SPECIFICATION
FOR THE PROPOSED ADA ADDITIONS TO THE CMR
(MARCH 2022)

Project Number: 130.3

TO BE READ IN CONJUNCTION WITH DRAWINGS

Architectural Drawings & Documentation:
Ref. 130.3 7.4.2-001 - Site Plan
7.4.2-101 - Bathroom Conversion – Plans, Schedules
7.4.2-102 - Bathroom Conversion – Sections, Ramp Details
7.4.2-201 - Garden Ramp 1
7.4.2-202 - Garden Ramp 1
7.4.2-301 - Assembly Area Ramp
7.4.2-561 - New Pedestrian Access
7.4.2-601 - External Shower

Structural Drawings & Documentation:
US-FMC2020-ST-01 Rev.A - Garden ramp 1 Layout
US-FMC2020-ST-02 Rev.A - Shower room ramp layout
US-FMC2020-ST-05 Rev.A - Assembly area ramp
Garden ramp retaining wall bending schedule
RC Retaining wall bending schedule
PRELIMINARIES

SECTION A: PRINCIPAL BUILDING AGREEMENT

Agreement
Refer to the abovementioned document for the full intent and meaning of each clause.
Clause headings with clause numbers in brackets are recited hereunder, together with modifications, corrections or supplements applicable to this contract. Where any item is not relevant to this contract such item is marked N/A (meaning "not applicable")

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Preliminaries
The preliminaries for this contract are the June 1991 edition of the Preliminaries for use with the Principal Building Agreement recommended by the Joint Building Contracts Committee. Refer to the abovementioned document for the full intent and meaning of each clause. Clause numbers and headings are recited hereunder, together with modifications, corrections or supplements applicable to this contract.

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Description of Works
The works detailed in the attached drawings are described as the additions to the existing CMR in Mbabane, Eswatini. The additions are restricted to making the existing external toilet and garden ramps ADA compliant and includes the construction of a new visitors drop off area, house the staff quarters, laundry and existing stores.
Water and sewer lines are to be connected to the existing infrastructure.
Subcontract works are to be undertaken as domestic contractors to the main contractor.

Note: All necessary retaining walls are to be included in the contract sum
Note: The contractor is to take cognizance of the specific security rules and regulations of the US Embassy and is to bide by all the requirements set out by the US Embassy security.
Note: Supply of goods is to be priced as fixed price amounts pertaining to escalations of material costs
Meaning of words
According to the manufacturer's instructions" means the manufacturer's instructions at the time of tender
The words "or other approved" are considered to be included if trade names are used. This means that products of different fabrication at the same price as the specified product may, with approval, be used unless otherwise agreed. Use one product throughout
"Approval" means approval in writing and is limited to visual appearance of the work, material or components, and does not relieve the contractor from compliance with the specification. Suppliers or manufacturers of specified materials, components or products without trade names, must be approved by the architect before any materials, components or products are ordered
"Invoked specification" means that this specification invokes the said specification as a tender document and shall be used with this specification. Obtain a copy and keep on the site for the duration of the contract
"SABS" means the relevant specification or code of practice of the South African Bureau of Standards "NBR" means the National Building Regulations
The description of an item implies the complete supply, assembly and operation of the item unless otherwise stated

Standards and compliance
STANDARDS referred to in this specification are the latest edition, including all amendments, published three calendar months or longer before the closing date of tenders
COMPLIANCE: Check deliveries for compliance with the relevant standards. Provide evidence of compliance with the specification where the material obtained is from an unknown source, or where there is doubt about the suitability of the material

Site book
Keep a book in the site office wherein daily reports of completed work, site instructions, site visits, rainfall, delays and details of labour force are kept, and make this information available at site meetings

Samples
SAMPLES: Supply at own cost samples of materials, components or workmanship as instructed for approval
APPROVAL: Ensure that the materials and components are approved before any orders are placed. The materials, components or workmanship must be in accordance with the approved samples

Accuracy
Building work must comply with accuracy level 2 of SABS 0155, except where stated otherwise.

Unauthorised persons
Keep unauthorised persons off the site at all times
Keys
Hand over all keys, properly tagged, at completion to the employer and obtain a receipt thereof

ON COMPLETION

All mud, grease, grout and Paint spots are to be removed from underside of eaves sheeting, from outside paving and left clean and unmarked.

The inside of the building, including floors, windows, light fittings are to be left clean and unmarked by any stain or paint spots, and are to be washed with suitable household cleaners. Sanitary fittings are to be left clean and in a working condition with all traps sealed with water plugs, installed and all stopcocks in the open position. Cupboards to bedrooms, passages, bathrooms and kitchen are to be clean and dusted, keys left in position and doors closed.

All builder’s rubble, including paint tins, wire, tubing, metal sheeting, cement bags, blocks etc. shall be removed from the site, and the concrete and plaster mixing area chopped out and removed. The keys (2 No. per door) together with the duly signed occupation certificate, are to be handed to the owner.

Any excess sub-soil and rocks which have been excavated shall be removed from the site and the entire site left clean and tidy.
ALTERATIONS

Alterations

**DAMAGE**: Prevent structural or other damage to remaining portions of the building(s). Make good all existing work damaged during alterations

**SERVICES**: Ensure that services (electrical, telephone, water supply etc.) are not interfered with. Give notice to the architect if disconnection or alteration is necessary

**DISTURBANCE**: Prevent disturbance and nuisance from dust and noise

**RECOVER**: Recover the following material for re-use: (refer to drawing or schedule)

**FITTINGS**: Remove light fittings, ironmongery and other removable fittings that could be damaged, mark and store until after painting, and refix

**OWNERSHIP**: Demolished material is the property of the contractor. Allow credit to the employer.
EARTHWORKS

Bench mark
Set up and maintain a site datum level as set up by a Land Surveyor or based on an established benchmark

Site clearance

PERMITS: Obtain, before commencing work, all necessary permits for carrying out the work and pay all fees. Obtain a rodent extermination certificate. Hand over all receipts and certificates to the architect for safe-keeping

SITE CLEARANCE:
a) Demolish existing structures shown on drawings or scheduled and remove all material and rubble within one metre of the perimeter of the building, including floors, screen walls, services and manholes, down to 150mm below ground level
b) Use methods that keep dust, noise and vibration to acceptable levels, and which leave adjoining structures safe, to the approval of the local authority
c) Give notice to the architect and the local authority regarding the disconnection of electric cables, water pipes and telephone cables, and leave safe
d) Cut sewer-pipes and seal to the satisfaction of the local authority
e) Remove all trees and bushes (with roots) subject to approval of the architect, other vegetable matter, rubble or garbage and wire fences. Fill stump holes with approved soil and compact
f) Remove top-soil over building area to a depth of 100mm and temporarily store on site for later use as garden soil
g) Any trees, bushes or rocks which are to be preserved will be as directed by the Architect, and care is to be taken not to mark, cut or damage these in any way.

RECOVER the following material for re-use: refer to schedule or drawings.

OWNERSHIP: Demolished material is the property of the contractor. Allow credit to the employer.

Excavations

CLASSIFICATION
"Soil" means soil which can be removed with hand tools and includes sand, made-up ground, gravel, clay, shale and loose stones not more than 75mm wide
"Soft rock" means rock which can be loosened by hand pick axe or crow- bar and includes hard shale, compact gravel-stone, stone of equal hardness and boulders at least 75mm wide and with a volume of not more than 0,03m³
"Hard rock" means granite, quartzite, sandstone, solid shale, slate and rock just as hard or harder, as well as boulders with a volume of at least 0,03m³
"Soft excavations" means excavations in material which can be efficiently removed by
a) back actor with flywheel power of approximately 0.10kW per millimetre of tined-bucket width
b) without the assistance of pneumatic tools
c) rubber tired front-end loader with a mass of about 15t and flywheel power of +100 kW, without ripping or stockpiling

"Intermediate excavations" means excavations in material which can be efficiently removed by
a) back actor with flywheel power of more than 0.10kW for every millimetre of tined-bucket width
b) with the assistance of pneumatic tools
c) be loaded by rubber tired front-end loaders with a mass of about 15t and flywheel power of 0 100 kW, without ripping or stockpiling

"Hard rock excavations" means excavations in material which cannot be efficiently removed without blasting, or wedging and splitting

"Boulder excavations class A" means excavation in material which contains more than 40% by volume of boulders between 0.03m$^3$ and 20m$^3$ in size, in a matrix of softer material or smaller boulders.
"Boulder excavations class B" means excavation in material which contains less than 40% by volume of boulders between 0.03m$^3$ and 20m$^3$ in size, in a matrix of softer material or smaller boulders.

EXCAVATIONS: Assume all excavations are in "soil" or "soft excavations". Notify the architect if harder material is encountered.

BLASTING: If blasting is required, obtain written approval from the architect and carry out the work in compliance with the latest state and local authority regulations

REDUCING LEVELS: Excavate to reduce levels as required or to a depth determined by the architect or engineer.

EXCESS SOIL: Spread excess soil over the site, keep aside for filling later on or cart away to a suitable dumping site as directed by the architect

BULKING: Provide for bulking of excavated material

BANKING: Cut and trim sloping banks at 30° to the horizontal

FOUNDATIONS: Excavate for foundations down to firm natural ground or to solid rock so that the bottom will be at least 750 mm below the level of the adjoining finished ground. Only the architect or engineer will determine firm natural ground

FOUNDATIONS: Excavate for foundations according to the instructions of the engineer

STEPS: Form steps in trench bottoms with horizontal and vertical surfaces where necessary, except where there is solid rock

ROCK: Clean the bearing area of solid rock and provide steps or dowels to prevent lateral movement

SERVICE TRENCHES: Excavate trenches for water supply and sewers at least 450mm, and for electric cables at least 600mm, below finished ground level

ROADS, PAVING: Excavate to required levels/depth
**EXCAVATIONS TOO DEEP:** If excavations for foundations are dug too deep, fill up with 10 MPa concrete at own expense

**NOTICE:** Give notice for approval of foundation excavations before concrete is cast

**RISK OF COLLAPSE:** Maintain all excavated faces up to 1,5m deep where necessary or when instructed by the architect, against collapse by means of planking, strutting or other appropriate methods. Maintain excavations deeper than 1,5m in accordance with government regulations

**STORM- AND GROUND WATER:** Protect excavations against flooding by stormwater or seepage by pumping or baling

**Filling**

**FILLING MATERIAL**

a) Approved clean earth or gravel without clay or organic matter for general filling work under floors, paving, etc.

b) Approved clean earth with a maximum plasticity index of 10, for filling under roads

c) Hardcore consisting of 50 mm stone where height of filling exceeds 1m.

d) Allow for reduction of volume as a result of compaction

**BLINDING MATERIAL**

Sand, fine gravel or other approved fine material

**INSPECTION**

a) Do not fill around the foundation structure before this has been inspected and approved

b) Ensure that foundation walls are adequately braced or have adequate strength to withstand the horizontal pressure resulting from compaction

**FILLING**

a) Spread, level and compact filling at optimum moisture content in layers not exceeding 300mm thick before compaction, to a density of at least 90% of the maximum modified AASHTO density

b) Fill against the outside of foundation walls with a minimum fall of 1:100 away from the building(s) over a distance of at least 1.5 metres

c) Finish sloping banks at a maximum gradient of 30˚ to the horizontal

d) Fill under floors at least 150mm thick in layers not exceeding 150mm

e) Fill under roads to a density of 98% modified AASHTO

f) Cover coarse surfaces like hardcore and which are to receive concrete, or surfaces which are to receive damp proof membranes and where there is a likelihood that the membrane will be damaged, or where shown on drawings, with sufficient blinding material to fill interstices to provide a close smooth surface

g) If fill exceeds 1m use hardcore

**TOP SOIL:** Spread, level and lightly consolidate top soil temporarily stored on site after clearing, or carted in as directed, in one layer at least 75mm thick

**STORMWATER REMOVAL:** Shape ground levels to avoid the damming of storm water, as directed by the architect

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Soil poisoning
Poison the soil against the inside of foundation walls and under floors with CHLORDANE (SABS 1165) soil insecticide according to SABS 0124

a) By a certified pest control contractor
b) Not when soil is excessively wet
c) Do not disturb treated surface
d) Do not bury scraps of timber in ground fill
e) Treat foundation trench bottoms before casting
f) Treat every 300mm backfill before compacting
g) Treat full length of pipe and cable trenches inside the building and for a distance of 3m outside the building
h) Take necessary health precautions on site

GUARANTEE: Provide a written guarantee for ten years for the effectiveness of the treatment, and hand over to the architect
**CONCRETE, FORMWORK AND REINFORCEMENT**

**Concrete foundations, surface beds, floors, paving, ramps, steps, stormwater channels**

**INVOKED SPECIFICATION:** SABS 0100 - Concrete Work. Part 2: Materials and execution of work

**IN-SITU CONCRETE:** Mix ordinary Portland cement (SABS 471), sand and stone for concrete (SABS 1083) and clean, fresh drinking water to produce the following compressive strengths after 28 days. Slump must be between 75 and 100 mm

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Stone</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strip foundations, surface beds;</td>
<td>20 mm</td>
<td>10 MPa</td>
</tr>
<tr>
<td>ramps, steps to be finished</td>
<td>20 mm</td>
<td>10 MPa</td>
</tr>
<tr>
<td>Paving, rainwater channels</td>
<td>20 mm</td>
<td>20 MPa</td>
</tr>
<tr>
<td>Industrial floors</td>
<td>40 mm</td>
<td>30 MPa</td>
</tr>
</tbody>
</table>

**READY-MIXED CONCRETE:** The contractor may purchase ready-mixed concrete, in which case the following applies:

a) It must conform to SABS 878

b) The supplier is responsible for the quality of the material and the design of the mix

c) Retain all delivery tickets for inspection

d) Test the concrete by preparing at least three test cubes from every 6 m³ of concrete

**BREEZE CONCRETE:** Mix 12 parts ash (SABS 794) and one-part ordinary Portland cement (SABS 471). Mix the fine fractions of the ash with cement to produce a mortar before adding the coarse fractions

**COARSE (NO-FINES) CONCRETE:** Mix 9 parts coarse aggregate (SABS 1083) or 6 parts ash (SABS 794) with one-part ordinary Portland cement (SABS 471) and not more than 20 litre of water per 50 kg cement. Do not vibrate coarse concrete

**CASTING:** Cast, spread, compact and wood-float to a level surface. Cast paving with a fall of 1:100. Cast rainwater channels to the desired profile and with the channel floor to a fall of 1:250 minimum or as indicated on drawings. Keep channel sides level with brick courses and/or paving

**CASTING FOUNDATIONS:**

Cast foundations in mix specified by Engineer to widths and depths shown on drawings. No depth of foundation shall be less than three (3) number courses of blocks below surface bed and top of foundation, but never less than 600 below natural ground level. Where foundations are to be stepped,

no step shall be more than 230 in height with 230 overlap. No steps on corners of building will be allowed. All concrete must be used within one hour of mixing, and no concreting will be allowed before 9 a.m. and after 4 p.m. during the months of June, July and August.

**MOVEMENT JOINTS:**

a) Arrange movement joints to coincide with joint pattern of floor finish

b) Movement joints in floor slabs must be keyed (i.e. tongue-and-groove), sawn or dowelled according to SABS 0109
c) Form movement joints in paving and rainwater channels by means of 13 mm thick bitumen impregnated softboard

d) Separate floor slabs from foundation walls by means of a 20x75 mm polystyrene or another approved strip

e) Seal joints with a suitable permanently plastic material

SURFACE FINISH: Finish floor slabs that are to receive thermoplastic or similar floor finish directly (i.e. without screed) as follows

a) Leave the surface undisturbed for about an hour
b) Remove bleed water and laitance on the surface
c) Steel trowel till the desired texture is achieved

Finish industrial floor slabs as follows

a) Leave the finish undisturbed until bleeding has ceased and the surface has stiffened so that foot pressure barely indents the surface (several hours)
b) Remove bleed water and laitance on the surface
c) Power trowel till the desired surface texture is achieved

Finish paving as follows

a) Brush the surface after the concrete has stiffened sufficiently with a stiff brush or similar to leave a coarse surface
b) Round edges of panels
c) Prepare a sample panel for approval

Finish rainwater channels with 1:3 cement: sand plaster

REINFORCING: Reinforce the slab with 4 x 200 x 200mm welded steel mesh (SABS 1024). Ensure that the reinforcement is placed in the middle of the slab. Use large mats. Overlap by at least 300mm where necessary

CURING: Spray regularly with water, cover with plastic or use an approved curing compound for at least five days if the ambient temperature is above 5° C and for eight days if below 5° C

TESTS: Cast and have 1 @ 7 days and 2 @ 28 days cubes tested for compressive strength by an approved laboratory according to SABS method 863/861

Reinforced concrete columns, beams, slabs and lintels

CONCRETE: Cast reinforced concrete according to the instructions of the engineer

INVOKED SPECIFICATION: SABS 1200 G

AGGREGATES: to SABS 1083

a) Supplies of sand and stone must be uniform throughout the contract.
b) Keep grading of aggregates constant throughout the contract 020 stone

CEMENT: to SABS 471

a) Type: (Refer to drawings or schedules)
b) Colour must be uniform
c) Supply all cement from one source
PIGMENTS (refer to drawings or schedules)

MIX
a) Mix: 1:2:4
b) Maximum slump: 40-50 mm
c) Vibration: moderate to heavy for thorough consolidation in the formwork

FORMWORK: Use formwork that will achieve the following surface finishes
a) Rough: If no treatment of the concrete surface after removal of the formwork is required, and the surface is within the degree of accuracy 3 (SABS 0155)
b) Smooth: If small defects like honeycombing, irregularities and discolouration can be made good according to approved methods, and the surface is within degree of accuracy 2 (SABS 0155). Make this formwork of metal or wrot timber. Fit shutter bolts and joints in a regular pattern to the approval of the architect. Strike horizontal day joints true and level with a trowel
c) Special: Smooth, dense well-compacted concrete showing the slight grain marks of planed boards or smooth plywood with well-fitted joints and sound arises, with a surface within degree of accuracy 1 (SABS 0155). Make good any blemishes
d) Board patterned finish: Boards of softwood with distinct grain and surface texture, coarse sanded to remove splinters and loose fibres, to impart a finish to concrete which closely resembles timber. Individual boards may vary between 100 and 200 mm in width and 3mm in thickness. Fix with staggered heading joints. Use galvanised nails, their head marks visible in the proximity of heading joints (this effect may be faked). Nail heads may be slightly proud or punched below the surface but use only one method. Only very minor blemishes will be accepted. Contractor to provide panel for approval.
e) Joints must be watertight
f) Formwork ties permanently cast in are subject to approval
g) Tie-wires are not permitted
h) The depths of all lintels to correspond with block courses.

REINFORCEMENT
Refer to Structural Engineer’s Specification.
Lintel over openings of 2 metres but not more than 3 meters to be reinforced with 2 No. Y16 diameter bar at bottom and 2 No. Y12 diameter at top with 008 diameter M.S. stirrups at 250c. 'U' Lintel blocks to be used on solid blockwork only and to have 2 No. R12 diameter bars with 008 M.S. stirrups at 250cc.

BATCHING AND MIXING
a) Batch by mass
b) Mix concrete in pan mixers

PLACING
a) Cast walls and columns in single lifts not less than one storey in height
b) Take special care with the bottom 200 mm of a new lift, e.g. by increasing the proportion of
sand in the mix or by reducing the stone content by +20%

**CURING**
a) Maintain constant stripping times to assist in achieving colour uniformity

**BUSH HAMMERING OR TOOLING**
a) Heavy bush hammering is not permitted before the concrete has attained a compressive strength of at least 25 MPa

**ABRASIVE BLASTING**
a) Blast as soon as possible, while the mortar matrix is still soft
b) Blast two to three days after casting, and keep this age constant throughout the work
c) Do not blast to a depth more than one-third to one-half the smallest size stone
d) Take the necessary precautions to protect the public and the blasting operators
**PRECAST CONCRETE**

**Precast concrete units**

**CASTING:** Manufacture all precast concrete units off site in approved factory conditions or, if site casting is allowed, submit proposals for casting procedures to be used

**INVOKED SPECIFICATION:** Manufacture, cure, handle, transport, store and erect according to SABS 1200 GE - 1984 (Precast concrete for building work)

**PATENTS:** Exempt the client of any claims for infringement of patent rights, design or trade names regarding precast systems used in this work. Pay all due patent holder's monies

**SAMPLES:** Submit samples on site of every required architectural finish for approval. Do not start production before samples have been approved

**MARKING:** Mark every unit indelibly so as to identify its location

**STORING:** Store units separately on their designed end bearing surfaces in the position they will adopt when built in. Cure for at least 10 days

**HANDLING:** Handle units so that strain, deformation and damage is kept to a minimum

**DAMAGED UNITS:** Report minor defects and hair cracks. Repair of these defects may be permitted depending on exposure

**BUILD IN:** Build in units at least 21 days after casting. Bed and joint solidly in 1:3 cement: sand mortar. Key joints and tint if necessary, to match other facings

**Precast prestressed concrete lintels**

**MATERIAL:** Precast prestressed concrete lintels (SABS 1504)

**LAYING:** Lay lintels with a bearing length of at least 200 mm in 1:5 cement mortar. Prop lintels at 1,5m centres for at least seven days after brickwork has been completed

**REVEALS:** Cut the faces of lintels above reveals to make provision for face brick faggots when used in face brick walls

**Precast concrete plank walling**

**POSTS AND PLANKS:** Precast concrete posts and planks (SABS 1372) (refer to drawings or schedules)

**ERECTING**

a) Plant posts 600*mm deep in concrete at approximately 1,6m centres

b) Slip in planks between posts and level

**Precast concrete window and door frame system**

**TYPE:** Precast concrete window frame system as per window schedule
Precast concrete door frame system as per door schedule (refer to drawings or schedules)

CONCRETE FRAMES AND SILLS
High strength reinforced concrete frames with smooth finish and cast-in lugs. Supply door frames with recessed hinges and centered lock plate to approved sample. Cast-in lugs must match a building gauge.

