# APPENDICES

# Appendix A.
# List of Participants at the Harare Workshop

An interesting surprise at the Harare Workshop was discovering that most of the delegates, although all working in the same region, were meeting for the first time. All agreed that they and future delegates to similar workshops should be able to contact and support each other. This is in itself a good reason for publishing this list.

## ANGOLA

Dr. Braz DIAS FERREIRA
Adviser to the Minister,
Ministry of Health
P. O. Box 16 514
LUANDA

Mrs. MaFernanda PEREIRA
Architect,
Ministry of Health
P. O. Box 5669
LUANDA
Phone: 244-2-334035
Fax: 244-2-338147

Mr. Jose Alberto PUNA ZAU
Vice Minister,
Ministry of Public Works and Urbanism
Rua Friedrich Engels 92, 5
Mutamba
LUANDA
Phone: 333745/334842
Fax: 3332866

## BOTSWANA

Mr. Jode ANDERSON
Principal Architect,
Department of Architecture and Building Services
Government of Botswana
Kopanyo House, Nelson Mandela Drive
Private Bag 0025
GABORONE
Phone: (267) 351901
Fax: 374832

Mr. Tidimogo GAAMANGWE
Principal Biomedical Engineer,
Ministry of Health
Private Bag 0038
GABORONE
Phone: 302165/352000
Fax: 353100
E-mail: tgaamangwe@bot.healthnet.org

Mr. Moabi Tebogo MADISA
Technical Officer,
Department of Architecture and Building Services
Private Bag 0025
GABORONE
Phone: 351901
Fax: 374832

## LESOTHO

Mr. Moorosi E. LATELA
Principal Technical Officer,
Ministry of Health
Ma Tsosane
P. O. Box 7775
MASERU
Phone: 09266 - 325693
Fax: 09266-310375

## MALAWI

Mr. Davie KALOMBA
Health Planner,
Ministry of Health and Population
Falls Estate
P. O. Box 30377

LILONGWE
Phone: 7830044

Mr. Joe MANDA
Controller of Health Planning Services,
Ministry of Health and Population
P. O. Box 30377
LILONGWE
Phone: 783775/783044

Mr. Sam NGOMA
Senior Architect,
Ministry of Works and Supplies
Flat No. 10/10, Area 11
Private Bag 316
LILONGWE
Phone: 784200

## MOZAMBIQUE

Mr. Mario ALMEIDA
Co-ordinator GACOPI,
Ministry of Health
Av. Eduardo Mondlane
P. O. Box 264
MAPUTO
Phone: (258-1) 427056
Fax: (258-1) 32103
Email: almeida @malmeida.uem.mz

Mr. Dino Albino COUTINHO
Technical Engineer,
Ministry of Public Works and Housing
Av. Karl Marx 606
MAPUTO
Phone: 426081/3
Fax: 421368

Mr. Dionisio ZAQUEU
Architect in GACOPI,
Ministry of Health
Av. Eduardo Mondlane
P. O. Box 264
MAPUTO
Phone: 258-1-32083/33593
Fax: 258-1-32103

## NAMIBIA

Mr. Kuutumbeni B. KATHINDI
Deputy Director, Architectural Services
Ministry of Works, Transport and
Communication
Private Bag 1334
WINDHOEK
Phone: 264-61-208431
Fax: 264-61-226737

Ms. Kautoo MUTIRUA
Director of Health Planning,
Ministry of Health and Social Services
Private Bag 13198
WINDHOEK
Phone: 2032817
Fax: 227607

Mrs. Miriam VAN ZYL
Health Program Administrator,
Ministry of Health and Social Services
Private Bag 13198
WINDHOEK
Phone: 061-2032869
Fax: 227607

## SOUTH AFRICA (RSA)

Mrs. Annelene BESTER
Deputy Director, Health Facilities Planning,
Department of National Health
Room 2422 Civitas Building,
Struben (corner of Andries Street)
Private Bag X828
PRETORIA 0001
Phone: 27-12-312 0678/0683
Fax: 27-12-328 6117

Mr. Johan BLAAUW
Director, Kwazulu Natal Works
191 Prince Alfred Street
Private Bag 9041
PIETERMARITZBURG, 3200
Phone: 27-331-947828
Fax: 27-331-425063

Mr. Malcolm JONES
Director, Health Facilities Planning,
Department of Health
Room 2428, Civitas Building,
Struben (corner of Andries Street)
Private Bag X828
PRETORIA 0001
Phone: 27-12-312 0682
Fax: 27-12-328 6117

Mr. Patrick MASOBE
Consultant, Planning & Financing,
Department of Health
Room 2417, Civitas Building,
Struben (corner of Andries Street)
Private Bag X828
PRETORIA 0001
Phone: 27-12-312-0958
Fax: 27-12-328-6102

