+0.3m for every additional 33 KV

The horizontal clearances between the nearest conductor and any part of such building shall on the basis of maximum deflection due to wind pressure be not less than ...

- For HV lines up to and including 11 KV - 1.2m For HV lines above 11 KV and up to 33 KV - 2.0m
- For EHV lines - 2.0 + 0.3m for every additional 33 KV

12.1.4 TEMPORARY INSTALLATIONS ON BUILDING SITES:

For temporary electricity supplies, voltage operated Earth Leakage Circuit Breaker shall be installed. Only double insulated cables and industrial type weatherproof socket outlets should be used for the distribution of temporary power.

12.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the electrical personnel:

I	Hand Tools	
1	Screw Drivers - Flat	Small, Medium & Heavy Duty
2	Screw Drivers - Star	Small, Medium & Heavy Duty
3	Cutting Pliers	Small, Medium & Heavy Duty
4	Nose Pliers	
5	Wire Stripper	
6	Line Tester	
7	Hammer	Small, Medium & Heavy Duty
8	Chisel	
9	File	Rough, Smooth
10	Hacksaw Frame	
11	Hacksaw Blade	Ordinary, High Speed
12	Ring Spanner Set	
13	Box Spanner set	
14	Metal Tool Box	
15	Crimping Tools	Small, Medium & Heavy Duty
16	Telephone Crimping tool	
17	Hole saw Cutter	
18	Bending Spring	20 mm & 25 mm
19	Curtain Spring	
20	Line Dori	
21	Blow Lamp	
II	Power Tools	
1	Hammer Drilling Machine	
2	Air Blowing Machine	

3	Angle Grinding Machine	
4	Mini Drilling Machine	
5	Hammer Drill Bits	Different Sizes
6	DC Segmented/Non-Segmented Blades	
III	Measuring Instruments	
1	Multimeter	
2	Digital Clamp Meter (Tong Tester)	
3	Megger	
4	Earth Resistance Tester	
5	Lux Meter	
6	Measuring Tapes	Different Lengths
7	Spirit Level	Different Lengths

12.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

Ensure:

1. All junction boxes, fan boxes, and drop points pertain to drawing location
2. Check Inner diameter, wall thickness and allowable tolerance for conduits has to be done by means of SlideCalliper
3. Binding of all conduits to steel done properly before slab concreting
4. Solvent cement for all joints applied properly
5. All openings / open ends are sealed
6. Conduits running parallelly are not touching each other i.e. there are no voids in the concrete
7. Test lamp method – ensure that all electrical points are charged
8. Check of ELCB (Earth Leakage Circuit Breaker)/ Residual Current Circuit Breaker by random trip of electricalcircuit
9. Check with multimeter
 - Phase to neutral – 230V
 - Neutral to earth – less than 2V
 - Phase to Earth – 230V
10. In contractual projects where lighting fixtures are part of the scope of work, check the illumination levels with a Lux meter to conform to client specifications
11. Electrical switch plates should be flush with finished wall level

12.3.4 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Multimeter
2. Lux meter
3. Test lamps
4. Vernier Calipers
5. Spirit levels 1-2m
6. Measuring tape

Sl. no	Activity	Confirming to Drawing No.	Inspected by ProjectEngg.	Date	Remarks
1	Slab Conduiting				
2	Opening & Checking with spring				
3	Wall Conduiting				
4	Box Fixing				
5	Wiring				
6	DB Dressing				
7	Switch plate Fixing				
8	Common Area electrical works				
9	Testing & Commissioning				
10	LT Installlation				
11	HT Installlation				
12	Handing over				

Checked by: Approved by:

Sign: Sign:

Name: Name:

Date: Date:

Sl.no	Apartment no.	Snag Date	Snag status	Proposed Date of Completion of Snags	Date of Completion	Checked	Remarks if any
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Checked by:

Approved by:

Sign: Sign:

Name: Name: Date: Date:

CHECKLIST FOR MODIFICATION										
Sl. no	Apparatus No.	No. of Revision	Latest Modified Drawing number with Date	Date of Completion of Modification Works	Checked by Supervisor	By Date	Remarks	Inspected by Project Engg.	Date	Remarks
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										

Checked by:
 Sign:
 Name:Date:

Approved by:
 Sign:
 Name:Date:

QUALITY CHECK LIST - GENERAL (AS PER STANDARD DRAWINGS)LOCATION:											
Sl. no	Activity	Confirming to Drawin gNo.	Nat ure of Con firm ity	Sn ag s Fo und if An y	Re m edi al act io n ta ke n	Chec ked by Sype rviso r	Da te	Re m ar ks	Ins pec ted by Pro ject Eng g.	Da te	Re m ar ks
1	Slab Conduiting										
2	Opening & Checking with spring										
3	Wall Conduiting										
4	Box Fixing										
5	Wiring										
6	Distribution BoxDressing										
7	Switch plate Fixing										
8	Common Area electrical works										
9	Testing & Commissionin g										
10	LT Installlation										
11	HT Installlation										
12	Handing over										
Checked by: Approved by: Sign: Sign: APPROVED BY Name: Name: Date: Date:											

13.0 ACTIVITY: PLASTERING

13.1 KNOWLEDGE OF ACTIVITY

13.1.1 CHECKS PRIOR TO START OF WORK

1. Ensure all the checks after block work is complied with. **(See block work details)**
2. The aluminium template for openings from SIPL should be available at site.
3. The blockwork should have been cured for 7 days and dry before plastering is started.
4. Button mark the surface to be plastered keeping the bull minimum. 12mm plaster is the desired thickness. Distance of button marks should be within an aluminium straight edge length.
5. Plastering mesh should be 8" wide and fixed rigidly before plastering on the junction between concrete and masonry surface with steel nails / wooden plug and nails. This strip has to be plastered and cured for minimum of 3 days before the entire wall is plastered.
6. Get the plastering specifications like lime finish, trowel finish, sponge finish, rough plaster and zone of application clarified from architects.
7. In case of external plaster grooves, it can be incorporated to break the day's work without creating an uneven joint. The proposal should be cleared for aesthetics from architect.
8. Do not plaster for a thickness of more than 15mm. In case it is required, the plastering should be done in 2 coats. The first layer applied should be cured for a day before applying the subsequent coats.
9. **Cement** of 43 grade OPC within 90 days old, **Sand** - FM 2 to 2.2, clean, fine silt content low (<5%) and potable water should be used for mixing mortar.
10. All surfaces in concrete should be hacked (80 hacks per sq. ft) before plastering.

13.1.2 CHECKS DURING PLASTERING

1. All surfaces to be plastered must be wet to prevent absorption of water from plaster.
2. Mix shall be generally CM 1:4 for ceiling and 1:6 for wall plastering.
3. Mix mortar on MS sheet using Farma for volumetric batching and measure mortar to mix for consistency.
4. Mix thoroughly for uniform mix and the CM should be used within ½ to 1 hour of the mix.
5. After plastering check the surface for undulations using halogen lamps. Yellow light thrown on the plastered wall from one-side shows undulations, if any, rectify immediately while the plaster is still fresh. All cut-outs such as fan, junction box, electrical box and skirting line should be finished to perfection.
6. Grooves and mortar bands should be given while plaster is wet.
7. If lime rendering or punning is required, do it within 3 to 4 hour of setting of cement mortar after plastering.
8. Write down the date of work in paint on the element for plastering, concrete & monitor the curing accordingly.

13.1.3 CARE TO BE TAKEN AFTER PLASTERING

1. Cure the works for a minimum of 10 days. Write the date of plastering on the wall / ceiling with permanent marker.
2. All mortar spillage stuck to walls, floor and MS works shall be cleared after the day's work.

13.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the plastering gangare:

1. Trowels
2. Line dori
3. Sand Sieve
4. Tube levels
5. Plumb bobs
6. Measurement Tape
7. Spirit levels 1-2m
8. Aluminium straight edge
9. Right angle
10. Chipping Tools
11. Masons trowels
12. Floating trowel
13. Masons hammer
14. Levelling threads
15. Masons brushes and buckets
16. Mortar boxes
17. Water Barrel and measuring can
18. Halogen lamps
19. MS sheets
20. Farma

13.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

13.3.1 INTERNAL PLASTER:

1. Check for smooth finish using spirit levels for undulations, cracks and evenness / straightness in vertical and horizontal directions
2. Ensure plastered surface is cured for entire recommended period
3. Ensure the 1 metre level markings are made along all walls. Measure the ceiling from this level – it should be even at all points. [Check for ceiling plaster]
4. Ensure plastering / POP thickness is even at all points during plastering.
5. Ensure the bull marking tiles are removed.

13.3.2 EXTERNAL PLASTER

1. Employment of specialized trowels to obtain different structural finishes for the external plastering
2. No undulations and unevenness by using spirit levels
3. Ensure all plastered surfaces are cured for entire recommended period

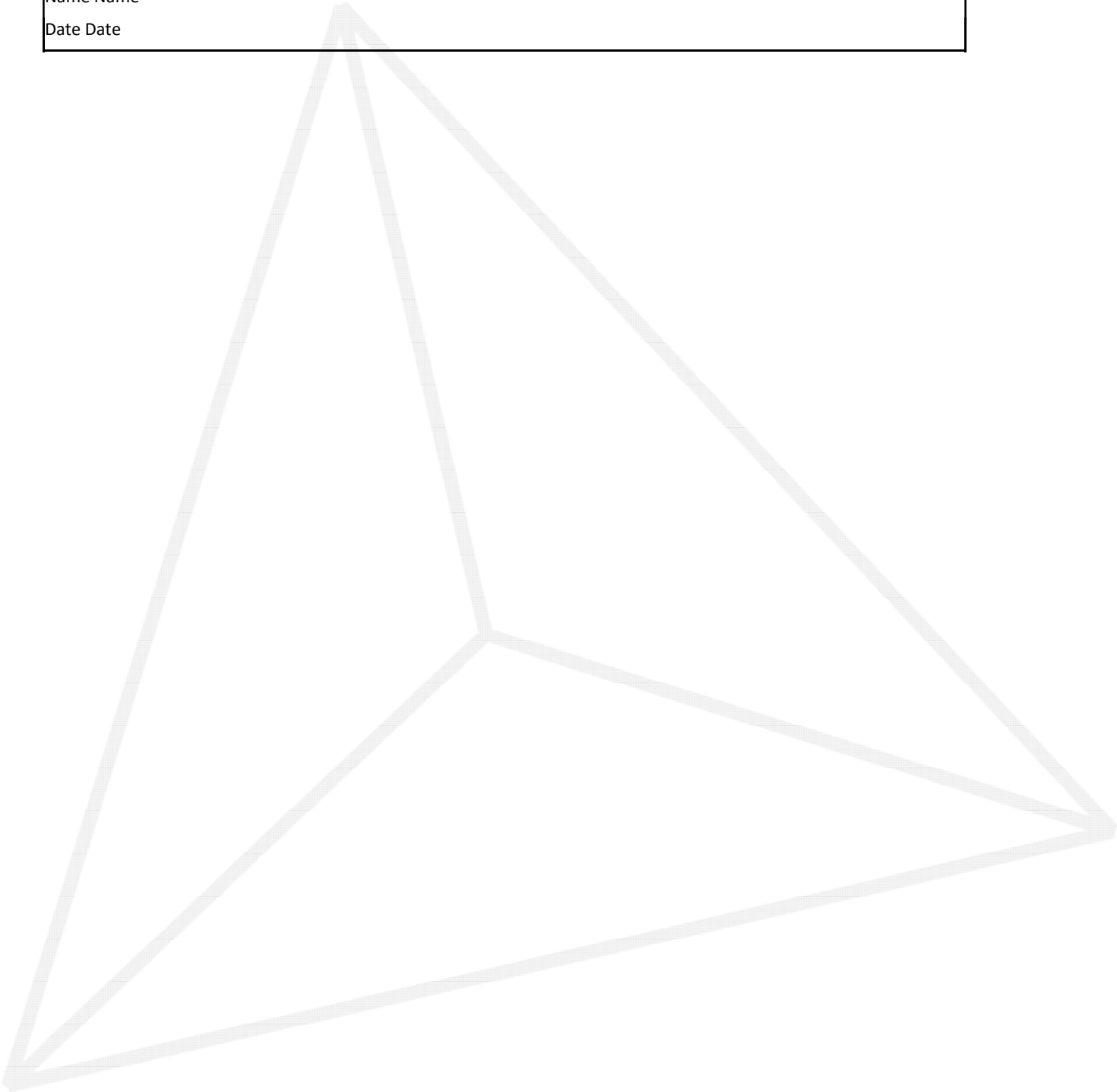
13.3.3 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Spirit levels 1-2m
2. Measuring tape
3. Related "Good for Construction" drawings

