



Gujarat Metro Rail Corporation Limited

“General Civil Maintenance Work of Viaduct & 07 Metro Stations (i.e. Sardar Patel Stadium, Commerce Six Road, Gujarat University, Gurukul Road, Doordarshan Kendra, Thaltej and Thaltej Gam) excluding Old High Court Station of East-West Corridor Western Reach Section from Shahpur Ramp to Thaltej Gam Dead End of Ahmedabad Metro Rail Project Phase - 1.”

TENDER NO: GMRC/CIVIL MAINTENANCE/WR/PH-1/2026

VOLUME-2

Technical Specification / SOW

Gujarat Metro Rail Corporation (GMRC) Limited

(SPV of Govt. of Gujarat and Govt. of India)

Formerly known as Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Co. Ltd.

Block No.1, First Floor, Karmayogi Bhavan, Behind Nirman Bhavan, Sector 10/A,

Gandhinagar: 382010,

Gujarat, India

Corporate Identification No (CIN): U60200GJ2010SGC059407

GENERAL

1. The specifications for the architectural works shall be read in conjunction with other sections of these specifications and other tender documents for this Contract, CPWD Specifications 2023 VOLUME 1 & 2 and approvals, instructions given by the Engineer. The general requirements are described in Section 01 herein.
2. All proprietary material shall be of approved make and the type as stipulated. Lists of approved makes are given at the end of this book. It will be deemed that the contractor has priced the respective items on the basis of those approved makes. However, it shall be the prerogative of the owner to choose any particular make among the list as the most appropriate one and the contractor shall be bound to provide the same without any variation in the contract rate. The guarantees for various architectural finishes shall be stipulated under clause 1.5 of Special Specifications for this Contract.
3. The Contractor shall submit a comprehensive list of all proprietary articles and materials used in the works containing catalogue reference numbers, colour shades, etc. and the manufactures and or supplier's names, addresses and where appropriate, supplier's names and addresses including a price list CIF to the site of works. This list in approved format shall be complete in all respects and shall be submitted together with the 'As-Built' drawings and operation and maintenance manuals.
4. Relevant extract of CPWD Specification 2023 Volume 1 or 2 is provided against each item of work as per BOQ as applicable for ready reckner. Further details if any shall be considered from CPWD Specification Volume 1 and 2 with up to date amendments and circulars issued by CPWD time to time. These documents are available in website in PDF format.

Schedule "A" (Any DSR Items 2023/AMC SOR/R&B SOR)**Part I**

The Tenderer/ bidder are advised to refer to specification of Central Public Works Department (CPWD) Government of India named as "CPWD Specification VOL-1 & VOL-2" of 2023 which is available at website of CPWD.

OR

(Any DSR Items 2023/AMC SOR/R&B SOR)

Schedule "B" (NDSR - Building works)**1. WINDOWS /GLAZING****12.76MM THICK PVB LAMINATED GLASS**

Two panes of Clear or Tinted Float Glass shall be laminated using a layer of PVB.76 mm. Laminated glass shall be provided where specified. The preparation of Laminated Glass shall be as per BS: 952 Part-1.

6MM THICK TOUGHNED GLASS

Glass

Glass shall generally conform to the requirements of BS: 952 or JIS: R3203 or equivalent standards. It shall be clean cut without edge faults and free from defects. Glasses shall be tested for critical parameters like flexural bending strength, fragmentation, bow and corrugation as per DIN: 1249 Part-12 with necessary test certificates from the manufacturer for each lot.

a. Float Glass

Glass shall be clear Float Glass or Body Tinted Float Glass, conforming to JIS: R3203 manufactured by Saint Gobain glass, Belgium glass, Float Glass India Ltd. or Gujarat Guardian Ltd. or approved equivalent manufacturer.

b. Toughened Glass

Clear or Tinted Float Glass shall be toughened (tempered) for applications where specified. The glass shall be horizontally tempered as per DIN: 1249 Part-12 having no tong or suspension mark and shall have machined edges with no burrs or sharp surfaces.

c. Insulating Glass

The Insulating Glass shall conform to BS: 5713 and shall comprise two panes of Float Glass fixed with a gap of 12mm created by a spacer and hermetically sealed around the edges leaving a dehydrated air space.

ALUMINIUM LOUVERS

Please refer Section 21.1 of CPWD Specifications 2023 Volume 2

METAL WORKS

FACTORY MADE SOLID PVC DOOR FRAME

Please refer Section 9.20 of CPWD Specifications 2023 Volume 1

PVC DOOR FRAME

Solid PVC door frame and shutter shall be as per para 9.19.

Solid PVC Door Frames consisting of section 50 x 47 mm shall be fabricated from 5 mm PVC sheet having density of 600 kg./cum. The sheet used may be in plain colour, printed design or prelam veneer shade as approved by the Engineer-in-Charge. The weight per running metre of the door frame including reinforcement should be a minimum of 1.5 kg./sq. mtr. The depth of the rebate of door frame shall be 10 mm. Frames shall have smooth surface, without any warping or bending in any member. All the parts of the door frame are to be joined to each other using solvent adhesive conforming to IS 14182_A tolerance of + 3 mm shall be permitted in the specified dimension of PVC section in the door frames.

The solid PVC door frames shall be fabricated in factory as per nomenclature of the item and directions of the Engineer-in-charge.