Mrs. Carolina A.G. STEYN
Director Raubenheimer and Partners Inc,
Consultant to Department of Health
1261 Burnett Street,
Hatfield,
Pretoria
P. O. Box 11440
Brooklyn
PRETORIA 0011
Phone: 27-12-436773/4
Fax: 27-12 3422479

Mr. George B. ZONDAGH
Architect,
Department of Public Works
Room 702B
Central Government Building
Corner of Bosman/Vermeulen Streets
P. O. Box 842
PRETORIA 0001
Phone. 27-12-205 2338
Fax 27-12-325 8095

## SWAZILAND

Mr. Thulani MATSEBULA
Health Planner, Ministry of Health
P. O. Box 5
MBABANE
Phone: 268-42431
Fax: 269-44296

Mr. Paul D. NKAMBULE
Chief Building Engineer,
Ministry of Works and Construction,
Government of Swaziland
P.O. Box 58
MBABANE
Phone: 268-41936/42321

Mr. Bhekie NTSHANGASE
Bio-Medical Engineer, Ministry of Health
Mbabane Hospital
P.O. Box 8
MBABANE
Phone: 268-44045
Fax: 268-42829

## ZAMBIA

Ms. Mulela AMATENDE
Senior Architect, Health
Buildings Department
P. O. Box 50800
LUSAKA
Phone: 260-1-251323

Mr. Felix CHINDELE
Health Planner,
Ministry of Health
P.O. Box 30205
LUSAKA
Phone: 260-1-228385/225785
Fax: 260-1-225785

Mrs. Bwalya MUMBA
Physical Planner,
Ministry of Health
Ndeke House,
Haile Selassie Road
P.O. Box 30205
LUSAKA
Phone: 260-1-253180/2
Fax: 260-1-253173

## ZIMBABWE

Dr. Joana BARROS
Angolan Embassy
Doncaster House,
26 Speke Avenue
HARARE
Phone: 263-4-790070/790675
Fax: 263-4-790077

Ms. Najwa GADAH ELDAM
Researcher,
Ministry of Public Construction & National Housing
4 Hurlington Close, Mount Pleasant
HARARE
Phone: 263-4-744387

Mr. John T.T. MANYANGA
Principal Civil Engineer,
Ministry of Public Construction & National Housing
New Makombe Complex,
Leopold Takawira Street
P.O. Box CY 441
CAUSEWAY
Phone: 263-4-704561/ 700811

Mr. Ronald MUGANDIWA
Architect,
Ministry of Public Construction & National Housing
New Makombe Complex,
Leopold Takawira Street
P.O. Box CY 441
CAUSEWAY
Phone: 263-4-704561

Mr. Willie J.W. PFUNYE
Assistant Secretary,
Ministry of Health and Child Welfare
Fourth Street/Central Avenue
P.O. Box CY 1122
CAUSEWAY
Phone: 263-4-730011
Fax: 263-4-729154

Mr. Osten RUTSATE
Deputy Director Family Health Project,
Ministry of Health and Child Welfare
P.O. Box CY 1122
CAUSEWAY
PHONE: 263-4-730011
Fax: 263-4-729154

Mr. Jackson TAIVAVASHE
Senior Mechanical Engineer
Ministry of Public Construction & National Housing
New Makombe Complex,
Leopold Takawira Street
P.O. Box CY 441
CAUSEWAY
Phone: 263-4-704561

Mr. Gibson TINARWO
Architect,
Ministry of Public Construction & National Housing
New Makombe Complex,
Leopold Takawira Street
P.O. Box CY 441
CAUSEWAY
Phone: 263-4-704561

Ms. Eppie USHEWOKUNZE
Planning Officer,
Ministry of Health and Child Welfare
P.O. Box CY 1122
CAUSEWAY
Phone: 263-4-730011
Fax: 263-4-729154

Mr. Moses Addison S. UTA
Quantity Surveyor,
Ministry of Public Construction & National Housing
New Makombe Complex,
Leopold Takawira Street
P.O. Box CY 441
CAUSEWAY
Phone: 263-4-704561/9

## Resource Persons

Mr. Michael HOPKINSON
Architect, Initiatives
Winster, Derbyshire
UNITED KINGDOM
Phone: 44-0-1629-650 621
Fax: 44-0-1629-650 621
e-mail: 106166.727@compuserve.com

Dr. Kees KOSTERMANS
Public Health Specialist,
World Bank
1818 H Street N.W.
Washington DC 20433
USA
Phone: 1-202-473 4058
Fax: 1-202-473-8239
e-mail: ckostermans@worldbank.org@internet