CHECKLIST FOR ON-SITE INSPECTION ACTIVITY: LIME RENDERING
--

Project:		Date:	
Location:			
NOTE:- Please ☐ appropriate box or enter readings as per requirements			
Sl. No.	ITEM	YES	NA
1	Name, date and number of the drawing		
PRE-EXECUTION CHECKS			
2	Has it been ensured that wall and ceiling surfaces are completely dry?	[]	[]
3	Have all the loose particles, dirt and dust been scrubbed off from the surface?	[]	[]
4	Has proper scaffolding arrangement been done with safety measures?	[]	[]
5	Are the required tools available?	[]	[]
6	Are there any specific requirements of the client?	[]	[]
CHECKS DURING EXECUTION			
7	Is the lime plastering being done 3 to 4 hours after the cement plastering?	[]	[]
8	Has the first coat been trowel finished ?	[]	[]
9	Has a thickness of 2mm been maintained ?	[]	[]
10	Has the second coat of lime applied after the first coat been completely dried?	[]	[]
11	Is the second coat smooth finished with steel float?	[]	[]
POST-EXECUTION CHECKS			
12	Has the surface been checked for any undulations?	[]	[]

13	Has the curing been done after 24 hours of lime plastering?	[]	[]	
Checked by: Approved by:				
Sign Sign				
Name Name				
Date Date				



CHECKLIST FOR ON-SITE INSPECTION

ACTIVITY: PUNNING

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the area been prepared for executing the work?	☐	☐	
3	Is there any impediment that could hamper the work?	☐	☐	
4	Is the surface free from dust, oil and all forms of contaminations?	☐	☐	
5	Is the bullmarking complete and the plumb correct?	☐	☐	
6	Is the fibre mesh installed at critical junctions?	☐	☐	
7	Are the corner beadings in place and plumb?	☐	☐	
8	Has the plaster been cured for atleast 5 days?	☐	☐	
9	Have the plumbing, electrical and fire alarm works been completed?	☐	☐	
10	Are there any specific requirements of the client?	☐	☐	
11	Are the required tools and safety Equipments (scaffolding) available?	☐	☐	
CHECKS DURING EXECUTION				
12	Is the application being done by trained personnel?	☐	☐	
13	Are the beam bottoms, window jambs, corners and edges plastered at right angles and checked for plumb?	☐	☐	
14	Have the edges of electrical boxes been finely worked on ?	☐	☐	
POST-EXECUTION CHECKS				
15	Is the surface horizontally and vertically perfect ?	☐	☐	
16	Are the electrical boxes cleaned properly?	☐	☐	
17	No tiny hairline crack in the punned surface	☐	☐	
18	No ridges or track marks visible	☐	☐	

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

CHECKLIST FOR ON-SITE INSPECTION

ACTIVITY : CEILING PLASTER

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-PLASTERING CHECKS				
2	Is the latest "Good for Construction" drawings available?	[]	[]	
3	Is sufficient place available for starting plastering?	[]	[]	
4	Has the required barricading and safety measures been taken?	[]	[]	
5	Is the concrete surface hacked with a minimum of 80 indents/sq.ft?	[]	[]	
6	Are button marks placed at appropriate intervals?	[]	[]	
7	Has the GI mesh been nailed between all RCC & masonry members?	[]	[]	
8	Is the electrical conduiting works completed?	[]	[]	
9	Is the PHE piping works in toilets & kitchen completed?	[]	[]	
10	Has proper scaffolding arrangement been made?	[]	[]	
11	Are all boxes covered by dummy plates?	[]	[]	
12	Are the A/c works, access control and fire alarms systems in place?	[]	[]	
13	Is the surface wet & free from dust, oil & all forms of contamination?	[]	[]	
14	Has the dried mortar been cleaned off the surface?	[]	[]	
15	Are there any specific requirements of the client?	[]	[]	
16	Are the required tools available?	[]	[]	
17	Are the required materials available?	[]	[]	
18	Have the increased requirements (renova painting) been included in the total tolerance?	[]	[]	
19	Has the proper roughing of first coat been done?	[]	[]	
CHECKS DURING PLASTERING				
20	Is the mixing of cement mortar being done correctly, on MS sheet?	[]	[]	
21	Is the plaster in proper line?	[]	[]	
22	Is plastering done above & below all platforms and lofts?	[]	[]	
23	Is the kind of finishing required been achieved?	[]	[]	
24	Normal sponge finish (for POP application) ?	[]	[]	
25	Rough finish (tile application/first coat)?	[]	[]	
26	Smooth, even finish (textured coatings)?	[]	[]	
POST- PLASTERING CHECKS				
27	Is curing carried out for a min.of 10 days, with the date of plastering on wall with permanent marker	[]	[]	
28	Has lime been properly applied, if required?	[]	[]	
29	Has all mortar spillage been cleaned?	[]	[]	

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

**CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: EXTERNAL PLASTERING**

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-PLASTERING CHECKS				
2	Is the latest "Good for Construction" drawings available?	☐	☐	
3	Is access available for starting plastering?	☐	☐	
4	Has the required barricading and safety measures been taken?	☐	☐	
5	Is the concrete surface beam/column hacked with a minimum of 80 hackings/sq.ft?	☐	☐	
6	Are Button marks placed at appropriate intervals?	☐	☐	
7	Has the GI mesh been nailed between all RCC & masonry members?	☐	☐	
8	Are the corner beadings in place and plumb?	☐	☐	
9	Have openings of doors & windows been fixed using aluminium templates?	☐	☐	
10	Is the electrical conduiting works completed?	☐	☐	
11	Is the PHE piping works in toilets & kitchen completed?	☐	☐	
12	Has proper scaffolding arrangement been made?	☐	☐	
13	Is the height of switch boxes fixed correctly?	☐	☐	
14	Are all boxes covered by dummy plates?	☐	☐	
15	Are the access control and fire alarm systems in place?	☐	☐	
16	Is the blockwork cured for atleast 7 days?	☐	☐	
17	Is the surface wet & free from dust, oil & all forms of contamination?	☐	☐	
18	Has the dried mortar been cleaned off the surface?	☐	☐	
19	Are there any specific requirements of the client?	☐	☐	
20	Are the required tools available?	☐	☐	
21	Are the required materials available?	☐	☐	
22	Has the proper roughening of first coat done?	☐	☐	
CHECKS DURING PLASTERING				
23	Is the mixing of cement mortar being done correctly, on MS sheet?	☐	☐	
24	Is the plaster in proper line & verticality?	☐	☐	
25	Is the wall being plastered to given specifications, to plumb and even?	☐	☐	
26	Is plastering done above & below all platforms and lofts?	☐	☐	
27	Are the edges of window frames & door frames perfectly vertical?	☐	☐	
28	Are all corners in line and finished properly?	☐	☐	
29	Are switch boxes in position and properly finished?	☐	☐	
30	Is the plaster surface cut properly for skirting?	☐	☐	
31	Is the kind of finishing required been achieved?	☐	☐	
	Rough finish (tile application/first coat)?	☐	☐	
	Smooth, even finish (textured coatings)?	☐	☐	
POST-PLASTERING CHECKS				
32	Is curing been carried out for a minimum of 10 days, with the date of plastering on the wall?	☐	☐	
33	Are grooves, drip mould and mortar bands given as per design?	☐	☐	
34	Has all mortar spillage been cleaned?	☐	☐	

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

CHECKLIST FOR ON-SITE INSPECTION ACTIVITY: INTERNAL PLASTERING				
Project:				Date:
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-PLASTERING CHECKS				
2	Is the latest "Good for Construction" drawings available?	☐	☐	
3	Is sufficient place available for starting plastering?	☐	☐	
4	Has the required barricading and safety measures been taken?	☐	☐	
5	Is the concrete surface beam/column hacked with a minimum of 80 indents/sq.ft?	☐	☐	
6	Are button marks placed at appropriate intervals?	☐	☐	
7	Has the GI mesh been nailed between all RCC & masonry members?	☐	☐	
8	Are the corner beadings in place and plumb?	☐	☐	
9	Are openings of doors & windows been fixed using aluminium templates?	☐	☐	
10	Is the electrical conduiting works completed?	☐	☐	
11	Is the PHE piping works in toilets & kitchen completed?	☐	☐	
12	Has proper scaffolding arrangement been made?	☐	☐	
13	Is the height of switch boxes fixed correctly?	☐	☐	
14	Are all boxes covered by dummy plates?	☐	☐	
15	Are the A/c works, access control and fire alarms systems in place?	☐	☐	
16	Is the blockwork cured for atleast 7 days?	☐	☐	
17	Is the surface wet & free from dust, oil & all forms of contaminations?	☐	☐	
18	Has the dried mortar been cleaned off the surface?	☐	☐	
19	Are there any specific requirements of the client?	☐	☐	
20	Are the required tools available?	☐	☐	
21	Are the required materials available?	☐	☐	
22	Have the increased requirements (renova painting) been included in the total tolerance?	☐	☐	
CHECKS DURING PLASTERING				
23	Is the mixing of cement mortar being done correctly, on MS sheet?	☐	☐	
24	Is the plaster in proper line & verticality?	☐	☐	
25	Is the wall being plastered to given specifications, to plumb and even?	☐	☐	
26	Is plastering done above & below all platforms and lofts?	☐	☐	
27	Are the edges of window frames & door frames perfectly vertical?	☐	☐	
28	Are all corners in line and finished properly?	☐	☐	
29	Are switch boxes in position and properly finished?	☐	☐	
30	Is the plaster surface cut properly for skirting?	☐	☐	
31	Has the kind of finishing required been achieved?	☐	☐	
	Normal sponge finish (for POP application) ?	☐	☐	
	Rough finish (tile application/first coat)?	☐	☐	
	Smooth, even finish (textured coatings)?	☐	☐	
POST-PLASTERING CHECKS				
32	Is curing carried out for a minimum of 10 days, with the date of plastering on wall with permanent marker?	☐	☐	
33	Are grooves, drip mould and mortar bands given as per design?	☐	☐	
34	Has lime been properly applied, if required?	☐	☐	
35	Has all the mortar spillage been cleaned?	☐	☐	
Checked by:		Approved by:		
Sign _____		Sign _____		
Name _____		Name _____		
Date _____		Date _____		

14.0 ACTIVITY: GYPSUM WORKS

14.1 KNOWLEDGE OF ACTIVITY

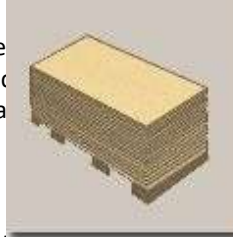
Handling & Storage

Manual off-loading is only advisable on small sites. One man may carry required and this will reduce the risk of damage to the boards. When off-carried on edge.



Generally two men will be required. Boards must always be

The boards should always be stored in a dry & covered place, sheltered from rain. They should be stored on wooden battens, to avoid dampness from floors. These battens should be spaced 400mm apart on a flat surface. Gypboard should never be stacked on edge for long periods as it will warp.



They should be supported on wooden battens 400mm apart on a flat surface.

