Technical guidelines for construction of institutional and public toilets - drawings

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This document contains copies of the key drawings from the Technical Guidelines. Please use this document to print out larger scale copies of individual drawings if required.
LOCATION & SITING

- Any obstacle obstructs clear view of toilet entrances; consider relocation as insecurity may deter use. Consult with users.

- Washwater and separated urine should be diverted to planter, soakpit or drainage trench.

- Minimum 3m between any two pits or any pit & trench.

- Absolute minimum 2m to wet season groundwater table.

- Maximum 30m (if cannot be attached to the institution served); for primary schools, maximum 10m from school building.

- Take into account all local risks; for example, avoid bushes near footpath in areas with snakes.

- For pit sizing, refer to Annex 4.

- Superstructure floor level to extend at least 100mm above ground level.

- Surface drained to ensure water drains away from toilets, pit.

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-Maximum 30m (if natural drainage channels existing; ensure any surface water runoff is directed around building / pit).

- Site toilets away from natural drainage channels; ensure any surface water runoff is directed around building / pit.

- Pit, drainage field, soakpit etc. to be downhill of water sources.

- Provide tactile aids for the vision impaired to follow the path.

- Superstructure floor level to extend at least 100mm above ground level.

- Ground water source.

- Well lit, graded & drained path without obstacle. Minimum width 1000mm. Maximum gradient 5% (absolute maximum 12% if 5% not possible, but wheelchair users will require assistance for gradients above 5%; preferably paved, gravel or clay / murram surface).

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**Notes:**
1. This layout is one of a large number of possibilities, provided to highlight key guidelines.
2. All dimensions in millimetres; dimensions shown here are recommended minimums - increase as space allows.
3. Note there are 2:1 female to male cubicles, as in Annex 1.
4. Note there is one handwash facility for every toilet facility, as in Annex 1.
5. For schools there should be separate male and female accessible facilities.
6. The toilet facilities shown here are water flushed; if water for washing or flushing is not available, all toilet facilities indicated above to be replaced with simple slab or pedestals directly above a pit. VIP latrines or UDDT facilities should be considered. Pipes would then be only for drain points and urinals.
7. Drain pipes are shown (indicative only) here but water supply pipes, power supply and other utilities are not.
8. Structural walls extend all the way from floor to ceiling.
9. All cubicle doors to lock internally. Only cleaner's room door and external doors, if any, to lock from the outside.
10. All items, including bins, soaps, drying towels etc., to be theft and vandal resistant as far as practical.
11. In selecting facility materials, consider longevity - often preferred materials may be more fragile.
ACCESSIBLE TOILET: MINIMUM DIMENSIONS

- **Waste Bin**: 600mm
- **Free-standing or wall-mounted railing depending on proximity of toilet to wall**: 320-450mm
- **Clear Path**: 1000mm wide
- **All rails**: 32-35mm tubular, firmly fixed to wall, floor or door
- **TAP and soap dispenser**: Simple to use (one push or similar)
- **Bin with lid, large enough for incontinence pads**: 300-360mm
- **WALL MOUNTED BABY CHANGING STATION**: (shown here in open position, stows vertically)
- **WALL MOUNTED BABY CHANGING STATION** (shown here in open position, stows vertically)
- **Easy flush (if flushable toilet) and easily accessible wash or wipe materials**
- **Providing steps, seat adapters, varying rail and handle heights, etc., if use by children is anticipated**
- **Ensure facilities are adapted to the assistive devices most common to future users**
- **Consider providing steps, seat adapters, varying rail and handle heights, etc., if use by children is anticipated**
- **Clear path: no steps or obstacles, 1000mm wide**
- **Outward opening door**: 900mm minimum
- **where only squatting slabs are available, consider providing simple seat structure to place over slab. Note rails should be the same for slab or pedestal.**
- **Waste bin**: With lid, large enough for incontinence pads.
- **Where only squatting slabs are available, consider providing simple seat structure to place over slab. Note rails should be the same for slab or pedestal.**
- **Fixed or foldable seat**: 500 X 400mm minimum in plan, 450mm high

