



C3.4.2.3 PARTICULAR SPECIFICATIONS FOR THE CIVIL WORKS

The following Particular Specifications for civil works will be applicable to this Contract:

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SOL PLAATJE LOCAL MUNICIPALITY

INTEGRATED BULK WATER SUPPLY SYSTEM INTERVENTION

CONTRACT No: BFI01/23/E2SC2

Re-Advert: RIVERTON WTW REFURBISHMENT OF OLD PLANT'S FILTERS, CHLORINE AND CHEMICAL DOSING SYSTEM

PU : BUILDING WORK

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PU BUILDING WORK

PU 1 SCOPE

This section of the Specification deals specifically with all the building work associated with the Works.

Concrete work, steelwork, cladding, pipelaying, mechanical and electrical equipment, etc. forming part of or to be housed in a building erected in terms of this specification shall conform to the requirements of the relevant standardised or particular specifications referred to in the Project Specification.

PU 2 INTERPRETATIONS

The relevant SANS 1200 Standardised Specifications such as Site Clearance, Earthworks, Earthworks (Pipe Trenches), Concrete (Structural), Low Pressure Pipelines, Bedding (Pipes), Sewers and Stormwater drainage shall also apply to the work under this section.

PU 3 MATERIALS

All materials used for the Building Works shall, where such mark has been awarded for a specific type of material, bear the SANS mark.

PU 3.1 Brick and Plasterwork

PU 3.1.1 Cement

Cement shall conform to the requirements of SANS 1200 G-Concrete (structural)

PU 3.1.2 Sand

Sand or plaster and mortar shall comply with the requirements of SANS 1090, whereas the aggregates for normal and granolithic floor screeds shall comply with the requirements of BS 1199 and BS 1201 respectively.

PU 3.1.3 Water

Water shall conform to the requirements of SANS 1200 G-Concrete (structural).

PU 3.1.4 Cement Mortar

Unless otherwise described, cement mortar shall be composed of six parts by volume of sand to one part by volume of cement. The materials are to be mixed dry until the mixture is of a uniform

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colour and then clean water is to be added gradually through a fine hose and the mixture turned over until the ingredients are thoroughly incorporated.

Cement mortar must be mixed in small quantities and must be used within one hour of mixing, as the use of cement mortar that has commenced to set will not be permitted.

PU 3.1.5 Plaster

Plaster on brick walls shall be mixed one part cement to six parts sand.

Plaster on concrete ceilings, beams, columns etc. shall be mixed one part cement to three parts sand.

Plaster shall be mixed as specified in Clause PU 3.1.4

PU 3.1.6 Bricks

Bricks shall be of the best quality sound hardburnt pressed bricks or in the absence of clay bricks, concrete bricks, even in size and shape and equal to a sample submitted to and approved by the Engineer prior to commencement of work.

Clay bricks shall conform with the requirements of SANS 227 and concrete bricks to SANS 987.

PU 3.1.7 Wall Ties

Wall ties shall be the galvanised, crimped, single-wire type with a 3,5 mm diameter, and shall comply with the requirements of SANS 28.

PU 3.1.8 Damp Proof Courses

Damp proof courses, unless otherwise described, shall be an asphaltic damp proof course with a base of fibre felt, and complying with the requirements of SANS 248 Horizontal Damp Proof Courses, and with a mass of 3,25 kg/m² or a plastic damp proof course of 15 micron thickness as Type B, complying with the requirements of SANS952.

PU 3.2 Fascias, Barge Boards and Window Sills

PU 3.2.1 Fascias and Barge Boards

Asbestos cement fascias and barge boards, where specified, shall be 12 mm pressed sheets, 200 or 225 mm wide, free from cracks, twists, blemishes or other defects and complying with the requirements of SANS 685.

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PU 3.2.2 Window Sills

Internal fibre reinforced cement sills (NUTEC) shall be single lengths cut between reveals, fitted with fixing lugs and solidly bedded in 3:1 cement mortar with a slight projection beyond the finished wall face below. Sills shall be pressed reinforced cement of approved manufacture 152 x 15 mm thick set level.

PU 3.3 Paintwork

PU 3.3.1 Primers

Plastered surfaces must be cleaned down and have one coat alkali resisting primer of an approved brand applied in strict accordance with the manufacturer's instructions, before any undercoats are applied.

Galvanised metal surfaces must be treated with one coat Metal Etch Primer complying with the requirements of SANS 723.

Steel surfaces and doors and steel door frames, before being built in, must have all loose primer together with all rust spots, dirt, etc. removed and be treated with one coat red oxide zinc chromate primer complying with the requirements of SANS 909.

Wood surfaces to receive paint finish must be cleaned down, all knots treated with knotting and be primed with Type 1 Wood Primer externally and Type III Wood Primer internally, both complying with the requirements of SANS 678.

PU 3.3.2 Emulsion paint for interior use must be Grade I Emulsion paint complying with the requirements of SANS 663. Emulsion paint for exterior use must be of the Synthetic Polymer Base Type complying with the requirements of SANS 634.