Cutting

Gypboards can easily be cut either longitudinally or transversely. A cut should be made in the face side of the board by means of a retractable knife. A line may be ruled prior to cutting, or with practice. The rule may be drawn down the board at the required distance from the edge whilst the board is scored with a knife at the end of the rule. The board should then be pressed with both hands and the gypsum core will break in line with the cut in the side face. The board should then be turned over and the other side paper be cut with the knife.

Sawing

Gypboard may be cut using a normal saw. A fret saw or an electric tool may also be used for cutting of curves. When large quantities of board are to be cut, the use of a circular handsaw is advisable.

Making holes/ cut-outs

Electrical or manual carpenters' tools may be used for making cut-outs. Drills should be used when making holes for electrical installations. For holes of diameter less than 50mm a high-speed still drill gives a better result.

Planing

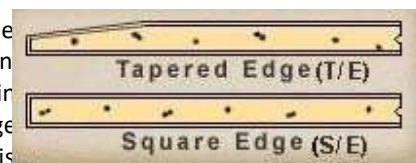
The edges of the board can be pared off using a plane. A file may also be used to level off any irregularities, which may remain after cutting. The edges of both paper faces may be trimmed up if necessary using fine sandpaper.

Bending

Gypboard may also be used to line curved areas. The curvature radius will be 60cms for 9.5 mm Gypboard. Both sides of the Gypboard should be sprayed with water until they are damp. The board should then be bent very slowly and carefully, and fixed into position. Before jointing, the boards should be completely dry.

JOINTING AND FINISHING

Gypboard is available with two different types of edge finish. The choice depends on the type of application and the convenience of using it. For an invisible joint, the gap between each board being filled and finished. Square edge joints present a continuous, smooth and seamless surface. Square edge joints are required incorporating a surface joint strip, or where the board is used in a suspended ceiling system.



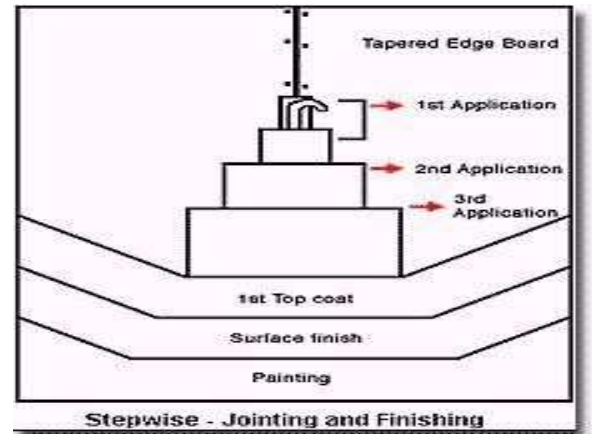
square, and gives a continuous surface. The tapered edge system is ideal for a suspended ceiling system.

Process of Jointing & Finishing

1st application -- Embedding of paper tape into joints by using taping knife.

2nd application -- After first application is dried. Second finishing coat is applied

3rd application -- Final finishing coat application followed with topcoat.



ILLUSTRATIVE CONSTRUCTION PROCEDURE:

(Refer Annexure)

1. **Ceiling**
 - Suspended Ceiling
 - Grid Ceiling
2. **Walls**
 - Half Partition walls
 - Full-length partition walls
 - Wall Lining
3. **Jointing and Finishin**

14.2 TOOLS TO BE USED BY TRADESMEN

Required tools at site for gypsum works are illustrated below:

The Gypboard range of accessories is designed to facilitate ease of handling. Ordinary tools can be used to cut and work with this versatile material. However, to ensure more efficient handling and a better finish, an extensive range of accessories are available.



Taping Knife

100 mm wide tapping knife, flexible steel bladed knife for embedding joint tape.



Applicator

200 mm wide rigid bakelite blade with plastic grip for applying Gypboard jointing compound.



Foot Lifter

For holding Gypboards in position tight against ceiling leaving hands free for fixing.



Electric Drill with Clutch Attachments

Converts standard electric drill

to a power screwdriver suitable for fixing Gypboard to metal frame system.

.....Stud Interlocking Tools.....



Simple action punches through stud to lock two lengths together when using boxed or extended studs.

Crimping Tool

Punches and locks together 0.55 mm sections. Used for crimping at the base and head of the partition or separating wall. Also used in Gypboard steel beam and column encasement system.

Holding Clips

These holding clips are made of PVC in white colour. It can be used for both, 12.5 mm and 9.5 mm Ceiling Panels.

Rawl plug

It is of 12 mm diameter and 38mm long expandable aluminium alloy fastener. It is used to hold, the suspended ceiling at 1220 mm in both directions. Each rawl plug can take load of up to 25 kg.

Connecting Clip

2.64 mm diameter spring steel wire made to suit and hold the ceiling section & intermediate channel together to form a regular frame.

Soffit Cleat

1.8 mm thick and 25 mm wide G.I. Angle with two unequal legs of 27 and 35 mm. Each leg has a hole of 6.5mm in its centre to hold the rawl plug and G.I. angle.

Drywall Screws

Dry wall screws are self-drilling and self-tapping with counter sunk Philips head. These are either oxidized or galvanized to avoid rusting.

Joint Paper Tape



A paper tape of reinforcing tapered edge joints and internal angles in both manual and mechanical jointing systems. It has a centre crease, chamfered edges and slit perforation in four rows.

Supplied in 120 mtr x 53 mm rolls, ten rolls to a pack.

Level Adjuster



Made of metal size 50 x 25 mm. It is used at 1220 mm c/c to hold the H.D. tube section.

Level Clip



Level clip comprises of clip and G.I. wire of 4 mm diameter. The clip is made of spring steel with two equal flanges and holes to suit the wire. It is used in fine line ceiling system to suspend main

'T' from soffit at 1220 mm c/c.

14.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check for line level plumb using the same tools used for block masonry.
2. Ensure the joints are recessed to 4 mm to 5 mm at the joints to the width of the fibre mesh.
3. Ensure fibre-mesh / paper tape is fixed for all joints and horizontal corners.

4. Ensure gypsum corner beads are fixed at all vertical joints.
5. Gap between two boards should not exceed more than 5 mm.
6. Ensure joints of two Gypboards are treated with only jointing compound of Indian Gypsum Limited and not Plaster of Paris (POP).
7. Ensure horizontal bracings are provided for GI frame in partitions of more than 3m high.
8. Ensure horizontal bracings are provided for GI frame in slender partitions or places where switch plates, wall mounted fixtures, etc are fixed.
9. Avoid gypsum walls and partitions in water prone areas like toilets, pantry kitchen etc.
10. The dust from sanding at the joints should be removed either using soft cloth or soft broom before start of painting works.
11. Ensure fisher plug with 35mm long GI screws are used for perimeter channel fixing and black star screws of 25mm are used for fixing boards.
12. For prevention of cracks at joints ensure that:
 - Paper tape is used and pressed properly at the joints.
 - 'V' groove is cut & filled properly at square edge joint.
 - Drywall screws are properly driven with clutch attachment, arresting movement between board & frame.
 - Vibrations of A.C. duct/ generators are not passing onto the ceiling/ partitions.

14.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bob
2. Spirit levels 3m
3. Right angle
4. Measuring tape
5. Related "Good for Construction" drawings

CHECKLIST FOR ON-SITE INSPECTION
ACTIVITY: GYPSUM WORKS (WALL AND CEILING)

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Is the design of the channels plumb and horizontal?	[]	[]	
3	In case of ceilings, are sufficient supports in place?	[]	[]	
4	Are the openings for doors and windows perfect ?	[]	[]	
5	Has proper scaffolding arrangement done with safety measures?	[]	[]	
6	Are the electrical, a/c ducts, fire alarm and access control works complete?	[]	[]	
7	No undulations on the gypsum board	[]	[]	
8	Are the required tools available on-site?	[]	[]	
9	Are there any specific requirements of the client?	[]	[]	
CHECKS DURING EXECUTION				
10	Is the fibre tape being fixed during the joint filling ?	[]	[]	
11	Is the distance between channels exactly 2 feet ?	[]	[]	
12	Is the distance between ceiling supports less than 4 feet?	[]	[]	
13	Are the joints between the boards perfect?	[]	[]	
14	Is the work being carried out by trained personnel ?	[]	[]	
POST-EXECUTION CHECKS				
15	Is the alignment perfect ?	[]	[]	
16	Are the wall and ceiling surfaces at right angles?	[]	[]	
17	Check for undulations	[]	[]	
18	Is the distance between the floor and ceiling perfect ?	[]	[]	

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

15.0 ACTIVITY: WATERPROOFING

15.1 KNOWLEDGE OF ACTIVITY

15.1.1 FLAT ROOFS AND SLOPED ROOFS

1. The surface to be waterproofed should be prepared thoroughly by chipping all cement mortar deposits/ loose material, dust etc. using a chisel, wire and coir brush.
2. The surface, which is to be waterproofed, should be ponded with water and any dampness / leakage should be marked in the ceiling below the terrace. Wherever leakage persists, 12mm diameter GI nipples should be fixed depending on the depth of dampness, on such weak locations in the ceiling, and is pressure grouted with neat cement slurry admixed with expansive grouting.
3. 'V' grooves should be cut along the concrete / brickwork junctions on joints. Surface cracks if any should be filled with polymer modified diluted solution and also in cut-outs, around the sleeves, drain pipe joints and filled with sealant.
4. Every upturn and pipe outlet should be reinforced with fibre mat between the two coats.
5. Two coats of Acrylic polymer based waterproofing system or equivalent should be applied on terrace and parapet walls. One coat of neat cement mixed with polymer additive should be applied as bonding coat.
6. A protective screed of 20-25mm thick should be provided with proper slopes. The treated area should be plastered to required slope as per drawing and cured for a minimum of 3-4 days.
7. To ensure water tightness, the treated area shall be filled with water and tested.
8. Over the treated surface, weathering course tiles should be laid on the terrace maintaining a proper slope.

15.1.2 SUNKEN AREAS/ SLABS

1. The surface, which is to be waterproofed, should be cleaned thoroughly from all loose material, and dust, using wire and coir brush.
2. The surface, which is to be waterproofed, should be ponded with water and any dampness/ leakage should be marked in the ceiling below the terrace. Whenever leakage persists, 12mm diameter GI nipples should be fixed depending on the depth of dampness, on such weak locations in the ceiling and it is pressure grouted with neat cement slurry admixed with expansive grouting.
3. 'V' grooves should be cut along the concrete / brickwork junctions on joints. Surface cracks if any should be filled with polymer modified diluted solution and also in cut-outs, around the sleeves, drain pipe joints and should be filled with sealant.
4. Two coats of Acrylic polymer based waterproofing system should be applied as a bonding coat on the treated surface.
5. All joints between the beam and blockwork should be covered with the fibre mat.
6. Plaster the treated area with neat cement and high grade waterproofing additive to the required slope as per drawing to protect the coating from wear and tear.
7. The treated area should be subjected for testing by ponding water at least for a depth of 150mm for 24hrs.
8. The chasing for concealed plumbing, and electrical works should be completed before the start of waterproofing and the chasing must be treated with an agent such as FORMDEX.
9. Over the treated area, stone dust should be filled and roughly finished with 75mm thick screed concrete 1:2:4 to facilitate laying of tiles. The screed concrete floor level should be 20mm below the main floor, to facilitate a level difference between main area and toilet after tiling and to prevent toilet water entering the main area.