2. SUSPENDED FALSE CEILING

2.a ALUMINIUM LINEAL FALSE CEILING

Aluminium Lineal False Ceiling Material Material

Aluminium ceiling wherever shown shall be Track or Hunter Douglas or equal approved powder coated aluminium strip dropped ceiling with perforated / plain panels of approved shade. The ceiling shall be supplied and fixed by specialized workmen approved by the manufacturer, strictly as per manufacturers printed instruction. The panel will be 84mm x 16mm deep with recessed flanges of made out of 0.50mm aluminium alloy AA3105 with powder coated finish.

Installation

The ceiling including suspension system shall be installed as per the material specifications and printed instructions of the manufacturer. Provision for cut outs for lights and air-condition diffusers etc. shall be made as shown in the drawings and as required at site. The entire installation shall meet the approval of the Engineer.

Suspension

The ceiling panels shall be fixed at maximum 1500 mm c/c carriers to be suspended from slab/roof by 4 mm dia galvanized wire hangers with special height adjustment clip made out of spring steel including all trims, angles, recessed edges profile (20 mm x 20 mm) screwed to panel carrier 84 R Exterior grade@ 1300 c/c.

2.b GI METAL TILED FALSE CEILING

Please refer CPWD Specifications 2023 Volume 1 & 2 with up to date Amendments.

3. STONE/GRANITE/MARBLE WORKS**3.1 20MM THICK MIRROR POLISH GRANITE FOR FLOORING**

Please refer CPWD Specification 2023 Volume 1 and 2 with up to date amendments and details mentioned in Section-S13 above.

EXTRA FOR PROVIDING OPENING FOR COUNTER WASH BASIN

Please refer CPWD Specifications 2023 Volume 1 and 2 with up to date amendments.

Design and Pattern

All work shall be laid as per design, detail, pattern, colours, sizes and dimensions given on the drawings. Any modifications and variations at site shall be reflected in adjustment in design as per the approval of the Engineer. All junctions, rebates, nosings, corners shall have square, curved or shaped mounting as desired and as shown on the drawings.

20MM THICK MIRROR POLISHED GRANITE FOR CLADDING WORK

Please refer Section 8.6 of CPWD Specifications 2023 Volume 1.

FLOORING**3.2 PROVIDING AND LAYING PCC M 15 FOR SCREED**

Please refer Section 4.0 of CPWD Specifications 2023 Volume 1.

3.3 52MM THICK CC FLOORING WITH CONCRETE HARDNER TOPPING

Please refer Section 11.3 of CPWD Specifications 2023 Volume 1.

CEMENT CONCRETE FLOORING WITH METALLIC HARDENER TOPPING

Wherever floors are required to withstand heavy wear and tear, use of floor hardener shall be

avoided as far as possible by using richer mixes of concrete, unless the use of a metallic hardener is justified on the basis of cost. Where metallic hardener topping is used, it shall be 12 mm thick.

Metallic Hardening Compound

The compound shall be of approved quality consisting of uniformly graded iron particles, free from non-ferrous metal particles, oil, grease sand, soluble alkaline compounds. Where so directed by the Engineer-in-Charge it shall be tested as described in Appendix A.

Base Concrete

It shall be as specified in 11.2.2.

Under Layer

Cement concrete flooring of specified thickness and mix (mentioned in item for under layer) shall be laid as under layer (11.2.1 and 11.2.4). The top surface shall be roughened with brushes while the concrete is still green and the forms/strips shall be kept projecting up 12 mm over the concrete surface, to receive the metallic hardening compound topping.

Topping

This shall consist of 12 mm thick layer of mix 1:2 (1 cement: 2 stone aggregate 6 mm nominal size) by volume or as otherwise specified with which metallic hardening compound is mixed in the ratio of 1 : 4 (1 metallic concrete hardener : 4 cement) by weight. Metallic hardener shall be dry mixed thoroughly with cement on a clean dry pacca platform. This dry mixture shall be mixed with stone aggregate 6 mm nominal size or as otherwise specified in the ratio of 1 : 2 (1 cement : 2 stone aggregate) and well turned over. Just enough water shall then be added to this dry mix as required for floor concrete.

The mixture so obtained shall be laid in 12 mm thickness, on cement concrete floor within 2 to 4 hours of its laying. The topping shall be laid true to provide a uniform and even surface. It shall be firmly pressed into the bottom concrete so as to have good bond with it. After the initial set has started, the surface shall be finished smooth and true to slope with steel floats.

The junction of floor with wall plaster, dado or skirting and finishing operations shall be dealt with as described in 11.2.5.

The men engaged on finishing operations shall be provided with raised wooden platform to sit on, so as to prevent damage to new work.

The specifications for curing, precautions to be taken, 'Measurements' and 'Rates' shall be as specified in 11.2.)

3.4 RAISED FALSE ACCESS FLOORING

Please refer CPWD Specifications 2023 Volume 1 and 2 with up to date amendments.

3.5 CHEQUERED PRECAST CEMENT CONCRETE TILES

Please refer Section 11.12 of CPWD Specifications 2023 Volume 1.

CHEQUERED TILE FLOORING**Chequered Tiles**

The tiles shall be of nominal sizes such as 20 x 20 cm, 25 x 25 cm and 30 x 30 cm or of standard sizes with equal sides. The size of tiles to be used shall be as shown in drawings or as required by the Engineer-in-Charge. The centre to centre distance of chequers shall not be less than 2.5 cm and not

more than 5 cm.

The overall thickness of the tiles shall not be less than 30 mm. The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be cement tiles, or terrazo tiles as specified in the description of the item. The thickness of the upper layer, measured from the top of the chequers shall not be less than 6 mm.