ALUMINIUM SASHES
25 x 25 mm nominal extruded aluminium 50 STF alloy sections, anodised finish to 0,025 mm thickness, with silicone treated woven pile weather-strip, and grade 304 stainless steel hardware, 4 mm thick glass factory fitted in uPVC black top hat glazing gasket, all to approved sample and to AAAMSA standards

STEEL SASHES
Cold rolled steel sections factory finished with oven baked polyester epoxy electrostatic powder coating to nominal thickness of 0,025”mm, with approved hardware, 4 mm thick glass factory fitted in black silicone, all to approved sample

ALUMINIUM LOUVRES
Extruded aluminium 50 STF alloy sections, anodised finish to 0,25mm thickness

FLYSCREENS
25 x 25 mm nominal extruded aluminium 50 STF alloy sections, anodised finish to 0,025mm thickness

BURGLAR BARS
8mm diameter mild steel rod with full strength butt welds at all intersections and end flattened to 30mm and drilled 5mm for 4,5mm rivets. Factory finish with epoxy polyester electrostatic powder coating

HANDLING
a) Handle units carefully
b) Stack units on timber strips on level ground
c) Transport units manually or on timber pallets

BUILDING IN
a) Lay units on 1:4 cement mortar. Tamp the unit on corners only
b) Set up door frames by means of a reusable patent jig and T-stay
c) Screw aluminium frames into the concrete frames at the end of the building phase
d) Bolt burglar bars to concrete frames into cast-in sockets

FIXING GLASS DIRECTLY INTO CONCRETE SURROUNDS
a) Fix glass with a non-ascetic silicone sealant gunned directly onto clean concrete surface
b) Glaze with putty (SABS 680)
c) Paint putty within seven days

FIXING FRAMES INTO CONCRETE SURROUNDS
a) Clean the glazing rebate with white spirits
b) Clean the contact face of aluminium frames with white spirits
c) Clean the contact face of steel frames with a suitable primer

d) Glue the frame into the surround with a non-ascetic silicone sealant
MASONRY

Brickwork and blockwork

CLAY BRICKS: Clay bricks to SABS 227

Common bricks (refer to drawings or schedule)

Face bricks (refer to drawings or schedule)

ADVANCE REGISTRATION has been placed by the architect as per the schedule or PC items.

Calculate the correct quantity, place a firm order and agree on delivery dates (refer to drawings or schedules).

SAMPLES: Supply a sample of 20 face bricks and six of every other type of brick for approval. Keep these bricks on site for reference

CONCRETE BRICKS AND BLOCKS: to SABS 1215 (refer to drawings or schedules)

CALCIUM SILICATE BRICKS AND BLOCKS: to SABS 285 (refer to drawings or schedules)

Air bricks

Supply and fit 2 No. 230 x 150 vermin proof air-bricks for every room one on external wall and one into

the passage where indicated on drawings. These are to be immediately under concrete ring beams.

MORTAR

Cement: ordinary Portland cement (SABS 471)

Other types of cement may only be used with permission of the manufacturer of the masonry unit

Sand: to SABS 1090 and from one source throughout the duration of the works (refer to drawings or schedules).

If the sand does not comply with the requirements of SABS 1090, obtain a report from a recognized concrete testing laboratory certifying whether or not the sand is suitable

Allow for a laboratory evaluation of the technical and economic advantages of sands from different sources.

Plasticiser: (Refer to drawings or schedules).

Lime: to SABS 523, type: bedding mortar

Ready-mixed mortar: may be used with approval
PROPORTIONS:
Class 1: 1:4 for work below ground (10 MPa)
Class 2: 1:6 for general work (5 MPa)
Class 3: 1:9 for unexposed single-storey non-load bearing walls (1.5 MPa)
Do not add plasticisers without the approval of the architect. Use the following proportions with mortar plasticiser, or masonry cement
Class 1: 1:3 for work below ground
Class 2: 1:5 for general work
Class 3: 1:6 for unexposed single-storey non-load bearing walls
Use the following proportions with bedding mortar lime
Class 1: 1:0.25:3 for work below ground (10 MPa)
Class 2: 1:1:6 for general work (5 MPa)
Class 3: 1:2:9 for unexposed single-storey non-load bearing walls (1.5 MPa)

Colouring agent: Add colouring agent at g/kg of the cement used as per Architects Instruction (Refer to drawings or schedules).

Mixing
a) Mix ingredients dry on a clean surface or by means of an approved mechanical mixer. Add water to give the desired plasticity. Use within 2h
d) In the case of cement-lime mortar, mix the sand and lime dry and then with sufficient water to give a stiff mix. Form into a heap and cover with wet sacks for at least 24h. Mix with cement prior to use and add sufficient water to give desired plasticity. Use within 2m.

METAL WALL TIES: to SABS 28
a) Type: Brickforce
b) Material: GMS

STORAGE
a) Unload bricks and blocks carefully to prevent chipping and breakage. Stack on prepared level areas and protect from staining or marking
b) Protect cement from moisture. Sacks shall be so arranged that they can be used in the order in which they were delivered on site. Storage of cement in silos is permitted provided the cement drawn for use is measured by mass and not by volume. Do not store cement for more than six weeks
c) Store sand in a way that will avoid contamination by foreign matter

BOND
a) Use full bricks or blocks wherever possible
b) Build brickwork, wherever practical, in English bond (alternative header and stretcher courses). Build half-brick walls, skins of cavity walls, blockwork, and walls with two or more unbonded skins in stretcher bond
c) Tie brick- or blockwork to concrete with 600 x 30 x 1.6mm galvanised hoop iron ties at about
500mm centres. Fix ties to concrete with 40mm steel shot nails

d) Tie walls with two or more unbonded skins with hard-drawn steel brick reinforcement (SABS 190 Part 2) every fourth course
e) Reinforce intersections of walls with metal corner mesh (SABS 190 Part 2) as recommended by the manufacturer of the masonry unit
f) Build face brick lintels, top courses of face brick parapet walls, and face brick window cills in brick-on-edge
g) Build into all walls brickforce as follows: to every course below the surface bed, every course to septic tank and manholes and 4 no. courses to walls generally above the surface bed. Provide 190 wide brickforce in 230 walls and 090 wide in 115 walls.

LAYING

a) Lay bricks on a full bed of mortar and fill all vertical joints solid
b) Lay hollow blocks on shell bedding except first courses on foundations, where damp proof courses occur, and in columns, where all joints must be filled solid
c) Construct corners accurately. Check height of courses with a gauge rod
d) Carry up work evenly
e) Keep perpends and angles plumb
f) Do not fill perforations except where concentrated loads occur
g) Wet clay bricks and blocks 24 hours before laying. Lay concrete bricks and blocks, and calcium silicate bricks, dry
h) The contractor is to allow for minimum three courses of 230 blocks from top of foundation to underside of surface bed. Blocks shall be filled solid with 1:3:6 concrete and each course with 190 wide brickforce. Allow for 4 number courses at change of level and 5 number courses where necessary. Blocks to septic tank and manholes to be filled solid with concrete ad reinforced as above.

JOINTING

a) Rake out joints 10mm deep where a mechanical key is required for plastering or tiling
b) Form concave horizontal and concave vertical joints (unless otherwise specified on schedules or drawings) in face brick work and compactly tool. Retool after the joints have stiffened.

CLEANING

a) Keep face-brick work clean
b) Do not use oil as a finish
c) Do not try to remove vanadium (yellow-green) stains with solutions of hydrochloric or sulphuric acid

SORTING

a) Examine face bricks as the work proceeds and set aside those with damaged faces for cutting or for use in common brickwork
b) Sort face bricks to ensure proper mixing within the colour range. Prepare mortar in a consistent
manner to ensure brickwork with uniform appearance

**CUTTING:** Cut face bricks with a bolster or carborundum wheel

**SAMPLE:** Provide a sample panel of 3m². Maintain and protect until bricklaying is complete

**BRICK SCALE:** One brick and one joint must measure 230mm horizontally and 85mm vertically

**BLOCK SCALE:** One block and one joint must measure 450mm horizontally and 230mm vertically.

**CAVITY WALLS**

a) Build cavity walls with a clean cavity. Join the walls with 3,15 mm diameter butterfly or modified PWD type metal wall ties (SABS 28), two and a half per m² in cases where the cavity does not exceed 75mm and three per 2m² if the cavity is 75 - 100mm wide

b) Ensure ties are embedded 50mm in mortar joints. Provide additional ties at intervals not exceeding 300mm in height within 150mm of the edge of openings, at discontinuities in masonry (e.g. movement joints) and where deemed necessary at external angles

c) Ensure ties do not slope towards the inner leaf

d) Leave cross joints open in the outer skin of the brickwork at the base of the cavity at floor or exposed lintel level, at centres not exceeding one metre

**REINFORCED BRICK-MASONRY LINTELS**

a) Reinforcement: (Refer to drawings or schedules)

b) Embed reinforcement fully

c) Fill all joints solid with mortar

d) Ensure exposed side cover of reinforcement is 40 mm inland, 50 mm in coastal regions

e) Use 1:4 cement: sand mortar

f) Leave supports in place for two weeks for small spans, three weeks for long spans

**MOVEMENT JOINTS**

a) Form movement joints with polystyrene or bitumen-impregnated soft board

b) Fill the foremost part of the joint with: (Refer to drawings or schedules).

**TESTING:** Provide provisional sum for tests as per drawings or schedules

**Glass blockwork**

**GLASS BLOCKS** (Refer to drawings or schedules)

**LAYING**

a) Use only complete blocks

b) Use mortar consisting of 1-part Portland cement, 1-part hydrated lime or lime putty, 4-6 parts clean, gravel-free sand. Add cement last

c) Coat the surface on which the first course is laid with bitumen emulsion or similar material to permit movement of the blocks

d) Use joints 10mm thick, strike back and smooth. Allow 15mm clear at sides and top. Fill these
clearances with non-hardening compound
e) Reinforce every fifth horizontal joint, and vertical joints at 1m maximum centres, with 25 - 65mm wide corrosion resistant metal strips or mesh

Concrete block or clay brick paving

BLOCKS: Precast concrete segmental blocks (SABS 1058) (refer to drawings or schedules)

CLAY PAVERS: Burnt clay paving units to SABS 1575
a) Class and work size: Grade M; Type 12.
b) Supply a sample of ten units for comparison purposes

SAND:
a) Sand for bedding and jointing must be free of soluble salts or contaminants likely to cause efflorescence or staining, and have a moisture content of 5-8%
b) Bedding sand must comply with the following grading limits:

<table>
<thead>
<tr>
<th>Sieve size (mm)</th>
<th>% passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,25</td>
<td>100</td>
</tr>
<tr>
<td>4,75</td>
<td>95 -100</td>
</tr>
<tr>
<td>2,36</td>
<td>80 -100</td>
</tr>
<tr>
<td>1,18</td>
<td>50 - 85</td>
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<tr>
<td>0,60</td>
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<tr>
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<td>10 - 30</td>
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<tr>
<td>0,15</td>
<td>5 - 15</td>
</tr>
<tr>
<td>0,075</td>
<td>0 - 10</td>
</tr>
</tbody>
</table>

c) Do not use mine sand
d) Jointing sand must pass a 1,18 mm sieve and contain 10-50% material passing a 0,075 mm sieve

MORTAR
a) 1:3 cement: sand or 1:0,25:3 cement: lime: sand (class 1) mortar
b) Use a minimum water and a sand with a fineness modulus in the region of 2,2 - 4,0 to minimize permeability

SUBGRADE
a) Excavate to achieve desired finished levels
b) Remove soft spots and biodegradable material and replace with approved material
c) Complete installation of all sub-soil drainage pipes
d) Compact to 90% of maximum modified AASHTO density. Take special care to compact trenches and around manholes. Stabilise with 5% cement prior to compaction if necessary

SUB-BASE
a) Material: To Engineer/Architects Specification.
b) Compact to at least 90% of its modified AASHTO density
c) Form the paving surface profile on the finished surface of the sub-base. Do not make up irregularities in the surface with bedding sand  
(Refer to drawings or schedules)  
**SUB-BASE CONCRETE**  
a) 10MPa, with reinforcement to Engineers/Architects Specification.  
b) Lay concrete on prepared sub-base, and form to paving surface profile  
c) Cure concrete for 28 days  
(Refer to drawings or schedules)  
**EDGE RESTRAINTS:** (refer to drawings or schedules)  
**INFILL CONCRETE:** 25MPa with 10mm aggregate  
**WEED KILLER:** Treat the area to be paved with approved weed killer  
**LAYING**  
a) Ensure all kerbs and edge restraints are completed and levels and falls are correct. Agree laying patterns with the architect.  
(Refer to drawings or schedules)  
**FOR RIGID PAVING**  
b) Clean base concrete  
c) Set out pavers to approved pattern with string, templates or gauge rods, or dry lay the entire area  
d) Brush a 1:1 cement: fine sand slurry over the surface  
e) Dip clay pavers with a high absorption rate in water before laying. Otherwise do not wet pavers  
f) Butter each paver, bed solid in mortar, and fill joint in one operation  
g) Tool joints flush or bucket handle to approval  
h) Provide 10mm movement joints at 4,5m intervals at right angles, against buildings or edge restraints, around manholes, columns, or as shown on drawings. Fill joints with polysulphide or silicone rubber sealant  
**FOR FLEXIBLE PAVING:**  
b) Lay pavers true to line and level on loose and evenly spread sand bedding. Lay full units first. Joints to be between 2 and 6mm wide  
c) Fill areas in which a full unit will not fit with clean-cut units or, if less than 25% of a full unit, with concrete left for 24h before compacting  
d) Compact the surface as soon as practicable and not closer than 1m from free edges or working faces with a high frequency, low amplitude mechanical flat plate vibrator capable of producing a centrifugal force of 7-16kN at a frequency of approximately 75-100Hz on a plate size of 0,35-0,5m². Make sufficient passes to compact the sand bedding to between 15 and 35mm thickness. Make at least two passes  
e) Brush joint filling sand into joints after initial vibration. Remove excess sand on completion  
**CUTTING:** Cut pavers with a masonry disc cutter  
**TOLERANCE**
a) Gradual deviation under a 3m straight edge is 10mm maximum
b) Difference in level between adjacent units is 3mm maximum
c) Deviation of line of pattern is 15mm in 3m maximum

CLEANING: Leave the paving clean and free from stains

Concrete kerbs and channels

KERBS AND CHANNELS: Precast concrete to SABS 927. Nominal length 1000 mm maximum for straight or curved kerbs with a maximum radius of more than 20m, or 500mm maximum for curved kerbs with a radius between 4 and 20m, or 300mm maximum for radii up to 4m. In situ concrete channels may be of 30MPa concrete

MORTAR: 1:3 cement: sand

BEDDING MATERIAL: Crushed stone, sinter, slag, sand or approved porous material with a particle size of 13mm maximum

BACKING CONCRETE: 15MPa

JOINT SEALANT: Polysulphide (SABS 110)

LAYING
a) Excavate trenches for kerbs and channels to below the required level and refill with at least 70mm of bedding material. Compact to required slope to at least 90% of its maximum modified AASHTO density
b) Bed kerbs and channels on 50mm bedding material with 10mm joints filled with mortar. Wet joints well before jointing
c) Provide 12mm wide movement joints at intervals not exceeding 20m and fill with polysulphide when dry
d) Support backs of kerbs with a layer of well-compacted concrete
e) Fill behind kerbs with approved material in layers not exceeding 150mm, wet and compact to 90% of its maximum modified AASHTO density
f) Protect concrete against damage and discolouration

TOLERANCE
a) Deviation of any edge, centre line or vertical surface from specified position is 25mm
b) Deviation of any invert level is 10mm

Precast concrete paving slabs

SLABS: Precast natural colour concrete paving slabs (SABS 541)

LAYING
a) Treat ground underneath concrete paving slabs with an approved weed-killer
b) Lay slabs on 50mm clean river sand with a 1:100 fall away from the building, fill joints with 1:3 cement mortar and strike off with a jointer

Rubble walling

STONE: Approved natural stone varying in size between 150 and 600mm in section. Stone to be sound, free from cracks, spalls and even in shape and shall be trimmed if necessary.
MORTAR: 1:4 cement: sand

BOND: Uncoursed, but with homogeneous pattern

LAYING
   a) Bed stones solid in mortar
   b) Build in wire ties at 3 per m² where rubble walls are to be joined to brick- or blockwork. Level up tops of walls with selected long and flat stones
   c) Keep wall faces even. Stonework to be built at random.
   d) All mortar to be removed and the stonework cleaned to its natural colour on completion.

JOINTING: Make joints 25 - 50mm wide and deep, square recessed, raked out with the thumb.

Stonework

STONE: (refer to drawings or schedules)

METAL ANCHORS, DOWELS, BRACKETS AND TIES
(Refer to drawings or schedules)

MORTAR
   For edge joints: 1:1:6 cement: lime: sand
   Weak mix of coloured cement and lime with powdered marble as filling

GROUT: 1:4-5 cement: coarse sand or gravel

JOINTS: Refer to drawing and specialist details.

FIXING: Refer to drawing and specialist details.

WATERPROOFING

Polyolefin damp-proof course

MATERIAL: 0.375mm black embossed polyolefin damp proof course (SABS 952, type B)

LAYING
   a) Lay damp-proof course in unjointed lengths where possible and with full corner laps over full width of wall, level with the top of concrete surface beds and not less than 150mm above finished ground level
   b) Lay damp-proof course under jointed window sills (e.g. tiles and bricks) and tuck in under window profiles
   c) Lay damp-proof course staggered over cavity walls so that inner layer is level with the top of the surface bed and the outer layer one brick course lower but not less than 150mm above finished ground level
   d) Lay damp-proof course staggered over cavity wall lintels where exposed to rain.
   e) Lay vertical damp-proof course between two leaves of cavity wall in line with window or door frame, and tuck into frame.
**Polyolefin damp-proof membrane**

MATERIAL: 0,25mm smooth green polyolefin membrane (SABS 952 type C)

LAYING

a) Lay damp-proof membrane under concrete surface beds. Fold membrane up against the foundation walls

b) Lay damp-proof membrane in the largest practical sizes with 200mm laps. Seal laps according to the instructions of the manufacturer

**Polyolefin under-roof-tile membrane**

MATERIAL: 0,25mm white polyolefin membrane (SABS 952 type E), grade 1

LAYING

a) Lay membrane horizontally over rafters prior to battening, with minimum overlaps of 150mm, and fix with clout nails to rafter centres

b) Terminate the membrane + 25mm beyond the external walls and fold down against gable walls. Lay a 600mm strip under the main membrane under valleys, and over the main membrane over hips and ridges

**Mastic Asphalt**

a) Asphalt roofing mastic (SABS 297)

b) Thickness for flat roofs, canopies, paved areas, planters, roof gardens, tank rooms: 20 mm

c) Thickness for basement walls, lift shafts etc.: 2x10 mm

**Bituminous Roofing Felt**: Type: refer to schedules or drawings (SABS 92), 3-layer

**Modified Bitumen Membrane**

a) Type: APP (Atactic polypropylene) wax modified bitumen membrane or

b) Type: SBS (Styrene Butadiene Styrene) rubber modified bitumen membrane

b) Thickness: 3-5 mm

(Refer to drawings or schedules)

**Polyethylene Membrane**: Thickness: 1,5-3,0 mm

**Reinforced Acrylic**

a) Acrylic top coat, saturator and primer: (refer to drawings or schedules)

b) Reinforcing fabric: non-woven needle-punched polyester or poly-propylene fibre fabrics, 125 - 150 g/m2, as: (refer to drawings or schedules)

**Reinforced Bitumen Emulsion**

a) Bitumen emulsion top coat, saturator and primer: (Refer to drawings or schedules)

b) Reinforcing fabric: (Refer to drawings or schedules)

**Butyl Rubbers, EPDM’s (Synthetic Rubber), PVC’s, Fibreglass, Polyurethanes and Bituminous Spray-ons**

**Application**

a) Organise a meeting with the waterproofing manufacturer, the architect, and the waterproofing contractor well in advance of installation to review products, procedures and guarantees, and so that clarity may be reached on construction details, e.g. grooves, flashings and outlets
b) Ensure screed is laid to a fall of 1:70, is finished with a fine wood float, and is clean and dry
c) Waterproofing must be applied by a qualified contractor using only trained artisans
d) Apply waterproofing according to SABS 021 and to the recommendations of the manufacturer
e) Provide fillets, slip layers, metal lathe, ventilators, movement joints etc. as necessary and as recommended by the manufacturer
f) Dress the waterproofing down into patent type storm-water outlets
g) Tuck waterproofing into grooves at turn-ups, and counter-flash
h) Seal off outlets, flood test waterproofing for 48 hours before applying the protection layer. Provide the Main Contractor with a certificate that the waterproofing treatment was handed over in a watertight and workmanlike condition

PROTECTION
a) Lay light coloured non-absorbent natural stone of 15mm nominal size in a thinly applied cold dressing compound to give light adhesion. Keep back from outlets, gutters and water shedding edges and firmly bond in these areas or
   a) Paint the surface with a heavy brush of bituminous based aluminium paint (SABS 802) (refer to drawings or schedules)
   b) 2-3 mm fine sand covered with 150-micron polyolefin sheet slip layer plus mortar and tiles
c) Drainage layer plus garden soil
d) Pavers as per Architects Drawing.
e) Premix, thickness as per Architects Drawing.
f) Cold mix or slurry seal as per Architects Drawings.