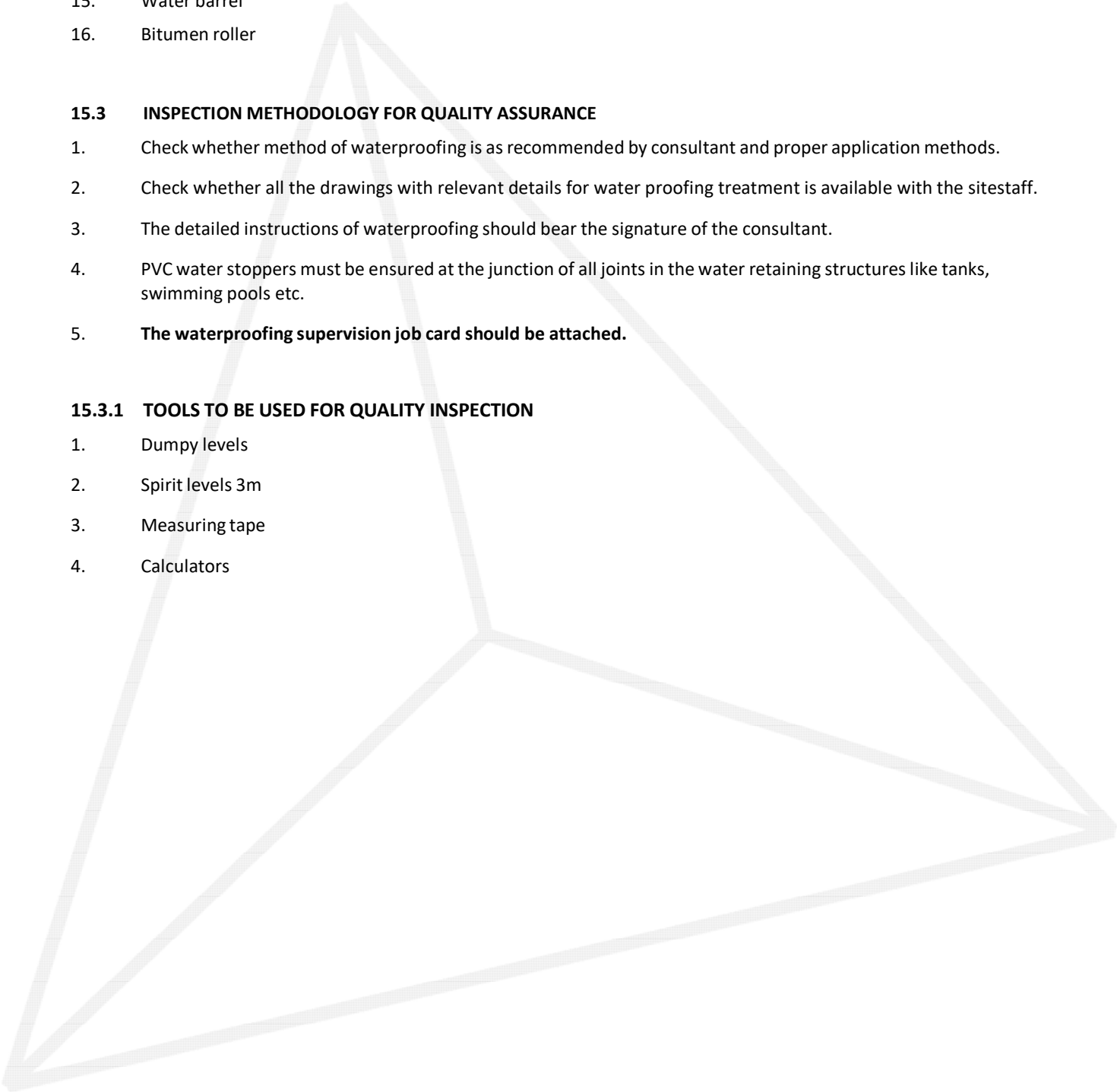
15.1.3 METHODOLOGY OF W.P. IN TOILET AND SHOWER / WASH AREAS USING MUREXIN COMPOUND

1. Ensure the cement plastering for all toilet and shower areas are plumb, and at right angles to the facing walls, ceiling and floor levels. Further the plaster should have an even surface and a slightly rough texture. The flooring during the finishing stage must be adjusted to the slope of screed level set towards water-outlets.
2. After sufficient time for setting of plaster, clean the plastered surface using a mason's brush of all dirt and dust particles. Before each application, the base must be dry and free of all dust particles and foreign materials.
3. Mark out the areas to be waterproofed, with the help of a pencil, measuring tape and spirit levels. Separate this area from the rest using masking tape.
4. Apply the base coat MUREXIN LF as the first coat. This coat is done uniformly using the Masons brush over the entire area. Allow this coat to dry for about 20 minutes. Let the drying process be natural and do not subject the area to any wind-draft.
5. During the drying period of the base-coat, the two component sealing material MUREXIN, made up of the powder component and the liquid component should be mixed slowly and evenly in the ratio of 2:1, using the **mechanical stirrer** (imported from Germany for the purpose). For example, for every 2 Kg of Powder component mix with 1 Litre of the liquid compound. Stir this mixture slowly and uniformly into a homogenous mass free of any knots or nodules (Mixing time- 3 minutes).
6. Now the well-mixed sealing medium may be applied uniformly using the 6mm teathed trowels first vertically in all the corners, in the spray areas of the shower area up to a height of 2 meters and in the rest of the toilet area to a height of 0.30 meters. Subsequently the MUREXIN sealing strip (caulking strip) will be placed along the corners and fixed uniformly using the right edged trowel and pressed firmly along the corners. Now please ensure that the sealing strip – also called the caulking strip, is fixed firmly in the corner ensuring there is no air gap.
7. Subsequently the sealing compound is applied uniformly using the 6 mm-teathed trowel ensuring the thickness of the applied layer is maintained evenly at 1 mm. In the region where the pipe connections project from the plastered area, overlap such areas with the strips and apply the compound to fix them. After sufficient time for drying (About 24 hours), the second layer of 1 mm layer is to be applied thus bringing the total thickness of the application to 2 mm. Now remove the masking tape.
8. After allowing about 24 hours for drying, the walls are tiled, using “**MUREXIN-Flexi-mortar**” adhesive using the 6 mm teeth trowels.
9. After the walls are completely tiled, the flooring tiling is also taken up in a similar fashion. This means repetition of the procedures 1 to 8 before the floor tiles are brought on, so that the flooring is also well water proofed and sealed.

15.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the waterproofing gang are:

1. Dumpy levels
2. Line dori
3. Spirit level
4. Tube level
5. Plumb bob
6. Aluminium straight edge
7. Trowels
8. Mason's brush
9. Mechanical Stirrer (German)
10. 6mm teathed trowel

- 
11. Right edged trowel
 12. Finishing boards and sponge
 13. Chipping tools
 14. Hammer
 15. Water barrel
 16. Bitumen roller

15.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check whether method of waterproofing is as recommended by consultant and proper application methods.
2. Check whether all the drawings with relevant details for water proofing treatment is available with the sitestaff.
3. The detailed instructions of waterproofing should bear the signature of the consultant.
4. PVC water stoppers must be ensured at the junction of all joints in the water retaining structures like tanks, swimming pools etc.
5. **The waterproofing supervision job card should be attached.**

15.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Dumpy levels
2. Spirit levels 3m
3. Measuring tape
4. Calculators

CHECK LIST FOR ON-SITE QUALITY

ACTIVITY: WATERPROOFING

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks/ Clarifications
PRE-EXECUTION CHECKS				
TOILET AND SHOWER AREA:				
1	Is the cement plastering plumb and at right angles to the facing walls, ceiling and floor levels?	[]	[]	
2	Does the plaster have an even surface and slightly rough finished in its structure?	[]	[]	
3	Is the flooring in its finishing stage with the required screed level set towards the water-outlets?	[]	[]	
4	Is the plastered surface free from all dirt, dust particles, fats and other foreign particles?	[]	[]	
5	Has the waterproofing area, marked out to a height of 2 meters, width 1 meter in shower area and in the rest of toilet area to a height of 0.30 meters from the floor level?	[]	[]	
6	Is the marking done using a pencil, measuring tape and spirit levels?	[]	[]	
7	Has the waterproofing area bordered using a masking tape?	[]	[]	
8	Are the necessary tools available?	[]	[]	
CHECKS DURING EXECUTION				
9	Has the base coat been applied uniformly on the entire waterproofing area?	[]	[]	
10	Has the drying process been natural for about 20 minutes and not subjected to any wind-draft?	[]	[]	
11	Has the sealing medium been applied uniformly, firstly, vertically at all the corners and in the spray areas of the showering area?	[]	[]	
12	Has the sealing strip (caulking strip) been placed subsequently along the corners and fixed uniformly and pressed firmly ensuring that there is no airspace in-between?	[]	[]	
13	Has the sealing compound applied subsequently with a uniform thickness of 1mm?	[]	[]	
14	Has the area of pipe connections jetting out from the plastered surface overlapped with the strips and the compound is applied uniformly?	[]	[]	
15	Has the second layer of sealing compound of 1 mm thick applied after a drying period of 24 hours of first layer?	[]	[]	
POST-EXECUTION CHECKS				
16	Has the masking tape been removed?	[]	[]	
17	Are the walls tiled after a drying period of 24 hours?	[]	[]	

Checked by:

 Sign
 Name
 Date

Approved by:

 Sign
 Name
 Date

CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: WATERPROOFING				
Project:			Date:	
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
SLOPED ROOFS:				
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Is the surface clean and free from all laitance?	[]	[]	
3	Has the surface been pre-wet?	[]	[]	
4	Are the necessary tools available on-site?	[]	[]	
CHECKS DURING EXECUTION				
5	Is the waterproofing material/ compound, fresh?	[]	[]	
6	Has the ridge and eaves been treated separately, by reinforcing with fibre mat between two coats?	[]	[]	
POST-EXECUTION CHECKS				
7	Has air curing been done for 3 days?	[]	[]	
8	Has protective screed of 20-25mm thick provided?	[]	[]	
9	Has tiling work carried within 7 days of waterproofing?	[]	[]	
10	Has the mechanical stirrer been cleaned?	[]	[]	
<u>Checked by:</u>		<u>Approved by:</u>		
Sign _____		Sign _____		
Name _____		Name _____		
Date _____		Date _____		

CHECKLIST FOR ON-SITE INSPECTION**ACTIVITY: WATERPROOFING**

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
FLAT ROOFS:				
1	Name, date and number of the drawing			
PRE-EXECUTION CHECK				
2	Is the surface clean and free from all laitance?	[]	[]	
3	Has the cement mortar covering done at the upturns?	[]	[]	
4	Has the surface been pre-wet?	[]	[]	
5	Are the necessary tools available?	[]	[]	
CHECKS DURING WATERPROOFING				
6	Have the upturns and pipe outlets been reinforced with fibre mat between two coats?	[]	[]	
7	Is the material in fresh condition?	[]	[]	
8	Has the coating been done in two coats?	[]	[]	
POST-EXECUTION CHECKS				
9	Has protective screed of 20-25 mm thick provided with proper slopes?	[]	[]	
10	Has air curing been done for 3 days?	[]	[]	
11	Has the mechanical stirrer been cleaned?	[]	[]	

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: WATERPROOFING				
Project:				Date:
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
SUNKEN AREAS:				
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Is the surface clean and free from all laitance?	☐	☐	
3	Has the surface been pre-wet?	☐	☐	
4	Has cement mortar covering been done at the upturns?	☐	☐	
5	Are the necessary tools available?	☐	☐	
6	Has the joint between the beam and blockwork been treated with fibre mat?	☐	☐	
7	Has the opening left for sleeves been treated to full thickness of section pipe?	☐	☐	
8	Has chasing for concealed plumbing, electrical etc. been done?	☐	☐	
9	Has the surface been pre-wet?	☐	☐	
CHECKS DURING WATERPROOFING				
10	Is the material in fresh condition?	☐	☐	
11	Has the coating been done in two coats?	☐	☐	
12	Has chasing been treated with FORMDEX?	☐	☐	
POST-EXECUTION CHECKS				
13	Has protective screed of 20-25mm thick provided with proper slopes?	☐	☐	
14	Has air curing been done for 3 days?	☐	☐	
15	Has the floor been treated with two coats?	☐	☐	
16	Has the treatment been done upto 2' above FFL and shower areas upto 7'?	☐	☐	
17	Has the opening been covered with concrete after fixing of pipes and also covered with fibre reinforcement?	☐	☐	
18	Has the mechanical stirrer been cleaned?	☐	☐	
Checked by:		Approved by:		
Sign _____		Sign _____		
Name _____		Name _____		
Date _____		Date _____		

16.0 ACTIVITY: PAINTING

16.1 KNOWLEDGE OF ACTIVITY

16.1.1 STORAGE OF PAINT

All containers of paint, thinners and allied materials shall be stored preferably in a separate room. The room shall be well ventilated and free from excessive heat, sparking and direct rays of the sun. The lids of containers shall not be opened except when using the paint. The paint shall be used before the expiry of its shelf life marked on the containers.