The terrazo tiles shall be given the first grinding with machine before delivery to site.

The tiles shall conform to the specifications for plain cement concrete or terrazo tiles in respect of method of manufacture and the mix of the backing and wearing layers.

Laying, curing, Polishing and Finishing shall be as specified in 11.10.2 and 11.10.3 except that the polishing of the tiles and the chequer grooves, after laying, may be done by hand. Special care shall be taken to polish the grooves in such a manner as to get a uniform section and that their finish shall match with the finish of flat portion of the tiles. Cement concrete tiles normally do not require polishing but where polishing is required the same shall be done as described above.

Measurement and Rate: Shall be as specified in **11.10.4 and 11.10.5** of CPWD Specifications 2023 Volume 1

3.6 VITRIFIED FLOOR TILES OF LIGHT AND DARK SHADES

Please refer Section 11.16 of CPWD Specifications 2023 Volume 1.

PRESSED CERAMIC TILE FLOORING (VITRIFIED TILE FLOORING)

Operations as described in 11.15.1 to 11.15.6 shall be followed except the tiles shall conform to Table 12 of IS 15622 (Tiles with water absorption $E_s \leq 0.08$ per cent Group B1a) and the joint thickness in flooring shall not be more than 1mm.

Rate

The rate for flooring shall include the cost of all materials and labour involved in all the operations described above. Nothing extra shall be paid for the use of cut (sawn) tiles in the work.

3.7 CEMENT CONCRETE FLOORING 40MM THICK

Please refer Section 11.02 of CPWD Specifications 2023 Volume 1.

CEMENT CONCRETE FLOORING

Cement Concrete

Cement concrete of specified mix grade shall be used and it shall generally conform to the specifications described under sub head 4.0.

Base Concrete

Flooring shall be laid on base concrete where so provided. The base concrete shall be provided with the slopes required for the flooring. Flooring in verandah, Courtyard, kitchens & baths shall have slope ranging from 1 : 48 to 1 : 60 depending upon location and as decided by the Engineer-in-Charge. Floors in water closet portion shall have slope of 1:30 or as decided by the Engineer-in-Charge to drain off washing water. Further, necessary drop in flooring in bath, WC, kitchen near floor traps ranging from 6mm to 10 mm will also be provided to avoid spread of water. Necessary margin to accommodate this drop shall be made in base concrete. Plinth masonry off set shall be depressed so

as to allow the base concrete to rest on it.

The flooring shall be commenced preferably within 48 hours of the laying of base concrete. The surface of the base shall be roughened with steel wire brushes without disturbing the concrete. Immediately before laying the flooring, the base shall be wetted and a coat of cement slurry @ 2 kg of cement spread over an area of one sqm so as to get a good bond between the base and concrete floor.

If the cement concrete flooring is to be laid directly on the RCC slab, the top surface of RCC slab shall be cleaned and the laitance shall be removed and a coat of cement slurry @ 2 kg of cement spread over an area of one sqm so as to get a good bond between the base and concrete floor.

Thickness

The thickness of floor shall be as specified in the description of the item.

Laying

Panels: Flooring of specified thickness shall be laid in the pattern including the border as given in the drawings or as directed by the Engineer-in-Charge. The border panels shall not exceed 450 mm in width and the joints in the border shall be in line with panel joints. The panels shall be of uniform size and no dimension of a panel shall exceed 2 m and the area of a panel shall not be more than 2 sqm. The joints of borders at corners shall be mitred for provision of strips.

Laying of Flooring with Strips: Normally cement concrete flooring shall be laid in one operation using glass/aluminium/PVC/brass strips/stainless steel strips or any other strips as required as per drawing or instructions of the Engineer-in-Charge, at the junction of two panels. This method ensures uniformity in colour of all the panels and straightness at the junction of the panels. 4 mm thick glass strips or 2 mm PVC strips or 2 mm aluminium or brass strips shall be fixed with their tops at proper level, giving required slopes. Use of glass and metallic strips shall be avoided in areas exposed to sun. Cost of providing and fixing strips shall be paid for separately.

Concreting: Cement concrete shall be placed in the panels and be levelled with the help of straight edge and trowel and beaten with thapy or mason's trowel. The blows shall be fairly heavy in the beginning but as consolidation takes place, light rapid strokes shall be given. Beating shall cease as soon as the surface is found covered with a thin layer of cream of mortar. The evenness of the surface shall be tested with straight edge. Surface of flooring be true to required slopes. While laying concrete, care shall be taken to see that the strips are not damaged/disturbed by the labourers. The tops of strips shall be visible clearly after finishing with cement slurry.

Laying of Flooring without Strips: Laying of cement concrete flooring in alternate panels may be allowed by the Engineer-in-Charge in case strips are not to be provided.

Shuttering: The panels shall be bounded by angle iron or flats. The angle iron/flat shall have the same depth as the concrete flooring. These shall be fixed in position, with their top at proper level giving required slopes. The surface of the angle iron or flats, to come in contact with concrete shall be smeared with soap solution or non-sticking oil (Form oil or raw linseed oil) before concreting. The flooring shall butt against the unplastered masonry wall.

Concreting: The concreting shall be done in the manner described under 11.2.4.2. The angle iron/flats used for shuttering, shall be removed on the next day of the laying of cement concrete. The ends thus exposed shall be repaired, if damaged with cement mortar 1 : 2 (1 cement : 2 coarse sand) and

allowed to set for minimum period of 24 hours. The alternate panels shall then be cleaned of dust, mortar, droppings etc. and concrete laid. While laying concrete, care shall be taken to see that the edges of the previously laid panels are not damaged and fresh mortar is not splashed over them. The joints between the panels should come out as fine straight lines.