GUARANTEE
a) Provide an insurance backed guarantee from the manufacturer for the waterproofed area including flashings, skirtings, outlets, expansion joints and other details for a minimum period of 5 years
b) If any finish installed over the waterproofing is to be removed due to leaks it shall be replaced by the guarantor at no charge
c) Provide full maintenance particulars

Joint filler/sealants

POLYSULPHIDE: two-part gun-grade polysulphide sealant (SABS 110)

SILICONE RUBBER:
a) one-part low modulus silicone rubber sealant (SABS 1305, type 1) for building joints
b) one-part high modulus fungus proof silicone rubber sealant (SABS 1305, type 2), for glazing and sanitary ware

POLYURETHANE: two-part gun grade (SABS 1077, type 2)

OLEO-RESINOUS BASE: gun grade (SABS 1254, type 2)
**SUBMITTALS**
a) Submit product information and samples of the various sealants, sealant backing, bond breaker, weep tubes and any other accessory materials. The sample must be of the cured sealant in the desired colour. The samples shall be used to determine colour acceptability and material quality on site.
b) Submit quality control statements from the sealant manufacturer. The statements must be on the manufacturer's letterhead, signed by a responsible company representative, should be dated no earlier than one year prior to submittal, and should include verification that the sealant meets the specified standards; that the sealant is compatible with the specified sealant backing material; that the sealant is compatible with and does not adhere to the specified bond breaker; that the sealant is compatible with and has been tested for adequate adhesion to each respective substrate, including any special substrate cleaning process, adhesion promoter or primer.
c) Do a) and b) well in advance of construction, so as not to delay or stop progress at the construction site.

**PREPARATION**
a) This work must be done by specialists with at least five years experience of similar work.
b) Organise a preinstallation meeting with the sealant manufacturer, the architect, and the sealant installer at least two weeks prior to installation to review products and procedures. The samples asked for must be in place and cured before this meeting.
c) Ensure joint is clean and dry.
d) Apply correct primer.
e) Fill the joint with an expanded polyethylene cord or strip backing as recommended by the sealant manufacturer.
f) Mask edges of joint if necessary.

**FILLING**
a) Fill the foremost part of movement joints to a thickness of not less than half the width of the joint, with sealant of approved colour.
b) Finish neatly and smoothly.
c) Fill joints in wet areas, e.g. between ceramic wall tiles and kitchen cupboards, baths, washbasins and shower floors, with fungus-proof sealant.
ROOF COVERINGS

Concrete or clay roof tiles

TILES
Through colour, granular or sanded finish, various patterns
a) Concrete roof tiles (SABS 542), (refer to drawings or schedules)
b) Clay tiles: (SABS 632), (refer to drawings or schedules)

FIXING
a) Fix tiles according to SABS 062 and to the recommendations of the manufacturer applicable to locality and pitch
b) Nail all tiles at eaves projection and gable ends with galvanised clout nails penetrating the battens at least 25mm. Nail the main body of the roof according to manufacturer’s specifications
c) The first row of tiles at the eaves and the last row of tiles at the ridge must be full tiles
d) Bed concrete ridge and hip tiles on a polyolefin damp course in tinted 1:3 cement/sand mortar. Soak ridge tiles in water before bedding to improve bonding with mortar
e) Fix all other fittings and accessories according to the specification of the manufacturer

Fibre-cement roofing slates

SLATES
(Refer to drawings or schedules)

FIXING
a) Fix slates to roof battens with 40mm galvanised clout nails (50mm for end slates)
b) Fit copper disc rivets between slates according to the instructions of the manufacturer
c) Lay ridge slates on two layers of glass fibre reinforced bitumen damp proof course

Thatch roofing

ROOF TIMBER: wood poles to SABS 457
Hardwood, pine or Eucalyptus
Type: round poles
Class of preservative: Creosote or tanalith to Architects Instructions.
(refer to drawings or schedules)

BATTENS: 20-40 mm poplar or wattle lathes in lengths not less than 3m
GRASS: Approved Hyparrhenia species thatching grass without leaves and loose material. Store grass in well ventilated piles

FIRE-RESISTANT BLANKET: approved aluminium foil or other non-combustible layer (refer to drawings or schedules)
**ROOF STRUCTURE**

a) Spike all joints in rafters and trusses with 150-200 mm wire nails
b) Bolt main stress points with 12-24 mm I mild steel bolts, the diameter depending on the size of the roof
c) Spike battens to roof structure with 75 mm wire nails
d) Laths to be spaced at 150mm centres at ridge and eaves and at 270 to 280mm between.
e) Trusses to be spaced at not more than 800mm centres and shall be secured to the top of walls with 1.6mm thick galvanised hoop iron ties bent tightly over the rafter and spiked.
f) The pitch of the roof is to be 40 to 45 degrees and not less than 35 degrees over dormer windows.

**LAYING**

a) Comb thatching grass for the visible spray layer
b) Lay thatching grass on battens and bind with suitable poplar or wattle lathes
c) Fasten with tarred sisal rope at distances of 75mm to a total thickness of 150mm minimum on 45° pitch and 180 thick on 35° pitch.
d) Install fire blanket on lathes in areas where appearance is not important, and woven in between the thatch in areas where the grass is visible from below

**RIDGING**: Install fibreglass ridges to the specifications of a specialist thatcher or concrete screed.
(Refer to drawings or schedules).

**GUARANTEE**: Maintain the roof free of charge for a period of 5 years, storm damage excluded

**LIGHTNING CONDUCTORS**: Install a SABS specified and approved lightning conductor according to SABS 03:1986 - The protection of structures against lightning

**Profiled metal, fibre cement and glass reinforced polyester roofing sheets and cladding**

**METAL SHEETS**: (refer to drawings or schedules)

**GLASS FIBRE REINFORCED POLYESTER RESIN SHEETS (SABS 1150)** (refer to drawings or schedules)

**FIBRE CEMENT SHEETS (SABS 685)** (refer to drawings or schedules)

**FASTENERS AND WASHERS**: to SABS 1273

a) Must be as corrosion resistant as the metal roofing, durable, and compatible with the material they come in contact with
b) Must be hot dip galvanised if used with fibre cement sheets
c) Self tapping screws and blind rivets must have suitable seals and not have holes
d) Fasteners for glass reinforced polyester to have malthoid washers

**SEALANTS**: to SABS 110, SABS 1254 or SABS 1305

**REFLECTIVE FOIL LAMINATES**: SABS 1381, class: (refer to drawings or schedules)

**STORING**: Store sheets under cover to protect them from dust and moisture. Report wet-storage stain
or white rust on galvanised sheet and do not fix until inspected

**FIXING:** Fix sheets according to the manufacturer's instructions
a) Drill all holes
b) Lay side laps away from prevailing storm winds. Side laps of corrugated sheets must be 1 corrugations minimum
c) Bend down trough ends at gutters, bend up trough ends at ridges
d) All profiled sheet work must be done by an approved firm of specialists and, if relevant, one that has been licensed by the sheet manufacturer
e) Do not order any sheet material or do any related work until every aspect thereof has been discussed with the architect. Arrange such a discussion in advance so as not to delay the work
f) No end laps are permitted without approval

**Supported metal sheet roofing and cladding:** (refer to drawings or schedules)

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**CARPENTRY AND JOINERY**

**Timber roof trusses**

**MATERIAL**

a) Grade or specie of timber: Refer to drawings or schedules.
b) Preservative treatment of timber: Refer to drawings or schedules.
c) Type of timber connections that may or may not be used: in accordance with Chapter 7 of the SABS Standard Building Regulations.
(Refer to drawings or schedules)
d) Swaziland Pine is to be the best quality available, kiln or air dried to 12 - 14% moisture content, and shall be fixed in position and covered within one week of delivery from the mill.
e) All timber to be built into or against blockwork or concrete is to be twice treated with "Pressurewood" or equal and approved wood preservative applied in accordance with the manufacturer's instructions, before fixing.
f) Bolted with 009 bolts and 018 washers. All rader ends and timbered exposed externally shall be dressed.

**DESIGN:** The trusses and bracing must be designed by a competent professional engineer according to SABS 0243, and be prefabricated by an approved specialist firm who must have a valid certificate of competence of the Institute for Timber Construction, under cover of a written guarantee. The design and guarantee must be submitted for approval before any work is started

**ERECTION**

a) Erect and fix the roof structure according to SABS 0243

**CERTIFICATE:** Supply a certificate after erection, signed by the engineer who designed the structure,
stating that the whole roof structure has been fabricated and erected to SABS 0243

MAINTENANCE PERIOD:
The maintenance period for the roof is one year after completion of the building and all defects apparent during this time are to be made good by the Contractor, at his expense under the direction of the Architect.

Timber gangplanks
TIMBER: Softwood grade V4 (SABS 563)
FIXING
a) Nail gangplanks onto tie beams
b) Nail two 150-x 38mm gangplanks onto tie beams of two adjoining trusses on both sides of geyser

Timber wall plates
TIMBER: Softwood grade V4 (SABS 563), painted with creosote (SABS 1290)
FIXING: Bed wall plate in long lengths in cement mortar and strap where necessary with galv. wire ties at 900 centres. Wire ties are to be built into wall minimum of 3 courses.

Timber roof beams and lintels
TIMBER: Structural laminated timber (SABS 1460): (refer to drawings or schedules)
STORE beams flat on level surface and on bearers at 1,5m centres maximum and 150mm from ends, and cover with plastic when exposed to the weather
FIXING
a) Pretreat beam ends and build in at least 100mm in walls
b) Tie beams to walls with 30 x 1,2mm galvanised steel straps or double strands of 4mm twisted galvanised wire cast into concrete or built 600mm into blockwork or brickwork and as far as possible in line with the truss. Provide the strap or wire anchors in blockwork or brickwork with a 20 x 100mm mild steel rod through end to prevent pulling out

Timber battens, purlins:
TIMBER
a) Softwood battens (SABS 653)
b) Softwood grade V4 (SABS 563) for timber 38 x 76mm and larger.
c) Plane all timber that will be visible
FIXING
a) Nail battens in long lengths and with staggered joints onto beams or trusses with 100 x 4mm galvanised wire nails. Joints must occur on rafter centres
b) Install counter battens at valleys and hips
c) Tie purlins to beams or trusses at every intersection with 3,25mm galvanised wire if roof covering is sheet material.
**Fibre cement sheet fascias and barge boards**

**SHEETS**: fibre-cement sheets to SABS 685

Type: flat pressed

**FIXING**

a) Drill, countersink and screw sheets at 750mm maximum centres with nr. 10 x 50mm cadmium plated screws

b) Cover end joints with 50mm girth x 0.5mm thick H-profile galvanised sheet metal cover strips, with 15mm tongues at top and bottom bent over sheets when in place

**Wood doors**

**DOORS**: Wood doors to SABS 545

**VENEER**: veneer on pairs of doors must match in grain and colour

**STORAGE:**

a) Seal, or knot and prime, on all four edges immediately after delivery on site (if not prefinished)

b) Store doors flat (not on edge) on a level surface in a dry and well-ventilated building

**HANGING:**

a) Delay hanging of doors until all wet trades are done

b) Hang doors to leave a clear space of 3mm above and along the sides, and 5mm under the door. Take off equal amounts from each side, top and bottom of flush doors when fitting. To reduce the height of panel or framed doors, take off from the bottom only

c) Fit three hinges to doors weighing more than 20 kg, and doors which are exposed to large differences in humidity or temperature

d) Paint or seal the top and bottom edges after trimming to size and before hanging

**Timber door frames, sidelights, fanlights**

**FRAMES**: (refer to drawings or schedules)

**MANUFACTURE**

a) Mortise and tenon frame

b) Rebate frame for door, side- and/or fanlight. Do not lay on door stops

c) Provide top rail with beveled haunches for building in

d) Tack glazing beads lightly in place

e) Screw to outside of every stile three 500 x 40 x 2mm galvanised hoop iron lugs for building in

f) Provide at ends of stiles one 10mm diameter steel dowel for building into thresholds

g) Provide drip in bottom rail of sidelights

h) Paint backs of subframes one coat wood primer before building in

**Timber cupboards, counters, tops, pinboards, shelves**: (refer to drawings or schedules)

**HARDWOOD**: furniture timber to SABS 1099: (refer to drawings or schedules)

**SOFTWOOD**: for industrial use, to SABS 1359

a) Grade: clear for visible joinery, selected grade for shelves and non-visible framing

**PLYWOOD**: to SABS 929: (refer to drawings or schedules).
**COMPOSITE BOARD**: to SABS 929

**WORKTOPS, DOORS, DRAWERS, VERTICAL SURFACES**

a) Substrate: high density particleboard (SABS 1300 class 3) or medium density fibreboard (SABS 540) for dry areas; water resistant grade particleboard (SABS 1300 class 1) for wet areas

b) Laminate: 1,2mm high-pressure general-purpose quality, and/or 1,0mm high-pressure postforming quality decorative laminate (SABS 1405): (refer to drawings or schedules).

c) Reverse face: 0,8mm backer quality laminate (SABS 1405)

d) Adhesive: approved synthetic resin type adhesive for dry areas; approved water-resistant type adhesive for wet areas: (refer to drawings or schedules)

e) Edges

Post-formed edges, splash backs and down stands: profile 90°, post-formed under factory conditions with no joints, fabricated from the same substrate material

Edging: neatly trimmed and slightly chamfered flush with the surface area: (refer to drawings or schedules)

Exposed edges: self-edged with matching laminate

Exposed particleboard edges, cutouts: preseal with silicon sealant in accordance with the instructions of the sealant manufacturer

**DOOR AND DRAWER FRONTS, CARCASSING, SHELVING**

a) Substrate: high density particleboard (SABS 1300 class 3) or medium density fibreboard (SABS 540): (refer to drawings or schedules)

b) Laminate: 0,35mm high-pressure light duty quality decorative laminate (SABS 1405): (refer to drawings or schedules)

c) Adhesive: approved synthetic resin type adhesive

d) Edging: neatly trimmed and slightly chamfered flush with the surface area

Exposed edges: self-edged with matching laminate: (refer to drawings or schedule)

**LOW WEAR HORIZONTAL SURFACES, DOOR AND DRAWER FRONTS, VERTICAL SURFACES AND SHELVING**

a) Substrate: high density particleboard (SABS 1300 class 3) or medium density fibreboard (SABS 540):

b) Laminate: 0,55mm high-pressure light duty quality decorative laminate (SABS 1405): (refer to drawings or schedules)

c) Adhesive: approved synthetic resin type adhesive

d) Edging: neatly trimmed and slightly chamfered flush with the surface area

Exposed edges: self-edged with 0,35mm matching laminate.

**DOOR AND DRAWER FRONTS WITH PROFILED EDGES**

a) Substrate: medium density fibreboard (SABS 540)

b) Laminate: 0,55mm light duty quality decorative laminate (SABS 1405): (refer to drawings or schedules)
c) Adhesive: approved synthetic resin type adhesive
d) Exposed edges: self-edged with 0.35mm matching laminate precoated with PVAC adhesive

**LAMINATED TIMBER:** to SABS 1460: (refer to drawings or schedules)
**FIBREBOARD:** Woodfibre board to SABS 540: (refer to drawings or schedules)

**KITCHEN CUPBOARDS:** to SABS 1385: (refer to drawings or schedules)
*To be Supplied by Employer*
The supplier is responsible for checking the sizes on site and for providing detail layout drawings for approval before any work is started.
Kitchen fittings form part of the Contractor's work, and he shall be responsible for supplying and fixing of all the fittings, including sink, broom and/or grocery units, floor and wall units.

**SHELVES:** (refer to drawings or schedules)
**GRAIN:** The grain of all fitted visible clear-finished timber, or the pattern of laminates when relevant, must run vertically on vertical surfaces and parallel to walls on horizontal surfaces, wherever practicable. Veneer on any one fitting must match in grain and colour

**SIZES:** Do not start any joinery before sizes have been checked on site

**SHOP DRAWINGS:** Provide shop drawings of all joinery works. Discuss all aspects with the architect before any work is put in hand

**JOINERY**
a) Produce joinery in humidity conditions which resemble those of the building site, in workshops equipped with modern machinery manned by skilled joiners
b) Use joints that are not wholly dependent on adhesive and that conceal the end grain of natural wood or the edge of laminated or particle board
c) Round all angles and edges slightly. Pencil round all vulnerable or exposed angles and edges
d) Punch all exposed nail heads and fill with stopping that will match the wood after clear finish has been applied
e) Countersink all exposed screw heads to 6mm below the surface and glue in matching dowels.
Countersink all other screws to 2mm below surface and fill
f) Glue together solid hardwood tops in wide boards with tongue and groove joints stopping 25mm from visible ends. Boards must be in single lengths or, if this is not possible, with staggered end joints
g) Screw tops to framework with rebated hardwood clamps or metal cleats at 300mm centres, screwed from underneath
h) Bevel hardboard backs all round
j) Screw and plug shelf bands to walls. Bolt top of each band with 6mm expansion bolt. Start first band 100mm away from corners of rooms or from other shelves
k) Make drawers with 19mm hardwood front, 12mm softwood sides and back and 6mm tempered
hardboard bottom, all rebated, grooved, dovetailed and glued together. Fit each side with two 19 x 19mm hardwood runners, screwed on with brass countersunk screws, to take hardwood guide similarly screwed to fitting side. Wax runners and guides with candle wax. Drawer sizes stated are internal sizes

**INSPECTION:** Provide the architect with the opportunity to inspect the joinery before any priming or decoration is done

**SAMPLES:** Provide a sample of a typical finished surface showing its final appearance and smoothness, including edge strips, stopping and dowelling. This sample will be kept on site for reference

**PAINTING:** Knot and prime one coat of primer, or brush apply one coat clear finish before delivery to site

**FIXING:** Fix joinery to masonry or concrete with appropriate plugs and screws or expanding bolts. Do not use shot nails

**BLOCKING PIECES:** Provide the necessary blocking pieces and subframes. Paint visible faces of subframes with schoolboard black

**Timber floor beams**

**TIMBER:** Stress-graded softwood (SABS 563): (refer to drawings or schedules)

**FIXING**

a) Secure beams to walls with 40 x 1,6mm galvanised hoop iron straps built into wall and nailed to beams

b) Build in beams 100mm in walls. Cover ends with damp proof material

**Timber floor battens**

**TIMBER:** Softwood (SABS 653): (refer to drawings or schedules)

**FIXING**

a) Secure battens to concrete surface bed with metal clips, 4mm diameter galvanised wire ties or with masonry nails at 600mm maximum centres set in or fixed to the floor

b) Hole, notch or stagger battens to provide cross ventilation

**Wood cornice, skirting, quarter rounds**

**WOOD**

Hardwood: (SABS 1099)

Softwood: (SABS 1359)

(Refer to drawings or schedules)

**FIXING**

a) Fix members to walls in long lengths with splayed heading joints and mitred corner joints, with masonry nails

b) Nail quarter round to skirting with panel pins
CEILINGS, PARTITIONS AND ACCESS FLOORING