Mr. Basilio Alfredo MANDLHATE
Architect,
Ministry of Health
No 797, Avenue Eduardo Mondlane
P.O. Box 264
MAPUTO
Mozambique
Phone: 258-1-427056
Fax: 258-1-32103
E-mail: mandlate@basilcom.mmz

Mr. Thierry RIVOL
Architect GACOPI,
Ministry of Health
Rua E. Noronha 1
MAPUTO
Mozambique
Phone: 258-1-32 083
Fax: 258-1-32103

Ms. Evelyn SERIMA
Director-Family Health Project,
Ministry of Health and Child Welfare
Kaguvi Building,
Fourth Street/Central Avenue
P.O. Box CY 1122
CAUSEWAY
Harare,
Zimbabwe
Phone: 263-4-727951
Fax: 263-4-729154

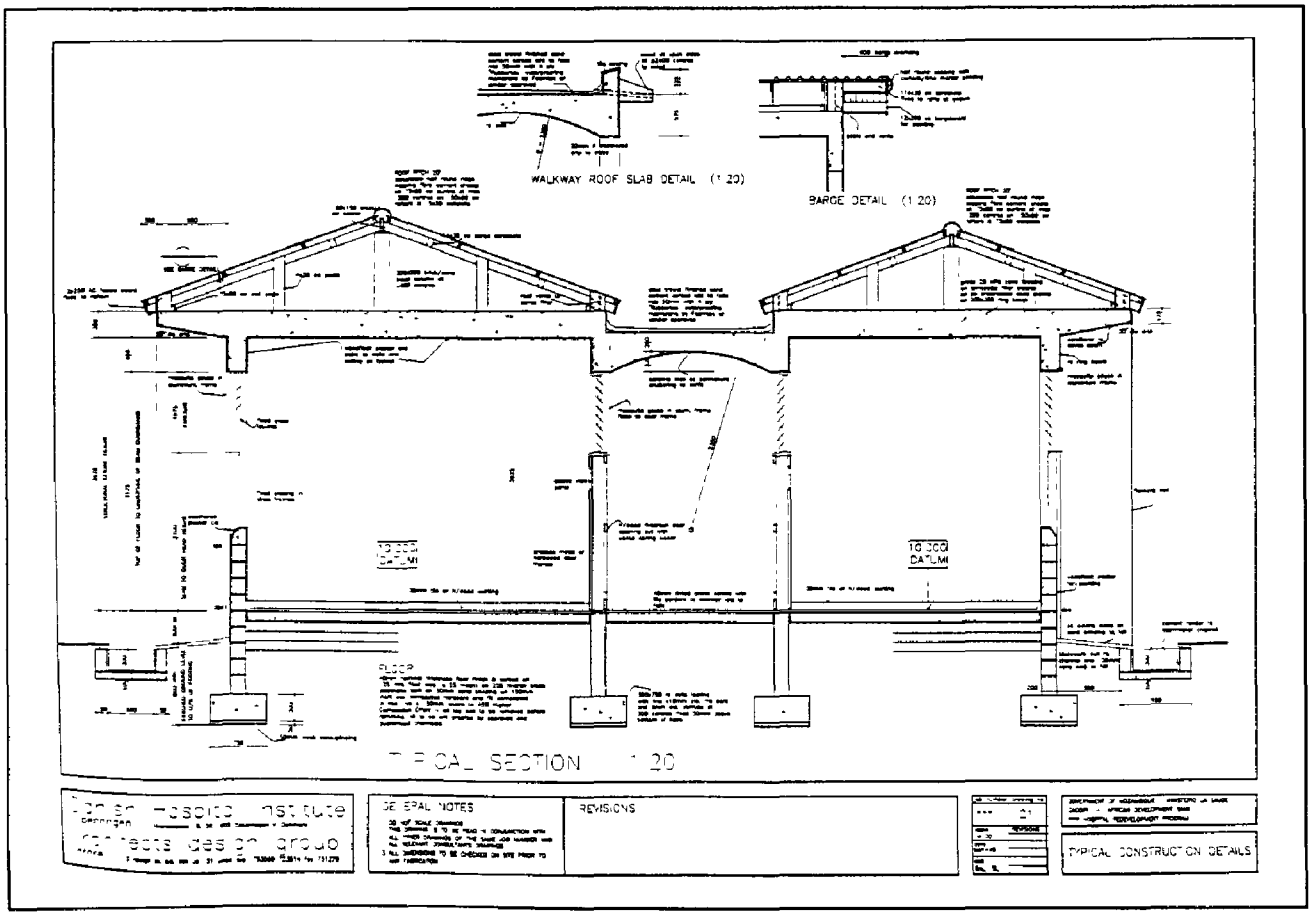
# Appendix B. Example of a Standard Building Specification

A standard building specification is the client's means of expressing his wishes regarding the types of construction and materials to be used. The specification represents his decisions regarding what is an appropriate facility for the activities he intends to carry out at a specific location. It further conveys the client's attitude to issues regarding quality and economy.