16.1.2 CHECKS PRIOR TO START OF WORK

1. The approved and duly certified shade and type of paint shall be made available at site in sufficient quantity.
2. Ensure that the wall and ceiling surfaces are completely dry prior to the application of paint.
3. Ensure that all furniture and the flooring is protected before starting the painting works.
4. Proper scaffolding arrangement with safety measures to be taken.
5. All loose particles, dirt and dust must be thoroughly scrubbed from the surface using sandpaper.
6. All painting accessories like brush, roller, mixing tray etc to be thoroughly cleaned and washed outside the working premises before starting the works.
7. Primer application with brush dilution ratio not to exceed 1:1 with water as thinner solvent.
8. A drying period of 24 hours is required before the putty application.
9. Application of 2 putty coats, ensure the first coat is thoroughly dried before applying the final coat.
10. Putty to be applied uniformly to cover all undulations
11. Proper sanding of surfaces to render a smooth surface prior to the application of paints. Ensure that the dust on the surface is thoroughly wiped off after sanding the puttied surface.

16.1.3 GUIDELINES TO OBSERVE WHILE PAINTING

1. First coat paint to be applied with brush and finished with roller preferably with single mix and dilution ratio not to exceed the below said criteria. i.e., 2 parts of paint to 1 part of water.
2. Ensure a drying period of 4 to 6 hours before application of the final coat of paint.
3. All external walls and semi-exposed areas such as balconies and utility walls, to be given a textured finish.

16.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the painting gang are:

1. Paint brushes
2. Rollers
3. Trowels
4. Line dori
5. Tube levels
6. Plumb bobs
7. Aluminium straight edge
8. Levelling threads

9. Masons brushes and buckets

16.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Flagging off with rounded pebbles for a distance of 50-75cm from the wall (away from the building) to avoid discolouring of external painted walls.
2. The colour tone throughout the checked surface should be uniform.
3. The concentration in the mixture must be uniform [for paints mixed manually on site].
4. No overlapping to be seen – overlapping could appear due to interruptions in painting an entire surface.
5. Use halogen lamps and check for
 - Undulations on the surface
 - Corns on the surface
 - Structure of the painted surface
 - Shadows appearing on the painted surface
 - Any smudges (due to touch ups in punning)
 - Changes in the concentration of the paint

16.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Spirit levels
2. Halogen lamps
3. Related “Good for Construction” drawings and specification from Architects

CHECKLIST FOR ON-SITE INSPECTION**ACTIVITY: PAINTING**

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-PAINTING CHECKS				
2	Has the shade, type of paint been approved by the architect and duly certified?	[]	[]	
3	Has it been ensured that wall and ceiling surfaces are completely dry?	[]	[]	
4	Have all the loose particles, dirt and dust been scrubbed off from the surface?	[]	[]	
5	Has proper scaffolding arrangement been done With safety measures ?	[]	[]	
6	Are the required tools available?	[]	[]	
7	Are there any specific requirements of the client?	[]	[]	
CHECKS DURING PAINTING				
8	Is the primer application done?	[]	[]	
9	Has the putty been applied after 24 hours of primer application?	[]	[]	
10	Has the 2nd coat of putty been applied after the 1st coat has completely dried?	[]	[]	
11	Have all undulations been covered using putty?	[]	[]	
12	Has sanding of the surfaces been done properly to render a smooth surface?	[]	[]	
13	Has the dust from the surface been thoroughly Wiped off after sanding the puttied surface?	[]	[]	
14	Has it been ensured that the first coat of paint is applied and finished with roller?	[]	[]	
15	Has it been ensured that the final coat is applied after 4 to 6 hours of first coat?	[]	[]	
POST-EXECUTION CHECKS				
16	Has it been ensured that the area which is painted is protected?	[]	[]	
17	Has the quality of the work been certified by concerned authority?	[]	[]	

Checked by:

Sign
Name
Date

Approved by:

Sign
Name
Date

17.0 ACTIVITY: TILING

17.1 KNOWLEDGE OF ACTIVITY

17.1.1 CHECKS PRIOR TO START OF WORK

STORAGE OF TILES

1. The tiles shall be stacked on edges on regular platforms in proper layers and tiers. Height of stack shall not be more than 1 meter. During unloading, care shall be exercised to avoid breakage.
2. Tiles of different quality, size and thickness shall be stacked separately. Special care should be taken to ensure different batch materials do not get mixed up.
3. Tiles supplied in crates shall be stored as such. The crates shall be opened one at a time as and when required for use. Tiles supplied in cartons shall be handled with care. Within the site, the tiles shall be transported on platform trolleys.
4. Manufacturer's test certificate to establish conformity with relevant IS Codes shall be furnished by supplier.

17.1.2 WALL TILING

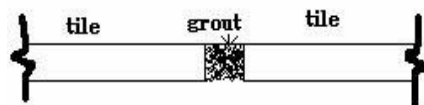
1. All chasing for the concealed piping, and electrical conduiting etc. shall be carried out before commencement of work.
2. In order to obtain uniform tonality, it is recommended to mix tiles from different boxes for laying to great, harmonious tonality.
3. Backing plaster shall be initially carried out on the brick / block walls so as to achieve a background that is fairly to plumb and at right angles in all corners. This plaster shall be furnished rough to provide key while fixing of the ceramic tiles.
4. The backing plaster shall be carried out not earlier than 28 days after the masonry has been constructed. So also, the ceramic tiling shall be fixed only after allowing a period of 28 days after the plastering, to allow for shrinkage of the plaster.
5. Cutting of tiles should be kept to the minimum. Cut tiles shall finish into internal corners and floor, wherever possible.
6. Make sure the distance from the skirting board or worktop to the top of the batten is no more than one whole tile allowing the grouting gap. The main body of whole tiles - known as the 'field' - is fixed first and the adhesive is allowed to dry. Then the border or edge tiles are fitted.
7. Tiles shall be soaked in water for at least two hours prior to use. Neat cement paste shall be battered on the back of the tile pressed on to the background surface and tapped gently with a wooden / rubber mallet. Any gap between the tile and the background shall be filled with cement paste so as to avoid hollowness behind tiles.
8. Wall tiles shall be fixed with a joint of 2.5mm between tiles. Proprietary spacers shall be used for achieving a uniform joint width in all directions.
9. Great care shall be exercised to keep all courses perfectly horizontal and perfectly vertical. From time to time, hold a spirit level or straight edge across the tile surface to ensure straightness.
10. All corners shall be provided with proprietary PVC corner strips and tiling started beyond the strip.
11. The joints shall be filled with a proprietary non-shrink waterproof filler material of matching colour after a minimum gap of 24 hours and finished slightly recessed.

17.1.3 TILE FLOORING

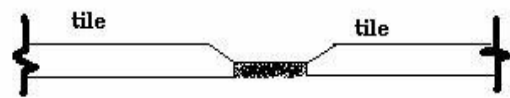
1. The concrete base to receive flooring shall be cleared off mortar dropping etc. and cleaned thoroughly.
2. Cement mortar (1:3) screed shall be spread evenly in the room based on the "level dots" made already and tamped. The recommended thickness of mortar should be in the range of 20-25 mm.
3. In order to obtain uniform tonality, it is recommended to mix tiles from different boxes for laying to great, harmonious tonality.
4. Cement slurry of 'Honey' like consistency (1 bag to 60 litres of water) shall be prepared and spread on the mortar bed to an extent that can be covered with the tiles within half an hour. The tiles shall be placed on the slurry coat matching all four corners and fixed in place with the help of a wooden / rubber mallet.
5. Alternatively, tiles can be laid on a bed of adhesive using plastic spacers, to create a gap between tiles, which can be grouted later on. Lay around one sq. metre of adhesive at a time and press the tiles into place, with correct gap provided by spacers, available in different thickness.
6. Proper slopes shall be given in flooring of toilets and balconies to ensure quick drainage of water on the surface.
7. Floor tiles shall be laid with minimum joint width, which shall be grouted with a proprietary non-shrink, waterproof filler material.
8. After the tiles have been laid, clean the joints thoroughly with a brush to remove loose mortar before it dries up.
9. For the tiles to set properly it is essential to allow a 24-hour setting period before filling. DO NOT ALLOW ANYONE TO WALK ON THE FRESHLY TILED SURFACE.

17.1.4 GROUTING

1. Do not use Indian grout. Always use imported grout, preferably German.
2. The gaps between ceramic tiles need to be filled with grout. Plain and coloured ready mixed grouts are also available. To spread the grout, use a rubber squeegee making sure it is pushed well into the gaps between the tiles. Remove excess grout regularly as it is difficult to get off once it has been allowed to harden. Wipe off the extra grouting (before it sets hard) with a damp sponge and polish with a dry cloth.
3. Filling of grout in the floor will be the last activity only to be done along snagging. All grouts to be of lighter shade of the tile.

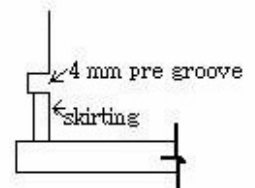


FLUSH (STRAIGHT EDGED TILE)



RECESSED (CHAMFERED TILE)

4. Chipped tiles should not be used. All ceramic and terracotta tile should be immersed in water 12 hrs before laying. Stick the name of the tile mason over the tiled area done by him
5. For skirting using vitrified or ceramic tile the wall level and tile level should be flush with 4 mm pre groove. However avoid using cut tiles for skirting unless skirting tiles are factory manufactured and come with chamfered edges. Granite / Marble skirting is preferred.
6. Cure all tiling works and joint filling works for 3 days.



skirting details

17.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the tiling gang are:

1. Trowels
2. Line dori
3. Tube levels
4. Plumb bobs
5. Measurement Tape
6. Spirit levels 1-2m
7. Sand sieve
8. Aluminium straight edge
9. Right angle
10. Chipping Tools
11. Masons hammer
12. Rubber hammer
13. Levelling threads
14. Tile cutter
15. Masons brushes and buckets
16. Mortar boxes

17.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check for conformance of the tiled pattern, specifications and tile grout colour to the approved drawings.
2. Check for uniformity in line, level and grout thickness visually.
3. Check of straightness of tiled surface. The fresh tiled surface should be of proper level using a spirit level / Aluminium straight edge or line dori.
4. Ensure the cement and the sand have been checked / tested prior to tiling.
5. Ensure that no tile is broken / cracked and the joints are well filled.
6. Tap the tiled surface to check for hollowness. The tiled surface should be covered with POP / tarpaulin sheets to prevent damage to the tiled surface.