**Timber ceiling brandering**

**TIMBER:** Softwood brandering (SABS 653), or saligna

**FIXING**

a) Nail brandering with staggered joints at right angles with roof trusses at centres recommended by the manufacturer of the ceiling boards, and at 38 mm centres away from walls for the fixing of cornices, with 75 - 100mm wire nails

b) Skew nail brandering additional to the normal nail at every intersection with roof timber

c) Fix 38 x 50 mm brandering with 50 mm dimension vertical

d) Level brandering out, starting from the lowest point

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**Fibre cement and gypsum ceilings**

**BOARDS**

6 mm Flat fibre cement ceiling boards (SABS 803)

4 mm Flat nutec-cement ceiling boards (SABS 803)

6,4 Flat gypsum ceiling boards (SABS 266)

Store boards on an even surface under cover and keep dry

**FIXING**

a) Use only approved specialist installers

b) Arrange boards symmetrically about room, with cut boards along walls and to approved pattern: straight joints in both directions or staggered cross joints or as shown on drawings

c) Nail boards at right angles to timber brandering with 38 mm galvanised iron clout nails or 2 mm I x 32 mm galvanised serrated ceiling nails at 150 mm centres. Nail from the centre of the board outwards

d) Insert H-profile metal cover strips between boards or

c) Nail 50 mm gypsum cover strip in long lengths with 38 mm galvanised nails staggered at 150mm centres or

d) Suspend ceiling boards in quick-fix galvanised hangers, H-profile chromaprep coated steel jointing strips and flat cover strips, strictly in accordance with the manufacturer of the ceiling boards or

d) Tack 63 mm wide wire scrim over all joints with galvanised nails or staples

e) Plaster the entire ceiling with 3 - 6 mm gypsum plaster the same day as the board has been erected
**Gypsum and fibre cement cornice**

CORNICE

75 x 6 mm coved gypsum cornice (SABS 622)

6 mm thick coved fibre cement cornice, inside corner piece, outside corner piece, metal H-jointing strip

**FIXING**

a) Nail cornice to brandering with 30 mm galvanised clout nails at 400mm maximum centres

b) Glue cornice to wall with approved contact adhesive. Mitre corner joints in gypsum board

**Patent suspended ceilings**

**BOARDs:** (refer to drawings or schedules)

Nutec-cement ceiling boards (SABS 803): (refer to drawings or schedules)

Vinyl clad gypsum ceiling boards (SABS 266): (refer to drawings or schedules)

Chromadek steel pan lay-in with fibreglass backing: (refer to drawings or schedules)

Mineral fibre tiles: (refer to drawings or schedules)

Cement-bonded wood wool panels to SABS 637: (refer to drawings or schedules)

Panel: medium impact grade injection moulded polystyrene: (refer to drawings or schedules)

Store boards on an even surface under cover and keep dry

**FITTINGS:** Roll-formed galvanised steel Tees, hold down clips, suspension rods and hooks, suspension clips, T suspension plates, lipped wall angles, shadowline wall angles and wall channel trim: (refer to drawings or schedules)

Finish: Chromadek finish on exposed elements: (refer to drawings or schedules)

**FIXING**

a) Use only approved specialist installers in accordance with SABISA (South African Building Interior Systems Association) standards, and the manufacturers of the ceiling material and suspension systems

b) Do not start this work before the building is enclosed, plasterwork has dried out, and the services are in position and in operation

c) Arrange boards symmetrically about room, with cut boards along walls and to approved pattern: straight joints in both directions or staggered cross joints or as shown on drawings

d) Suspend main tees from structure by 25 x 1mm galvanised strapping or 2mm diameter galvanised wire or by suspension rods/hooks combined with spring clips and suspension plates.

Clip cross tees into main tees at the end of each board. Level out: (refer to drawings or schedules)

e) Hold down ceiling boards/tiles with patent hold-down tags or wedges

f) Provide extra hangers for light fittings, sound systems, air conditioning vents etc. as may be necessary

g) Provide approved access to ceiling space where concealed Tee system is used
**Mineral fibre insulation**

**INSULATION**: mineral fibre insulation (SABS 1381 part 1) or loose fill thermal insulation (SABS 1381 part 2)

**LAYING**: Lay insulation over ceiling and fit snugly between roof trusses. Nail batts where necessary.

**Ceilings, partitions and access flooring**

**Timber strip ceiling and paneling**

**TIMBER**: Tongue and groove with matching ends (SABS 1039): (refer to drawings or schedules)

**FIXING**: Secret nail boards with panel pins. Finish edges of ceiling: (refer to drawings or schedules)

**Aluminium foil insulation**

**FOIL**: Reflective foil laminates (SABS 1381 part 4)

a) **Class**: Refer to drawings or schedules.

**LAYING**: Lay foil on span wires with 140mm laps so that span wires support each lap. Draw foil tight and fix to bottom and top purlin according to manufacturer's instructions.

**Ceiling hatch**

**TIMBER**

a) 700 x 700mm clear opening hatch made of 38 x 38mm brandering frame covered with ceiling board

b) Provide hatch with one pair 50mm steel butts screwed to 38 x 38mm frame around opening in ceiling

c) Provide rebated hardwood cover strip to ceiling around hatch opening, to carry hatch

**STEEL**

a) 600 x 600 x 12 x 0.6 mm pressed steel ceiling trap opening into ceiling space, in 25 x 25 x 3mm T-profile steel frame

b) Drill frame twelve times and screw into ceiling brandering
FLOOR COVERINGS, WALL LININGS, ETC.
Vinyl, cork, rubber, linoleum tiles, sheet and skirting

RESIN MODIFIED VINYL TILES: (SABS 586): (refer to drawings or schedules)

SEMI-FLEXIBLE VINYL TILES: (SABS 581): (refer to drawings or schedules)

FLEXIBLE VINYL FLOORING: (SABS 786): (refer to drawings or schedules)

PREPARATION
a) Do not lay flooring before all building operations that may damage the floor have been completed
b) The base must be dry and clean.
c) Rectify any defects. Apply smoothing compounds only to irregularities and to the recommendations of the manufacturer

PATTERN
a) Discuss the layout and pattern with the architect before any flooring is laid
b) Continue pattern through door openings connecting rooms with similar flooring

LAYING
a) Lay flooring and skirting according to the recommendations of the manufacturer of the flooring and to SABS 070
b) All flooring must be done by an approved specialist
c) Mitre all corners of skirtings

FINISHING: Clean and polish floors with two coats polymer floor coating (SABS 1042)

Wood block, strip, board, strip panel, mosaic panel, composite board, and wood sheet floor

STRIP OR BLOCK: hardwood (SABS 281): (refer to drawings or schedules)

STRIP: softwood (SABS 629): (refer to drawings or schedules)

WOOD MOSAIC: to SABS 978: (refer to drawings or schedules)

NAILS: Flooring nails to SABS 820

STORING AND HANDLING: Ensure that strips are delivered in bundles on site four weeks before floor is installed. Open bundles after delivery and stack strips loosely on end and under cover

PATTERN: Discuss the layout and pattern with the architect before any flooring is laid. Continue pattern through door openings connecting rooms with similar flooring

LAYING
a) Lay floors after all building operations have, as far as possible, been completed. The base must be dry and clean. Rectify any defects
b) Lay floors according to SABS 043
c) Allow 20mm expansion space between flooring edge and wall or column faces
d) Ensure that the top edges of bearers for strip flooring lie in a plane surface and are securely fixed
e) Lay boards with staggered end joints, cramp together and secret nail twice to every bearer
f) Nail skirtings to walls, not to floorboards

g) Lay mosaic flooring according to the recommendations of the manufacturer. This flooring must be done by an approved specialist

FINISHING
a) Sand strip flooring with a floor sander in two (rough and fine) operations to a smooth and even surface

b) Sand mosaic with a floor sander in one operation (fine only) to a smooth and even surface

c) Finish floor with one coat clear wax polish or

c) Finish floor with a sealing coat and two coats approved varnish

GUARANTEE for mosaic floors: Provide a guarantee for the floor for one year after virtual completion of the building

Textile floor coverings

COVERING: textile floor covering (woven pile or tufted) (SABS 1375): (refer to drawings or schedules)

COVERING: textile floor covering (needle punched construction) (SABS 1415): (refer to drawings or schedules)

UNDERLAY: Needle-felt (SABS 1419): (refer to drawings or schedules)

ACCESSORIES AND FIXING MATERIALS:

a) as recommended by the carpet manufacturer

b) use non flammable contact adhesive where fire ratings are critical, e.g. wall cladding in cinemas

LAYING

Install floor coverings to SABS 0186 by an agreed specialist who is a member of the Carpet Association of South Africa (CASA)

a) Ensure base is clean, level and dry, and all floor-bound services are complete

b) Use coverings from the same production run to ensure uniform colour and texture

c) Agree direction of seams and pile with the architect. Seams should run parallel to length of area (so that traffic moves along rather than across the seam) and so that light from windows does not strike across the seam. Pile should face away from incident light and downwards on stairs

d) Start full widths on door side of the room. Finish carpets under doors within the width of the closed door

e) Cover exposed edges of carpeting with a metal edging strip

f) Stick carpet to the floor with approved adhesive in medical institutions.

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IRONMONGERY

MATERIAL
a) Locks and furniture to SABS 4. No key may fit more than one lock. Provide two keys with every lock
b) Single action overhead door closers: SABS 1510
c) Provide ironmongery including screws as shown on schedules
d) Provide and build in 006 x 030 brass weather bars to external doors to project 006 above external finished level.

FIXING
a) Fix all ironmongery with matching screws
b) Remove before painting and refix
c) Ease and adjust on completion
d) Label all keys and hand over to architect

Curtain rails and pelmets
CURTAIN RAILS AND PELMETS: Pressed steel pelmets of approved design with square ends and plastic caps, galvanised steel brackets at 800 mm maximum centres, and two galvanised H-profile rails with 15 nylon rollers per metre. Pelmet must be phosphate treated and finished with a factory primer before delivery to site
CURTAIN RAILS: Single light duty curtain rail with baked enamel finish and end caps, and with brackets at one metre centres, 13 nylon rollers per metre rail, nylon cord and weighted cord pulleys
SHOWER CURTAIN: 19mm diameter chromium plated curtain rod with chromium plated sockets and ten curtain rings
FIXING: Plug and screw rail brackets to wall. Project pelmet and rail 150 mm past all window jambs wherever possible

Plastic number plates
PLATES: (refer to drawings or schedules)
FIXING: Fix plates with chromium plated round head screws

Sunken door mat
a) Leave a 30mm deep recess in floor
b) Edge recess with 40 x 3mm brass strip
c) Fill with approved natural rubber mat

Safety signs
SIGNS: symbolic safety signs on aluminium alloy backing sheets (SABS 1186): (refer to drawings or schedules)
FIX signs to walls etc. in an approved manner
STRUCTURAL STEELWORK

**Structural steelwork**

**STEEL**

a) Hot-rolled weldable structural steel: grade 300 (SABS 1431)
b) High tensile steel: grade 50
c) Steel tubes: to SABS 657 part 1: (refer to drawings or schedules)
d) Steel tubes for furniture: to SABS 657 part 2: (refer to drawings or schedules)
e) Cor-ten steel: grade to Engineers/Architects Specification: (refer to drawings or schedules)
f) Present the structural engineer with the supplier’s test certificates if required

**SHOP DRAWINGS:** Prepare all shop drawings in co-operation with the structural engineer

**WELDING**

a) Use only coded welders
b) Weld according to SABS 044
c) All welds must be continuous
d) Grind smooth

**PREPAINTING**

a) Prepare steel surfaces for coating according to SABS 064
b) Paint steel with one coat red lead-based primer (SABS 312 type 2 grade 1) before leaving workshop

**BOLTS:** bearing bolts for clearance holes

a) SABS 135, grade: (Refer to drawings or schedules)
b) SABS 136, type of metal; grade: (Refer to drawings or schedules)

High-strength friction-grip bolts to SABS 1282, for all friction-grip fastenings, Grade: (Refer to drawings or schedules).

**RIVETS:** Mild steel rivets to SABS 435
METALWORK

Steel windows, doors and frames

ROLLED MILD STEEL FRAMES: Window and door frames of rolled mild steel profiles (SABS 727)

CLISCO FRAMES: CLISCO single rebated pressed metal window frames (SABS 1311)

PRESSED STEEL: Pressed steel door frames (SABS 1129)

CHAWL DOOR
a) 1.2mm pressed steel door with 40mm edge, two V-shaped vertical ribs over full door height, three horizontal rails and 1.6mm steel lock box
b) Hang door on one pair 100mm steel hinges in single rebated pressed metal door frame (SABS 1129)

TIP-UP DOOR: Pressed mild steel tip-up door with spring action and frame, from an approved manufacturer and consisting of
a) 0.8mm mild steel door pressed to troughed or fluted pattern, reinforced at back with 1.2mm mild steel braces and channel surround, all welded together
b) Two nylon rollers in guides
c) 1.6mm mild steel frame with three build-in lugs on both sides, reinforced where fittings are to be fixed and with 3mm angle profile brace at bottom of frame to form weather bar
d) Two spiral springs with chains
e) Two galvanised barrel bolts for padlocks, galvanised handle on outside, pull rope on inside: (refer to drawings or schedules)

TIP-UP DOOR: Mild steel framed tip-up door with vertical hardwood batten cladding, cross bracing, sealed ball bearings and spring mechanism, from an approved manufacturer

PREPAINTING: Paint frames one coat red oxide zinc chromate primer (SABS 909) in factory

GALVANISING: Galvanise frames according to SABS 763 after manufacture

BURGLAR BARS: 20 x 5 mm mild steel burglar proofing: (refer to drawings or schedules)
Rivet and weld bars to window frames and at every intersection at 250 mm horizontal and 300 mm vertical centres, with black or bright mild steel rivets. Kink bars at peg stays. Fix burglar bars to inside of windows that open outward, and to outside of windows that open inward

BUILDING IN
a) Build in frames upright, square and free from warp
b) Brace jambs with timber
c) Bed fixing lugs in 1:3 cement mortar
d) Ensure space between door frame and wall is filled solid with mortar
e) Remove base ties after mortar has set, if they are to be removed
**Aluminium windows and doors**

Aluminium windows and doors of 6063 or 6261 alloy extrusions, and 1200 or 3004 or 5251 alloy flat sheet

a) Class: To Architects Specification. (Refer to drawings or schedules)
b) Anodising: ____ finish: ____ thickness ____ mm to SABS 999 (Refer to drawings or schedules)
b) Powder coating: ____ thickness 0,050 - 0,070 mm (Refer to drawings or schedules)
c) Provide a certificate of conformance by an approved anodizer or powder applicator, who is a member of ASFA
d) Provide a written guarantee from the anodizer/powder applicator

**DESIGN**
a) Site category: (Refer to drawings or schedules)
b) Height above ground to top of window: (Refer to drawings or schedules)

**MANUFACTURE**
a) Manufacture windows and doors according to minimum requirements of the Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA)
b) Mark each window and door with the mark and number of the test certificate issued by AAAMSA
c) The supplier is responsible for confirmation of opening sizes
d) Designs not covered by the above must conform to the requirements of SABS 0160 and the National Building Regulations
e) Prevent contact between incompatible materials
f) Join parts by mechanical means or by welding. Joints may have flush, stepped or lapped surfaces. Mitred joints may only be flush
g) Make accessories removable without removing the frames from the structure. Make sliding members so that no metal to metal sliding contact occurs
h) Make sealants compatible with aluminium, and so that the performance of the sliding or swinging parts are not impaired by their deterioration
i) Glazing beads, gaskets and glazing compounds must be compatible with the aluminium, its finish and with the glass
j) Hardware and fittings must be resistant to atmospheric corrosion and be accessible for adjustment, repair and replacement after the window or door has been installed

**INSTALLATION**
a) Build in approved subframes
b) Fit windows at last possible stage to prevent damage and staining
c) Install the window or door secure, sealed and undamaged
Steel kitchen cupboards

KITCHEN CUPBOARDS: to SABS 1385: (refer to drawings or schedules)
Supply a sample of a cupboard unit with door, drawer, handles and lock for approval

FIXING: Securely fix cupboards in position according to recommendations of the manufacturer
TESTING: Inspect and test all components after fixing, and protect from damage

Metal louvre frames

MATERIAL: Adjustable louvre frames of natural anodised aluminium alloy with high-tensile rivet spindles, nylon bushes and washers, and the necessary weathering strips
Provide timber or aluminium long arm of appropriate length

FIXING
a) Screw louvre frames to metal window frames with stainless steel self-tapping screws, type 304
b) Screw louvre frames to timber window frames with high-tensile aluminium alloy countersunk screws

Steel roller shutters and doors

SLATS
a) Cold rolled interlocking galvanised mild steel sections of approved profile and in continuous lengths without joints, forming a weather proof curtain capable of withstanding a wind loading of 70 kPa
b) Galvanising: Z275 (inland regions); Z600-Z625 for coastal regions
c) Mass (excluding T-bar): 11,0 kg/m² (door span ≤ 4500mm); 13,5 kg/m² (door span 4500-5500mm); 16 kg/m² (door span ≥ 5500mm)

GRILLES
a) Profile: To Architects Specification: (refer to drawings or schedules)
b) 10mm Ø continuous mild steel bar without joints over the span of the door width and of approved profile, assembled by means of an approved shaped clip
c) Mass (excluding T-bar): 13 kg/m² (Pera, Napoli, Ovale); 18 kg/m² (Trestino, Romany)

T-BARS
a) Two cold rolled steel angles fitted back to back with a half slat in between, riveted together with 8 mm diameter mild steel rivets, or with 6 mm diameter steel screws, at 350 mm maximum centres (Pop riveting is not acceptable)
b) Lifting handles on T-bar of hand operated (push-up type) doors on the side from where it is to be operated: one per door of ≥1500 mm width; two of 25 x 5 mm flat mild steel bent to desired shape, for doors of U1500 mm width); 40 x 40 x 3 mm mild steel angle, for doors of 1500 - 5500 mm width); 50 x 50 x 6 mm mild steel angle, for doors of 5500 - 6500 mm width)

GUIDES
a) 3 mm minimum thickness cold rolled mild steel channel with minimum depth of 50 mm (doors ≥2500 mm width), 70 mm (doors 2500 - 6500mm width. Specially fabricated guides for doors ≥6500 mm width
b) Provide guides with the necessary bell mouths, 25 x 3 mm flat mild steel T-bar stoppers, and 50 x 5 mm mild steel fixing lugs with 11 mm diameter hole for fixing bolt

**END PLATES**
4 mm minimum thickness mild steel plate, fastened to supporting wall angles with not less than two 10 mm diameter bolts

**BARREL OR SHAFT**

a) Outer and inner tube complete with springs, anchors, barrel end castings, ball bearings, stub axles and rings

b) Deflection of barrel: 4 mm/m maximum

c) Torque safety factor of inner tube: 3:1 minimum

d) Torsion spring: hard drawn spring steel wire to DIN 17223/1984 or BS 5216/1980. Adjust spring so that door, when stationary, does not move more than 200 mm up or down

e) Barrel end castings and spring anchors: grey cast iron

f) Bearings: high grade sealed ball bearings

**CANOPY COVER**

a) 1 mm thickness for door spans of ≤3000 mm; 1.2 mm thickness for door spans of ≥3000 mm

b) Galvanising: Z275 (inland regions); Z600-Z625 for coastal regions

**WICKET GATES**

a) Size: 685 x 1830 mm or 685 x 1220 mm

b) Fill-in curtain: similar to the door curtain

c) Lock: cylinder night latch and/or provision for padlock

d) Electrically operated doors: power cut-off switch

**OPERATION**

a) Manual or push-up

b) Chain-operated: endless hand chain that will not foul the opening of the doorway, and hangs to within 1 m of the floor. Provide a chain lock on one of the guides

c) Gear operated: gearbox and handle with locking system, to be installed 1m from floor level

d) Electrical operation: electrical motor and gearbox with emergency handle in the event of a power failure, isolator and control push buttons, limit switches

**FIXING**

a) Bolt guides to wall with 10 mm diameter steel anchor bolt, rawl bolt or sleeve anchor

b) Weld guides to steel structure by means of a stitch weld
Strong room/fire resisting doors
STRONGROOM DOOR: (SABS 949): (refer to drawings or schedules)
FIRE RESISTING DOOR: (SABS 1015): (refer to drawings or schedules)
INSTALL door according to instructions of the manufacturer
KEY: Arrange with the manufacturer to have the key sent to the architect by registered post

Fire places
Construct fireplace as shown on drawings and build up New Universal ‘Jetmaster’ fireplace completes with 038 fibreglass insulating blanket. Form concrete lintel 230 deep and 380 wide over Jetmaster as directed. The projection from the face of the chimney must be 150mm minimum into the room.

Clothes drier
Supply and concrete into kitchen yard 2 No. 050 diameter M.S. poles, 2700 long with 750 long cross arms 4 times drilled with plastic coated clothes lines, or alternatively 1 no. 1800 diameter Rotary dryer of an approved quality as shown on the drawings.