The specification will be the result of years of experience and will continually be revised and extended. The following specification, developed for projects in Mozambique, contains details which are special to the Mozambican situation (the use of locally fabricated pre-stressed concrete beams for the ceilings, for example). These standard specifications have been drawn up in collaboration with Ken Lever of Architects Design Group, Harare, Zimbabwe. Both the form and content shown here should help other clients to develop their own precisely appropriate standard specifications.



## Typical cross-section



# Specifications of Building Materials and Labour

## SUB-STRUCTURE

**SITE CLEARANCE**

Mark out positions of all buildings and clear top soil to a depth of 150 mm for a distance of 1500 mm beyond wall lines in all directions. All vegetation matter, roots, trees, boulders, termite and ant nests to be removed, before placing cleared top soil in piles away from building works and material storage in heaps no higher than 1000 mm high.

**EXCAVATIONS**

All foundation trenches to be properly marked out using square and stable profiles and approved by Architect or Engineer or both before beginning excavation. All foundation trenches to be excavated in accordance with foundation layout drawings.
Depth of trenches to be ascertained on-site and approved by Engineer or Architect or both. Bottoms of all trenches to be cleared of boulders, roots, termite and ant nests and any other foreign material, and well rammed to accept foundation concrete.

**FOUNDATIONS**

Option 1
Ground Beams

350 mm wide x 1000 mm deep (av.) trenches to take 350 mm wide x 500 mm reinforced concrete beams. All beams to contain triangular profile reinforcing cage set 50 mm above trench base. Reinforcing cage to consist of 3 No x 12 mm diameter reinforcing bars 250 mm apart in triangular profile with 8 mm diameter ms stirrups at 300 mm centres.

No ground beams will be required under internal partition walls —floor slab to be thickened accordingly to 400 mm wide x 200 mm deep strip below partition walls.

Option 2
Strip Footings

700 wide x 900 deep (av) trench, with all foreign matter (as above) cleared and trench base rammed to take concrete. 700 wide x 250 deep concrete strip footings to include flat profile reinforcing mat consisting of 3 No. x 12 mm diameter ms bars set 300 mm apart and linked with 8 mm diameter ms strips at 300 mm centres.
NB. Stub column option —where concrete columns are used to support roofs and ring beams 4 No. x 450 mm long x 12 mm diameter ms starter bars are to be set into either ground beam or strip footing at all column centres, all to be in accordance with foundation and layout drawings.
Concrete grade —all foundation concrete to be 20 MPa strength with 1:3:6 mix using only approved aggregates. River sand to be washed and cleaned of all soil and vegetation matter to Architect's approval.
Stone aggregate to be 15 mm diameter to 25 mm diameter granite, schist or other hard igneous-type rock —no soft, friable or particle-type rock aggregate to be used.

## FOUNDATION WALLS

Option 1

115 mm wide x 75 mm thick (minimum) burnt clay brick or block rated at 15 MPa crushing strength set in 2 : 1 : 8 (cement : lime : clean pit sand) mortar mix.
Pit sand to be clean and free of all vegetation matter. Stones must be obtained from source subject to Architect's approval.

Option 2

230 mm or 115 mm wide x 150 mm thick cellular pre-cast concrete block rated at 15 MPa crushing strength.
All bricks and/or blocks to have a water absorption rate of 15% maximum by weight.

### FLOOR SLABS

Option 1
Surface Beds

After all top soil, vegetation matter, boulders, termite nests, and other detritus have been cleared from below floor areas, the entire area between foundation walls, including all foundation trenches is to be treated with approved ant-proofing chemicals to comply with WHO and Government of Mozambique standards. A twenty-year written guarantee will be required from the Main Contractor. Under-floor fill is to consist of inert, granular, clay-free fill laid and rammed in 150 mm thick layers to underside of slab level.
Damp-proof membrane is to consist of 2 layers x 250 micron black PVC with 300 mm long double-welted junction seams. DPM to be turned up 250 mm at all wall faces to allow structural separation of floor slabs from wall faces.
Floor slabs to be 100 mm thick x 25 MPa-grade concrete. (1:2:4 mix to Engineer's approval) with light-weight 2.45 kg per $m^2$ welded reinforcing mesh mat laid over entire floor slab area and fixed 25 mm above slab bottom.

Option 2
Suspended Slab

175 mm x 125 mm pre-cast, pre-stressed concrete T-beams laid at 400 mm centres between ground beams, with either well-burnt hollow cellular clay filler blocks, approximately 400 x 400 x 150 mm thick, or pre-cast concrete hollow filler blocks approximately 400 x 400 x 150 mm thick manufactured to Engineer's approval.
75 mm x 25 MPa grade concrete topping including 2.45 kg per $m^2$ weld mesh reinforcement set 25 mm above filler blocks.
NB. Pre-cast T planks and concrete slab topping to be cast integral with top 250 mm of ground beams. Floor slabs generally to be set 300 mm above finished ground level.