PU 3.3.3 High Gloss Enamel Paint shall be used on all surfaces other than specified above. High Gloss enamel paint must be Grade I paint complying with the requirements of SANS 630 for decorative High Gloss Enamel Paints with a Non-Aqueous Solvent Base, for interior and exterior use.

Undercoats for paints, except Emulsion paints, must be Type I undercoat Paint complying with the requirements of SANS 681.

PU 3.4 Doors, Windows and Glazing

PU 3.4.1 Solid Hardwood Doors

Unless indicated otherwise on the drawings, all doors shall be solid hardwood doors, manufactured from hardwood complying to SANS 1099.

PU 3.4.2 Wooden Door Frames

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All wooden door frames shall be of solid hardwood, complying to SANS 1099. Frames shall be fitted with suitable tie bars and braces at bottom and lugs for building in, three to each jamb of frames without fanlights and four to each jamb of frames with fanlights. All doors shall be provided with locks to the requirements of SANS 4 and each lock shall be provided with a duplicate key.

PU 3.4.3 *Pressed Steel Door Frames*

Pressed steel door frames shall comply with SANS 1129 and shall be manufactured from 1,6 mm thick mild-steel sheeting, pressed to the required shapes, properly mitred, welded and reinforced, with all welding neatly cleaned off.

Frames shall be of the widths required to suit the thickness of the walls into which they are built and shall be fitted with suitable tie bars and braces at the bottom. Three lugs to be built into the brickwork shall be provided on each jamb.

Rebates in frames and transom for doors shall be of the widths required to suit thicknesses of the doors and shall be fitted with a pair of approved steel butt hinges set flush into recesses in the frames. 4,5 mm thick reinforcing plates shall be welded to the backs of the frames at hinge positions.

PU 3.4.4 *3CR12 Door Frames*

The same conditions as specified in clause PU3.4.3 shall apply for 3CR12 Door Frames except that 1,6 mm thick 3CR12 sheetings shall be used.

PU 3.4.5 *Windows*

Steel windows must be of approved manufacture and design, constructed of rolled mild steel sections, properly mitred and welded at angles with welding cleaned off smooth on all faces and complying with the requirements of SANS 727. Window types and sized shall be as specified on the drawings.

PU 3.4.6 *Aluminium Window Frames*

Standard aluminium window frames shall be manufactured from aluminium extruded section with anodised finish.

PU 3.4.7 *Winblock Window Systems*

Precast concrete window systems shall be winblock window systems as supplied by Winblock Transvaal, Tel: (011) 444 6996/444 4887 or similar approved.

Standard Winblock surrounds shall be supplied as indicated on the drawings. The surrounds shall be manufactured from unreinforced low permeability, 30 MPa concrete and shall conform to the specification of Wintec in all respects.

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Where direct glazing is specified, the glazing shall be fixed to the winblock surround in accordance with the instructions of the manufacturer.

Where opening windows are specified top-hung Winvents shall be supplied with factory glazing. The frame shall be manufactured from aluminium extruded sections with anodised finish. Weather seals the wool pile. Friction stays to be manufactured from stainless steel and handles from glass reinforced nylon (GRP)

PU 3.4.8 Fixed Louvre Windows

Fixed louvre windows shall be standard louvres to the sizes indicated on the drawings as manufactured by HH Robertson (Africa) Pty Ltd or similar approved and shall have a dark blue chromodek finish

Fixed louver windows shall be provided with a vermin proof screen manufactured from Mentis Type 362 Flatex screen as manufactured by Andrew. Mentis (Pty) Limited or similar approved welded to a 75 x 50 x 20 x 2,5 lipped angle frame, sized to fit into the wall opening as indicated on the drawings. The frame shall be provided with four lugs and fixed to the masinary work with four 8 mm x 50 mm expansion bolts.

PU 3.4.9 Glazing

Sheeting glass for glazing, unless otherwise specified, must be flat drawn clear glass of the thickness indicated below and comply to SABS 0400, Part N. For safety glazing refer to NN3.1.

For panes not exceeding 0,65 m² : 3 mm

For panes exceeding 0,65 m² and not exceeding 1,5 m² : 4 mm

Where obscured glass is specified, 4 mm thick.

Specific pattern glass shall be used.

PU 3.5 Tiling

PU 3.5.1 Adhesive and Grouts

(a) Wall adhesive

Wall adhesive shall be a grey, cement-based thin bed, wall tile powder adhesive for fixing tiles to walls.

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(b) Floor adhesive

Floor adhesive shall be a grey, cement-based thick bed, floor tile powder adhesive for fixing heavy tiles to floors or walls.

(c) Bonding agent

Bonding agent shall be a latex modified for use with adhesives and grouts to improve water resistance.

PU 3.5.2 Tiles

Tiles shall be of first grade quality, white in colour, and of minimum thickness of 5 mm and shall be glazed ceramic tiles (unless specified to the contrary).

PU 3.6 Floor Finishes

PU 3.6.1 Vinyl Floor Tiles and Accessories

Vinyl floor tiles shall be semi-flexible vinyl floor tiles, 300 mm x 300 mm x 2,5 mm thick to the colours specified. The colour scheme shall be approved by the Engineer before any tiles are ordered - irrespective whether colours have already been specified on the drawings.