PLASTERING
Granolithic and sand-cement floor finish
GRANOLITHIC: Mix 1-part ordinary Portland cement (SABS 471) to 1 part hard stone chippings of maximum 10 mm diameter to 1-part sand (SABS 1083, preferably natural sand) to give a compressive strength of 40MPa after 28 days.
SAND-CEMENT: Mix one-part ordinary Portland cement (SABS 471) to three to four parts sand (SABS 1083). Slump must be 40 mm.
PIGMENT: Add approved colour pigment to the cement before the aggregate is added
PREPARATION
a) Ensure all piped services are in position
b) Ensure the base concrete is hard and strong, free of cracks and reasonably accurate (20 MPA).
c) Clean the surface by chipping if necessary
d) Wet only if the concrete is absorptive
e) Prepare bay forms. Lay screeds in panels as large as possible in one operation
LAYING: Lay granolithic or cement-sand finish according to SABS 0109
Bonded method
a) Brush a 1:1 cement: sand slurry over the surface
b) Before slurry coating has set, spread the mix, ram, compact, screed and lightly wood-float to thickness of 25 mm +15 -10
c) Leave finish undisturbed for about one hour, remove bleed water and laitance on the surface, and steel trowel until the desired texture is obtained
d) Where necessary, brush surface lightly with a broom to achieve a non-slip texture

e) Do not add dry cement at any stage. Do not trowel too soon, and avoid over trowelling

Monolithic method

a) Remove all laitance and remaining bleed water from the surface of the concrete slab and apply finish immediately afterwards

b) Spread mix, compact, screed to level and lightly wood-float to 12 mm thickness

c) Leave finish undisturbed for about one hour, remove bleed water and laitance on the surface, and steel trowel until the desired texture is obtained

d) Brush surface lightly with a broom to achieve a non-slip texture

e) Do not add dry cement at any stage. Do not trowel too soon, and avoid over trowelling

f) Lay coloured grano in two coats in one operation. Do not sprinkle on pigment after grano is laid

ACCURACY:

a) Deviation from datum level: +15 mm

b) Surface regularity: Maximum permissible deviation from 3 m long straight-edge in any direction: 5 mm

STAIR TREADS: Provide stair treads with 100mm wide reeding. Stop the reeding 100mm from the tread ends.

GRANO THRESHOLDS:

Lay grano minimum of 020 thick to thresholds with reeding as per stair treads.

JOINTS

a) Provide joints between bays, over joints in base slabs on ground filling, against walls, columns or other fixed objects, and over centres of any main supporting beams that occur below the finish

b) Joints must extend through the full thickness of the finish

c) Arris- round the top edges of joints where the screed is not to be covered, and seal with an approved material that will remain plastic

DIVIDING STRIPS: Fix 6 x 50mm brass floor dividing strips in floors under all internal doors where floor finish changes material or pattern, and under external doors so that external threshold is 10mm lower than the inside threshold

CURING: Cure the finish for at least five days by ponding water on the surface, covering with sand which is kept moist, or with polyolefin sheet

TESTING:

a) Test the hardness of the screed after 28 days with the "BRE screed tester", available from the PCI

b) Test adhesion of screed to base by tapping the surface with a hammer or the end of a rod: a hollow sound indicates lack of adhesion

c) Isolate panels which are rejected by sawing; remove and relay

FINISH: Seal with one coat non-slip wax polish
One-coat cement/lime plaster, two-coat plaster, barite plaster, bagging, roughcast

CEMENT: ordinary Portland cement (SABS 471)

SAND: to SABS 1090

a) Class: to Architects Specification. (Refer to drawings or schedules)
b) Type: internal for internal plaster, external for external plaster
c) Fineness modulus, when relevant

LIME: to SABS 523, plaster or putty plaster type

BARITE: Plaster grade barium sulphate (BaSO4)

One-coat cement/lime plaster, bagging, roughcast: Mix 1-part cement to 5 parts sand.

One-coat lime plaster: Mix one-part plaster lime to four parts sand

Compo-plaster: Mix two parts lime to nine parts sand. Add one-part cement immediately before use

Barite plaster

a) Mix one-part cement to five parts barites by weight
b) Apply the plaster in layers of 6-7 mm at a time, to a final thickness of 20mm.
c) Float every layer well while setting to prevent formation of cracks

Two-coat plaster

a) Mix one-part cement to one-part plaster lime and ten parts sand for the rendering coat
b) Mix one part hydrated putty plaster lime and one-part sand for the setting coat, to which mixture retarded hemi-hydrate hardwall finishing gypsum plaster is added in the proportion of one to four parts of the mixture
c) For plaster on metal lathing add 4kg of sisal to every m3 of the rendering coat mix

Workmanship

a) Complete all chased pipework and service outlets before plastering is commenced
b) Roughen concrete surfaces where necessary by hacking, clean the surface with a wire brush, wet and slush with 1:1 cement: sand grout to form a key for the plaster
c) When relevant fix 1500 x 1,0 x 35mm girth galvanised angle rounded corner protection strips (SABS 190 part 2) above skirting to external angles of all interior walls
d) Wet the surfaces directly before plastering is commenced
e) Plaster 12 - 20 mm thick on walls, 10 - 15 mm thick on concrete ceilings and beams
f) Finish inside plaster with a steel trowel, outside plaster with a wooden trowel, to an even and smooth finish. For a roughcast finish, spatter onto the still green rendering coat the same mix with a spatter machine to achieve an approved finish. For a bagged finish, spread the mix over the surface with a rolled-up sack until all holes have been filled
g) Plaster single surfaces in one operation
h) Protect surfaces against drying out for three days
i) Form knife joints through full plaster thickness over movement joints, with arris-rounded edges.
j) All window, door frames and cupboard frames to be fitted before any plaster work commences.
k) All salient angles are to be formed true, square, plumb and slightly rounded.
l) Cut neatly around all electrical outlet boxes and any other built-in boxes or units receiving cover plates.

**Cement plaster for squash courts**

**GENERAL REQUIREMENTS**
a) Provide constant and intelligent supervision during all work stages
b) Ensure that all materials are on site before any work is put in hand
c) Ensure that any part of the wall is easily accessible during any stage of the work
d) Prepare a sample panel of one square metre for approval before any work is put in hand

**PLASTER:** Mix one-part Portland cement to 2.75 parts high quality pit- or river sand graded as follows.

<table>
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<th>Sieve size (micrometers)</th>
<th>% through in mass (cumulative)</th>
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<tr>
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<td>60 - 100</td>
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<td>5 - 35</td>
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<td>150</td>
<td>10 - 20</td>
</tr>
<tr>
<td>75</td>
<td>3 - 7</td>
</tr>
</tbody>
</table>

**WORKMANSHP**
a) Wet the wall thoroughly the day before plastering is to be done
b) Apply with a brush a 1:1 slush coat shortly before plastering is to start
c) Plaster 10 - 15mm thick, level off with a straight-edge and wooden trowel so that surface does not deviate more than 3mm from a 1800mm straight-edge. Wait as long as possible before finishing off with a wooden trowel
d) Cure for at least seven days by spraying the surface every few hours with a fine spray, starting six to eight hours after application

**Terrazzo**

**CEMENT:** ordinary Portland cement (SABS 471)

**SAND:** to SABS 1083
a) Class: natural
b) Type: screed
c) Fineness modulus, when relevant

**MARBLE AGGREGATE:** Equal parts of 3 to 4mm size and 4 to 6mm size, and of approved colour

**DIVIDING STRIPS:** brass

**SCREED:** Mix one-part cement to three parts sand for the screed
**TERRAZZO**: Mix one-part cement to two parts marble aggregate

**PIGMENT**: Add approved colour pigment to the cement before the aggregate is added

**LAYING**: Lay terrazzo according to SABS 0109

a) Clean floor slab. Brush a 1:1 cement: sand slurry over the surface of the bay
b) Before slurry coating has set, spread the mix, compact, screed and lightly wood-float to within 16mm of the finished floor level
c) Set the dividing strips into the screed
d) While the screed is still plastic, spread the terrazzo mix in the bays and trowel to a level surface
e) Grind the surface after four days by wet mechanical process until the aggregate is fully exposed. Wash clean
f) Prepare a 300 x 300mm sample panel of each colour for approval

**CURING**: Cure the finish for at least three days

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**TILING**

*Ceramic, clay, precast concrete, natural stone and terrazzo floor, wall and cill tiles and bricks*

**TILES**

a) Glazed ceramic tiles (SABS 22)
b) Ceramic tiles: (SABS 1449)
c) Marble: with polished surface and beveled edges
d) Granite: with polished surface and beveled edges
e) Refer to drawings or schedule

**ADHESIVE**: (Refer to drawings or schedules)

**GROUT AND MORTAR:**

a) Cement for mortar: Ordinary Portland cement (SABS 471)
b) Sand for mortar: SABS 1090
c) Cement for grouting and pointing: (Refer to drawings or schedules)

**SAMPLES**: Provide samples of every colour for approval. Keep samples on site for reference

**FIXING**: Fix tiles according to SABS 0107

**Preparation**

a) Complete all adjacent rough construction work and install and test all services in the background before commencing tiling work
b) Use only personnel experienced in this type of work
c) Examine backgrounds, remedy defects and allow to dry to equilibrium. Remove dust, loose matter, efflorescence, laitance
d) Roughen surface of backgrounds if not rough enough to provide a satisfactory bond, or wet and slush with a 1:2 cement: coarse sand mix, or apply a bonding agent. Cover joints in backings of
sheets of asbestos cement, plasterboard, fibre board or plywood with 75mm wide scrim fixed with adhesive, and coat the whole surface with a suitable water-repellent

e) Wet the surface before applying the scratch or floated coat

f) Apply a 1:3-4 (by volume) cement: sand mix scratch or floated coat of thickness at least 13mm but not more than 25mm. Add a water proofing agent to the mix where tiles are liable to moisture penetration, e.g. swimming pools or showers. Scarify the surface of the scratch coat with a serrated tool before the mortar has set. Trowel the surface of the floated coat to produce a smooth but slightly porous surface. Form movement joints in scratch or floated coat over movement joints in the backing

Fixing tiles in cement mortar

a) Soak glazed ceramic tiles in water for at least 20 minutes before use. Stack tiles on edge and allow excess water to drain

b) Bed tiles solid in 1:3-4 (by volume) cement: sand bedding mortar to a final thickness of between 6 and 13mm

c) Lay cill tiles to the required angle

d) Clean out joints between tiles to a depth of at least 3mm

Fixing tiles in adhesive: Fix tiles to the background strictly in accordance with the instructions of the manufacturer of the adhesive

Fixing mosaic tiles

a) Fix mosaic sheets in accordance with the instructions of the manufacturer of the adhesive

b) Beat the sheets to an overall flat surface

c) Wet the adhesive paper when the adhesive has started to set, and remove paper with a brush

PATTERN

a) Fix tiles in agreed pattern

b) Cut tiles only along sides of wall panels and along floors

c) The top row of wall tiles must be a full tile

SILLS AND THRESHOLDS

a) Lay external sill tiles with a slope and internal sill tiles level, and where relevant to coincide with full tiles on the wall surface

b) Lay shower threshold tiles sloping towards the shower

c) Lay sill tiles symmetrically about opening, with cut tiles at sill ends

d) Fix approved floor dividing strips under doors where floor finishes change, or under external doors

e) Sills to project max 15mm beyond face of finished wall.

GROUTING AND POINTING

a) Grout or point tiles fixed in cement mortar the day after tiles have been fixed. Grout or point tiles fixed in adhesive after a time recommended by the manufacturer of the adhesive

b) Grouting: Dampen joints and apply a white cement grout with a brush. Work the grout into the
joints with a squeegee until joints are filled flush with the surface. Before grout hardens, pencil
in the joints with a piece of wood or tool of width the same as that of the joint.
c) Pointing: Dampen joints and fill with mortar of the same mix as the bedding mortar with a
pointing tool. Before mortar hardens, tool the joints to the desired finish.

**MOVEMENT JOINTS:** Form 6mm wide movement joints in tiling and through full depth of bedding coat.
a) Over movement joints in the background.
b) At ceiling level.
c) Vertically and horizontally at approximately 4.5m centres.
d) Where tiling is continuous over different backgrounds, fill joints with joint filler.

**Type:** (Refer to drawings or schedules)

**CLEANING**
a) Sponge the tiled surface with water and polish the tiled surface with clean, dry cloth. Do not use
acid cleaners, scouring powder or abrasive cleaning materials.
b) Seal movement joints.
c) Protect absorbent floor finishes (e.g. quarry tiles) with an application of non-slip wax polish or
proprietary sealer.

**PLUMBING AND DRAINAGE**

**Gutters, rain water pipes, flashings**

**GENERAL:**
a) Should a public sewer connection be available then the system is to be installed as a one pipe
system to the required depths and levels to connect through a manhole on the boundary into
the public sewer.
b) If no public sewer is provided in the area, then a two-pipe system is to be installed, complete
with septic tank and soak away to the required sizes as specified by the Architect.
c) All drains passing under building's, screen walls or foundations, are to be encased in 450 x 450
concrete, to 600 beyond the structure.

**MATERIAL**
a) Sheet steel: 0.6 mm galvanised sheet steel with class Z 275 zinc coating (SABS 934).
b) Sheet copper: (Refer to drawings or schedules).
c) Sheet lead: 2.0mm thick.
d) Sheet zinc: (Refer to drawings or schedules).
e) Sheet aluminium: 3003H14-3SH4 aluminium alloy x 0.7mm thick aluminium strip, roll formed on
site, coated both sides with baked enamel and two coats silicone modified polyester.
f) uPVC: to SABS 11.
g) Fibre cement: Spigot and socket joints.
GALVANISED SHEET METAL FLASHINGS: 0.6 mm thickness, in lengths of 1800mm
a) 175 x 50 mm undertile flashing
b) 175 x 50 mm over flashing
c) 25 x 100 mm cover flashing
d) 60 x 60 mm gable flashing
e) 19 or 32 mm diameter roll flashing

GUTTERS: Provide sheet metal eaves gutters with beaded edges, angles, stopped ends and outlet nozzles where necessary

FIXING
a) Lay galvanised sheet steel eaves gutters in 30 x 3mm galvanised mild steel brackets fixed at 1200 mm maximum centres to roof timber, and bolt close to underside of gutter bead with 6 mm diameter galvanised gutter bolt
b) Lap galvanised sheet steel eaves gutters at least 75 mm. Lap valley and secret gutters at least 200mm. Seal with approved sealant. Bolt eaves gutters twice per bracket with galvanised gutter bolts
c) Lay aluminium eaves gutters in continuous lengths between stopped ends and angles. Seal joints at ends and angles with mastic and pop rivets. Fix gutters on extruded aluminium brackets at 600mm maximum centres
d) Lay uPVC gutters on brackets supplied by the manufacturer and according to his instructions
e) Lay fibre cement gutters on aluminium alloy brackets according to the recommendations of the manufacturer
f) Fix secret gutters where roof tiles and gable or parapet walls abut
g) Rivet and solder joints in galvanised sheet steel downpipes. Fix pipes to walls, 25mm away from the finished wall surface, and with the seam at the back, with 25 x 1,6 mm galvanised mild steel clamps, bolted around pipe in two halves, and with 6mm diameter galvanised steel lug with toothed end riveted to clamp and built into wall
h) Fix aluminium downpipes in continuous lengths to walls with 20 x 0,6mm straps at 1,5m centres screwed to 25 x 75 x 100mm oiled hardwood blocks plugged to walls
j) Fix uPVC and fibre cement downpipes according to the recommendations of the manufacturer
k) Fix downpipes at least twice to walls and at 2m maximum centres
l) Cut, join and form sheet metal flashing to make a watertight finish
m) Fix counter-flashings in properly formed joints in masonry and fill with 1:3 cement: sand mortar
n) Fix flashings around pipes with suitable clamps
o) Any sheets, etc. which have been attacked by white rust before being fixed, must be immediately removed from the site.
Sewer, drain, waste and ventilation pipes, cleaning eyes

VITRIFIED CLAY PIPES: to SABS 559
a) Type: without socket
b) Couplings: polypropylene

PITCH FIBRE PIPES: to SABS 921
a) Class: (Refer to drawings or schedules)
b) Ends: tapered
c) Couplings: polypropylene

FIBRE CEMENT PIPES: to SABS 819
a) Series: (Refer to drawings or schedules)
b) Couplings: flexible (underground); spigot and socket joints with tarred rope yarn and caulking compound above ground

CAST IRON PIPES: to SABS 746
a) Type: (Refer to drawings or schedules)
b) Couplings: flexible

UPVC SEWER AND DRAIN PIPES, and fittings: to SABS 791
a) Class: (Refer to drawings or schedules)
b) Type of end: Refer to drawings or schedules)
c) Couplings: flexible ring seal

UPVC SOIL WASTE AND VENT PIPES and fittings, for use above ground: to SABS 967
a) Joints: solvent weld

SIZES: Pipe sizes mentioned on drawings refer to the nominal inside diameter of the pipe, except where shown as OD.

LAYING UNDERGROUND PIPES: Lay pipes to SABS 1200 LD, and SABS 0112 (for plastic pipes only)
 a) Excavate, lay and backfill in reasonable lengths and without delay. Assume excavations are in soil. Notify the architect if excavations are in harder material
 b) Excavate the trench not wider than is necessary to lay, joint and backfill the pipe, and to a depth of 100mm below the required pipe level. The trench must be inspected by the architect before bedding material is placed. Protect the trench against flooding
 c) Bed the pipe true to line and grade on 100mm minimum thickness approved granular material over the full trench width. Support the pipe uniformly and continuously, but not on the sockets. Carefully compact the bedding to 90% of the modified AASHTO density
 d) Place backfill in the trench, up to the level of the top of the pipe and carefully compact to 90 - 95% of its maximum density. Ensure the moisture content of the backfill is within 2% of its optimum
e) Fill over the pipe with a 300mm thick layer of the same material and tamp lightly
f) Fill the remainder of the trench in layers not exceeding 300mm with material from the trench excavations, but without organic material or boulders larger than 150mm and compact to 90% of its maximum density. Do not roll or use heavy mechanical compaction until at least 600mm of material has been placed over the pipe. Fill in layers not exceeding 150mm and compact to 93% of its maximum density where the trench crosses roads or paving

g) Lay pipes with a minimum soil cover of 300mm, or with 100mm precast or cast-in-situ concrete slabs over the pipe, isolated from the crown of the pipe by a soil cushion not less than 100mm thick, or with 100mm concrete where pipes run under buildings

h) Where drain gradient exceeds 1:5, provide concrete anchor blocks to secure pipe in place

i) Lay pipes with a minimum soil cover of 300mm, or with 100mm precast or cast-in-situ concrete slabs over the pipe, isolated from the crown of the pipe by a soil cushion not less than 100mm thick, or with 100mm concrete where pipes run under buildings

j) Where drain gradient exceeds 1:5, provide concrete anchor blocks to secure pipe in place

k) Connect the pipe to the sewer of the local authority

l) Construct cleaning eyes of pipe of same material and diameter as drain. Insert junction in drain, or bend in end of drain, and bring branch up to ground level with easy bends. Fit top at ground level with cast iron cover with letter "CE" or "SO" on the cover, secured with non-ferrous metal screws. Encase bends and pipe in concrete and finish on top with 1:2 cement: sand mortar

**FIXING PIPES ABOVE GROUND**

a) Fix cast iron ventilation pipes to walls with hinged cast iron holder bats (SABS 1209). Fix uPVC ventilation and soil water pipes with galvanised mild steel holder bats at centres recommended by the manufacturer

b) Provide open end of ventilation pipes with a galvanised wire- or uPVC balloon

**TEST** the sewer in the presence of the building control officer

a) Air test: Use an approved air test machine to raise the pressure in the pipe to 3,75kPa. Lower the pressure to 2,5kPa after two minutes. Switch off the machine and measure the time it takes for the pressure to fall to 1,25kPa. This should be 2 minutes for a 100\(^\text{mm}\) I pipe, and 3 minutes for a 150mm diameter pipe

b) Water test: Fill the pipe with water so that any part of the pipe is subjected to a pressure of at least 12kPa and not more than 60kPa. Allow ten minutes for absorption. Water loss should not be more than 6,0 litre per 100m per hour for a 100mm diameter pipe, or 9,0litre per 100m per hour for a 150mm diameter pipe.

**REPAIR** road or paving surfaces where disturbed by pipe-laying
**Gullies, grease traps**

**MATERIAL**

a) Vitrified clay gully: to SABS 559

b) Cast iron grating to SABS 1115

c) Vitrified clay grease trap with polypropylene lids and trap provided with 150mm deep perforated container of 1,2mm galvanised sheet steel with galvanised mild steel handle

**LAYING**

a) Encase gullies and traps in concrete

b) Lay gully so that overflow height is at least 150mm above the finished ground level

c) Provide precast concrete gully head where dished gullies are indicated so that the top of the head is at least 150mm above the finished ground level

d) Bed grating in bitumen.

e) Form gulley upstands 075 all round. Gulley grating to be 100 minimum below top of upstand. No gulley shall be smaller than 300 x 200 internally.