Finishing

The finishing of the surface shall follow immediately after the cessation of beating. The surface shall be left for some time, till moisture disappears from it or surplus water can be mopped up. Use of dry cement or cement and sand mixture stiffening the concrete to absorb excessive moisture shall not be permitted. Excessive trowelling shall be avoided.

Fresh cement shall be mixed with water to form a thick slurry and spreaded @ 2 kg of cement over an area of one sqm of flooring while the flooring concrete is still green. The cement slurry shall then be properly processed and finished smooth.

The edges of sunk floors shall be finished and rounded with cement mortar 1:2 (1 cement : 2 coarse sand) and finished with a floating coat of neat cement.

The junctions of floor with wall plaster, dada or skirting shall be rounded off where so specified.

The men engaged on finishing operations shall be provided with raised wooden platform to sit on so as to prevent damage to new work.

Curing

The curing shall be done for a minimum period of ten days. Curing shall not be commenced until the top layer has hardened. Covering with empty gunnies bag shall be avoided as the colour of the flooring is likely to be bleached due to the remnants of cement dust from the bags.

Precautions

Flooring in lavatories and bath room shall be laid only after fixing of water closet and squatting pans and floor traps. Traps shall be plugged while laying the floors and opened after the floors are cured and cleaned. Any damage done to W.C.'s squatting pans and floor traps during the execution of work shall be made good. During cold weather, concreting shall not be done when the temperature falls below 4°C. The concrete placed shall be protected against frost by suitable covering. Concrete damaged by frost shall be removed and work redone. During hot weather, precautions shall be taken to see that the temperature of wet concrete does not exceed 38° C. No concreting shall be laid within half an hour of the closing time of the day, unless permitted by the Engineer-in-Charge. To facilitate rounding of junction of skirting, dado and floor, the skirting/dado shall be laid along with the border or adjacent panels of floor.

Measurement

Length and breadth shall be measured before laying skirting, dado or wall plaster. No deduction shall be made nor extra paid for voids not exceeding 0.20 sqm. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 sqm. The flooring done either with strips (in one operation) or without strips (in alternate panels) shall be treated as same and measured together.

Rate

The rate shall include the cost of all materials and labour involved in all the operations described above including application of cement slurry on RCC slab or on base concrete including roughening

and cleaning the surface but excluding the cost of strips which shall be paid separately under relevant item. Nosing of steps where provided shall be paid for separately in running metre. Nothing extra shall be paid for laying the floor at different levels in the same room or courtyard and rounding off edges of sunk floors. In case the flooring is laid in alternate panels, nothing extra shall be paid towards the cost of shuttering used for this purpose.

3.8 CEMENT PLASTER SKIRTING

Please refer Section 11.04 of CPWD Specifications 2023 Volume 1.

CEMENT PLASTER IN RISERS OF STEPS, SKIRTING, DADO

Plaster at the bottom of wall not exceeding 30 cm in height above the floor shall be classified as skirting. It shall be flush with wall plaster or projecting out uniformly by 6 mm from the wall plaster, as specified. The work shall be preferably carried out simultaneously with the laying of floor. Its corners and junctions with floor shall be finished neatly as specified.

3.9 ACID AND / OR ALKALI RESISTANT TILE FLOORING

Please refer Section 11.14 of CPWD Specifications 2023 Volume 1.

ACID OR ALKALI RESISTANT TILES

Manufacture and Finish

The tiles shall be of vitreous ware and free from deleterious substances. The iron oxide content allowable in the raw material shall not exceed two percent. The tiles shall be vitrified at the temperature of 1100°C and above and shall be kept unglazed. The finished, tile, when fractured shall appear fine grained in texture, dense and homogenous. The tiles shall be sound, true to shape, flat and free from flaws and manufacturing defects affecting their utility. The tiles shall be conforming to IS 4457. The tiles to be tested for water absorption, compressive strength, acid resistance as per IS 4457. Sampling procedure for acceptance tests and criteria for conformity to be as per IS 4457. The tiles shall be of required colour.

Dimensions and Tolerances

Ceramic unglazed vitreous acid-resistant tiles shall be made in three sizes namely 98.5 X 98.5 mm, 148.5 X 148.5 mm and 198.5 X 198.5 mm. They shall be available in the following thickness: 35, 30, 25, 20 and 15 mm. The depth of the grooves on the underside of the tile shall not exceed 3 mm. Tolerance on length, breadth and thickness of tiles shall be + 2 percent.

Shape

The tiles shall be square shaped. Half tiles rectangular in shape shall also be available. Half tiles for use with full tiles shall have dimensions which shall be such as to make two half tiles, when joined together, match with the dimension of full tile. The shape of tiles other than square shall be as agreed to between the purchaser and the manufacturer. Tiles shall be checked for squareness and warp as per IS 4457.

Performance Requirements

The tiles when tested in accordance with method given in IS 4457, shall conform to be requirement specified in the code (IS 4457).

Loss in Abrasion

The maximum percentage of loss in abrasion of the ceramic unglazed vitreous acid resistant tiles determined in accordance with the procedure laid down in IS 1237, shall be as mentioned in IS 4457.