Skirtings shall match the colour of the floor tiles and shall reach 100 mm up against the wall.

PU 3.6.2 Epoxy Floor Coatings

PU 3.6.2.1 Self Levelling Coatings

Self-levelling and self-smoothing epoxy coatings shall be solvent free, epoxy overlay systems in general 4 – 6 mm thick. However, the epoxy coating shall be applied to the thickness specified strictly in accordance with the manufacturer's instructions. Before application the concrete shall be prepared and primed in accordance with the manufacturer's instructions.

PU 3.7 Electrical Connection

Electrical wiring and fittings are to comply with the requirements laid down by:

- (i) The latest issue of the "Standard Regulations for wiring of premises" issued by the South African Institute of Electrical Engineers.
- (ii) The Factories, Machinery and Building Works Act of 1941.
- (iii) The local authorities By-laws and any special requirements of the Local Supply Authority.

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PU 3.8 Sanitary Equipment

PU 3.8.1 Pedestal Water Closet Pans

Pedestal water closed pans shall be of wash-down type approximately 450 mm high, of white glazed fireclay or vitreous china, complying with the requirements of the relevant SANS specification.

Pans shall be bedded on the floors in 3:1 cement mortar. Pans shall be fitted with approved wooden seats with double flap of size and shape required to fit the pans and each attached to pan with two non-ferrous metal fixing bolts.

PU 3.8.2 Flushing Cisterns

Closed coupled vitreous china cisterns, no less than 12 mm thick in any part, shall be provided complying with the relevant SANS specification and shall have a capacity of not more than 9 litres and shall be of the valveless symphonic type of approved manufacture.

PU 3.8.3 Hand Wash Basins

Hand wash basins shall be of the bracket type of white vitreous china, complying with the requirements of the relevant SANS specification and having overflow, fitted with chromium plated grid.

Unless otherwise specified, basins shall be size 585 x 430 mm each fitted with 38 mm plug and chromium-plated chain, and with 12 mm chromium-plated brass easy clean pattern screw down pillar taps.

Basins shall be fixed on concealed wall hangers fixed to walls with 6mm brass bolts, 150 mm long.

PU 4 PLANT

Plant, equipment, tools, scaffolding, etc. utilised in building work shall be of suitable capacity, condition and design to ensure the satisfactory and timeous completion of the Works within the specified period and in terms of these specifications and good building practices.

Only registered artisans (e.g. plumbers, electricians, etc) shall be employed on any work where this is compulsory building practice.

PU 5 CONSTRUCTION

PU 5.1.1 Normal Brick Walls

Brickwork, wherever practicable, and not otherwise described must be built in Stretcher bond. Half brick walls, walls in two skins and cavity walls must have separate skins built in stretcher

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bond. No false headers are to be used and none but whole bricks except where legitimately required to form bond. The bricks are to be well wetted (saturated in hot weather) with water before being laid and the course of bricks last laid is to be well wetted before bedding fresh bricks upon it. All perpends and angles are to be kept plumb. The brickwork is to have the joints flushed up at every course solid throughout the whole width of the course, and each course is to be laid on a solid bed of mortar. Pointing is to be done as the work proceeds.

The joints of all walls to be plastered or tiled are to be raked out 15 mm as the work proceeds to form a key for plaster or screed. All walls are to be built up in regular and horizontal courses and carried out so that no part built is more than 1,2 m higher than any adjoining walls. Mortar beds generally are not to exceed 12 mm thickness.

PU 5.1.2 Face Brick Walls

In all face brickwork the bond must be set out on the first level course of brickwork, at floor level internally and two courses below ground level externally. The bond, if necessary, is to be broken in the centre of panels under windows or to piers between windows. All perpends must be kept true, and all courses must be built to gauge rods. Facings must be carefully protected from damage, mortar droppings, paint splashes, etc. during the whole period of the Contract, and facing on completion will not be allowed.

PU5.1.3 Cavity Walls

Cavity walls are to be built with two brick skins with a cavity between the skins and the two skins tied together with wire ties, four to the metre square, carefully laid and in no case to fall inwards towards the inner skin of the wall.

Care must be taken to keep the cavity free of mortar droppings or other matter by movable boards or other means, and temporary openings must be left at plinth level through which any such droppings, etc. can be removed, and the openings made good on completion.

At door, windows and other openings, the cavities shall be stopped 102,5 mm back from heads, jambs and sills of openings.

PU 5.1.4 Reinforced Brick Lintols

Brick lintols are to be built of normal, sound, well burnt, good quality building bricks, similar to the facings where exposed properly bonded longitudinally and bedded and pointed in cement mortar as described. Special care must be taken to ensure solid bedding, particularly where the reinforcement occurs.

The lintols are to be reinforced with straight continuous mild steel rods of the size and number scheduled. The rods must each extend 300 mm on each side of the opening and are to be evenly spaced across its thickness in the first horizontal joint above the soffit.

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Brick lintols in cavity walls must have all rods placed below the solid sections of the walls, excepting for those specifically scheduled to occur below the cavity.