**Galvanised mild steel water supply and waste pipes**

**PIPES:** to SABS 62

a) Class: (Refer to drawings or schedules)

b) Type: screwed at ends

c) Coating: galvanised inside and outside

**FITTINGS:** malleable cast-iron to SABS 509

a) Coating: (Refer to drawings or schedule)

**DIAMETERS:** Pipe diameters mentioned on drawings. Refer to the nominal inside diameters of the pipe

**JOINTING**

a) Join cold water pipes with lead paint and hemp

b) Join hot water pipes with graphite and hemp

c) Ream pipe ends to remove burr before screwing

d) Keep jointing surfaces clean. Remove cutting oil

**LAYING:** Lay pipes in ground not less than 400mm below finished ground level

**FIXING**

a) Fix pipes larger than 20mm diameter firmly to walls with galvanised cast iron holder bats (SABS 1209) to leave a clear space of 25mm between the pipe and the finished wall

b) Embed pipes up to 20mm diameter in walls. Chase neatly. Do not chase walls constructed of hollow blocks - locate pipes in the block cavities. Chase solid walls not deeper than one third of the wall thickness vertically and not more than one sixth horizontally. Avoid horizontal chasing where possible. Ensure that chases, holes and recesses are so made as not to impair the strength or stability of the wall, or reduce the fire resistance properties of the wall. Fill chases with class 1 or 2 mortar once the conduits are in position
c) Fasten pipes firmly to roof timber
d) Use bends in preference to elbows if practicable
e) Provide for expansion in long lengths of pipes. Insert long screws or approved couplings at convenient points to provide for alterations and repairs. Provide galvanised unions at in- and outlet of geysers
f) Deburr pipe ends carefully.

CLEANING: Flush the entire pipeworks before any valves or taps are connected

INSULATION: Insulate pipes with: (Refer to drawings or schedules).

**Copper water, steam or gas supply pipes**

**PIPES:** Copper to SABS 460

a) Class: (Refer to drawings or schedules)

**FITTINGS**

a) Capillary fittings: Pure copper (SABS 1067)
b) Compression and flared joints: Brass (SABS 1067)

**JOINTING**

a) Cut pipe end square, ream, remove burrs and size if required
b) Clean bore of fitting and pipe with a ring brush or fine emery paper

Capillary joints:
c) Apply flux to outside of pipe, twist to help distribute the flux over the two surfaces. Use flux carefully and sparingly
d) Apply flame to tube and fitting and apply solder until a complete fillet of solder appears around the mouth of the fitting
e) Wipe joint clean

Compression joints:
f) Slide fitting onto tube end until it stops against the inner shoulder. Tighten capnut by hand
g) Tighten nut with a spanner until the fitting is difficult to turn on the pipe. Thereafter tighten fittings half turn

Flared joints:
h) Slide coupling nut over end of pipe and insert flaring tool
i) Drive the flaring tool to expand the pipe end
j) Assemble joint by placing ferrule squarely between flared end of pipe and flare in fitting body, and engage coupling nut with fitting threads. Tighten with two spanners

**FIXING**

a) Fix pipes larger than 20mm diameter firmly to walls with galvanised cast iron holder bats (SABS 1209) to leave a clear space of 25mm between the pipe and the finished wall
b) Embed pipes up to 20mm diameter in walls. Chase neatly. Do not chase walls constructed of hollow blocks - locate pipes in the block cavities. Chase solid walls not deeper than one third of
the wall thickness vertically and not more than one sixth horizontally. Avoid horizontal chasing where possible. Ensure that chases, holes and recesses are so made as not to impair the strength or stability of the wall, or reduce the fire resistance properties of the wall. Fill chases with class 1 or 2 mortar once the conduits are in position.
c) Fasten pipes firmly to roof timber
d) Use bends in preference to elbows if practicable
e) Provide for expansion in long lengths of pipes. Insert long screws or approved couplings at convenient points to provide for alterations and repairs. Provide galvanised unions at in- and outlet of geyser.

**CLEANING:** Flush the entire pipeworks before any valves or taps are connected

**INSULATION:** Insulate pipes with 0.25 polyurethane foam lagging or eq. app.

**Hot Water Pipes**
Install 0.20 diameter copper hot water piped ring from geyser outlet to all points required and return back geyser.

Tee off from hot water ring to fittings in pipe size as follows:
- 0.20 diameter: to baths
- 0.15 diameter: to all other fittings (including wash tub)

**Fibre cement water supply pipes**

**PIPES:** Fibre cement pressure pipes and couplings to SABS 1223

a) **Class:** (Refer to drawings and schedules).

**LAYING**

a) Lay pipes according to the recommendations of the manufacturer and to SABS 1200 L
b) Provide 0.5 m2 concrete anchors at changes in direction and at ends of lines

**TESTING:** Test pipes to a working pressure of 0.6 MPa, while couplings are exposed

**CLEANING**

a) Flush pipes with clean water to remove all sediment and foreign matter before any valves or taps are connected
b) Fill pipes with water containing 0.15g/litre calcium hypochlorite. Allow the solution to flow slowly into the pipe and let stand for 24h
c) Flush pipes with clean water until a sample taken from the pipe complies with the requirements for drinking water of the local authority

**Concrete stormwater pipes**

**PIPES:** unreinforced concrete non-pressure pipes to SABS 677

a) **Type:** SC
b) **Joint:** open-ended or ogee

**LAYING:**

a) Lay pipes on 100 mm minimum compacted granular bedding material. Fully support the pipe over its entire length. Excavate holes in the bedding to clear sockets or joints that have a
diameter greater than that of the barrel of the pipe
b) Lay pipes accurately to lines and gradient
c) Joint ogee pipes with 1:2 cement mortar, well caulked in with a steel tool, and finish with a smoothly trowelled fillet. Joint butt joined pipes with mortar coated hessian band or
c) Joint ogee or butt joined pipes with an approved external rubber collar
d) Lay pipes with top of bores at the same level where pipes enter or leave sumps, catchpits or inspection chambers, with the invert of the largest pipe at the bottom of the sump, pit or chamber

Polyethylene, upvc and polypropylene water supply pipes
POLYETHYLENE (Usually called polythene): Black polyethylene pipe to SABS 533: (Refer to drawings or schedules)
Fittings: Galvanized malleable cast iron pipe fittings to SABS 509: (Refer to drawings or schedules)
UPVC PIPE AND FITTINGS: to SABS 966: (Refer to drawings or schedules)
POLYPROPYLENE: to SABS 1315: (Refer to drawings or schedules)

JOINTING: Join pipes according to SABS 0112
Thermofusion: Use only skilled and properly trained operators to carry out the thermofusion of polyethylene
Compression joints
a) Use approved compression fittings to the recommendations of the manufacturer
b) Insert metal liner in pipe end to prevent collapse of the pipe
c) Screw nut of fitting hand tight, and then a further one-and-a-quarter turns to compress the ring into the pipe
Insert joints
a) Force spigot of insert piece into end of pipe. Soften pipe end if necessary by inserting in hot water
b) Clamp pipe to spigot with circular metal clamp
Screwed joints
a) Cut ends of pipe off square. Chamfer pipe end with a file. Cut thread on pipe ends with special dies, without oil and with a mandrel inserted in the end of the pipe to support it against the die. Thread only enough length necessary to enter the joint
b) Screw on cast iron fittings firmly hand-tight
Solvent welding
a) Use only integrally preformed matched spigots and sockets
b) Clean surfaces of spigot and socket, abrade lightly, clean with fluid supplied by manufacturer, and ensure surfaces are dry
c) Apply solvent cement with a brush and immediately insert spigot in socket, twisting it a quarter turn while pushing it home
d) Wipe excess solvent from joint

**LAYING:** Lay pipes according to SABS 1200 and SABS 0112

a) Lay pipes 500mm away from drains if parallel, 100mm away if at right angles. Pipes of 75mm diameter or less must have 450mm minimum cover, larger pipes must have 750mm cover.

Pipes must not have more than 1000mm cover

b) Excavate trench 100mm deeper than the required level. Backfill with compacted stable material to achieve a level bottom

c) Bed the pipe true to line. Support the pipe uniformly and continuously

d) Test the pipe for leakages before covering the pipe

e) Fill over the pipe with selected soil and compact in layers not exceeding 300mm. Tamp the first layer lightly and do not roll or use heavy mechanical compaction until at least 600*mm of material has been placed over the pipe. Compact to 90% modified AASHTO density

**FIXING**

Fix pipes to walls with supports provided by the manufacturer and installed at centres recommended by him.

**Stand Pipe**

Connect into 32mm diameter pipe and run 19mm3 bar class black polypropylene pipe to stand pipes where shown on the drawings and connect into 19mm diameter copper elbow and rise against the external walls with 19mm diameter copper pipe secured to wall with holderbats and fitted with 19mm diameter brass tap with threaded nozzle for garden hose.

**Water supply valve box**

**BOX:** Pressed sheet steel valve box with door or lid, ball stopcock, 20”mm stainless steel sieve, pressure reducing valve with non-return and relief valve (SABS 198, working pressure ___kPa) and 20”mm overflow pipe through bottom of box down in wall and bent outwards at floor height. Pre-paint box in factory

**FIXING:** Build in valve box in wall at a height of 1200”mm above finished ground level so that it can be reached easily

**Sanitary appliances**

Enamelled steel baths: (Refer to drawings or schedules)

Acrylic baths: SABS 1402

Ceramic hand wash basins and pedestals: SABS 497

Ceramic shower trays: (Refer to drawings or schedules)

Ceramic water closets: SABS 497

Cisterns: to SABS 821, with galvanised steel flush pipes for high level cisterns, plastic flush pipes for low level cisterns, chromium plated copper flush and sparge pipes for urinals (SABS 821): (Refer to drawings or schedules)

Ceramic urinals: SABS 497
Concrete wash trough: Reinforced concrete, on two reinforced concrete pedestals

Stainless steel sinks and draining boards: Satin polished stainless steel sinks and drainboards, type 304, with sound-deadening material on the underside, and with overflow (SABS 242 or 907)

Stainless steel wash hand basins and wash troughs: Satin polished stainless-steel type 304, with sound-deadening material on the under side (SABS 906)

Stainless steel stall urinals: Satin polished stainless-steel type 304, with sound-deadening material on the back (SABS 924)

Brass taps: SABS 226

Traps:
   a) Plastic waste traps (SABS 1321, part 1), (Refer to drawings or schedules)
   b) Rubber waste traps (SABS 1321 part 2), (Refer to drawings or schedules)
   c) Exposed traps to be Chromium plated bottle traps.

Showers: (Refer to drawings and schedules)

Taps:
   a) Metallic to SABS 226
   b) Polyacetal to SABS 1021
   c) Single control mixer taps to SABS 1480

Flush valves: to SABS 1240, (Refer to drawings or schedules)

**FIXING**
   a) Leave protective wrappings in position for as long as possible
   b) Fix in a manner that will facilitate future removal if necessary
   c) Fix all appliances securely. Use manufacturers' brackets and fixing methods wherever possible.

Bed water closet pans in weak concrete. Build bath fronts up in brick masonry except where shown otherwise

   d) Fix shower heads at 2100*mm above shower floor level
   e) Fill space between walls and stainless-steel urinals with weak concrete
   f) Bed acrylic baths in 1:5 cement: sand mortar on three rows of bricks, or bed solidly on dry river sand or concrete
   g) Supply and fix the sanitary fittings as shown on the drawings free of all cracks or blemishes or any kind whatsoever.
   h) W.C.'s are to be installed with cistern edge min. 200 from side walls.
   i) Basins are to be installed 825 high and with min 450 from centre of basin to side wall
Sumps, catchpits, inspection chambers, stopcock- and meter boxes, valve boxes

BRICKS: to SABS 227
a) class: (Refer to drawings or schedules)

CONCRETE
a) Unreinforced: 1:3:5 (15MPa)
b) Reinforced: 1:2,5:3,5 (20MPa)

MORTAR: 1:3 cement: sand

PLASTER: 1:3 cement: sand

GRATINGS, COVERS
a) Cast iron covers and frames (SABS 558) for inspection chambers, septic tanks and surface boxes, class : (Refer to drawings or schedules)
b) Cast iron gratings and frames (SABS 1115) for gullies and stormwater drains, class: (Refer to drawings or schedules).

PRECAST CONCRETE CATCHPITS, MANHOLES AND INSPECTION CHAMBERS: SABS 1294
a) Type and size: see drawings
b) Thickness of concrete cover: (Refer to drawings or schedules)
c) Cover type: medium duty, for use in backyards; heavy duty, for use in roads and parking areas
d) Offload and stack manhole components in an upright position, not higher than 2m. Use lifting equipment recommended by the manufacturer

STEP-IRONS: SABS 1294 - Build 300 apart into wall where manhole is deeper than 1m.

CONSTRUCTION
a) Follow closely excavation, installation and backfilling operations in order to minimise obstruction to traffic and possible stormwater damage
b) Excavate 300 mm greater than the outside measurements of the chamber
c) Drain any water filtering in to one side and remove by suitable means
d) Take the necessary safety precautions as required by law

IN-SITU BRICK AND CONCRETE CONSTRUCTION
a) Build rainwater sumps and stopcock-, meter- and valve boxes with half brick walls on 100mm un reinforced concrete bottom and with 80mm reinforced concrete top rebated for frame of grating and cover, and to full depth of cast iron boxes. Plaster exposed surfaces only
b) Build stormwater catch pits and inspection chambers with one brick walls on 150mm un reinforced concrete bottom and with 100mm reinforced concrete cover slab rebated for frame of grating or cover. Plaster the chamber internally and on exposed surfaces. Bench around halfround channels, bends and junctions of sewer chambers with un-reinforced concrete finished smooth.

PRECAST MANHOLE CAST IN-SITU BASE CONSTRUCTION
a) Lay a 150 mm thick 20 MPa concrete foundation slab. Lay on a 50 mm thick concrete blinding layer if in-situ material conditions are unsuitable
b) Lay acceptable channel fittings to the required line and level
c) Fill around the channels with concrete and bench to the wall of the manhole at a slope of at least 1:6. Finish off with 12 mm of 1:3 cement: sand mortar

d) Set the starter section into the foundation slab or on 1:3 cement: sand mortar. Lower successive sections onto one another and point neatly

**MANHOLE SIZES:**
The following internal sizes will apply to the various depths:

- 0 - 1m deep: 600 x 450
- 1 0 2m deep: 920 x 920
- Over 2m deep: 1380 x 920

**TEST**
a) Test the chamber for water tightness before backfilling

**BACKFILLING**
a) Backfill with selected fill material in layers not exceeding 300 mm in thickness, and compact to the same density as the fill over the pipeline
b) Remove surplus material

**Septic Tanks and French Drains; Testing of Soil Drains**
a) Septic Tank

Septic tank shall be constructed from concrete filled block walls 230mm thick to the sizes shown on the drawings. Cast 100mm thick concrete cover slab with two 600 x 450mm cast iron two-piece double sealed cover and frame. The frame embedded in concrete. The interior of the chambers to be plastered and finished off with steel float. Complete the inlet and outlet pipework as shown on the detailed drawing.

b) French Drains

Excavate the drains to the sizes and depth shown on the drawing and filled in up to the invert level of the pipe with hard durable stone. Cover the drain with sheets of second-hand corrugated iron supported on stones approximately 150mm above the top of the stone filling and fill with suitable earth and top soil up to ground level and lightly ram.

c) Testing of Soil Drains

Provide the necessary equipment for and test the whole of the plumbing and drainage installation to the satisfaction of the Local authorities and the Architects.

**Electric geysers**

**GEYSERS: to SABS 151**
a) Type: 'Kwikot' Megaflow high pressure geyser.
b) Capacity: (Refer to drawings or schedules)
c) Guarantee: Refer to Manufacturers Specification.

**INSTALL** geysers according to the manufacturer's instructions

a) on firm timber joists in roof space near a ceiling hatch so that the electric element can be
reached from a step ladder through the hatch, when relevant

b) in positions shown on drawings

**SET** the geyser’s thermostat to 60˚ C

**Fire hose reels**

Fire hose reels to SABS 543

a) Size of hose: ____ mm diameter (refer to drawings or schedules).

b) Type of hose: light duty rubber (SABS 988)

c) Corrosive conditions: (refer to drawings or schedules).

d) Couplings, connections, branch pipe and nozzle to SABS 1128 part 2

**FIX** reel against wall with suitable expansion bolts at a height of 2100mm from floor to spindle

**GENERAL:** All pipes, other than storm water pipes, to be chased into wall where possible.

**CUT HOLES**

Cut holes through chases in all walls, floors, roofs, ceilings etc. for pipes where necessary and make good. All necessary flashings to be to Architects approval.

**Fire extinguishers**

DCP-extinguisher: portable rechargeable dry powder to SABS 810: (Refer to drawings or schedules)

Water-type extinguisher: water type portable fire extinguisher to SABS 889: (Refer to drawings or schedules)

HCH-type: halogenised carbon hydroxide type fire extinguisher (SABS 1151): (Refer to drawings or schedules)

**FIXING:** Hang extinguisher on a wall hook screwed and plugged to wall, at an agreed height

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**ELECTRICIAN**

**Electrical installation**

1.0 **GENERAL**

For the purposes of this specification, the following definitions shall apply:

"Architect" shall mean Hall/Stacey Architects.

"Contractor" shall mean the Electrical Sub-Contractor, nominated or direct.

"Builder" shall mean the Main Contractor.

1.1 **TYPE OF CONTRACT**

Type of contract: domestic sub-contract.

1.2 **SCOPE**

The work to be carried out includes the supply, delivery, installation, connection, testing, energising and leaving in service condition to the satisfaction of the Employer and Engineer the complete electrical installation in accordance with the Specification and Drawings.

1.3 **SITE**
All equipment shall be rated for site conditions, a maximum ambient temperature of 28 degrees Celsius and a dust laden atmosphere.

1.4 SYSTEM
Supply will be given at 240 volts, 1 phase, 50 Hz, multiple earthed neutral with separate neutral and earth service cable.

1.5 COMPLIANCE WITH STANDARDS
The complete electrical installation shall be carried out in full conformity with the Specification and the latest edition of the following regulations and standards:
(i) Code of Practice for the wiring of premises SABS 0142
(ii) SABS Specifications
(iii) Regulations and by-laws of the Swaziland Electricity Company (SEC)
(iv) All local and other authorities having jurisdiction over the installation.
(v) All work must be done under supervision of a registered electrician.

1.6 INSTALLATION PROGRAMME
Building work is scheduled to commence on an agreed date and the project duration is set for 6 months.

The Contractor shall at the commencement of the contract finalize an installation programme with the Builder to suit the building programme.

It shall be the responsibility of the Contractor to ensure that all materials necessary for the installation are on site in good time to ensure an even flow of work in accordance with the programme.

1.7 BUILDER’S WORK
1.7.1 All trenching, cable sleeves and openings shown on the drawing will be by the Builder. It remains the responsibility of the Contractor to ensure that these sleeves and openings are correctly installed for his requirements.
1.7.2 The Contractor will be held responsible for making good any damage to paintwork, plaster, face bricks, fittings or any part of the building proved to have been caused by the negligence or incompetence of his employees.

1.8 QUALITY OF MATERIALS
All materials and fittings used shall be SABS approved where applicable.

2.0 ELECTRICAL INSTALLATION
The specification set out hereunder is for a general installation. Only items of equipment shown on the drawing are to be included in this particular installation. The Contractor is responsible for the supply, installation and connection of all such items unless otherwise noted.

2.1 METER BOARD
Meter boards shall be semi-recessed weather-proof boards with dust-proof lockable doors and fitted with a 6mm Masonite backboard for the mounting of a circuit breaker and meter. The circuit breaker shall be as specified in the Schedule of Distribution Boards.

Meters will be supplied and installed by the SEB.

2.2 DISTRIBUTION BOARDS
**BOARD:** Prepainted (to approved colour) pressed steel distribution board with door and latch (SABS 1180), and with isolator, earth leakage devices and circuit breakers.

**BUILD IN** distribution board in walls, or surface mount.

**LABEL** all functions and provide a legend card.

Distribution boards shall be equipped according to the Schedule of Distribution Boards.

All circuit breakers and isolators shall be miniature size and shall be flush mounted with operating handles protruding neatly through close fitting slots cut in the face plate.

### 2.3 CABLES

2.3.1 Supply and install all cables according to the Schedule of cables. Cables shall be PVC insulated, steel wire armoured, PVC sheathed with copper conductors and shall be 600/1000-volt grade. (SABS 150)

2.3.2 The armouring layer may be used as a protective conductor only if meets SABS requirements for protective conductors, failing which a supplementary protective conductor may be used. Alternatively, for a single-phase installation, a 3-core cable with one core functioning as a protective conductor may be used, and for a three-phase installation, a 5-core cable may be similarly used.