## SUPERSTRUCTURE

### DAMP-PROOF COURSE

Option 1

3-ply reinforced bitumen asphalt strip supplied by approved manufacturer, 300 mm laps to ends and sides as required.

| | |
|---|---|
| Option 2 | Two layers of 250 micron PVC sheet strip cut to wall thickness. End laps to be 300 mm double-welted. |

**EXTERNAL WALLS**

| | |
|---|---|
| Option 1 | 230 mm thick fair-faced external quality well - burnt clay brick (230 x 115 x 75 mm) or cellular clay block (300 x 200 x 150 mm) laid in 2:1:8 cement lime sand mortar (clean pit sand as above) with minimum crushing strength of 7 MPa and maximum absorption rate of 15% by weight. |
| Option 2 | Pre-cast, well-cured cellular cement blocks (300 x 230 x 170 to Engineer's approval, or by approved manufacturer, with minimum absorption rate of 15% by weight.<br>All clay brick or block walls to have vertical movement joints at 12 m maximum centres, and all cellular cement blocks to have vertical movement joints at 6m maximum centres. |
| Option 3 | 230 x 230 mm reinforced concrete columns of grade 25 MPa concrete at approximately 6m centres (as indicated on layout drawings) with reinforcement cage of 4 No. x 12 mm centres in both directions. 8 mm diameter ms rod stirrups wired to vertical reinforcing rods at 300 mm centres. Clay brick or block, (or cellular cement block) infill panels between columns. |
| **AIR BRICKS** | 300 x 150 mm pre-cast cement air bricks with aluminium gauze vermin-proofing fixed to internal face, will be required at high level in all habitable rooms and store rooms at the rate of 1 no per $5m^2$ of floor space. Any louvered openings through walls are to be mosquito and vermin-proofed. |

**LINTOLS**

| | |
|---|---|
| Option 1 | 350 x 230 mm reinforced concrete eaves ring beams. |
| Option 2 | 170 deep x 115 pre-cast concrete lintols for openings up to 2500 mm wide, built into brickwork or blockwork. All pre-cast concrete lintols to include 3 No. x 12 mm diameter ms rods. |
| Option 3 | 5 No. courses of approved brick force reinforcing strip manufactured of 18 gge galvanised wire with welded cross stirrups at 300 mm centres maximum, and to Architect's and Engineer's approval —for openings up to 1500 mm wide. |

**WINDOW CILLS**

| | |
|---|---|
| Option 1 | 230 wide x 150 mm pre-cast concrete with splayed cill to Architect's requirement in 1200 mm lengths. All of 1:2:4 grade 25 concrete. |
| Option 2 | 20 mm wide float-finished plaster over brick on edge cills laid at 30 degrees minimum with approved DPC beneath. |
| Option 3 | Approved 150 x 150 x 25 mm well-burnt clay qt at minimum 30 degrees fall laid in 50 mm minimum mortar bed over approved DPC. |

**DOOR FRAMES**

Option 1 — 1.2 mm pressed galvanised steel, factory-made, door frames (kit form for assembly on site or pre-welded at factory). Approved epoxy paint finish after construction.

Option 2 — Ex 175 x 50 mm selected knot-free chamfuta or approved equal hardwood frames with all joints tenoned, doweled and glued (or dove-tailed and glued) —sizes as in Door Schedules.

**WINDOW FRAMES**

Option 1 — Factory-welded galvanised rolled steel frames (as in Window Schedules). 1 No. coat epoxy paint all round before fixing and two coats approved epoxy paint finish after completion of all wet trades.

Option 2 — Ex 175 x 50 mm selected knot-free chamfuta (or approved equal) hardwood frames (as per Window Schedules).
All external doors and opening window sections will be fitted with hinged or sliding aluminium mesh mosquito/fly screens - frames. All door and window frames to be fitted with galvanised fixings lugs, minimum 100 mm long at maximum 1m centres for building into brick or blockwork.

**CYCLONE SCREENS**

All external glazing (windows and doors) are to be fitted with framed and braced hardwood cyclone screens supported on external galvanised steel brackets or channels or both. Cyclone screens to be removable for storage when not in use.
Specify storage positions for each building.