17.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bobs
2. Spirit levels 1-2m
3. Aluminium straight edge
4. Measuring Tape
5. Approved "Good for Construction" Drawings

CHECKLIST FOR ON-SITE INSPECTION

ACTIVITY: FLOOR TILING

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name,date and number of the drawing			
PRE-TILING CHECKS				
2	Has the surface been prepared for tiling?	☐	☐	
3	Is the surface smooth, free from dust and other contamination?	☐	☐	
4	Has the setting out been done?	☐	☐	
5	Are all pre cursory works completed?	☐	☐	
6	If tiles are used, have they been soaked for atleast 30 minutes?	☐	☐	
7	Has the thickness of mortar bed checked?	☐	☐	
8	Are the required tools available?	☐	☐	
9	Are there any specific requirements of the client?	☐	☐	
10	Has the tile code number and tile name ensured?	☐	☐	
CHECKS DURING TILING				
11	Has slope been provided wherever required?	☐	☐	
12	Has the laying procedure been followed?	☐	☐	
13	Has it been ensured that back of the ceramic tiles is completely coated with cement slurry?	☐	☐	
14	Have the tiles been gently tapped after laying on the motar bed?	☐	☐	
POST-TILING CHECKS				
15	Have the joints been cleaned to remove loose mortar?	☐	☐	
16	Are the joints properly aligned?	☐	☐	
17	No hollow sound on the tile when tapped	☐	☐	
18	Is the finished floor, level?	☐	☐	
19	Are all the laid floor tiles properly covered?	☐	☐	
20	Has it been ensured that grouting is only done after 24hrs of laying of tiles?	☐	☐	
21	Has the area been barricaded so as not to allow foot movement?	☐	☐	

Checked by:

Sign _____
 Name _____
 Date _____

Approved by:

Sign _____
 Name _____
 Date _____

CHECKLIST FOR ON-SITE INSPECTION

ACTIVITY: WALL TILING

Project:		Date:	
Location:			

NOTE:- Please ☒ appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-TILING CHECKS				
2	Has the surface been prepared for tiling ?	[]	[]	
3	Is the surface smooth, free from dust and other contamination?	[]	[]	
4	Are all pre cursory works completed?	[]	[]	
5	Are the required tools available?	[]	[]	
6	Are there any specific requirements of the client?	[]	[]	
7	Has the tile code number and tile name been ensured?	[]	[]	
8	Is the cement less than 3 months old?	[]	[]	
CHECKS DURING TILING				
9	Are the tiles moist before placing in mortar?	[]	[]	
10	Have the edges been checked for straightness?	[]	[]	
11	Is the tile surface even and in one level?	[]	[]	
12	Have the tiles been coated with a layer of cement slurry?	[]	[]	
13	Have the tiles been gently tapped after laying on the mortar bed?	[]	[]	
14	Have the tiles been mixed from different boxes?	[]	[]	
POST-TILING CHECKS				
15	Are the joints less than 3mm in width?	[]	[]	
16	Are the joints properly aligned?	[]	[]	
17	No hollow sound on the tile when tapped	[]	[]	
18	Have the edges been checked for straightness?	[]	[]	
19	Are all the laid floor tiles properly covered?	[]	[]	
20	Has the grouting been done?	[]	[]	
21	Is the tile surface plumb?	[]	[]	
22	Have the setting of joints been done only after a minimum of 24 hours?	[]	[]	

Checked by:

Sign

Name

Date

Approved by:

Sign

Name

Date

18.0 ACTIVITY: GRANITE & MARBLE WORKS

18.1 KNOWLEDGE OF ACTIVITY

18.1.1 STORAGE OF GRANITE AND MARBLE

1. The slabs/ tiles shall be stacked on edges on regular platforms under cover. During unloading, care shall be exercised to avoid breakage.
2. Tiles of different quality, size and thickness shall be stacked separately.
3. Within the site, the tiles shall be transported on platform trolleys.

18.1.2 RECOMMENDED TILE LAYING PROCEDURE

18.1.2(a) CHECKS PRIOR TO START OF WORK

- The marble / granite tiles shall be ordered in sizes as determined by site dimensions to avoid cutting at site.
- The material received at site shall be checked for the following defects prior to acceptance.
- Tiles of same type but with distinctly different colour or texture shall be rejected outright
- Tiles shall be free from holes, seams, shakes, pockets, stains and other effects and shall be of uniform colour and texture.
- Dimensional tolerances shall be restricted to
 - Length + 0.5mm Width + 0.5mm
 - Area + 0.5mm Plane + 1 / 500
- Ensure that the site is cleaned, taking care to remove any loose concrete, mortar or other substances.
- All chasing for the concealed piping and electrical conduiting etc. shall be carried out before commencement of work.
- Make bull mark levels according to architectural specifications.
- Design mix of Cement Mortar (1:6 or 1:8) to be followed.
- Ensure that the tiles to be laid are matched, numbered and available in the required number for laying on the site.
- Tiles are dry matched in the yard. They are then cut to the exact size required, and numbered in the sequence and are laid at site in exactly the same order.
- For marble works, coat the bottom with sealant before laying. It is good practice to seal the to also after laying and polishing. This is done due to the high porosity of marble.

18.1.2(b) CHECKS DURING EXECUTION OF WORK

1. As per drawing, work should be started by taking right angles for existing walls.
2. Laying starts as per the previously numbered tiles.
3. The surface on which granite or marble is to be laid is watered. A bed of mortar is placed on the floor, and tiles are put into position with white cement slurry.
4. Levelling is done with an aluminium straight edge and rubber hammer.

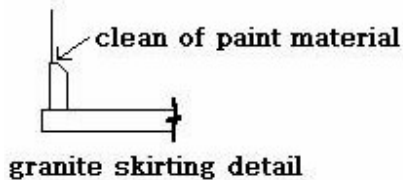
5. If there is any slope, it has to be decided in the bull itself.
6. Joint filler should make a joint filling material as per colour of the tiles.
7. Putty blade is used to rake all joints and fill the joint material neatly as the joints will be paper joints.
8. For fixing tiles to wall, suitable stainless steel mechanical anchors shall be used.

18.1.2(c) POST-EXECUTION CHECKS

1. Stick the name of the tile mason on the job done by him.
2. All surfaces & edges, which will remain exposed after installation, shall be polished.
3. Cure all tiling works and joint filling works for 3 days.
4. After work is complete, ensure that it is covered with plastic sheet and Plaster of Paris.

18.1.2(d) SKIRTING

1. 10 mm tiles are used for skirting, and the height of the tile is 100 mm.
2. Skirting is chamfered at the edge to 4 mm. and fixed so that after fixing the tile 4 mm of straight edge and 4 mm chamfered edge is seen outside. The skirting goes into the plaster by about 2 mm.
3. Check the right angle that the skirting makes with the floor tile.
4. For skirting with granite the skirting will be pushed out as following



18.1.2(e) COPING

1. The back of the granite should be pasted with Araldite and rough pebbles should be affixed to ensure proper bonding.
2. Measure granite as per the specifications of the architect
3. The coping may be half - or full - bull nosed.
4. Tiles for treads, coping etc. shall be supplied with rounded / profiled edges, grooves etc. as shown in the drawings.
5. Cut out in marble / granite tiles shall be cut with a rebated edge to allow faceplates to finish flush with the finished surface.

18.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the tiling gang are:

1. Trowels
2. Line dori
3. Tube levels

4. Plumb bobs
5. Measurement Tape
6. Spirit levels 1-2m
7. Sand sieve
8. Aluminium straight edge
9. Right angle
10. Chipping Tools
11. Masons hammer
12. Rubber hammer
13. Leveling threads
14. Tile cutter
15. Angle grinder
16. Masons brushes and buckets
17. Mortar boxes

18.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check for conformance of the tiled pattern and specifications to the approved drawings.
2. Check for uniformity in line and level visually.
3. Check of straightness of tiled surface. The fresh tiled surface should be of proper level using a spirit level / Aluminium straight edge or line dori.
4. Ensure the cement and the sand have been checked / tested prior to tiling.
5. Ensure that the granite / marble is not broken / cracked and joints are well filled. In case of cracks near the edges, these cracks to be filled using epoxy compound.
6. After joint filing, ensure that joints are made even using an angle grinder.
7. Tap the tiled surface to check for hollowness. The tiled surface should be covered with POP and tarpaulin sheets to prevent damage to the tiled surface.
8. Ensure while fixing of granite doorjambs, proper packing with cement paste throughout the entire contact surface of the granite slab and blockwork. This surface should be 90° to the floor.
9. During fixing of windowsills, ensure that the concerned mason immediately removes extra cement slurry / dripping.
10. Ensure chamfering of skirting is as per specifications.
11. Treads and risers to be of uniform dimension and thickness.

18.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bobs
2. Spirit levels 1-2m
3. Aluminium straight edge
4. Measuring Tape
5. Approved "Good for Construction" Drawings

CHECKLIST FOR ON-SITE INSPECTION**ACTIVITY: GRANITE / MARBLE TILING**

Project:		Date:	
Location:			

NOTE:- Please tick appropriate box or enter readings as per requirements

Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-TILING CHECKS				
2	Has floor slab been prepared for granite work ?	[]	[]	
3	Is the floor free from dust and other contamination?	[]	[]	
4	Are all pre cursory works completed?	[]	[]	
5	Have the bull markings been done according to architectural specifications?	[]	[]	
6	Have the tiles been matched, numbered and available in required number for laying?	[]	[]	
7	Are the required tools available on-site?	[]	[]	
8	Are there any specific requirements of the client?	[]	[]	
9	Are the tiles dry matched and cut to exact size ?	[]	[]	
10	Has the tile code number and tile name ensured?	[]	[]	
CHECKS DURING TILING				
11	Has the work been started by taking right angles for existing walls?	[]	[]	
12	Has the laying procedure been followed?	[]	[]	
13	Has the laying been started as per the previously numbered tiles?	[]	[]	
14	Is the floor moist and provided with cement slurry for bonding?	[]	[]	
15	Has the levelling been done with an aluminium straight edge and rubber hammer?	[]	[]	
16	Has the joint filling been done as per colour of the Granite / marble?	[]	[]	
17	Have the tiles been gently tapped after laying on the mortar bed?	[]	[]	
POST-TILING CHECKS				
18	Have the joints been cleaned to remove loose mortar?	[]	[]	
19	Are the joints properly aligned?	[]	[]	
20	Is work carried out to plump and horizontally to line?	[]	[]	
21	Is the finished floor level?	[]	[]	
22	Are all the laid floor surfaces properly covered?	[]	[]	
23	Has it been ensured that grouting is done after 24hrs of laying of tiles?	[]	[]	
24	Has the area been barricaded so as not to allow foot movement?	[]	[]	

Checked by:

Sign _____
Name _____
Date _____

Approved by:

Sign _____
Name _____
Date _____

19.0 ACTIVITY: METAL WORKS

19.1 KNOWLEDGE OF ACTIVITY

1. Refer latest duly approved "Good for Construction" drawings.
2. If the fabrication works are done at site, ensure proper electrical connections and proper working platform.
3. All the joints should be properly welded from either sides.
4. Excess weld should be grinded off, but ensure too much of grinding should be avoided on welded joints as it may tend to weaken the joints.
5. After grinding the edges and all corners should be finished off with metal paste.
6. Allow the metal paste to completely dry and sand the parts to perfection.
7. Avoid chamfered or filleted edges; ensure joints to be in perfect plane and perpendiculars.
8. Apply one coat of metal primer with brush before fixing.
9. Ensure rosettes are placed in position before fixing the grills or railings.
10. Painting 2 coats enamel for railings after the completion of external painting works.
11. Anchor bolts to be used instead of coach screw, for fixing railing to concrete/ blockwork.
12. Rosette detail to be given for all holdfasts going into wall/ floor.
13. Rosette should be painted keeping it away from the wall and after drying pushed to fix in place using spot adhesive.
14. All mortar spillage stuck to MS works shall be cleared after the day's work. It is good practice to cover the grill with a plastic cover while the plastering is in progress.

19.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work.