Cavity walls must be built solid for the number of courses scheduled above the lintols soffit. This solid section must extend the full width of the opening, plus 300 mm on each side. Combined brick and concrete lintols may have the reinforcement divided proportionately between brick and the concrete skins. Where two or more openings are less than 600 mm apart, the lintol shall be continuous over all such opening and such openings and dividing piers, plus 300 mm bearing at each extreme end as before, shall have such height and reinforcement as scheduled for widest opening spanned.

Span in mm	Min Height of Lintols above soffit course, in brick courses	Reinforcement per half-brick thickness of wall above for solid walls		Additional reinforcement for cavity, placed below cavity	
		No of rods	Dia mm	No of rods	Dia mm
600	2	1	6	1	6
900	3	2	6	2	6
1200	3	3	6	1	6
1500-1800	4	2	10	1	10
2100-2400	5	3	10	1	10

PU 5.1.5 Damp Proof Courses

The sheeting is to be cut into strips of the required width and laid on all foundation walls to the full thickness of the walls and without any longitudinal joints. At ends, angles and intersections the sheeting must be lapped 150 mm and sealed. In cavity walls the sheeting must be laid across the full width of the wall, including the cavity, and must be stepped up one course in the cavity, over a cement triangular fillet, so that the sheeting under the inner skin of the wall is higher than that under the outer skin of the wall.

Under all windowsills exposed to the weather, the sheeting must be laid on the brickwork in the first joint immediately below the sill and turned up with an easy bend and tucked into window frame.

Over reinforced brick lintols exposed to the weather, the sheeting must be laid to form damp proof course as detailed above for solid walls and cavity walls.

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PU 5.1.6 Reinforcing in Brick Walls

Reinforcing (brickforce) of an approved manufacture shall be placed on every fifth course in all brick walls. In halfbrick and cavity walls 80 mm wide reinforcing mesh shall be used and 150 mm wide mesh in the case of the one-brick walls.

Except where otherwise described, all external plaster is to be finished with a wooden float and all internal plaster is to be finished with steel trowel, all to perfectly true and even surfaces, free from tool marks and other defects on completion.

All finished surfaces are to be protected from injury. All joints in brickwork are to be well raked out all surfaces, brickwork and concrete, to be plastered must be brushed down to remove all dirt and dust and be thoroughly wetted directly before plastering. Concrete surfaces must be roughened or hacked as necessary to give a proper key for plaster. The surfaces must then be sloshed with a course cement grout before plastering commenced. Plaster must be returned into reveals and soffit of openings and all angles and edges must be true and straight. All plaster surfaces must be free from blemish and any cracks, blisters, or other defects must be cut out and made good and the whole left perfect at completion. Plaster on walls must not be less than 12 mm or more than 20 mm in thickness, and plaster on concrete work must be not less than 10 mm or more than 15 mm in thickness, except where specifically otherwise described.

PU 5.1.8 Slip Joints

Slip joints shall be provided between brickwork and concrete slabs and beams by levelling up and steel trowelling smooth the bearing surfaces of brickwork with 3:1 mortar and covering the bearing surface before concrete is cast with 2 layers of 500 µm (five hundred micron) black general purpose sheeting membrane.

The ends and sides of beams and edges of concrete slabs shall be separated from the brickwork with 12 mm polystyrene placed vertically against the brickwork before the concrete is cast.

PU 5.1.9 Beam Filling

Unless otherwise specified, beam filling shall be half brick, built in cement mortar, cut in between roof timbers and carried hard up to underside of roof covering and flushed up in mortar with a groove formed between covering and mortar to the satisfaction of the Engineer.

PU 5.1.10 Securing of Roofs

Roof plates shall be fixed to walls with bands of 1,6 mm thick galvanised hoop iron, 32 mm wide, built six (6) courses deep into brickwork or embedded 300 mm deep into concrete, and not exceeding 1,5 metre centres, and well lapped and spiked to plates and to roof trusses where adjacent, otherwise taken up to and lapped round the nearest purlin and well spiked thereto. A layer of brickforce shall be provided at each alternate course above the building in of the hoop iron to fix the roofs.

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PU 5.2 Rain-Water Goods

All gutters, downpipes and flashings shall be 0,6 mm thick galvanised sheet iron. Rates for sheet iron eaves gutter and rainwater pipes shall include for short lengths and for lapped, riveted and soldered joints. Eaves gutters are to be screwed or welded to fascia boards or roof timbers;/beams with 38 X 3 mm galvanised steel gutter brackets at approximately 900 mm centres, or as otherwise described. Rainwater pipes are to be fixed with sheet iron ears to and including 25 C 76 X 150 mm wrought and chamfered hardwood blocks, plugged to brickwork or concrete and oiled, or with 38 X 14-gauge galvanised hoop iron straps built into walls not more than 2 metres apart, bent around pipe and bolted at back.

Flashings shall be properly cut, lapped and shaped to render a waterproof finish. Flashings turned up against walls must be finished with cover flashings bent to shape, dressed over the underflashing and with top edge wedged into joint of brickwork and pointed or secured by other approved means.