Marking

Tiles shall be legibly marked on the back with the name of the manufacturer or his trade mark. Manufacturer's batch number and year of manufacture. Each tile may also be marked with the ISI certification mark. 465 SUB HEAD 11.0: FLOORING

Preparation of Surface and Laying

Preparation of surface and laying to be according to para 11.15.4, except the cement used to be acid and or alkali resistant cement and cement mortar to be used to be acid and or Alkali resistant mortar. Thickness of bedding of mortar for flooring to be 10 mm or specified on the item and for dado/skirting to be 12 mm or specified on item.

Pointing and Finishing

As per para 11.15.5, except that cement used for pointing to be acid and or alkali resistant cement.

Measurements

As per para 11.15.6.

Rate

The rate for flooring shall include the cost of all materials and labour involved in all the operations described above. For tiles of sizes upto 0.16 Sqm, unless otherwise specified in the description of the item. Nothing extra shall be paid for the use of cost (Sawn) tiles in the work.

3.10 GLAZED TILE DADO

Please refer Section 11.18 of CPWD Specifications 2023 Volume 1.

PRESSED CERAMIC TILES IN SKIRTING AND DADO

The tiles shall be of approved make and shall generally conform to IS 15622. The tiles shall be pressed ceramic covered by a glaze thoroughly matured and fitted to the body. The tiles shall be sound, true to shape, flat and free from flaws and other manufacturing defects affecting their utility. The top surface of the tiles shall be glazed. The underside of the tiles shall not have glaze on more than 5% of the area in order that the tile may adhere properly to the base. The edges of the tiles shall be free from glaze, however, any glaze if unavoidable shall be permissible on only upto 50 per cent of the surface area of edges.

The glaze shall be free from welts, chips, craze, specks, crawlings or other imperfections detracting from the appearance when viewed from a distance of one metre. The glaze shall be either glossy or matt as specified. The glaze shall be white in colour except in the case of coloured tiles when colours shall be specified by the Engineer-in-Charge. There may be more than one colour on a tile.

Dimensions and Tolerances

Glazed pressed ceramic tiles shall be made square or rectangular in sizes Table 1, 3, 5 & 7 of IS 15622 give the modular sizes and table 2, 4, 6 & 8 of IS 15622 gives the sizes of non- modular tiles. The tiles shall conform to IS 15622 for dimensional tolerance, physical and chemical properties. Half tiles for use as full tiles shall have dimensions which shall be such as to make the half tiles when jointed together (with 1 mm joint) match with dimensions of full tiles. Tiles may be manufactured in sizes other than those specified. above_ The thickness of the tiles shall be 5 mm or 6 mm or as specified. The dimensions of fittings associated with the glazed tiles namely cover base, round edge tile, angles corner cups, ridge and legs, cronices and capping beads shall be of the shape and dimensions as required and the thickness of fittings shall be the same as the thickness of tiles given above.

Preparation of Surfaces

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

Laying

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

The tiles should be soaked in water, washed clean, and a coat of cement slurry applied liberally at the back of tiles and set in the bedding mortar. The tiles shall be tamped and corrected to proper plane and lines. The tiles shall be set in the required pattern and jointed. The joints shall be as fine as possible. Top of skirting or dado shall be truly horizontal and joints truly vertical except where otherwise indicated. Odd size/cut size of tile shall be adjusted at bottom to take care of slope of the flooring. Skirting and dado shall rest on the top of the flooring. Where full size tiles cannot be fixed these shall be cut (sawn) to the required size and their edges rubbed smooth. Skirting /dado shall not project from the finished "surface of wall" by more than the tile thickness, undulations if any shall be adjusted in wall.

Curing and Finishing

The joints shall be cleaned off the grey cement grout with wire/coir brush or trowel to a depth of 2 mm to 3 mm and all dust and loose mortar removed. Joints shall then be flush pointed with white cement added with pigments if required to match the colour of tiles. The work shall then be kept wet for 7 days.

After curing, the surface shall be washed and finished clean. The finished work shall not sound hollow when tapped with a wooden mallet.

Measurements

Length shall be measured correct to a cm. Height shall be measured correct to a cm in the case of dado and 5 mm in the case of riser and skirting. The area shall be calculated in square metre, correct to two places of decimal. Length and height shall be measured along the finished face of the skirting or dado including curves where specials such as coves, internal and external angles and beads are used.

Where cornices are used the area of dado shall be measured excluding the cornices. Nothing extra will be paid for cutting (sawn) the tiles to sizes.

Areas where coloured tiles or different types of decorative tiles are used will be measured separately to be paid extra over and above the normal rate for white tiles.

Rates

The rate shall include the cost of all material and labour involved in all the operations described above, for tiles of sizes upto 0.14 sqm. unless otherwise specified in the description of the item. The specials such as coves, internal and external angles and beading shall be measured and paid for separately. The rate shall not include cost of cornices which shall be measured and paid for in running meters separately.

3.11 ANTI SKID VITRIFIED TILES FOR FLOORING AND SKIRTING

Please refer Section 11.16 of CPWD Specifications 2023 Volume 1
PRESSED CERAMIC TILE FLOORING (VITRIFIED TILE FLOORING)

Operations as described in 11.15.1 to 11.15.6 shall be followed except the tiles shall conform to Table 12 of IS 15622 (Tiles with water absorption $E \leq 0.08$ per cent Group B_{la}) and the joint thickness in flooring shall not be more than 1mm.

Rate

The rate for flooring shall include the cost of all materials and labour involved in all the operations described above. Nothing extra shall be paid for the use of cut (sawn) tiles in the work.