1. Trowels
2. Line dori
3. Sand Sieve
4. Tube levels
5. Plumb bobs
6. Measurement Tape
7. Spirit levels 1-2m
8. Right angle
9. Chipping Tools
10. Masons trowels
11. Floating trowel
12. Masons hammer
13. Leveling threads

19.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

Ensure plastering is cured for entire recommended period

19.3.1 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Spirit levels 1-2m
2. Measuring tape
3. Related "Good for Construction" drawings

CHECKLIST FOR ON-SITE INSPECTION				
ACTIVITY: METAL (MS) WORKS				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-EXECUTION CHECKS				
2	Has the area been prepared for executing the work?	[]	[]	
3	Are proper electrical connections and working platform available, in case of on-site fabrication	[]	[]	
4	Are the required tools and safety equipments(scaffolding) available?	[]	[]	
CHECKS DURING EXECUTION				
5	Have all joints been welded from both sides and excess weld ground?	[]	[]	
6	Has metal paste been applied to all edges and corners?	[]	[]	
7	Have all parts been sanded?	[]	[]	
8	Are rosettes in position before fixing?	[]	[]	
9	Have all coats of metal primer and paint been applied?	[]	[]	
POST-EXECUTION CHECKS				
10	Have all rosettes been fixed in place using spot adhesive?	[]	[]	
11	Have all mortar spillage stuck to MS works been cleared?	[]	[]	
Checked by:		Approved by:		
Sign		Sign		
Name		Name		
Date		Date		

20.0 ACTIVITY: WOOD WORK

20.1 KNOWLEDGE OF ACTIVITY - DOORS

1. Door fixing involves fixing of three components - Door Frames, Architraves and Shutters

Door fixing should be done in such a way that the frame binds well with the wall.

The door frame must be plumb to ensure shutters close without nudging

The colour of the shutter, architrave and door frame should match to give a uniform look
2. The doorframe is fixed only after all civil works for that area are completed. The first coat of Painting and the flooring should be complete.
3. While unloading, shifting, handling and stacking, care shall be taken to avoid dragging one unit over the other as it may cause damage particularly to decorative surfaces. The material should be lifted and carried preferably flat to avoid damage to corners/sides. If the materials are received in crates, they shall be stacked as such and removed from the crate as and when required for the work
4. The Site Opening sizes to be perfect and in conformance to actual doorframe size. Aluminium templates / sub-frames must be adopted on-site for all door and window openings. Calibrated Aluminium templates should be used for finishing openings like doors, window ventilators, exhaust fan opening, AC openings etc. Sufficient gap should exist between the finished wall surface and frame for the Worth Glue. (10 mm recommended)
5. All dimensions i.e. height, width and the wall thickness should be properly checked.
6. Place the inner frame in position. Check the plumb and tighten the doorframe on the inner frame with wooden wedges.
7. Once the frame is assured to be in plumb fill the gaps with polyurethane foam (**Worth Glue**). Leave the frame for 2 hours to set.
8. Worth glue should be pumped in adequate quantity to avoid any shaking of the door frame
9. Clean up the surface of the frame after the glue has dried and place the architrave on the frame and check for any gaps and sand accordingly to attain a final smooth surface.
10. Fix the architraves with lamellos and Lacquer Glue.
11. Allow the architraves to set for 2 hours. Tighten the surfaces with C- clamps.
12. Hang the shutters with hinges using screws; fix the Iron Mongries and doorstopper.
13. Cover the door handle with foam. Cover the door shutter with green polythene sheets and masking tape before the second coat of painting commences.
14. The sealant is the last activity before handing over to the client, done by specialized workers only.

20.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work.

1. Plumb bob
2. Chisel
3. Hammer
4. Planer
5. Worth Glue gun
6. Drilling machine

7. Worth Glue
8. Lacquer Glue
9. Plywood Inner Frame
10. Inner frame/wedges
11. Clamps

20.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

1. Check the Doorframe, Front Architrave, Back Architrave and shutters for Perpendicularity, using spirit levels and right angle.
2. Colour homogeneity of the Doorframe, Front Architrave, Back Architrave and door shutters must be ensured for uniformity.
3. Door shutters should close without nudging and a uniform gap should be visible between the doorframe and shutter. The horizontal and vertical gap between the doorframe and plastered wall should be filled with silicone sealant.

20.4 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Plumb bob
2. Spirit levels 1-2m
3. Right angles
4. Approved drawings and schedule of openings

CHECKLIST FOR ON-SITE INSPECTION ACTIVITY: DOOR FIXING				
Project:		Date:		
Location:				
NOTE:- Please ☐ appropriate box or enter readings as per requirements				
Sl. No.	To be checked	YES	NA	Remarks/ Clarifications
1	Name, date and number of the drawing			
2	Are the latest "Good for Construction" drawings available?	[]	[]	
3	Are civil finishing work over in the given area?	[]	[]	
4	Is the flooring and the tile works complete?	[]	[]	
5	Are the door frames and architraves of the required size and matching grains and colour available on-site?	[]	[]	
6	Is the provided openings in confirmation with the drawings provided?	[]	[]	
7	If the door is to be set on Gypsum partition, is there gap for the plywood inner frame?	[]	[]	

8	Is there sufficient gap between the door frame and civil finished surface to fill with worth glue?(recommended -10 mm gap)	[]	[]	
9	Is the frame set plumb?	[]	[]	
10	After drying of foam is the surface cleaned well to place architraves?	[]	[]	
11	Are the architraves surfaces sanded correctly to set them on the frame without any gap	[]	[]	
12	Is the gap between the wall and the architrave filled with silicone sealant?	[]	[]	
<u>Checked by:</u> Sign Name Date <u>Approved by:</u> Sign Name Date				

S N o .	Item	Civil Clearance			Preceding Interior Works	Requirements			Process	Quality check
		Plastering	First Coat Painting	POP over outer part of the jamb		Physi cal requi reme nts	Toolsreqd.	Timereqd.		
	Door									
1	Door Frame	✓	✓	✓		Surface should be rough enough to hold the frame	Worth glueGun	8 hrs setting time	Worth glue is applied in the gap between frame and the jamb using the gun; When the glue comes in contact with the atmosphere, it expands and holds fast the frame	Perpendicularity Colour homogeneity
2	Front Architrave	✓	✓	✓	Door Frame	Gap between frame and jamb should be less than the width of the architrave	Clamps	8 hrs. after fixing frame	Ply pieces are driven inside the grooves made behind the architrave and face of the frame.	Perpendicularity, Colour homogeneity
3	Back Architrave	✓	✓	✓	Door Frame		Clamps	8 hrs. after fixing frame	Same as Front Architrave	Perpendicularity, Colour homogeneity
4	Shutter	✓	✓	✓	Architrave		Drilling machine	3 hrs after fixing Architrave	Hinges are driven at the cut out made earlier on the frame and the shutter. Lockcases and other fittings are fixed on the shutter, using screws	Perpendicularity, Colour homogeneity, 3. Doors should close without nudging, 4. Uniform gap after closing the door

21.0 ACTIVITY: VACUUM DEWATERED FLOORING (VDF)

21.1 KNOWLEDGE OF ACTIVITY

21.1.1 PREPARATION OF SUB-GRADE

- Sub-grade should be laid according to specifications, levels as recommended by the consultant.
- Ensure that proper consolidation of the sub-grade has been achieved before proceeding for the PCC bed.
- Provide and lay PCC bed above the sub-grade as per thickness mentioned in the drawing.
- Provide reinforcement mesh as per specification and the drawings.
- Clean the entire PCC bed with water before concreting.

21.1.2 DEWATERING AND FINISHING

- Concreting should be carried out with concrete of right grade and slump. (See: Concreting)
- Concrete intermediate / alternate panels shuttered by ISMC runners or continuous bull marks.
- Ensure proper expansion joints as per working drawings and protected.
- Dewatering mat to be used to remove excess water from the concrete surface to ensure concrete of the highest strength is achieved.
- The dewatering mat should be properly laid to prevent air leakage. Care should be taken in ensuring that excess water does not enter the dewatered area.
- After initial set of concrete (2-3 hours), the top surface of concrete is finished using a power trowel. Care should be taken that no impact load is transferred to the finished surface.
- No load or stepping on concrete should be avoided, before initial set of finished concrete
- Heavy vibrations should be avoided in vicinity of the VDF area.

21.1.3 TESTING OF CONCRETE SLUMP TEST

- Conduct slump cone test, one during the start, one at midday and one towards the close of day's work.
- Any load under suspicion can be checked for slump on case-to-case basis.

CUBE TEST

- The sample is made at point of discharge of mixture.
- Take 3 samples after 7 days and 3 samples after 28 days strength.
- Every 100 cum or 10 batches of concrete (whichever is smaller) should be represented by a sample of test cubes.
- For concrete manufactured at site, there must be representative samples for the day's work and for different elements like footing, slab, column and wall.
- Test results should be discussed with the project in-charge even if the results are satisfactory.
- In case of cube failure, the element to be identified and non-destructive test to be conducted.

21.2 TOOLS TO BE USED BY TRADESMEN

Required tools must be available at site to ensure correct work. Basic tools of the concreting gangare:

1. Vacuum Dewatering machine
2. Power Trowels
3. Trowels
4. Gum boots
5. Dumpy levels
6. Spirit levels 1-3m
7. Measuring tape
8. Screed finishing darby
9. Steel trash tracks
10. Hammer
11. Leveling trowels
12. Wheelbarrow
13. Long handle Aluminium leveller with spirit level
14. Masons brushes and buckets
15. High pressure water cleaners

21.3 INSPECTION METHODOLOGY FOR QUALITY ASSURANCE

Personnel

- Ensure all personnel are wearing gumboots

Before Concreting

- Ensure shuttering is sealed with sealing tape so as there is no leakage of slurry
- All reinforcements are in place especially chairs
- All cover blocks damaged during reinforcement layout are replaced

During Concreting

- Ensure proper grade of concrete as recommended by the consultant is employed
- Ensure proper expansion joints as per working drawings and protected ☐ Check the top surface of fresh concrete for evenness of top surface

After Concreting

- Top surface is checked for straightness using Aluminium straight edge or levelling thread as the case may be.
- Curing carried as per guidelines
- Water level is maintained during ponding
- Ensure the cube test results are available at the end of the term indicated

21.4 TOOLS TO BE USED FOR QUALITY INSPECTION

1. Dumpy levels to check finished slab level
2. Aluminium straight edge

3. Leveling thread
4. Spirit levels 1-3m
5. Measuring tape
6. All the relevant related drawings

CHECKLIST FOR ON-SITE INSPECTION ACTIVITY: VACUUM DEWATERED FLOORING VDF				
Project:		Date:		
Location:				
NOTE:- Please ☒ appropriate box or enter readings as per requirements				
Sl. No.	ITEM	YES	NA	Remarks
1	Name, date and number of the drawing			
PRE-VDF CHECKS				
2	Has the surface been cleaned, rammed and well compacted?	[]	[]	
3	Have the guiding channels been placed according to the vibrator plate length?	[]	[]	
4	Are the guiding channels rigid?	[]	[]	
5	Has the slope been maintained as per the requirements?	[]	[]	
6	Are the required tools available?	[]	[]	
CHECKS DURING VDF				
7	Is the concrete as per design mix?	[]	[]	
8	If the area is too large, has it been divided accordingly, to do concreting alternatively?	[]	[]	
9	Has the concreting been done evenly and levelled with vibrating machine?	[]	[]	
10	Has the sucking mat been spread evenly to facilitate maximum withdrawal of water?	[]	[]	
11	Is the pump pressure maintained constant throughout?	[]	[]	
12	Has the mortar of 1:2 been spread evenly to cover any undulations?	[]	[]	
13	Has the floating started immediately after spreading of mortar?	[]	[]	
14	Has the floating been done evenly?	[]	[]	
15	Has the drying process been done along with floating to get a mirror finish?	[]	[]	
POST-VDF CHECKS				
16	Has curing been done, either with a curing compound or 7 days of curing?	[]	[]	
17	Have the guiding channels been removed carefully without damaging edges of concrete after 24 hours??	[]	[]	
18	Is the finished floor, level?	[]	[]	
Checked by: Name _____ Sign _____ Date _____ Approved by: Name _____ Sign _____ Date _____				

22.0 ACTIVITY : STRUCTURAL GLAZING

22.1 KNOWLEDGE OF THE ACTIVITY:

22.1.1 MATERIALS:

The main materials involved in structural glazing are

- Glass
- Aluminium extrusions
- Self Adhesive Tapes
- Structural Sealant
- Weather Sealant
- Fasteners and Fixtures

GLASS

- For glazing, usually reflective glass will be used. The quality will depend on their Relative Heat
- Gain values. For safety purposes, the glass can be laminated so that it becomes shatter proof.