Fibre-cement fascias and barge boards shall be secured with screws or bolts. Where joints occur in the length, they are to be covered with two channels 40 mm girth with web to suit thickness of plates formed from 0,5 mm thick galvanised sheet iron cut to shape, bent as required and with the webs riveted together back-to-back. Tongues 15 mm wide by 15 mm long must be left projecting at both ends of flanges and clamped down over edges of fascias or barge board when in position.

PU 5.3 Paintwork

All surfaces not being painted, such as face brickwork, sills, floors and stained woodwork, must be covered up and protected against paint and distemper spots before any painting is commenced. All floors must be swept clean, and walls dusted down before any paintwork is commenced and no sweeping or dusting must be done while painting is in progress.

All plastered wall, ceiling and similar surfaces must be perfectly dry and in a fit state to receive the finishings, before the work is put in hand.

All coats of paints, etc. must be thoroughly dry before subsequent coats are applied and rubbed down where necessary.

All work must be finished to colours approved by the Engineer.

The tints of undercoats must approximate those of the finishing colour and in order to indicate the number of coats applied and to avoid misses when applying a succeeding coat, a slight difference shall be made in the tint of each coat.

The Contractor must provide all necessary dust sheets, covers, etc and shall exercise all necessary care to prevent marking the surfaces of joinery, walls, floors, glass and electrical fitting,

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etc. and must keep all parts of the works perfectly clean and free at all times from spotting, accumulation of rubbish, debris or dirt arising from the painting operations. Any surface disfigured or otherwise damaged must be completely renovated or replaced as necessary, by the Contractor at his own expense. The premises must be left clean and fit for occupation at the completion of the Work.

PU 5.4 Floor Finishes

Where a floated concrete floor finish is specified on the drawings, the requirements of SANS 1200G or GA whichever is relevant shall apply.

Granolithic finish to floors, treads and risers of steps, thresholds, landing etc. must be composed of two parts hard stone chippings: half part sand and one part cement, steel trowelled to a true and even surface. The granolithic must be laid before the concrete surface bed has matured, otherwise the surface of the concrete must be thoroughly cleaned with a wire brush and a coat of neat cement grout applied immediately before the granolithic is laid. The granolithic must be laid in panes not exceeding 6 m² in areas and jointed to lines of panels and lined into smaller square as directed with sunk V-joint. The joints between the panels should coincide with joints in the concrete surface bed, where these occur. No dusting on of colouring pigment will be allowed.

Vinyl floor tiles shall be fixed on to a screed of thickness at least 25 mm. The screed shall have a wood floated finish and shall be smooth with no obstruction greater than 3 mm protruding and with the screeded surface level in such a way that no gap greater than 5 mm would show underneath a 3 m straight-edge or part thereof.

Vinyl tile adhesive shall carry the same product name as the vinyl tiles and adhesives shall be applied as stipulated by the supplier.

The acceptable tolerance of the final tiled floor shall be similar to that specified for the screeded surface underlying the tiles.

PU 5.5 Tiling Work

The area to be tiled, shall first be plastered as described under plasterwork leaving a wood float finish. The plastered surface shall be left for two weeks to cure before any tiling may start.

Tiles shall only be cut by approved tungsten tile cutters, or for irregular shapes by approved tile saws. The use of nibblers shall not be permitted.

A tiled panel shall be planned beforehand to minimise cuts. An initial perpendicular tiling configuration shall be laid against perpendicular fixed battens. A clear space of 1 to 2 mm shall be left between tiles by inserting positive temporary spacers.

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Prior to the application of any adhesive the rendering shall be vacuum cleaned. Adhesive shall be mixed with a bonding agent and not with water. The mixing proportions shall be as specified by the supplier. Adhesives shall be applied within a 15-minute period after mixing, with those adhesives not used during such time to be thrown away.

Adhesives shall be applied in a solid bed, some 6 mm thick and then struck with an approved serrated steel trowel. Adhesives shall not be applied by "the fire point tiling method". Grouting of the joints shall only start 48 hours after tiled section has been completed. The grout shall also be mixed with the bonding agent as specified by the supplier. The grout shall be worked off leaving a neat superficial rut in the joint centre. All tile faces shall be cleaned directly after grouting.

No tiling shall be done over a structural joint. In large tiled panels, a movement joint shall be left every 3 meters in the horizontal and vertical direction as detailed. At a structural joint (contraction or expansion joint) the rendering, adhesives and tiles shall be interrupted over the joint and the joint sealed at the surface.

The permissible deviation on the final surface shall be a maximum gap of 3 mm measured under a 3 m straight edge or part thereof.

PU 6 TOLERANCES

Where tolerances are not specified in the clauses above those generally accepted at representing good workmanship in the building trades shall apply.

PU 7 TESTING

The Engineer reserves the right to order any tests, whether at place of manufacture or on site, necessary to evaluate the quality of the work and to ensure the finished building conforms to all the specified requirements.