3.12 TACTILE TILE FLOORING

Please refer CPWD Specifications 2023 Volume 1 & 2 with up to date amendments.

3.13 Not Applicable**3.14 Not Applicable****3.15 BROKEN WHITE GLAZED CHINA MOSAIC FLOORING**

Please refer specification related to GUJARAT latest SOR (R&B SOR 2023-24)

WATER PROOFING**INTEGRAL CEMENT BASED WATER PROOFING**

Please refer CPWD Specifications 2023 Volume 1 & 2 with up to date Amendments.

INTEGRAL CEMENT BASED TREATMENT FOR WATER PROOFING ON HORIZONTAL SURFACE

Please refer Section 22.1 of CPWD Specifications 2023 Volume 2

INTEGRAL CEMENT BASED TREATMENT FOR WATER PROOFING ON HORIZONTAL SURFACE OF UNDER-GROUND STRUCTURE AT ALL DEPTH**Water Proofing of Horizontal Internal Surfaces of Under-Ground Structure****(i) Preparation of Surface**

The Water Proofing Treatment over the lean concrete/levelling course surface should adhere to the surface firmly, the surface of levelling course should be roughened properly when the concrete is still green. In case the surface is not made rough before the concrete is set, the work of water proofing should not be executed till proper key is provided for the base layer of Cement Mortar 1:3.

(ii) Blending Cement/Water with Water Proofing Compound

The required quantity of cement bags to be used for a particular portion of work should be emptied on a dry platform. Water proofing compound bearing ISI mark and conforming to IS 2645 should then be mixed properly with the cement. The quantity of water proofing compound to be mixed should be as prescribed by the manufacturer but not exceeding 3% by weight of cement. The quantity of cement and water proofing compound thus mixed should be thoroughly blended and the blended cement should again be packed in bags.

For the water proofing compound in liquid form, the blending is to be done with water. This can be done by taking the just required quantity of water to be mixed in the particular batch of dry cement mortar.

The required quantity of water thus collected per batch of dry cement mortar to be prepared should be mixed with liquid water proofing compound from sealed tins with ISI mark. The water thus mixed with water proofing compound shall be thoroughly stirred so that the water is blended with water proofing compound properly.

(iii) Rough Kota Stone 22 to 25 mm Thick

The stone slabs to be used for this item shall be in thickness of 22 mm to 25 mm. Larger size of stone slabs i.e. 550 mm x 550 mm or 550 mm x 850 mm shall be used to minimise the number of joints. General requirement of Kota stone shall be as laid down in CPWD Specifications of Kota Stone flooring.

(iv) Preparation of Cement Slurry

Cement slurry shall be prepared by using 2.2 kg of blended cement per sqm. area. Each time only that much quantity shall be prepared which can be covered on the surface and the surface in turn would be covered with 25 mm thick cement mortar base within half an hour. Slurry prepared and remained unused for more than half an hour shall be totally rejected.

(v) Preparation of Cement Mortar

Cement mortar 1:3 (1 blended cement: 3 coarse sand) shall be prepared with cement/ water duly blended as explained in clause 22.1.1 (ii). Only that much quantity of cement mortar which can be consumed within half an hour, shall be prepared. Any cement mortar that is prepared and remains unused for more than half an hour shall not be used in the work and shall be rejected.

(vi) Laying Water Proofing Course

Before laying the base course of cement mortar 1:3, the lean concrete surface shall be cleaned neatly with water. Cement slurry prepared as per clause 22.1.1 (ii), shall be applied only on the area of the concrete surface, that can be covered with the cement mortar (1:3) base course within half an hour. The cement slurry should cover every spot of the surface and no place shall remain uncovered.

Just after the application of cement slurry on the surface, the cement mortar prepared as per clause 22.1.1 (v) should be used for laying the base course. Base Course should be laid to a perfect level with wooden/aluminium straight edge of at least 2 mtrs. long. The top surface of cement mortar should be finished neatly and later scratched when green with a suitable instrument before the base course dries and gets hard that is just before the base course takes up initial set.

When the 25 mm thick base course is just getting set the cement slurry prepared as per clause 22.1.1 (iv) should be spread over the base course upto the area that shall be covered with just two to three stone slabs. The cement slurry shall be spread in such a way that the area of base course to be covered immediately shall be covered with slurry without any gap or dry spots. Immediately on applying cement slurry on the base course the Rough Kota Stone slab shall be laid over the base course and pressed gently so that the air gap can be removed. The slurry applied on the surface which gets spread when the stone slab is pressed shall get accumulated in the joints of adjacent stone slabs and if any gap still remains between the stone slabs the same should also be filled with additional quantity of cement slurry. For laying the stone slabs in perfect level, two stone slabs at adjacent concerns/ends shall be fixed firmly to the required level and a string stretched over the two slabs, the intermediate slabs shall then be set to the level of the string.

After filling all the joints of the Rough Kota stone Slabs with cement slurry the area of stone slab shall be laid with cement mortar 1:3. The surface of stone slabs shall be cleaned and lightly watered.

Cement mortar 1: 3 prepared as per clause 22.1.1 (iv) shall be used for laying this course. For lay this course 25 mm high wooden strips shall be used and the top surface shall be finished smooth without using additional cement or slurry.

After laying 3rd course and before the mortar layer takes the initial set, Stone aggregate of 10mm to 12 mm nominal size shall be uniformly spread and lightly pressed into the finished surface @ 8 cum. /sqm. The aggregates shall not be embedded totally inside the mortar and shall be visible on the top

surface.