ACCESSIBLE TOILET WITH SHOWER/MHM FACILITIES: MINIMUM DIMENSIONS

- **Clear path**: No steps or obstacles, 1000mm wide
- **WALL MOUNTED BABY CHANGING STATION**: (shown here in open position, stows vertically)
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- **Fixed or foldable seat**: 500 X 400mm minimum in plan, 450mm high

LOOKING INTO ACCESSIBLE TOILET WITH SHOWER/MHM FACILITIES

Note: Room and layout dimensions shown here are absolute minimums recommended. Where possible provide more space.
SUGGESTION FOR RAMP ACCESS TO RAISED LATRINE (PLAN)

RAMP ACCESS TO RAISED LATRINE (3D); SIGNAGE SUGGESTIONS

- Clearly indicate all relevant information on signs. Consider including Braille.
- If appropriate, provide tactile symbols (e.g., Braille signs) on internal fittings.

- Provide hand rails where possible as these help with manoeuvrability. Railings essential alongside drops of more than half a metre.
- Level resting stages preferable for longer ramps.
- Ensure unobstructed, navigable path to ramp. Consider paving, clay, graded gravel or similar.
- If possible, provide tactile symbols. E.g., Braille signs on internal fittings.

- Ensure the absolute minimum 1000mm.
GROUND WATER TABLE

PIT DESIGN & LINING

The angle of excavation for the pit depends on excavation depth and soil type; refer to Annex 7.

Pits to be fully lined for stability and longevity, and to enable pit emptying and reuse. External wall to be permeable except for septic tanks.

Diverting washwater and separated urine away from pit (to planters or soak pits) prolongs pit life and accelerates drying and sanitisation processes.

The top of the pit lining and any openings into the pit (such as toilet pans or holes) to be at least 100mm above ground level, or above highest recorded flood level (whichever is larger) to prevent rainwater flooding the pit.

Note some lining materials will not be strong enough to support a structure above and must be strengthened with a top beam.

Top 0.5m of pit wall to be fully sealed to keep out surface water and burrowing animals, and for strength & stability.

Top 1m to be filled with fully compacted earth.

The pit will be filled with granular material (sand, gravel), in compacted layers to avoid subsidence.

Partition walls to be impervious. Partition walls can be used: 1. for large pits, to support top slab & reduce slab span 2. to reduce cross-drafts for user benefit 3. for alternating pits, refer to Figure 11.

Provide foundations to fit lining/walls to avoid subsidence or collapse. Foundations made of blocks, bricks, rings or beams. Foundation width must be at least 3 times the lining or wall width.

Pits to be fully lined for stability and longevity, and to enable pit emptying and reuse. External wall to be permeable except for septic tanks.

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NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED
1. REFER TO ANNEXES 5 AND 5.1 FOR DETAILED SEPTIC TANK DESIGN

PUDDLE FLANGES RECOMMENDED TO PREVENT LEAKAGE AROUND PIPES

SEPTIC TANK: ELEVATION

Puddle flanges recommended to prevent leakage around pipes.

Seal around covers with water repelling grease or lean mortar to ensure no rainwater ingress. Sealant to be replaced after every opening. Note if mortar used, opening is difficult.

Access openings with sealed covers to allow effluent to pass from first to second compartment. Dividing wall must either have slots in it, or a tee pipe must be installed. Opening must be in the middle, above sludge settlement and below scum layer that forms at the top.

Scum slots (if used instead of additional tee pipe) in midwall to be mid-level. One to four number equidistant slots of similar area to outlet pipe. For example: 100mm diameter outlet pipe has area 0.008m²; so slots could be 0.1m x 0.08m.

Outlet pipe falls @ 1:100 min. to drainfield, or soakpit or sewer.

Walls can be reinforced concrete, brick or blocks, ensure fully sealed.

SEPTIC TANK: PLAN

From toilets to septic tank, pipes to fall @ 1:40

Walls can be reinforced concrete, brick or blocks, ensure fully sealed.

Tee pipe (or baffle plate in front of pipe) serves two essential functions:
1. Keeps floating scum layer from blocking the pipe.
2. Directs flow downward which ensures longer detention time, ensuring more solids settle out of the liquid.

Optional: 1st compartment base to fall at up to 1:10 to increase sludge storage capacity.

Sludge optional: 1st compartment base to fall at up to 1:10 to increase sludge storage capacity.