PU 8 MEASUREMENT AND PAYMENT

PU 8.1 Schedule items

PU 8.1.1 *Brickwork*

Brickwork, if measured as a separate item, shall be measured in square metre of the nett brickwalled area (with the wall width and type of brick-finish, indicated). No additions will be made for small openings such as air bricks, etc. The tendered price square metre of brickwork shall include for the following, if such items are not listed separately:

- (a) Plasterwork as indicated
- (b) Damp proofing

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INTEGRATED BULK WATER SUPPLY SYSTEM INTERVENTION

CONTRACT No: BFI01/23/E2SC2

Re-Advert: RIVERTON WTW REFURBISHMENT OF OLD PLANT'S FILTERS, CHLORINE AND CHEMICAL DOSING SYSTEM

PU : BUILDING WORK

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PUA PAINTING

PUA 1 SCOPE

This section covers the preparation of surfaces, painting, and materials for the decoration and protection of metal, concrete, wood and other surfaces which are exposed to non-corrosive or mildly corrosive conditions only.

Where surfaces which are exposed to severe conditions are to be protected, the painting systems, the factory's quality-control measures, any supervisory measures, and other appropriate information will be specified in the Project Specifications.

PUA 2 GENERAL

No paint shall be applied to any surface containing traces of dust, grit, grease, oil, loose rust, mill scale or corrosion products of any kind or to any surface that is not free from moisture. Where necessary, surfaces shall be thoroughly washed to remove all traces of soluble salts and/or corrosive air-borne contaminants prior to painting, and the surfaces shall be dried and painted immediately thereafter.

Welding shall be completed in so far as it is possible before painting commences, but in cases where welding can be done only at a later stage, no paint shall be applied to within 75 mm of the proposed weld position unless otherwise specified. Welds and adjacent parent metal shall be abrasive blasted and/or ground and all contaminants such as flux shall be removed prior to painting.

Surfaces of members which are to rest on concrete or other floors, or which will be otherwise inaccessible after erection shall receive the full paint system prior to erection.

Damaged paint areas on metal surfaces shall be cleaned, rust spots removed where applicable and the surrounding paint which is still intact shall be feathered for a distance of 20 mm beyond the damaged area. Spot priming and repair shall consist of all the coats previously applied and shall overlap the damaged area.

Damaged galvanised areas shall be cleaned and any rust spots and any flakes of the coating surrounding the damaged area removed. The coating shall then be restored by zinc spraying or soldering, or painting with a zinc-rich paint, as may be approved by the Engineer.

Where the shop coat is allowed to age for a few months before the final painting is done, light sanding or rubbing with steel wool or scrubbing with clean water using a bristle brush shall be carried out.

Steel to be embedded in concrete shall not be painted below 50 mm from the final level of the concrete.

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Each priming coat and each undercoat of paint shall be inspected and approved by the Engineer before any subsequent undercoat or finishing coat is applied.

All finishing colours shall be as specified in the Project Specifications, as shown on the Drawings, or as directed by the Engineer.

PUA 3 MATERIALS

Paints shall comply with the requirements of the appropriate specifications below:

PUA 3.1 Primers

- SANS 312: Red-lead based for structural steel
- SANS 678: For wood
- SANS 679: Zinc chromate for steel
- SANS 723: Etch-wash primer for metals
- SANS 912: Calcium plumbate for galvanised iron
- SANS 926: Zinc-rich epoxy for steel

PUA 3.2 Undercoats

- SANS 681: For all undercoats

PUA 3.3 Finishing coats

- SANS 515: For interior use, flat and eggshell finish
- SANS 630: For interior and exterior use, high-gloss enamel
- SANS 631: For interior and exterior use, oil gloss paint
- SANS 633: For interior use, emulsion paint
- SANS 634: For exterior use, emulsion paint
- SANS 684: For exterior use on structural steel
- SANS 801: For interior and exterior use, epoxy-tar paint
- SANS 802: For interior and exterior use, bituminous aluminium paint
- SANS 887: For interior use, glossy and egg-shell varnish

The Contractor shall furnish the Engineer with the following information and details regarding the paints and decorative materials for the painting system he proposes to use, for written approval:

- i) The name of the manufacturer and trade name.
- ii) The brand, type or grade of paint and the appropriate SANS Specification.
- iii) Manufacturer's data sheets, colour references, instructions for use, including surface preparation, sealers, primers, undercoats, finishing coats, coat thicknesses and curing periods, which shall all be considered as being part of these Specifications if approved by the Engineer.

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Before painting the interiors of buildings they shall be cleaned and the floors shall be washed and kept free from dust during the progress of the interior work.

The Contractor shall protect all nearby surfaces against disfigurement by spatters, splashes and smirches of paint or paint materials. The Contractor shall be responsible for any damage by paint or dirt caused by his operations to vehicles or property or injury to persons and he will be required to provide protective measures to prevent any such damage or injury and make good, where required, at his own expense.

If passing traffic creates dust which may harm or spoil the appearance of external painted surfaces, the Contractor shall sprinkle the adjacent areas with water, at his own cost, for a sufficient distance on each side of the location where painting is being done.

Undercoats shall be tinted by the manufacturer to distinguish between successive coats.

The final coats or finishing coats of paint shall be applied after all the other work in the vicinity has been completed.

The painter shall keep some of the final paint in reserve in the event of his having to make good any patching which may be required as a result of damage or unforeseen circumstances.

Upon completion, the Contractor shall, in the case of buildings, clean all glass, remove all paint spots from walls, floors and fittings, and leave the premises clean and fit for occupation.