2.3.3 If the armouring layer is to be used as a protective continuity conductor, termination shall be made using integral cone glands with a machined groove to accommodate the wire amounting. Glands with slots cut right through the body will not be permitted.

2.3.4 Underground cables shall be laid in 600mm deep 300mm wide trenches. Cable runs under concrete, pavement or tarred surfaces shall be in 50mm diameter PVC sleeves.

2.3.5 Where the cable enters the building a 50mm diameter PVC conduit with a slow bend to the board shall be installed, and along the conduit length the outer PVC cable sheath shall be stripped back and removed, and the inner conductors drawn in. without jointing, through the conduit to the board.

2.3.6 The Contractor shall ensure that the conduit is adequately insulated from the ingress of moisture from underground.

2.3.7 Encase the cable in river sand. Backfill and compact in layers not exceeding 300mm.

2.3.8 Mark the cable route with approved markers

### 2.4 SEC CONNECTION

2.4.1 Cable connections to all equipment supplied and installed by the SEC will be carried out by the SEC.

The Contractor shall carry out all protective conductor connections, including protective conductor terminations on the meter board and distribution board.

2.4.2 The Contractor shall pay all fees due to the SEC for connection and shall be responsible for arranging for this connection. A provisional sum is included for SEC connection fees.
2.5 OVERHEAD SEC SUPPLY
In the case of overhead SEC supply to the house, the Contractor shall supply and install at the point of entry a roof box with insulator and 32mm knock-out for conduit connection. Supply and install 32mm PVC conduit from the roof box to the meter board.

2.6 CONDUIT INSTALLATION
2.6.1 All conduit shall be PVC to SABS 950 and shall be concealed in walls, slabs or ceiling voids.
2.6.2 Wiring to lighting, socket outlets, telephones and communication systems shall be run in separate conduits, and wiring associated with one system shall not be installed within any enclosure containing wiring of another system.
2.6.3 Conduit having any flaws or damage, such as rust, dents, etc., shall not be used, all conduits shall be reamed and free of burrs and oil or cutting compound prior to erection.
2.6.4 Conduit shall be installed in straight lines where possible. Where bends and sets are required, the radii shall be as large as possible. Bends shall be made with a recognised and approved type of tool, such that the cross-section of the conduit remains unchanged and the surface of the material is not corrugated.
All junction boxes shall be readily accessible for inspection and rewiring without having to remove ceilings, fixed wall paneling, etc.
2.6.5 The conduit installation shall be so arranged that future wiring and rewiring can be carried out from lighting outlet, accessory and junction box positions. All conduit boxes shall be of sufficient size to accommodate this facility.
2.6.6 Where conduits are installed flush in plastered walls, no boxes, other than those for fittings and accessories, shall be installed for the drawing-in of wiring, except within cupboards and utility areas or where prior approval is given by the Architect. Where such approval is given, such boxes shall be permanently accessible, installed flush, and fitted with a cover blending in with the finished surroundings.
2.6.7 Conduits shall be fixed with holdfasts or crampets in chases in walls and shall have a minimum covering of 8mm of concrete or plaster over the highest projection of crampet, coupler, etc.
2.6.8 All conduits installed on the surface shall be fixed using spacer-bar saddles with screws and plugs or explosive-driven fixings. Saddles shall be installed at intervals not exceeding 1200mm, with additional saddles within 250mm of each side of every bend and outlet box.
2.6.9 No conduit smaller than 20mm diameter shall be used.
2.6.10 Where conduit is installed on shuttering and reinforcement prior to concrete being poured, it shall be securely fixed to prevent damage and movement. Outlet boxes shall be secured to the shuttering by means of 5mm nuts and bolts. Conduits shall, where possible, run in the neutral axis of any slab or beam. Where conduits are installed in hollow block or tile slabs, they shall be run in the solid concrete sections of the slab only. Where large conduits, or multiple conduit runs, cross such
slabs, the Contractor shall obtain permission to have one or more rows of blocks replaced by solid concrete, in which the conduits shall be installed.

2.6.11 Conduits installed in floor slabs shall not, unless it is completely unavoidable, be permitted to run in the surface bed or fill below. Where this occurs, such conduit shall have galvanised finish and be painted overall with bitumastic paint. Conduits installed in breeze or ash shall be totally encased in mass concrete to a minimum cover of 75mm specifically provided for this purpose.

2.6.12 Conduit shall not be installed within 150mm of any gas or hot-water pipe.

2.6.13 The conduit installation for any circuit shall be completely erected prior to the drawing-in of any circuit wiring.

2.6.14 Fixings in concrete or brickwork for conduit accessory boxes or saddles shall be made with screws no smaller than 40 x 3mm and plastic or fiber wall plugs. In structural timber, the minimum screw size shall be 25 3mm.

2.6.15 All boxes and enclosures shall be fixed with screws suitable for the fixing holes provided. Any fixing screw projecting into an enclosure containing wiring shall have all sharp edges removed.

2.6.16 All conduit fittings and accessories shall be of the same finish, type and manufacture as the conduit with which they are installed.

2.6.17 Joints shall be made using hard-setting vinyl cement supplied by the manufacturer of the conduit. All joints shall be cleaned, prepared and made strictly in accordance with the manufacturer’s instructions.

2.6.18 Where conduit enters an accessory, conduit box, enclosure or trunking, the termination shall be made using a cemented female threaded adapter and PVC lock-nut.

2.6.19 The Contractor shall ensure that provision for expansion of conduits is made in all parts of the installation, according to the conduit manufacturer’s recommendations, either by the use of expansion couplers, or by the introduction of bends and sets in the conduit runs.

2.6.20 Chase neatly. Do not chase walls constructed of hollow blocks - locate services in the block cavities. Chase solid walls not deeper than one third of the wall thickness vertically and not more than one sixth horizontally. Avoid horizontal chasing where possible. Ensure that chases, holes and recesses are so made as not to impair the strength or stability of the wall, or reduce the fire resistance properties of the wall. Fill chases with class 1 or 2 mortar once the conduits are in position electrical conduits are to be built into cavities of blocks to keep chasing to a minimum. Where any chasing for these occur block, cavities are to be filled solid in 1:3:6 concrete therefore chasing. Horizontal chasing is to be to a minimum 1500 maximum length.

**FIX**

a) Build in conduits in wall chases with cement mortar and clamps.

b) Fix conduits on wall surfaces and in roof spaces with clamps.

c) Cast conduits in concrete surface beds.

d) Do surface fixing level, plumb, neatly and in straight lines.
e) Electrical conduits are to be built into cavities of blocks to keep chasing to a minimum. Where any chasing for these occur block cavities are to be filled solid in 1:3:6 concrete therefore chasing. Horizontal chasing is to be to a minimum 1500 maximum length.

2.7 WIRING
2.7.1 Supply and install colour coded PVC insulated wiring with copper conductors from the respective circuit breakers in the distribution board to each circuit of the following equipment:

- **Luminaires**: 2 x 1,5mm sq. wire
- **Socket outlets**: 2 x 2,5mm sq. wire
- **Geyser Isolators**: 2 x 2,5mm sq. wire
- **Air Conditioner Isolators**: 2 x 4mm sq. wire
- **Cookers**: 2 x 10mm sq. wire

Circuits to cookers shall be run with 4mm sq. bare copper protective conductors. All other circuits shall be run with 2,5mm sq. protective conductors unless otherwise noted.

2.7.2 Circuit wiring shall be installed using the loop-in system, with joints only at outlet boxes, distribution boards and terminal boxes.

2.8 LUMINAIRE INSTALLATION
2.8.1 Lighting outlets shall be provided for the installation of each fitting shown on the drawings. Outlets shall be circular PVC boxes, deep pattern in concrete slabs, and shallow pattern elsewhere.

2.8.2 Unless otherwise specified, outlets for wall-mounted fittings shall be 2,2m above finished floor level. The Contractor shall confirm all such mounting heights with the Architect prior to the erection of the walls concerned.

2.8.3 Luminaires shall be fixed in accordance with the supplier’s requirements, neat and in a wellsupported manner, with surface mounted fluorescent fittings screw fixed at both ends in addition to the conduit box.

2.8.4 Where cut-outs in a false ceiling are required for flush mounted luminaries, reinforcing shall be provided by the Builder. It shall be the Contractor’s responsibility to provide the Builder with the hole diameters.

2.8.5 External bulkheads shall be fitted into recesses provided by the Builder. It shall be the Contractor’s responsibility to provide the Builder with the recess dimensions.

2.8.6 Ground-mounted floodlights shall be mounted on 300 x 300 x 600mm high concrete pedestals and secured by means of expansion bolts. Wall or roof-mounted floodlights shall be securely fixed to the fixing surface in accordance with the supplier’s requirements.

Final connection to the floodlight shall be made using a compression gland and 0,75mm sq. 3 core silicon rubber cord.
Determination of the final aiming angle of the floodlights for maximum illumination of the site shall take place at night.

2.9 LIGHTING SWITCHES
2.9.1 Lighting switches shall be rated at not less than 16 amps and shall be flush-mounted 1.2m above finished floor level unless otherwise noted on the drawings.
2.9.2 Internal lighting switches shall be in vertically mounted 100 x 50mm sheet steel boxes and shall be fitted with a white cover plate, unless otherwise specified by the Architect.
2.9.3 External lighting switches shall be weatherproof to IP55 and mounted according to the supplier’s requirements in the position shown.
2.9.4 Tumbler switches to SABS 163 with box and cover to SABS 1084/1085
2.9.5 Time switches: As per Architects Schedule or drawings.
2.9.6 Dimmer switches: SABS 1012

2.10 SOCKET OUTLET
2.10.1 Socket outlets shall be read at not less than 16 amps, and shall be 3 round pin shuttered type. (SABS 163 and 164 with box + cover to SABS 1084/1085).
2.10.2 Socket outlets shall be flush mounted in 100 x 100mm sheet steel boxes and shall be fitted with a white cover plate, unless otherwise specified by the Architect.
2.10.3 Socket outlets shall be of the same manufacturer as lighting switches.
2.10.4 Socket outlets shall generally be mounted 300mm above finished floor level. In kitchens and other wet areas, the mounting height shall be 1.2m unless otherwise specified.

2.11 ISOLATORS
2.11.1 Air conditioner isolators shall be as specified in the Schedule of Luminaires and Equipment and shall be mounted in the positions shown.
2.11.2 Isolators for heaters, cookers and geysers shall be as specified in the Schedule of Luminaires and Equipment and mounted in the positions shown.

2.12 COOKER CONNECTION
Connection to Cookers shall be made strictly in accordance with SABS 0142 and SABS 153.

2.13 STORAGE WATER HEATER CONNECTION
Connection to storage water heaters shall be made strictly in accordance with SABS 0142.
The Contractor is responsible for final connection from the isolator to the terminal compartment of the storage water heaters, including any flexible conduit required.

2.14 PHOTOCELL
Photocells shall be mounted on the eastern roof fascia and shall be rated at 500 watts, 240 volts.

2.15 TELEPHONE INSTALLATION
2.15.1 The Contractor is responsible for informing the Builder to provide any necessary sleeves in the case of underground entry by the Posts and Telecommunications Corporation. Sleeves shall be 50mm PVC and shall terminate at a telephone distribution point inside the building. The distribution point shall be a flush mounted 200 x 100mm box with white cover plate clearly labelled "TELEPHONES".
In the case of overhead entry, the telephone distribution point shall be a 200 x 100 x 50mm weatherproof semi-recessed galvanised box installed immediately below the roof eaves for P & T entry.

2.15.2 Conduits from the telephone distribution point to telephone outlets shall be 25mm PVC fitted with a draw-wire.

2.15.3 Telephone outlets shall be 100 x 50mm conduit boxes, installed horizontally 300mm above finished floor level, with white cover plates.

2.15.4 Box and cover to SABS 1084/1085.

2.16 TELEVISION OUTLETS

2.16.1 Television outlets shall be 100 x 100mm conduit boxes installed 300mm above finished floor level with white cover plates.

2.16.2 Television conduits shall be 25mm PVC. Provide a conduit run from the lounge television outlet to a conduit box mounted on the roof at a position suitable for the mounting of the TV aerial.

Bond - All exposed metallic pipe in the building strictly in accordance with SABS 0142.

2.16.3 Box and cover to SABS 1084/1085.

2.17 EARTHING

Provide 1m long copper plated steel earth spikes driven into the ground a distance of 1m from the meter board to provide an earth resistance not exceeding 2 ohms.

2.18 LABELLING

2.18.1 Labelling on distribution boards shall be engraved ivorine or approved with 6mm size black letters on a white background.

2.18.2 In the distribution board, an engraved number shall identify each circuit breaker by means of a typed index inside the door protected by a sheet of clear non-flammable plastic. A duplicate copy of the indices shall be handed to the Architect.

2.19 FINISHED APPEARANCE

The finished appearance of the completed installation shall be of the highest standard. The Contractor will be required to dismantle and re-erect at his own expense any part of the installation considered by the Architect not to be of such standard.

2.20 TESTING

The complete electrical installation shall be tested by the SEB and an approval certificate handed over to the Architect before it will be accepted that the work is complete.

The contractor shall arrange for the test and pay all fees due to the SEB for testing.

2.21 COMPLETION CERTIFICATE

The complete electrical installation shall be tested certified as safe and an approval certificate handed over to the Architect before it will be accepted that the work is complete.

2.22 GUARANTEE

Guarantee the efficient and safe working of the whole installation for 12 months after completion of the building. Lighting bulbs and tubes are excluded from this guarantee.
GLAZING

GLASS: (Refer to drawings or schedules)

PLASTICS: (Refer to drawings or schedules)

FIXING MATERIALS

Putty: SABS 680 type 1 (self-setting)

Flexible compounds

a) Non-setting compounds: Oleo-resinous-base, SABS 1254

b) Two-part rubberised compounds: (Refer to drawings or schedules)

Sealants

a) Polysulphide: SABS 110 (two part)

b) Silicone: SABS 1305

c) Polyurethane: SABS 1077

d) Refer to drawings or schedules.

Preformed strip materials: (Refer to drawings or schedules)

Preformed compression type gaskets: SABS 635

Adhesive glazing tape

a) treated cotton-based with self-adhesive coating on one or both sides

b) Adhesive velvet ribbon with adhesive coating one side

Fire resistant compounds: (Refer to drawings or schedules).

Setting and locating blocks: resilient, non-absorbent, inert material

Glazing Preparation

a) Allow an edge clearance of at least 3mm all round panes up to 6mm thick. Increase the edge clearance for thicker panes and with a minor dimension exceeding 1000mm

b) Do not cut or nip any glass thicker than 4mm on site

c) Discuss direction of pattern in obscure glass before cutting

d) Treat wood frames and beads with a wood primer (SABS 678). Ensure that the primer is compatible with glazing compounds

e) Treat steel frames with red oxide zinc chromate primer (SABS 909) or galvanising (SABS 763)

f) Seal relative areas of masonry and concrete frames with two coats of alkali-resistant sealer that is compatible with the compound, unless the glass is fixed in mortar

g) Ensure frames are dry, clean, true and square

h) Ensure rebates are free from projections, e.g. screws

i) Fix beads with screws and allow for the thickness of the glass plus at least 3mm of glazing compound on each face

j) Check edges of solar and tinted glass for damage and reject before fixing

Putty glazing
a) Place 25 - 75mm long setting and location blocks and apply putty to rebate
b) Press glass into putty to form solid backing at least 3mm thick
c) Secure sprigs, clips or cleats at 500mm centres around perimeter
d) Trim off excess back putty and finish to a smooth fillet
e) Apply front putty and finish to a splayed finish. Finish front putty approximately 2mm below the sight line to allow for sealing of the edge of the putty to the glazing material by overlapping of the paint. Intercut corners neatly
f) Seal the putty to the glass with a light brushing

Glazing with flexible compounds
a) Place 25 - 75mm long setting and location blocks and apply compound to rebate
b) Press glass into compound to form solid backing at least 3mm thick
c) Insert distance pieces
d) Apply compound to glazed face as bedding for the beads
e) Insert distance pieces
f) Fix beads
g) Tool compound to a smooth chamfer on both sides

PROTECTION AND CLEANING
a) Protect glass against harmful splashes and weld splatter
b) Clean the glass as soon as practicable after installation with mild soap and water
c) Ensure cleaning materials are not harmful to plastic glazing material and glazing compounds

Mirrors
MIRRORS: silvered float glass mirrors with chamfered and polished edges, class A (SABS 1236)
FIXING
a) Fasten mirrors with chromium plated mirror screws to wall
b) Fix mirrors with 3mm air space at back in areas with high humidity
c) Caution must be taken not to fix mirrors to uneven surfaces.

Skylights
Configuration: sloped, pitched, arched, domed, single or composite.
Mounting: flush, curb or integral
Operation: fixed or operable

WATERPROOFING:
a) glazing bars must allow for water penetration and effective drainage to the outside
b) Condensation must be removed through the use of a guttered weep system

METAL
a) Commercial alloy 6063 for extruded members
b) Commercial alloy 3103, copper, zinc alloy, lead, galvanised steel flat sheet for sills and flashings
c) Steel: Hot-rolled weldable structural steel: grade 300 (SABS 1431); Steel tubes: SABS 657 part
1

**GLASS**
a) to SABS 1263 part 1  
b) Laminated glass: thickness: (Refer to drawings or schedules)  
c) Toughened glass: thickness: (Refer to drawings or schedules)

**PLASTICS**
a) Acrylic: thickness: (Refer to drawings or schedules)  
b) Polycarbonate: thickness: (Refer to drawings or schedules)

**HARDWARE**
Aluminium, stainless steel or other corrosion resistant material which is compatible with adjoining materials

**WEATHERSTRIPPING, GASKETS, SEALANTS**

**FINISHES**
Aluminium:
Anodised to SABS 999: (Refer to drawings or schedules)  
Powder coating to SABS 1274: (Refer to drawings or schedules)  
Steel:
Galvanised to SABS 763, (Refer to drawings or schedules)  
Powder coating to SABS 1274, (Refer to drawings or schedules)  
Paint: alkyd enamel

**DRAWINGS, TESTING AND FIXING**
a) The appointed skylight contractor must provide drawings showing design and installation details for approval by the architect  
b) Securely anchor and properly seal the skylight(s)  
c) Test to SASA performance class before installation. Provide a test performance certificate

**PAINTING**

**Paint**

**GENERAL**
a) Supply proof that paint described hereafter complies with this specification before any paint work is done  
b) Restrict paint to one manufacturer  
b) Unless otherwise specified, obtain all paint from Dulux (Pty) Ltd  
c) All containers must reach the site unopened, and where appropriate bear the SABS-mark and specification number  
d) The complete paint system - primer, undercoat and topcoat - must be as recommended by the same manufacturer  
e) Clean all surfaces before painting. Prepare steel surfaces for coating according to SABS 064. Remove hemp from pipe joints
i) The colours of undercoats must match the finishing coat closely but with enough difference to be able to distinguish between all coats
j) Prepare colour samples of all finishing coats
k) Sandpaper all coats of paint and varnish and leave time to dry before the next coat is applied
l) Remove ironmongery, light fittings and other removable fittings that could be contaminated. Protect surfaces not to be painted. Refix after completion
m) Do not paint when conditions are unsuitable, e.g. dust, insufficient light, direct sunlight or inclement weather
n) Spray paint only where this is the accepted method. Mask all surrounding surfaces.
o) Coats of Paint:
   All coats of paint should be applied at the practical spreading rates in accordance with the specification. Should a uniform finish and texture, with insufficient coverage not be obtained due to defective preparation of surfaces and/or application, the Contractor, at the discretion of the client, must make any defective areas at his own cost, to the satisfaction of the Architect or Clerk of Works.
p) Clean:
   After each section has been painted, paint marks or splashes on other work must be carefully removed so that no trace remains. Work damaged by paint unsuitable for cleaning materials must be replaced at the Contractor's cost. No paint or thinners may be stored or mixed in any room where the floor covering has been laid.
q) Last Coat:
   Unless otherwise directed, the last coat of paint to each section must be applied when all other building work to that section has been completed and the premises are free from rubbish, dirt etc. where necessary, any touch-up work should be patched with the same batch of finishing paint originally used.
r) General:
   The contractor must provide all necessary dust sheets etc and prevent marking the surfaces of all work. He must keep all sections of the work area clean and free at all times from spotting, accumulation of rubbish, debris or dirt arising from decoration work. Any surface or other work disfigured or otherwise damaged should be completely renovated or replaced where necessary, to the approval of the client, at the Contractor's expense.
s) Exterior surfaces:
   Cracks must be scraped out, filled with an approved stopper and rubbed down flush. The whole surface must then be brushed down to remove all loose dust and powdery material before being sealed and painted.
t) Interior surfaces:
Grease marks, crayon marks, etc must be cleaned off with a strong detergent and thoroughly rinsed with clean water. Cracks, blow holes, etc. must be scraped out and filled as described above. The whole surface must be smoothed to an even finish and brushed down.