ALUMINIUM EXTRUSIONS

Standard aluminium extrusions will be used for the purpose. The main members are

- Mullion – Vertical member
- Transom – Horizontal member
- Sub frame – for glass bonding

SELF ADHESIVE TAPE

Usually tape of 6 x 6.5 and 10 x 9.5 will be used for normal glazing. The sizes will be decided by the design width of sealant. Currently 'Norton' brand is being used.

STRUCTURAL SEALANT

This is most important part of the glazing which bonds the glass with the sub frame without any mechanical fixtures. Dow corning or GE can be used.

WEATHER SEALANT

This can be used to seal the gaps in glazing which will give a weather proof system.

FASTENERS AND FIXTURES

Usually anchor bolt, screws of various sizes, aluminium clips, GI brackets, etc. will be used. In addition to this to break the contact of glass with the metal, rubber gaskets will be used in various sizes and shapes.

22.1.2 PROCESS

Depending on architects requirement and site conditions, shop drawings will be prepared prior to the start of the activity at site. Height of the glass will depend on the vision panel requirement which will be decided to keep the wastage of glass to a minimum.

Once glass size is decided, the same will be given to glass processor and aluminium production will be done at factory.

STEPS IN PRODUCTION

- The extrusions will be protected from scratches and damages by using protection tape as a 1st step.
- Transoms, mullions will be cut according to the sizes frozen.
- Sub frames will be assembled as per glass sizes and will be dispatched to site along with transom and mullions.
- The openable panels also will be cut, assembled and sent to site.

22.2 WORK AT SITE

22.2.1 CHECK LIST BEFORE START

- All the extrusions where glazing is proposed should be neatly plastered and black painted.
- Mullions and transoms are to be placed according to drawing and fixed to the wall with the help of GI / MS brackets and anchors and protected using protection tape.
- Proper alignment for verticality and horizontality to be maintained.
- Immediately after alignment, one more protection tape is to be wrapped on sections and granite at sill levels to be fixed.
- After drying, touch up is to be done on black painting wherever the paint has peeled off.
- At this point the second layer of protection can be removed and glass fixing can be started.
- Once fixing is completed, proper alignment is to be done once again for uniform groves in both ways.
- Then weather silicone is to be applied to seal the groves
- After finishing all the above from inside, weather silicone can be applied to seal small gaps between granite and transom at sill level.
- Then the protection tape can be removed from inside.
- Before removing the scaffolding from out side the neat cleaning of the glass to be carried out.

22.2.2 MAIN QUALITY TESTS

1. Peel off test to be conducted randomly on bonding to test uniformity of bonding.
2. The whole unit is to be truly vertical, and reasonably good line in horizontal direction to be established.
3. All glasses and aluminium sections to be free from chipping and scratches.
4. Weather silicon finish should be smooth and bubble less.

22.2.3 HANDLING AND STORAGE

GLASS

The glass should be unloaded very carefully either as the crate using a crane or one by one by opening the crate carefully. The glass storage before bonding is a very important activity. 'A' frames can be used for the purpose of storage with angle of 15° from vertical on both sides. Steel frames clad with wood or thick rubber pad or cork sheet can also be used. Glass should be placed equally on both sides of the 'A' racks.

After bonding the bonded glass will be kept on floor for 2 days with wooden battens and will be kept for another 5 days for curing.

For handling of the glass, usually vacuum catchers will be used. Catchers should be of high quality to avoid slipping. Small glass can be handled on edges by hands using proper cotton gloves. For the purpose of

cutting or processing the glass, wooden table of appropriate size and height has to be used with good carpet to avoid scratches.

ALUMINIUM

Usually anodized or powder coated aluminium will be used for structural glazing. Both finishes are very sensitive and are to be protected by adhesive tape before taking for production. After production at factory, utmost care is to be taken during transportation and storage at site. Sufficient packing materials and wooden battens and thin plywood should be used. At site the aluminium can be stacked length wise, in layers using wooden battens.

STRUCTURAL GLAZING

Both glass and aluminium are having shelf life less than a year. Storing of these materials in bulk is not advisable. Both are to be stored in neat dust free, damp free cool atmosphere.

22.3 ALUMINIUM COMPOSITE PANEL WORKS (ACP)

This is also a major activity like glazing. The work can be classified into two categories.

22.3.1 ACP STRUCTURAL BONDING METHOD

In this method ACP will be cut to size and bonded to the sub frame like glass bonding in structural glazing. All other fixing methods are similar to structural glazing, which has been mentioned above.

22.3.2 ROUT AND RETURN METHOD

In rout and return method instead of mullions and transoms, aluminium angles and channels will be used vertically and will be fixed to the wall first with the help of angle cleats and anchors.

ACP will be cut to size and routing will be done keeping 25mm border all around. Corners will be cut out and the panel is made as a tray by folding edges all around. Cleats of sufficient size (usually 20 x 20 x 2 thk) will be fixed on two long edges at 600 - 800 mm interval with the help of pop rivet. The above prepared panels will be fixed to the main angle frame which is already fixed to the wall vertically. A uniform groove of 10mm can be achieved by using 10 mm packing.

Proper alignment should be done for proper level, line and plumb. After inspection 12mm thk styrofoam backer rods will be placed in vertical and horizontal grooves by pushing with fingers.

Backer rods will be pushed with thumb to achieve a space of 5 to 6 mm deep.

22.3.3 SILICONE WORKS

After placing the backer rods, weather silicone of approved colour will be applied uniformly in vertical grooves and tooling will be done with steel scraper to achieve a smooth uniform finish. Mild soapwater can be used to clean tools and hands also for touch up on rough areas after a day's gap. Same procedure can be adopted for horizontal lines. Proper care is to be taken on junctions.

After 3-4 days of curing, the protection tape from ACP can be removed and a smooth cleaning can be done with water and rubber wiper.

22.3.4 MACHINE AND TOOLS FOR GLAZING

1. Cutting machine with minimum 300 Dia blade.
2. Copy router for hole, cut outs etc.

3. Drilling machine for screw holes.
4. Hammer drilling machine for anchors.
5. Screw driver and spanners.
6. Silicone Gun for bonding.
7. Small silicone gun for weather silicon.
8. Scrapper for tooling.
9. Plumb bob, spirit level and right angles for checking.

22.3.5 MACHINE AND TOOLS FOR ACP

1. Vertical panel saw for cutting and routing
2. Rivet for cleat fixing
3. Drilling machine
4. Hammer drill for Anchoring
5. Screw driver, spanner
6. Spirit level, plumb and right angles

22.3.6 QUALITY CHECK ON ACP

MATERIAL

Coating of ACP is the main criteria for quality. Knyar coating with knyar 500 resins of reputed manufacturers like PPLG is preferred. Uniformity of colour in various batches is to be tested. Flatness of ACP is the 2nd criteria. A true flat surface is the requirement after forming the tray.

PROCESS

A precision level of $\pm .5\text{mm}$ is required in ACP panel production process. All corners to be formed properly. All rough corners to be filed for smooth handling. Returns of the panel should be in right angle for straight job.

Fixing of ACP at site also demands $\pm 1\text{mm}$ accuracy. Upto 1 mm tolerance can be absorbed in silicon work. The surface of ACP work is to be in true line and level. All grooves are to be uniform. The finish of weather silicon is to be smooth and free from bubbles. Proper care is to be taken to avoid scratches which cannot be repaired at all.

ANNEXURE

Photographs of Illustrative construction procedure for Gypsum Works

Ceiling

- Suspended Ceiling
- Grid Ceiling

Wall

- Half Partition walls
- Full-length partition walls

Wall Lining

Jointing and Finishing

CHECKLIST FOR ON-SITE INSPECTION**ACTIVITY: STRUCTURAL GLAZING & ACP CLADDING**

Dhinwa Construction & Engineering Technology Manual

Project:		Date:	
Location:			
NOTE:- Please appropriate box or enter readings as per requirements			
Sl. No.	To be checked	YES	NA
Structural Glazing			
1. Frame Work			
1.1	Name, date and number of the drawings		
1.2	Are the latest "Good for Construction" drawings available?	[]	[]
1.3	Is the site ready with all civil openings duly plastered and painted before starting the frame work?	[]	[]
1.4	Are adequate quantity of materials available at site?	[]	[]
1.5	Have safety measures required for the frame work been taken care?	[]	[]
1.6	Are the required tools available?	[]	[]
1.7	Have the frame work materials viz. mullions, transoms etc. been properly protected before use?	[]	[]
1.8	Have the MS brackets used to anchor the mullions properly been surface treated?	[]	[]
1.9	Have the specified anchor bolts properly grouted to support the mullions in RCC/PCC only?	[]	[]
1.10	Have PVC shims been used in between MS bracket and mullion to avoid direct contact between dissimilar materials?	[]	[]
1.11	Have the bolts been used to connect the MS bracket and mullion are SS bolts and are the same tightened properly?	[]	[]
1.12	Are all the mullions in true plumb (in case of vertical glazing) or in the same angle (in case of inclined glazing) and all the transoms in the water level after installation?	[]	[]
1.13	Have the required gaskets properly been inserted in the mullions and transoms before the installation of glazed panels?	[]	[]
1.14	Is the gap between masonry opening and window/structural glazing unit less than or equal to 10 mm (max.) after the frame work?	[]	[]
2. Glazed Panel Installation			
2.1	Is a proper register for bonding of glass showing the date of bonding maintained in bonding area?	[]	[]
2.2	Are the glass and glass processing in compliance with the specification?	[]	[]
2.3	Is the processed glass free from all distortions?	[]	[]
2.4	Is the glass/ACP properly bonded with structural silicone sealant to the glass frame?	[]	[]
2.5	Is the silicone sealant bite as per the design requirement?	[]	[]
2.6	Is the silicone sealant properly cured atleast for 7 days before installation?	[]	[]

2.7	Has the bonded panel been installed on the frame work with glass clip and specified SS screws maintaining a uniform gap of 12(min.)-15(max.) mm between the glazed panels?	[]	[]	
2.8	Has the sealant been applied in the gap between the glazed panels with uniform width horizontally & vertically by placing suitable backer rod in the gap for weather proofing?	[]	[]	
2.9	Has the glass been cleaned with proper cleaning tools and mild soap solution with no dirt, stains, scratches etc, on the glass?	[]	[]	
2.10	Has the flashing, if required been taken care after the glazing?	[]	[]	
2.11	Has the gap between masonry opening and window/structural glazing unit been filled with the weather sealant backed by a suitable backer rod for weather proofing?	[]	[]	
3. Aluminium Composite Panel (ACP) Cladding (Rout & Return Method)				
3.1	Has the main-frame been properly fixed to the main structure by means of proper anchor bolts (in case of concrete/plastered surface) or welding (in case of MS structure) as per the design requirement?	[]	[]	
3.2	Has the main-frame been properly fixed to form the required grid as per the requirement?	[]	[]	
3.3	Is the ACP well protected with manufacturer supplied original protection sheet?	[]	[]	
3.4	Has the plane of ACP cladding been maintained properly?	[]	[]	
3.5	Has the gap between the adjacent panels been maintained 10 mm(min.) - 12 mm(max.)?	[]	[]	
3.6	Has the gap between the adjacent panels been filled with weather sealant backed on a suitable backer rod for weather proofing?	[]	[]	
3.7	Has the protection sheet been removed after installation as specified by the manufacturer?	[]	[]	
Checked by: _____ Approved by: _____ _____ Name _____ Name _____ Sign _____ Sign Date _____ Date				