**ROOFS**

Option 1 — 0.8 mm galvanised IBR profile long-span roof sheeting over 75 x 50 mm knot-free selected pine or hardwood purlins at 1200 mm maximum centres, over 150 x 50 mm selected knot-free pine rafters and vertical braces at 1200 centres. 18 gge galvanised strap fixings over 75 x 50 mm softwood or hardwood wall plates bolt-fixed over structural walls and at centre span of ceiling slab.
All roofing timber to be insect and termite-treated to Architect's approval before roof fabrication. All cut ends to be treated on completion of roof timbers.
All roofs will project 1 m minimum beyond wall faces at both eaves and gable ends. No metal gutters to be used and only pre-formed concrete gutters where detailed.

Option 2 — Approved textured latex-based roof paint over wood float finish 75 mm concrete topping to include 2.45 kg per $m^2$ weld mesh reinforcing (set 25 mm above clay or cement spacer blocks laid between 175 x 125 mm pre-cast pre-stressed concrete T-planks at 400 centres formed over timber centring profiles to be used at approximately 3000 mm centres during construction to form vaulted concrete slab construction, all between reinforced concrete ring beams and concrete gutters.

All habitable rooms and high-security store rooms to have flat or vaulted concrete slab ceilings. Elsewhere, 9 mm wood particle board (Bison Board or equal) sheeting with 30 mm 12 mm treated softwood cover strips to be used as ceilings, on 50 x 38 treated sw brandering at 400 crs, skew-nailed to u/s of rafters with 50 x 38 x 150 long treated sw droppers at every third rafter.

# FINISHES

## FLOORS

Option 1 — 25 mm thick x 1 : 1 : 4 (cement : granolithic : white sand) tinted granolithic cement screeding laid parallel to floor slab joints at approximately 3000 mm maximum centres. Clean off all construction markings and rub down as necessary before applying 3 coats of clear best wax floor polish.

Option 2 — 35 mm thick x 1 : 1 : 4 (cement : granolithic : white sand) tinted granolithic cement screed laid between bands of 150 x 150 x 25 mm well-burnt quarry tiles to form borders and cross bands at approximately 1 500 crs. See Architectural Layout Drawing for floor patterns. Clean off and finish with wax polish as in Option 1.

Option 3 — 20 mm sand : cement screed (1 : 4 mix) bedding for 200 x 200 x 10 mm-thick glazed ceramic/encaustic floor tiles by specialist manufacturer. Clean off and finish with wax polish as described.

Option 4 — 10 mm-thick self-levelling approved epoxy floor coating laid on site to manufacturers' recommendations over 20 mm-thick 1 : 4 cement : screed all e dges to be coved and turned up at side walls, projecting nibs and columns to form skirting integral with floor finish.

Option 5 — 300 x 300 x 30 mm-thick pre-cast tinted concrete floor tiles on 15 mm levelling and bedding screed; all 1 : 4 cement : sand mix.

## SKIRTINGS

Option 1 — 100 mm-high coved tinted granolithic cement skirting (1:1:4 mix) to match granolithic floor finish. Form joints to meet floor screeding joints.

Option 2 — 100 mm-high quarry tile skirting formed of 150 x 150 x 25 mm well-burnt quarry tiles, cement mortar bedded to structural wall face with wall plaster dressed into top edge of skirting.

Option 3 — 100 mm x 19 mm selected, knot-free approved hardwood (chamfuta, meranti or equal) standard timber skirting. Steel nailed fixed to wall face at approximately 500 mm centres. (No quadrant required).

## WALLS (INTERNAL)

Option 1 — 12 mm thick x 2 : 1 : 8 (cement : lime : white sand) mix woodfloat finish plaster (internal plastering only) for painting.

| | |
|---|---|
| Option 2 | 12 mm thick x 2 : 1 : 8 (cement : lime : white sand) steel trowelled finish plastering (to general quality wet areas only, for silicon sealer or painting as directed by Architect. |
| Option 3 | 12 mm wood-float plaster as above, finished with 3 coats best quality weatherproof and washable acrylic PVA-based paint ("Waterglo" or Architect or Engineer-approved equal). |
| Option 4 | 150 x 150 x 10 mm-thick glazed ceramic wall tiles bonded with approved quality ceramic tile adhesive to wood float finish cement plaster base, with all vertical and horizontal joints pointed with best quality white cement. |
| Option 5 | 10 mm-thick approved epoxy trowel applied wall finish over 12 mm-thick wood float cement plaster base, all work to follow manufacturers' recommendations. |

**WALLS (EXTERNAL)**

| | |
|---|---|
| Option 1 | 20 mm thick x 2 : 1 : 8 (cement : lime : white sand) mix external render. |
| Option 2 | Flush-pointed, bag-rubbed, fair-faced brick or blockwork to Architect's approval for finish with 3 coats cement-based exterior quality-approved paint applied following manufacturer's recommendations. |
| Option 3 | All horizontal joints to brickwork or blockwork walling to be weather-pointed during construction, with all vertical joints (perpends) flush-pointed. Entire face of wall to be cleaned-off and left "as is" or to receive exterior quality-approved paint (lime-based or PVA-based) as specified. |
| Option 4 | 20 mm-thick x 2 No. coats Tyrolean finish, colour tinted at 2 : 1 : 8 (cement : lime : white sand) exterior quality rendering. |