If tank sits within groundwater, thickness of base slab to be calculated as in Annex 5.1; otherwise 100mm minimum base slab depth (reinforced concrete).

NOTES
1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED
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SEPTIC TANK WITH INFILTRATION FIELD

1. NOTES
   a. All dimensions in millimetres unless otherwise indicated.
   b. Refer to Annexes 5 and 5.1 for detailed infiltration trench design.

2. SECTION DETAIL: INFILTRATION TRENCH

   PIPES IN INFILTRATION TRENCHES TO BE POROUS: E.G. BY DRILLING SMALL HOLES OR SLOTS IN PLASTIC PIPES OR LEAVING PIPE JOINTS UNSEALED.

   TRENCHES USED: DISTRIBUTION BOX (REPLACING PIPE FITTINGS INDICATED WITH DASHED LINES). REDUCES CHANGES OF BLOCKAGE AND INCREASES LIFE OF TRENCH SYSTEM.

   SEPTIC TANK: PIPE STOPS AT TOP OF SLOPING PIPE CONNECTOR TO ENSURE UPPER TRENCH IS UTILISED BEFORE EFFLUENT RUNS TO LOWER TRENCHES.

   INFILTRATION FIELD ON SLOPING GROUND

   TRENCHES FILLED WITH CLEAN GRAVEL OR STONES FROM BASE TO 50MM ABOVE TOP OF PIPE.

   DEDUCT TEXTILE OR LAYERS OF BUILDERS PAPER OR STRAW TO ALLOW AIR TO ENTER TRENCH & GASES TO ESCAPE BUT KEEPS TOPSOIL FROM MIXING INTO GRAVEL FILTER BELOW.

   DIAMETER, D = 1 - 2.5m

   POROUS LINING (E.G. PERFORATED, OR BRICKS OR BLOCKS WITH OPEN JOINTS)

   IN MORE POROUS SOILS CONSIDER SURROUNDING PIT WITH SAND ENVELOPE.

   SEATED COVER TO PREVENT RAINWATER INGRESS.

   SOIL TEXTILE OR LAYERS OF BUILDERS PAPER OR STRAW TO ALLOW AIR TO ENTER TRENCH & GASES TO ESCAPE BUT KEEPS TOPSOIL FROM MIXING INTO GRAVEL FILTER BELOW.

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PLAN ON SIMPLE PIT SLAB

DESIGN PITS TO LAST 2 YEARS (MINIMUM):
1. INITIALLY USE ONLY PITS 1 & 3
2. ONCE PITS 1 & 3 ARE FULL (CONTENTS ARE WITHIN 500mm OF TOP OF PIT), CHANGE TO USING PITS 2 & 4
3. BY THE TIME PITS 2 & 4 ARE FULL, PITS 1 & 3 SHOULD BE SANITISED AND SAFE TO EMPTY MANUALLY
4. EMPTY PITS 1 & 3 AND CHANGE BACK TO USING THESE PITS

NOTE CONTENTS MUST BE SAFELY DISPOSED OF OR RE-USED UNDER STRICTLY MANAGED CIRCUMSTANCES (BEYOND THE SCOPE OF THIS DOCUMENT)

THE MAIN REASON TO ADOPT THIS SOLUTION WOULD BE LACK OF SPACE COMBINED WITH LACK OF EMPTYING SERVICE.

ALTERNATIVE SIMPLE PIT ARRANGEMENT: ALTERNATING PITS
THIS CAN BE ADOPTED FOR SIMPLE OR OFFSET PITS OR VIP TYPE LATRINES
SIMPLE PIT LATRINE

Offset Pit Latrine

VENT PIPE (ONLY ESSENTIAL FOR VIP LATRINES) TO RISE AT LEAST 500mm ABOVE ROOF

VENTILATION HOLE (OPTIONAL IF NOT FOR VIP TYPE LATRINE) CAN BE FITTED WITH FLY SCREEN / MESH

POUR FLUSH PANS TO HAVE MINIMUM 25-30° SLOPE FOR REDUCED WATER USE

PIPE TO TANK, SEWER ETC TO HAVE MINIMUM GRADIENT 1:40

VENT PIPE ONLY IF REQUIRED FOR EMPTYING (AND VENT PIPE IF PROVIDED)