In cases where slope is to be provided for the water proofing layer, grading with additional cement concrete/cement mortar shall be provided and then the water proofing layer shall be laid on the graded surface. Extra payment shall however be made for the grading course.

(vii) Curing

Immediately after completing the fourth layer, arrangements shall be made for the top RCC slab as quickly as possible and in the meantime till the top slab is casted the water proofing treatment shall be kept wet continuously. In case the concreting of slab gets delayed for more than 2 weeks the curing can be stopped after 14 days.

(viii) Measurement

Length and breadth shall be measured along the finished surface correct to a cm and the area shall be worked out to nearest 0.01 sqm.

(ix) Rate

The rate shall include the cost of all labour & materials involved in all the operations described above. The cost of grading with cement concrete / cement mortar shall be paid for separately.

INTEGRAL CEMENT BASED TREATMENT FOR WATER PROOFING ON VERTICAL SURFACE

Please refer Section 22.2 of CPWD Specifications 2023 Volume 2

INTEGRAL CEMENT BASED WATER PROOFING TREATMENT ON THE VERTICAL SURFACE OF UNDER GROUND STRUCTURES (FIG. 22.3)

(i) Preparing the Surface

The surface of the structure to be treated shall be roughed either by raking of joints in case of brick/ stone masonry or by hacking the cement concrete surface with a specifically made hacking tool just after removing shuttering. Alternately, the surface should be roughened by providing spatter dash key as explained under clause 22.1.1 (i). While doing water proofing to vertical faces from inside, it shall be ensured that water proofing treatment of floor slab is not damaged. Preferably, water proofing of vertical surface shall be done before that of horizontal surface.

(ii) Blending Cement/Water with Water Proofing Compound

Same as under clause 22.1.1(ii).

(iii) Rough Kota Stone Slab

Same as explained under clause 22.1.1(iii).

(iv) Preparation of Cement Slurry

Same as explained under clause 22.1.1(iv).

(v) Preparation of Cement Mortar

Same as explained under clause 22.1.1(v).

(vi) Laying Water Proofing Course

Same as explained under clause 22.1.1(vi). Further rough kota stone are not sufficiently rough to remain in vertical position held by cement slurry. Therefore, the grip for the stone slab has to be increased and this can be done by planting 12 mm to 15 mm nominal size stone aggregate fixed with araldite on surface of each sand stone slab.

(vii) Curing

Same as explained under clause 22.1.1(vii). Further till the water proofing work on vertical face is in progress, the water proofing work done on floor slab shall be kept wet for a minimum period of 14 days. Immediately after completion of water proofing on vertical faces of side walls, the water tank shall be gradually filled with water for testing.

(viii) Measurement

Same as explained under clause 22.1.1(viii).

(ix) Rate

Same as explained under clause 22.1.1(ix).

4. Toilet/Washroom

4.1 Not Applicable

4.2 EXTRA FOR PROVIDING OPENING FOR COUNTER WASH BASIN

Please refer CPWD Specifications 2023 Volume 1 and 2 with up to date amendments.

4.3 20MM THICK MIRROR POLISHED GRANITE FOR CLADDING WORK

Please refer Section 8.6 of CPWD Specifications 2023 Volume 1.

5. IRON MONGERY

5.1 CHROMIUM PLATED BRASS 100mm MORTICE LATCH

Please refer Section 9.15.13 of CPWD Specifications 2023 Volume 1.

Mortice Lock and Latch

This should generally conform to IS 2209.

The size of the mortice lock shall be denoted by the length of the body towards the face and it shall be 65 mm, 75 mm and 100 mm as specified. The measured length shall not vary more than 3 mm from the length specified.

5.2 ALUMINIUM DOOR STOPS WALL STOPPERS

Please refer Section 9.15.21.1 of CPWD Specifications 2023 Volume 1.

Hanging Rubber Door Stopper

These shall be of cast brass, finished bright, chromium plated or as specified. Aluminium stopper shall be anodised and the anodic coating shall not be less than grade AC-10 of IS 1868. The size and pattern of the door stopper shall be approved by the Engineer-in-Charge. The size shall be determined by its length.

5.3 UNIVERSAL HYDRAULIC DOOR CLOSER

Please refer Section 9.15.22 of CPWD Specifications 2023 Volume 1.

Universal Hydraulic Door Closer (Exposed Type)

These shall be made of cast iron/aluminium alloy/zinc alloy and of shape and pattern as approved by the Engineer-in-Charge.

These shall generally conform to IS Specifications for door closers (Hydraulically regulated) IS 3564.

The door closers may be polished or painted and finished with lacquer to desired colour. Aluminium alloy door closer shall be anodized and the anodic coating shall not be less than grade AC 15 of IS 1868. All dents, burrs and sharp edges shall be removed from various components and they shall be pickled, scrubbed and rinsed to remove grease, rust, scale or any other foreign elements. After pickling, all the M.S. parts shall be given phosphating treatment in accordance with IS 3618.

The nominal size of door closers in relation to the weight and the width of the door size to which it is intended to be fitted shall be given in Table 9.19 of CPWD Specification.