**CEILINGS**

| | |
|---|---|
| Option 1 | 2 No. x 10 mm thick coats wood-float finish cement : lime : pit sand plaster applied to underside of in situ concrete ceiling slab. |
| Option 2 | 9 mm-thick timber particle ceiling board (Bison Board or equal) fixed to 50 x 38 mm selected sw or hw brandering at 400 mm centres, skew-nailed with droppers to underside of roofing rafting members (see Options 1 and 2 under Roofs). |

**CORNICES**

| | |
|---|---|
| Option 1 | 10 mm x 5 mm recessed groove in plaster at junction between wall and concrete ceiling slab |
| Option 2 | Ex 50 x 32 mm selected hardwood machined with 2 edges rebated 10 mm x 5 mm. |

**SANITARY WARE**

| | |
|---|---|
| Option 1 | Purpose-made factory-formed and welded sink and wash and basin units (see Architectural schedules) made of 18.8 ss-jointed with equivalent ss-welding rods. |

Option 2 — Factory-moulded 10 mm-thick approved epoxy (with stain retardant) sinks and wash-hand basins by approved manufacturer.

Option 3 — Wash-hand basins only glazed cast-iron standard factory size (see Architectural Schedules) on mild steel tubular legs and framing.

WATER CLOSETS AND URINALS

Option 1 — 18:8 ss, factory-formed and welded fittings to detail and Architect's Schedule.

Option 2 — Best-quality vitreous china units by approved manufacturer.

BATHS AND SHOWER TRAYS

Option 1 — Glazed cast-iron factory-made baths and shower trays to Architect's Schedule.

Option 2 — Glazed ceramic tile-finished, cement screed-formed shower trays. All taps, fittings and other hardware to be of robust, "limited maintenance" variety.

HOT WATER SYSTEMS

Electrically-boosted solar hot water systems to be considered. Alternatively, solid fuel/waste matter water heaters to be considered.

# Outline Specifications

## SUBSTRUCTURE

### EXCAVATIONS

- Clear all top-soil over area of construction.
- Store separate from sub-soil for later.
- Re-use. Do not pile higher than 1000 mm.

- Remove all vegetative matter, roots and burrows from trench excavations.
- Ram all trench bottoms for inspection and approval.

### FOUNDATIONS

**ground beams**

- Excavate trench 350 mm wide by 1000 mm deep.
- Fill with 500 mm depth of reinforced concrete.
- 3 No. 12 mm m.s. reinforcing bars.
- 8 mm stirrups at 300 mm centres.

**strip footings**

- Excavate trench 700 mm wide by 900 mm deep.
- Fill with mass concrete strip 700 mm wide by 250 mm deep and inlay flat, 3 No. 2 mm m.s. bars at equal ctrs 25 mm from top.

**stub columns**

- Provide starter bars for concrete columns.
- 4 No. bars.

- 8 mm stirrups at 300 mm ctrs.
- CONCRETE TO BE TO 20 M.P.A. (1:3:6).
- Use CLEAN approved river sand.

**blockwork**
- To be fired clay or concrete to 15 M.P.A.
- Maximum absorption by weight not to exceed 15%.

**sub-base**
- Sub-base shall be inert granular fill.
- Compact to 95% H.C.E.
- Layers not to exceed 150 mm thickness.

**non-compacted**
- To be inert granular backfill under suspended slabs.

**fill damp proof**
- Shall be thoroughly wet 24 hours before pouring slab.
- Shall be 2 No. black polythene sheeting to 250 microns with 300 mm double-welted joints.

**ant-proofing**
- Ant-proof all foundations and slabs to WHO standards.
- Provide minimum 20-year guarantee of effectiveness.

## CONCRETE SLABS

- All finish slab levels to be minimum 300 mm above natural ground level.
- Concrete test cubes to be provided by the Contractor during the works as requested by the Engineer.

**aggregates**
- Shall be 15-25 mm clean, conforming to CAS A34.
- The Contractor shall supply a 50 kg sample of each aggregate as requested by the Engineer.

**compacted bed**
- 100 mm mesh r.f. concrete slab.
- 25 grade concrete.
- 3000 x 3000 mm maximum panel size.
- 10 mm kaylite sheeting between slabs.

**suspended slab**
- 175 x 125 mm precast pressed T-beam.
- 400 mm centres.
- To Engineer's approval.
- Fired clay, p.c. concrete topping.
- Welded mesh inlay 245 kg/m2.