**PAINT ON WOODWORK**

a) Sand down surfaces with suitable grit abrasive paper, cloth or wire wool
b) Treat knots with patent knotting
c) Prime nail and screw heads. Stop nail and screw heads, cracks with suitable hard stopping
d) Prime or seal joinery before building in. This applies to all six sides of a door, and to rebates and the backs of beads in glazing apertures. Prime external structural timber before fixing
e) Prime with wood primer (SABS 678, type 1 on exterior woodwork, type 3 on interior woodwork)
f) Paint one universal undercoat (SABS 681, type 2), tinted if necessary
g) Finish with one coat alkyd enamel paint (SABS 630, type 2) or
g) Finish with one coat egg-shell alkyd paint (SABS 515)

**CLEAR FINISH ON WOODWORK**

a) Sand down surfaces with suitable grit abrasive paper. Remove all pencil marks or other surface discolourations
b) Prime nail and screw heads. Stop nail and screw heads, cracks with tinted stopping to match wood and rub down
c) Apply wax until absorbed and rub in
d) Repeat until a matt/glossy finish is obtained

Alternatively
c) Apply three coats clear eggshell varnish for interior wood (SABS 887 type 1)

Alternatively
c) Apply polyurethane varnish to manufacturer's instructions

Alternatively
c) Apply approved wood preservative to saturate the surface, allowing each coat to soak in before applying further coats
d) Apply to end grain until no further soaking in takes place

**STAINED FINISH ON WOODWORK**

a) Rub down surfaces with suitable abrasive paper, cloth or wire wool. Remove all pencil marks or other surface discolourations
b) Stop nails, screws and cracks with tinted stopping and rub down
c) Apply stain to manufacturer’s instructions
d) Provide a sample panel for approval
e) Apply three coats varnish (as specified above)

**ALKYD PAINT ON PLASTER**

a) One coat plaster only: Fill and stop cracks with suitable filling or plaster, rub down
b) Apply one coat alkali resistant primer (SABS 1416)
c) Apply one universal undercoat (SABS 681, type 2), tinted if necessary

d) Finish with one coat alkyd paint (SABS 630, type 2)

**EMULSION PAINT ON PLASTER**

a) One coat plaster only: Fill and stop cracks with suitable filling or plaster and rub down
b) On gypsum plaster (two coat plaster): Apply one coat bonding liquid
c) Apply two coats acrylic emulsion paint (SABS 634)

Alternative, PVA/acrylic co-polymer, commonly known as acrylic PVA paint. Less durable

c) Apply two coats co-polymer type emulsion paint (SABS 634)

Alternative, least durable, for interior use only

c) Apply two coats emulsion paint (SABS 633 grade 2) on interior walls only

**EMULSION PAINT ON FIBRE CEMENT FASCIAS, BARGE BOARDS, CLADDING**

a) Touch up steel screw heads and metal cover strips with calcium plumbate primer (SABS 912)
b) Touch up brass screw heads with suitable self etching primer
c) Apply one acrylic based undercoat
d) Finish with two coats acrylic emulsion paint (SABS 634)
e) Asbestos cement surfaces must be brushed down with a stiff brush and be free of all dust. If unpainted asbestos has been exposed to the elements it should be checked for fungus or lichen growth. If they are present these areas must be scrubbed with a solution of household bleach reduced with four parts of water. The asbestos should also be scrubbed with detergent solution and rinsed with clean water to remove all grime from the surface. A recommended alkali resistant primer or paint must be used on new asbestos.

**EMULSION PAINT ON FIBRE CEMENT AND GYPSUM CEILINGS**

a) Touch up nail heads and metal cover strips with calcium plumbate primer (SABS 912)
b) Finish with two coats acrylic emulsion paint (SABS 634)
c) Ceilings must be brushed down and free of all dust and powdery material. Cover strips and cornices must be stopped where necessary and sanded down smooth. Nail heads must be primed and stopped, rubbed down flush to the surface which should then be wiped or brushed free of all loose powdery materials before applying paint.

**ALKYD PAINT ON STEEL**

a) Clean steel surface to shiny metal state
b) Paint bare steel with one coat zinc phosphate primer (SABS 1319)

Alternative
b) Paint bare structural steel with one coat red lead primer (SABS 312, type 2, grade 1)
c) Paint one universal undercoat, type 2 (SABS 681), tinted if necessary
d) Finish with one coat alkyd enamel paint (SABS 630, type 2)

**ALKYD PAINT ON GALVANISED STEEL**

a) Scrub and wash with galvanised iron cleaner. Rinse thoroughly with clean water. Where galvanised steel was unavoidably welded on site, clean joint and cold galvanise to approval
b) Paint one coat calcium plumbate primer (SABS 912)
c) Paint one coat universal undercoat (SABS 681 type 2), tinted if necessary
d) Finish with one coat alkyd enamel paint (SABS 630, type¨2)

ALKYD PAINT ON CAST IRON
a) Remove bitumen until a clean, sound substrate is achieved
b) Apply one coat twin pack etch primer, tinted if necessary
c) Finish with one coat alkyd paint (SABS 630 type¨2)
Alternative
c) Finish with two coats acrylic emulsion paint (SABS 634)

ALUMINIUM PAINT ON GALVANISED STEEL
a) Remove rust and clean down. Scrub and wash galvanised steel with galvanised iron cleaner. Thereafter rinse thoroughly with clean water
b) Paint one coat calcium plumbate primer (SABS 912)
c) Apply two coats aluminium paint (SABS 682 grade 2)

ROOF PAINT ON GALVANISED STEEL
a) Scrub and wash with galvanised iron cleaner. Rinse thoroughly with clean water
b) Apply one coat calcium plumbate primer (SABS 912)
c) Apply two coats roof paint (SABS 683 type C)
Alternative
c) Apply two coats acrylic roof paint (SABS 940)
Alternative
c) Paint one coat universal undercoat (SABS 681 type 2), tinted if necessary
d) Paint one coat alkyd enamel roof paint

PAINT ON PVC
a) Clean PVC thoroughly with suitable degreasing agent. Abrade lightly
b) Paint one coat twin pack etch primer
c) Paint one coat suitable polyurethane undercoat
d) Paint two coats suitable polyurethane
Alternative
b) Paint two coats acrylic emulsion paint (SABS 634)

PREVIOUSLY PAINTED PLASTER SURFACES
Painted plaster surfaces being redecorated must have all loose and taking paint scraped off. Areas requiring to be filled must be filled with the appropriate FIXIT FILLER and allowed to dry before sanding. The surface must then be washed or wiped to remove any loose powdery material before spot priming the filled areas with DULUX PRIMER FOR NEW PLASTER (ALKALI RESISTANT PRIMER).

Surfaces previously painted with LIMEWASH must be wire brushed to remove all loose material then brushed off and repainted with LIMEWASH. If the plaster is to be painted with any other type of paint
other than limewash, the old limewash must be removed by wire brushing or scraping and then sealed
with DULUX BONDING LIQUID thinned 10% with mineral turps.

**NEW METAL WORK:**

**Iron and Steel**
New iron and steel must be cleaned by the most effective method such as shot or sand blasting, flame
cleaning, mechanical wire brushing, chipping, hand wire brushing to remove rust or scale. Anendeavour must be made to bring the surface to a bright or clean metallic condition. All traces of
surface oil and grease must be removed and any salt deposits must be removed by washing with a
water rinseable degreaser prior to the application of the appropriate primer.

**Galvanised Surfaces**
New galvanised surfaces must be well cleaned to remove all traces of dirt. When painting new
galvanised sheets, Dulux Paints instructions regarding the removal of the IS.15 protective coating
must be strictly adhered to.

Other Non-ferrous Metals (aluminium, zinc etc).
All milling oils and temporary protective coatings must be removed by degreasing with solvents or
degreaser, thereafter the surface must be cleaned with an abrasive paste cleaner or lightly rubbed
with find emery and then washed down. DULUX CORROCOTE 2 metal primer must then be applied
before applying the intermediate and finishing coats.

**Previously Painted Metal**
If the paint film is in good condition and there are no signs of blistering or pealing, the surface must be
cleaned down and lightly abraded prior to painting.
If the paint film has blistered, broken down or where rusting is evident the surface must be completely
stripped of all paint and abraded with steel wire brushes or other approved method such as grit
blasting. All affected areas must be primed with a suitable anticorrosive primer after cleaning.
Surfaces thus prepared should then be treated in the same way as for new metal.
**PAPERHANGING**

**Wallpaper**

**PREPARATION**

a) Ensure plaster surfaces are dry. Clean down, fill with suitable filler to a smooth surface. Paint one coat emulsion paint

b) Wood: Knot, prime, stop and sand down

**HANGING**

Hang wallpaper vertically with close-fitted and plumb vertical joints. No horizontal joints are allowed. Tightly fit against skirtings, ceilings, door frames and windows

**EXTERNAL WORK**

**Concrete retaining blocks**

(Refer to drawings or schedules)

**PLACING:**

a) Prepare level and compacted earth foundation trench

b) Stack units by hand, without mortar

c) Pattern: (Refer to drawings or schedules)

d) Place approved granular backfill and compact to: (Refer to drawings or schedules)

e) Fill units with fertile soil as each row is completed, and lightly tamp

**Bituminous premix road surface**

**SUBGRADE:** Scarify earth filling to a depth of 150mm and compact to 98% mod. AASHTO density

**BASE COURSE:** Spread crusher run stone and compact to 98% mod. AASHTO density

**WEED KILLER:** Treat the area to be paved with approved weed killer

**PREMIX**

a) Sweep base course clean, lightly wet and spray with prime coat (SABS 308) at the rate of 1 litre per m²

b) After the prime coat has dried out completely, apply premix consisting of stone chippings mixed with bituminous emulsion binder (SABS 748) to the required thickness

c) Roll as soon as the binder has set, followed after 3 days by a final rolling

d) Protect kerbs, channels and buildings against staining

**Wire fencing**

**STRAINING WIRE,** binding wire, chain-link wire: to SABS 1373 and SABS 675

(Refer to drawings or schedules)

**STRAINING EYE BOLTS**

a) 10 mm x 300 mm diameter threaded mild steel bolt, washer and nut, galvanised to SABS 763.

b) Approved permanent wire pullers may be used instead

**DROPPERS:** I-section iron with mass not less than 1kg each
WOOD DROPPERS creosote or tanalith treated (SABS 457)

STANDARDS: I-section iron with mass not less than 5.5kg each

STEEL POSTS
a) 100 mm outside diameter x 2.8 mm wall thickness mild steel with 200 x 200 x 5 mm mild steel base plate welded on one end and the other fitted with pressed steel mushroom cap welded on.
b) Provide holes for hinges, straining bolts or binding wire.
c) Paint part above ground with one coat aluminium paint, part below ground well tarred
Alternative
c) Galvanised post and base plate to SABS 763.

CONCRETE POSTS: Prestressed alkali aggregate reactive concrete

WOOD POSTS: Creosote or tanalith treated (SABS 457)

STAYS
a) 50 mm outside 1 x 2.8 mm wall thickness mild steel with 200 x 200 x 5 mm mild steel base plate welded on one end, the other end flattened, bent and holed for bolt
b) Paint part above ground with one coat aluminium paint, part below ground well tarred
Alternative
c) Galvanise post and base plate to SABS 763.

CONCRETE FOR BASES: 1:3:6 x 20 mm stone

ERECTION
a) Clear the fence route of vegetation or other obstructions. Roughly level to obtain a uniform gradient
b) Excavate holes: 800 mm deep x 400 x 400 for posts; 600 mm deep x 300 x 300 for stays.
Excavations are in "soil". Notify architect of other material
c) Plant posts and stays in concrete to just under ground level, at gates, corners, and at distances not exceeding 90 m, or at acute changes in level. Provide stays to all straining posts in direction of the line of fence
d) Drive standards 450 mm deep into ground at 3 m centres
e) Thread straining wire through holes in standards, bind around posts or straining eye bolts and strain to approval
f) Bind droppers to straining wire with binding wire
g) Cover with wire mesh, tension and bind securely to straining wire at every third mesh. Join roll ends with a spiral to form a continuous fence. Tie or clip welded mesh to straining wire at 300 mm centres. Trim roll ends by overlapping 100 mm
h) If ground is soft or a post or stay cannot be securely fixed, improvise
j) Make good any damaged protective coatings
k) Do not cut preservative treated timber where it will be in the ground. Check fence on completion. Grease hinges. Cut off projecting bolt threads. Burr over bolt ends to prevent bolt
removal and coat with bitumen paint

**Landscaping**

**DEFINITION OF TERMS**
"Top-soil" means soil with a composition of 15 to 25 % clay, 10 % silt and 65 to 75 % sand and with a minimum of two percent organic material, or
"Top-soil" means red soil mixed with kraal manure in the ratio of one cubic metre kraal manure to six cubic metre red soil
Top-soil must be free from deleterious matter and weed seeds
"Compost' means properly decomposed organic material, free from deleterious salts, waste products and impurities and with a pH-value between 4 and 7
"Fertiliser" means a mixture of material to comply with the specification under Law 36 of 1947. Order and store in plastic bags

**CLEANING OF SITE FOR PLANTING**
Remove existing grasses, weeds, foreign material and stone larger than 50 mm diameter before commencement of soil preparation

**CLEANING OF SITE FOR HYDROSEEDING**
Clean out existing natural grasses without damage to the latter. Remove loose foreign material from bare patches

**SOIL PREPARATION FOR GRASS SODS**
(a) Loosen existing top-soil throughout to a depth of 100 mm and mix thoroughly with 2:3:2 fertiliser in the ratio of 20 kg fertiliser to 150 m² of top-soil
(b) Wet, level off and compact slightly on flat surfaces and mildly on inclined surfaces

**SOIL PREPARATION FOR GROUND COVER AND SHRUB BEDS**
(a) Loosen existing top-soil throughout to a depth of 200 mm and mix thoroughly with 2:3:2 fertiliser in the ratio of 30 kg fertiliser to 150 m² of top-soil and with compost in the ratio of 6 m³ compost to 100 m² of top-soil
(b) Wet, level off and compact slightly on flat surfaces and mildly on inclined surfaces

**SOIL PREPARATION FOR SHRUBS**
(a) Dig a 450 x 450 x 450 mm deep hole in soil for each of the shrub species in bags 10 kg or larger and place excavated material aside
(b) Each hole must be inspected and approved by the architect
(c) Fill holes with a mix of two parts excavated soil and one-part compost
(d) Add and mix throughout 500 gram 2:3:2 fertiliser and 200 gram of bone phosphate per shrub hole
(e) Compact slightly and allow for decrease in volume

**SOIL PREPARATION FOR TREES**
(a) Dig a 900 x 900 x 900 mm deep hole in soil for each tree and place excavated material aside
(b) Finish the base of the hole with a fall in the general direction of the slope of the site
c) Each hole must be inspected and approved by the architect
d) Fill holes with a mix of two parts excavated soil and one-part compost
e) Add and mix throughout one kilogram 2:3:2 fertiliser and 300 gram of bone phosphate
f) Compact slightly and allow for decrease in volume

**SOIL PREPARATION FOR HYDROSEEDING**
a) Scarify all visible bare patches of existing soil 100 mm deep in both directions at 500 mm centres
b) Break up clods larger than 50 mm diameter, rake and level off

**PLANT QUALITY**
a) Acquire all plant material from a registered nursery
b) Plants must be typical of their species or variety with normal densely developed branches and a vigorous and healthy root system
c) Plants must be free from damaged parts, parasites, fungus, disfiguring knots, insects' pests and infestation
d) Grass sods must be approximately 1000 mm long and 500 mm wide and of uniform thickness. The sods must be clipped short and the soil base must be free from stones and clods
e) Ground covers must be well bushed with a high leaf density and have a height of 300 mm above ground level and must be delivered ex nursery in minimum 4 kg bag containers
f) Shrubs must be multi-stemmed with generous side branches and be well bushed to the ground. Shrubs must be at least 500 mm high as measured from the crown of the roots to the outer leaf circumference and must be delivered ex nursery in minimum 4 kg bag containers except where specifically described otherwise in the bills of quantities
g) Trees must be at least 1,5 metre in height as measured from the crown of the roots to the average top of the tree (not to the highest branch) and the stem diameter must be at least 25 mm at ground level except where specifically described otherwise in the bills of quantities
h) Pruning wounds must be limited to 25 mm in size and must show vigorous bark growth all round
i) All plant material must be approved by the architect beforehand
j) Replace all dead plants free of charge
k) Store plants under nursery conditions as approved by the architect

**PLANTING OF GRASS SODS**
a) Lay grass sods on wet prepared top-soil close together and fill joints and hollows with top-soil
b) Allow for area reduction
c) Roll the surface to keep the surface tolerance to a minimum and to allow a gradual change in slope at berms and embankments
d) Irrigate thoroughly after laying and rolling

**PLANTING OF GROUND COVERS**
a) Plant ground covers in prepared top-soil and in holes somewhat larger than the plant bulb and at least 200 mm deep so that the top of the bulb coincides with the finished level
b) Work the edges of the ground cover beds upwards to a height of 100mm and compact

c) Irrigate thoroughly after planting

**PLANTING OF SHRUBS**

a) Remove shrubs from containers and plant in backfilled holes so that the top of the soil originally in the containers is level with the finished ground level

b) Compact around shrubs and form 500 mm diameter x 150 mm deep soil dams around them

c) Wet thoroughly after planting with 25 litre of water per shrub

**PLANTING OF TREES**

a) Remove trees from containers and plant in backfilled holes so that the top of the soil originally in the containers is level with the finished ground level

b) Compact around trees and form 1000 mm diameter x 150 mm deep soil dams around them

c) Wet thoroughly after planting with 40 litre of water per tree

**HYDROSEEDING**

Hydroseed by specialist on prepared soil to the following specification:

a) Water: 10 000 litre per hectare

b) Fertiliser: Lime at 4 tons per hectare worked into the soil

c) Superphosphate at 0,3 tons per hectare worked into the soil

d) 2:3:2 at 0,5 tons per hectare with seed mix

e) LAN at 0,5 tons per hectare worked into soil after 6 and 12 weeks

f) Anti-erosion compound: 200 kg per hectare with seed mix

g) Mulch: 400 kg per hectare with seed mix

h) Germinating agent: Allow as per specialist’s instruction

i) Seed mix: (Refer to specialist specification)

j) Meeting: Before proceeding with hydroseeding, arrange for a meeting between the architect and the specialist to finalise specification and procedures

**TREE SUPPORTS**

a) Support every tree with a 2,5-metre-long x 50 mm diameter TANALITH- treated eucalyptus support driven 500 mm into the soil

b) Tie each tree to support with two steel wires sleeved in a 300 mm long plastic hose-pipe section

**PRECAST CONCRETE TREE RINGS**

a) Precast concrete tree rings in two halves

b) Place halves firmly and horizontally in soil dams around trees

c) Trim grass sods around tree rings where applicable

**GARDEN FURNITURE:** (Refer to drawings or schedules)

**DEPARTMENT OF NATURE CONSERVATION PERMITS**

Some plant species (e.g. Aloe spp.) may require permits for transplanting and transporting. Authorisation from landowners from whose property any plant is removed is also required by law. Allow in the tender amount for any costs in this regard
RIVER PEBBLES
Supply and place coloured river pebbles in the areas where indicated on the drawings. Pebble sizes and pebble mix to be the following:

50 mm ø : ___ %
75 mm ø : ___ %
100 mm ø : ___ %
50 mm ø : ___ %

(Refer to drawings or schedules)

EXTENT OF MAINTENANCE
Maintenance of plant material includes the following:
a) Keep all planted areas free from weeds and loosen soil around ground covers, shrubs and trees once every two weeks
b) Prune shrubs and trees regularly according to accepted horticultural practice. Replace sick or dead plants immediately
c) Mow grass sod areas weekly and remove cut grass
d) Mow all hydroseeded veld grass areas once every 3 months and remove cut grass
e) Apply 2:3:2 fertiliser at a rate of 5 kg per 100 square metre of grass sod area once monthly

WATERING OF PLANTED AREAS
Water planted areas once per week during September to March and once every fortnight during April to August as follows:
a) Shrubs - 25 litre at a time
b) Trees - 40 litre at a time

MAINTENANCE PERIOD
The maintenance period starts as soon as planting has commenced and will end 3 months after the date of practical completion of the work, provided that the maintenance period includes at least three months of the growing season namely September to March. The monthly maintenance payment may be reduced at the architect’s discretion should maintenance be carried out inadequately. Any such reduction in monthly maintenance payments shall be subtracted from the total maintenance contract value