All inflammable materials, comprising solvents, thinners, wiping cloths, etc, shall be placed in tightly closed containers and properly disposed of.

PUA 6 PAINTING OF PLASTER, CONCRETE OR BRICK SURFACES

PUA 6.1 Surface Preparation

Surfaces for painting shall be prepared by sandpapering scraping or wire brushing to remove loose material, dust, laitance, scum or other deleterious materials or high spots. Defective areas shall be cut out where necessary and made good with an approved non-shrink filler. Cracks shall be cut out, suitably keyed, and given a coat of an approved bonding agent before the filler is applied. All patches shall be rubbed down to an even surface. Surfaces shall be washed and allowed to dry.

Surfaces shall be treated with neutralising liquid for walls, and if the surface is coarse or textured, either one full coat of pigmented wall sealer or one full filler coat shall be applied in addition to the neutralising liquid.

PUA 6.2 Paint Application

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Prior to the emulsion paint being applied, the surface shall be sealed with an approved clear sealer and primed with an undercoat diluted to 50%. Emulsion paint (PVA or acrylic) shall then be applied in two finishing coats.

Egg-shell finish (alkyd oil based), oil gloss paint or enamel glass paint shall be applied as follows: one coat of universal undercoat shall be applied and it shall be followed by one coat of a mixture comprising 50% of the undercoat and 50% of the paint to be used for the finishing coat. A finishing coat of semi-gloss eggshell, or oil gloss paint or enamel gloss paint shall then be applied.

PUA 7 PAINTING OF WOODWORK

PUA 7.1 Surface Preparation

The surfaces shall be cleaned, sandpapered and rubbed down to a smooth, even face before painting. The moisture content of the timber shall not be more than 20% at the time when the first coat is applied. All cracks, shakes or scars shall be filled flush with a filler approved by the Engineer before painting. The surface shall then be washed with cleaner and allowed to dry.

PUA 7.2 Primer Application

One coat of an approved wood primer shall be applied.

After open-grained timber has been prepared and primed, the grain shall be stopped and filled with synthetic filler and rubbed down with water paper.

All new woodwork shall be properly primed on all surfaces and edges before being fixed in position. All woodwork not previously painted shall be given a prime coat, well brushed in.

PUA 7.3 Paint Application

One coat of universal undercoat shall be applied followed by one coat of mixture comprising 50% of the undercoat and 50% of the paint to be used for the finishing coat. A finishing coat of oil gloss paint or enamel gloss paint or semi-gloss eggshell (alkyd oil based) paint shall then be applied.

PUA 7.4 Varnish Finish

Prepare, stop and apply two coats of gloss varnish or eggshell varnish.

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PUA 8 PAINTING OF METAL SURFACES

PUA 8.1 General

Wherever possible, all painting shall be done at the fabricator's works, but where this is not feasible, the Engineer may permit the application of the undercoat and finishing coats to be carried out on the Site, in which case a prime coat shall be applied at the fabricator's works prior to the members being despatched to the Works.

PUA 8.2 Surface Preparation

The preparation of metal surfaces shall comply with SANS Code of Practice 064 and shall receive the greatest care to ensure rust-free conditions prior to the paint system being applied.

All surfaces shall be prepared by loose paint, rust, plaster, scale, dust, dirt, grease, etc, being removed and by the defective paint surfaces repaired or patched before painting or repainting. Damaged shop-primed surfaces shall be e thoroughly cleaned of rust and patched with a prime coat.

PUA 8.3 Paint Application

a) Iron and steel work

All iron and steel work shall be properly primed with a red-lead-based primer where steel work is likely to be exposed to the elements for longer than 30 days. Zinc-chromate primer may be used where overpainting will be completed within 30 days of priming. Metal-etch wash primers may be used under dry conditions where overpainting will be completed within 24 hours of priming. The dry-film thickness of the prime coat shall not be less than 0,030 mm.

After priming, one coat of universal undercoat shall be applied. If necessary, the undercoat shall be tinted to a shade just lighter than the desired finish with approved liquid stainers. The dry-film thickness shall not be less than 0,025 mm.

The two finishing coats shall either be of alkyd resin-based synthetic enamel, gloss or matt oil paint, or as specified elsewhere. The dry-film thickness shall not be less than 0,025 mm per coat.

When mating surfaces are brought together, both surfaces shall have been given the full treatment specified, but where this cannot be done, each surface shall be given a copious coating of primer and the surfaces drawn together while the paint is still wet.

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The portion of structural steel members to be buried in soil, and all bases to a height of 500 mm shall be given two coats of an epoxy-tar primer instead of the zinc-chromate primer specified for other surfaces.

Ungalvanised guard-rails shall receive two coats of zinc-chromate primer with a dry-film thickness of 0,020 mm per coat before being despatched to the Site.

Before the first finishing coat is applied, the guard-rails shall be thoroughly washed down to remove all traces of salt and other airborne corrosive materials and dirt or other contaminants.

As soon as the rinsed guard-rails are dry, a finishing coat of high-gloss enamel shall be applied to a dry-film thickness of not less than 0,025 mm. This shall be followed by a second coat, as before within 48 hours.