**damp-proofing**
- provide double layer bitumen asphalt strips between slab and walls.

## WALLS

**blocks**
- Shall be fired burned clay or pressed cellular concrete block.
- Shall be at the approval of the Architect.
- Shall be to a minimum compressive strength of 7 M.P.A.

**mortars**
- Shall be cement/lime/sand in the ratio (1:1/2:4).
- Shall use clean pit sand.

- Shall have weathered joints.

expansion joints
- Shall be a maximum distance of 6000 mm apart.
- Shall be of 10 mm flexcell or similar non-hardening sealant.

columns
- Shall be reinforced concrete.
- 4 No. 12 mm r.f. bars, 8 mm stirrups at 300 mm centres.

airbricks
- Shall be 39 x 150 mm pre-cast concrete.

lintol
- Shall be pre-cast concrete.
- Shall be reinforced brickwork

cills
- Shall be pre-cast concrete to detail.
- Shall be 150 x 150 mm quarry tile.
- Shall be plaster-formed.

## ROOF

top cover
- 0.8 mm I.B.R profiled steel sheeting.
- Profiled aluminium sheeting.
- Profiled pressed cement/clay tiles.
- Epoxy sealant on concrete slab.

structure
- Sawn softwood timber rafter and purlin.
- Triangulated reinforcing steel trusses.
- Vaulted precast concrete slab.

## WINDOWS

- Shall be of standard sizing.
- Shall contain permanent ventilated openings.
- Shall have fixed lights.
- Shall have woven mesh mosquito screens over openings.
- Shall have external brackets for demountable cyclone protective screens.

timber
- Shall be of selected chamfuta.
- Shall have frames ex 125 x 50 mm.
- Joints shall be dovetailed, tenoned and glued.

rolled steel
- Shall be hot-dipped galvanised.

## DOORS

frames
- Shall be of selected chamfuta.
- Shall be of pressed metal.
- Shall conform to standard sizes (2030 x 815).

leaves
- Shall be of selected chamfuta.
- Shall be solid core flush-panel.
- Shall be semi-solid core flush-panel.

- Shall be hollow-core flush-panel.
- Shall be panel doors.
- Shall have externally-fitted mesh flyscreens.

# FINISHES

## FLOORS

- Shall be 25 mm cement screed with granolithic additive with joints at 3000 mm centres as for slab.
- Shall include a colouring agent.
- Shall be granolithic with quarry tile edging.
- Shall have a 100 mm coved grano skirting.
- Shall have quarry tile laid on mortar bed in panels 1500 x 1500 mm.
- Shall have a 2 mm self-levelling epoxy coating.
- Shall be of 150 x 150 mm ceramic floor tiles.
- Shall be 300 x 300 x 40 mm p.c. concrete aggregate textured tiles.

## WALLS

**internally**

- Shall be plastered with a 12 mm (1.1/2:4) cement lime mortar.
- Shall be woodfloat finished.
- Shall be steelfloat finished.
- Shall be painted with water washable p.v.a. paint as "Waterglo".
- Shall be painted with exterior quality p.v.a.
- Shall be glazed with ceramic wall tiles.
- Shall be finished 12 mm plaster with epoxy coating.

**externally**

- Shall be of fair-face concrete/fired clay block.
- Shall be painted exterior quality p.v.a.
- Shall receive a 20 mm textured plaster finish.
- Shall receive a 20 mm coloured textured plaster finish.

**ceilings**

- Shall be painted flat concrete slab.
- Shall be plastered and painted vaulted concrete slab.
- Shall be suspended 9 mm particle board with 50 x 38 mm branders at 400 mm ctrs and 25 x 10 mm hardwood strip covers.
- Cornices shall be ex 50 x 38 mm s.w.

# Appendix C
# Key Activities to be Undertaken by Health and Construction Ministries

A central aim of this publication is to persuade Governments and clients responsible for health facility construction projects that it is possible to effectively perform the functions of a client without appointing specialist consultants. The text specifies how various important activities should be carried out. The following list sets out these key activities in their proper sequence.

1 Make a statistics-based overview of all health facilities in the country.

2 Begin to assemble surveys of existing conditions for the involved facilities.

3 Establish a permanent 'client-core' team to work in future projects.

4 Agree relevant lists of priorities to use in future discussions.

5 Draw-up operational policies.

6 Make Masterplans of relevant facilities.

7 Draw-up schedules of accepted space norms and construction standards.

8 Develop standard specifications of materials and labour.

9 Draw-up and agree standard layout plans for department types and building types.

10 Train staff in procurement procedures.

11 Develop agreed checklists for important functions such as:
- Contents of a Masterplan
- Approval of proposals
- Attendance at site meetings
- Commissioning.

12 Establish a permanent team to undertake commissioning of finished buildings.