Sampling and Criteria for Conformity: All the door closer of the same nominal size and shape and from the same batch of manufacture, in one consignment shall constitute a lot. The number of door closers to be taken at random from a lot shall depend upon the size of the lot. (Table 9.20). The sample shall be tested for construction, finish, dimensions, interchange ability of parts and performance in accordance of Table 9.20. Any door closer failing in any one or more of these characteristics shall be considered as defective. If in the first sample, the number of defective door closer is less than or equal to corresponding acceptance number, the lot shall be declared as conforming to the requirement of these characteristics. If the number of defective door closer is greater than or equal to the rejection number, the acceptance number but less than the rejection number, lot shall be deemed as not meeting with requirements of these characteristics. If the number of defectives is greater than the acceptance number, but less than the rejection number, a second sample of the size equivalent to that of the first shall be taken to determine the conformity or otherwise of the lot. The number of defective door closers found in the first and the second sample shall be combined and if the combined number of defective thus obtained is less than or equal to the corresponding acceptance number, the lot shall be declared as conforming to the requirements of these characteristics.

Endurance Test- Two door closer in case of lot size 280 or less and five door closers in case of lot size more than 280 shall be selected from those already found satisfactory. These door closers shall be tested for the endurance test.

If all the door closers tested for endurance test satisfy the requirement of this standard, the lot shall be deemed as having satisfied the requirements of endurance test, otherwise not. CPWD Specification.

Performance Requirements: After being fitted in its position when the door is opened through 90°, the same should swing back to angle of $20^\circ \pm 5^\circ$ with nominal speed but thereafter, the speed should get automatically retarded and in case of doors with latches, it should be so regulated that in its final position the door smoothly negotiates with the latch.

5.4 ALUMINIUM TOWER BOLT

Please refer Section 9.15.8 of CPWD Specifications 2023 Volume 1.

Tower Bolts

These shall generally conform to IS 204 (Part. I) & IS 204 (Part. II). Tower bolts shall be well made and shall be free from defects. The bolts shall be finished to the correct shape and shall have a smooth action. All tower bolts made with sheet of 1.2 mm thickness and above shall have counter sunk screw holes to suit counter sunk head of wood screws. All sharp edges and corners shall be removed and finished smooth.

The height of knob of tower bolt when the door, window etc. is in closed position from the floor level

shall be not more than 1.9 metre.

Tower bolts shall be of the following types:

a) Aluminium barrel tower bolts with barrel and bolt of extruded sections of aluminium alloy. The knob shall be properly screwed to the bolt and riveted at the back.

b) Brass tower bolts with cast brass barrel and rolled or cast brass bolt. Or

Brass tower bolts with barrel of extruded sections of brass and rolled or drawn brass bolt.

The knobs of brass tower bolts shall be cast and the bolt fixed with knob, steel spring and ball shall be provided between the bolt and the barrel.

(c) Mild steel barrel tower bolts with mild steel barrel and mild steel bolt.

Or

Mild steel tower bolts with mild steel barrel and cast iron bolts.

The plates and straps after assembly shall be firmly riveted or spot welded. The rivet head shall be properly formed and the rivet back shall be flush with the plate. These shall be made in one piece.

Unless otherwise specified bolt shall have finish as given below:

(a) Mild steel tower bolts (Types 1 and 2) Bolts bright finished or plated as specified and barrel and socket stove enamelled black.

(b) Brass tower bolts (type 3 to 5) Bolt and barrel polished or plated as specified.

(c) Aluminium alloy tower bolts (type 6) Bolt and barrel anodized.

The anodic film may be either transparent or dyed as specified. The quality of anodized finish shall not be less than grade AC-10 of IS 1868.

Sampling and Criteria for Conformity: It shall be same as specified in clause 9.15.1.4.

Scope of Work

The scope of work consists of **“General Civil Maintenance Work of Viaduct & 07 Metro Stations (i.e. Sardar Patel Stadium, Commerce Six Road, Gujarat University, Gurukul Road, Doordarshan Kendra, Thaltej and Thaltej Gam) excluding Old High Court Station of East-West Corridor Western Reach Section from Shahpur Ramp to Thaltej Gam Dead End of Ahmedabad Metro Rail Project Phase - 1.”**

Brief description of scope of work is given as below:

1. **Viaduct:** The repair and maintaining of viaduct may cover items of pedestal repair, Pier cap, pier footings, maintenance of elastomeric bearings, maintaining of drainage and other incidental repairs, Tree cutting, repairing and cleaning of Manholes cover, Cleaning of Viaduct with disposal of debris material, all machinery including work at height, tools & labours with safety and barricading. The item cover from Starting of **Shahpur Ramp to Thaltej Gam Dead End** as shown in the block diagram.

2. **Stations:** The scope of stations consists of **07 Metro Stations (i.e. Sardar Patel Stadium, Commerce Six Road, Gujarat University, Gurukul Road, Doordarshan Kendra, Thaltej and Thaltej Gam) excluding Old High Court Station of East-West Corridor Western Reach Section.** The repair and maintenance activity of stations may require repair of false ceiling, sanitary works, flooring works, roof repair works, all type of Doors repairing, lock repairing, Bearing Elastomeric and Pot-PTFE type maintenance, water pipeline works, glass works, Steel railing, rolling shutter repair works, drainage works, Paver block for footpath works, putty and paint works, drainage system including all construction, welding, tools, materials and labours with machinery to work at height with safety measures and barricading with cleaning of site.

“General Civil Maintenance Work of Viaduct & 07 Metro Stations (i.e. Sardar Patel Stadium, Commerce Six Road, Gujarat University, Gurukul Road, Doordarshan Kendra, Thaltej and Thaltej Gam) excluding Old High Court Station of East-West Corridor Western Reach Section from Shahpur Ramp to Thaltej Gam Dead End of Ahmedabad Metro Rail Project Phase - 1.”

Block Diagram of Western Reach Section stations of Phase-I