The guard-rails shall preferably be given both finishing coats before erection, but where this cannot be done, the Engineer may allow the finishing coats to be applied after erection, provided that all the mating surfaces and inaccessible spots be painted with the finishing coats before erection.

The total dry-film thickness of all the coats of paint on guard-rails shall not be less than 0,090 mm.

The surfaces of steel and cast-iron articles, such as floor gratings, grids and manhole covers, shall, after a thorough brushing to remove loose rust, be painted with two coats of epoxy-tar paint, each at least 0,023 mm thick.

b) Galvanised iron and steel

All traces of protective coating shall be removed with galvanised iron cleaner, and two coats of calcium plumbate primer shall be applied. One coat of tinted universal undercoat and two finishing coats of alkyd resin-based synthetic enamel gloss paint shall be applied.

c) Non-ferrous metals

Surfaces of aluminium, copper, etc, shall be prepared and cleaned, and one coat of self-etch zinc-chromate wash primer shall be applied. One coat of universal tinted undercoat and two finishing coats of enamel gloss paint shall then be applied. Where non-ferrous metals are not to be painted, the surfaces shall be cleaned, polished and two coats of lacquer applied.

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PUA 9 PAINTING OF FLOOR SCREEDS

Where chemicals could cause damage to floors, such floors shall be painted with an approved epoxy paint. The type of paint to be used will be specified in the Project Specifications and will depend on the types of chemicals that are used.

The preparation of such floor screeds for painting and the subsequent application of paints shall be carried out strictly in accordance with the manufacturer's instructions.

PUA 10 PAINT THICKNESS

Unless otherwise specified, all coats of paint, whether prime coat, undercoat or finishing coat, shall have a dry-film thickness of not less than 0,200 mm, irrespective of the method of application.

PUA 11 INSPECTION

The Contractor shall provide the necessary equipment to establish whether the primers, undercoats and finishing coats have been applied to the correct thickness and at the correct applications. The Engineer may take samples of the paints during painting operations for testing and quality control.

PUA 12 MEASUREMENT AND PAYMENT

Unless otherwise specified in the Project Specifications or in other sections of these Specifications where painting is required, painting shall be measured in square meters.

END OF SECTIO

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SOL PLAATJE LOCAL MUNICIPALITY

INTEGRATED BULK WATER SUPPLY SYSTEM INTERVENTION

CONTRACT No: BFI01/23/E2SC2

Re-Advert: RIVERTON WTW REFURBISHMENT OF OLD PLANT'S FILTERS, CHLORINE AND CHEMICAL DOSING SYSTEM

PWB : SETING OUT

INDEX

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PWB SETTING OUT

PWB 1 GENERAL

This Particular Specification describes the requirements for setting out of the Works. No separate payment will be made for work described in this section.

PWB 2 FIELD WORK

- (a) All survey shall be based on the appropriate Lo system of the national triangulation.
- (b) All points to be set out by the Contractor shall be located in the X, Y and Z directions according to land-survey methods generally accepted in the Republic of South Africa so as to ensure that the required degree of accuracy is achieved.
- (c) The Contractor shall identify and list the beacons that he used as traverse terminals, or for the fixing of points by trigonometrical survey methods.

PWB 3 SURVEY RECORDS AND CALCULATIONS

- (a) All records shall be neat, orderly, fully annotated and cross-referenced, adequately checked and shall include the following:
 - general report,
 - all field placings and checks,
 - final co-ordinate list and differences between polars,
 - levels and check levels, and
 - a summarised list of final X, Y and Z values on all pegs.
- (b) Plans, field books and all calculations shall bear the field surveyor's and the Contractor's signatures, be fully dated and numbered sequentially.
- (c) Only originals shall be submitted.
- (d) The calculations are required to follow basically the principles in common use in the Republic of South Africa, as described in the Annexures to the Survey Regulations framed under the Land-Survey Act of 1927 (as amended).

PWB 4 SURVEY BEACONS

Beacons that have been or will be erected by the Engineer are shown on the Drawings, generally at inflexion point and 400m maximum spacing. Additional survey beacons shall be provided by the Contractor at intermediate points in order to provide line of sight at all points and for the proper construction of the Works.

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PWB 5 REFERENCE PEGS

- (a) Reference pegs have been placed approximately every 400m and at all inflexion points. Two references have been placed per point to be referenced.
- (b) The Contractor shall protect these references, and place further references as may be necessary to secure the position of the pipeline at all times. All reference peg positions shall be determined by means of a double polar or by traverse.
- (c) Reference pegs placed by the Contractor shall at least consist of a steel peg (Y10 or Y12) cast into a concrete block of 300mm diameter and 200mm depth. The Contractor shall note that the value of the survey depends largely on the permanence of its reference points. The Contractor shall apply suitable additional measures in unstable soils to assure the permanence of points.
- (d) Reference pegs shall be numbered consecutively with a 10mm stamp on an aluminium tag cast into the concrete, in accordance with the node numbering sequence indicated on the Drawings.
- (e) The allowable error is 0,02m in the XY plane.

END OF SECTION

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