IF REQUIRED FOR EMPTYING OR RAIN, A CAP CAN BE PLACED ON VENT PIPE BUT IT MUST BE MINIMUM 100mm ABOVE TOP OF PIPE TO ENSURE SUNLIGHT CAN STILL REACH PIPE

THE SLAB OF AN OFFSET PIT FOLLOWS THE SAME CONCEPT AS THAT FOR A SIMPLE PIT, BUT THE ONLY OPENING WILL BE THAT FOR ACCESS FOR EMPTYING (AND VENT PIPE IF PROVIDED)

WIND DIRECTION

INTERNAL LINE OF PIT

IF REQUIRED FOR EMPTYING OR RAIN, A CAP CAN BE PLACED ON VENT PIPE BUT IT MUST BE MINIMUM 100mm ABOVE TOP OF PIPE TO ENSURE SUNLIGHT CAN STILL REACH PIPE

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SUPERSTRUCTURE: EXTERIOR

- **WIND:** Consider shading or other measures to protect against direct wind impact.
- **SUPERSTRUCTURE: INTERIOR**
  - **Shelving, Hooks, etc.** To be provided as appropriate / agreed with stakeholder consultation.
  - **All facilities including toilet seats, door handles and locks, hand-wash facilities, soap dispensers, etc.** To be set at appropriate height and / or depth for anticipated users.
  - **Walls and accessories** to be painted in light, non-reflective colours with strong contrast for handles, switches, etc.
  - **Breastfeeding facilities** can be provided as community preference following consultation.
  - **Surfaces to be gently graded towards drain points and / or away from toilets and user interface; no ponding should be allowed.**

- **SUPERSTRUCTURE: EXTERIOR**
  - **WELL VENTILATED INTERIOR**; harness natural ventilation as far as possible.
  - **HANDY LIGHT INTERIOR** (Except for VIP latrines); harness natural lighting as far as possible.
  - **All doors to be internally lockable, but with facility to open from outside in event of patrons (particularly children) getting stuck inside.**
  - **Where practical, top up flushing or washing water with collected rainwater.** Where provided, gutters to be regularly cleared to prevent blockage, mosquito breeding, overflow etc.
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  - **Consider skylights or similar to maximise harnessing natural light (not for VIP latrines).**
  - **Consider fly repelling plants such as basil, bay leaves.**
  - **Take into account all local risks:** For example, avoid bushes near footpath in areas with snakes.
  - **Ensure properly designed and constructed foundations to structure. If pit is offset, superstructure will require its own foundations.**
  - **Consider durability and security of all hardware and software; use durable materials and anti-vandal, theft-proof fittings as far as possible.**
  - **If children will be using adult-sized facilities, consider providing steps and other adapters for their use.**
  - **Handwash facilities to be highly visible, within bin of toilets, and must be passed by all users. Large flap or pedal-operated bins to be provided near hand-washing area. Each cubicle should also have a bin.**
  - **Consult with community on best approach for trans-gender or third-gender provision in special circumstances.**
  - **Additional design considerations must be accommodated:** Snow load to roof in snowy regions; roof anchorage in windy regions; animal damage in areas where wild animals are prevalent. (Refer to Annex 9 for guidance for difficult conditions.)

- **If any obstacle obstructs clear view of toilet entrances, consider relocation as insecurity may deter use; consult with users.**
- **Separate male & female entrances - door optional; if cannot see in & do not require overnight locking, consider having no door (with maze-type or similar entrance) as door handles can be a path for disease transmission. (If VIP latrine, ensure selected option maintains darkened interior).**
- **All doors to be internally lockable, but with facility to open from outside in event of patrons (particularly children) getting stuck inside.**
- **Inward opening doors require larger cubicles but improve circulation of users in outside shared space.**
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EXAMPLE LAYOUT:
HAND-WASH AREAS WITHIN SEPARATE GENDER AREAS

NOTES:
1. HAND-WASH STATION LOCATION IS FLEXIBLE, BUT STATIONS MUST BE LOCATED:
   - WITHIN 5m OF THE TOILET(S)
   - IN HIGH TRAFFICKED, VISIBLE AREAS
   - SUCH THAT EVERYONE USING TOILETS WILL PASS A HAND-WASH AREA WHEN LEAVING
2. IN PRIMARY SCHOOLS, SELECT A LOCATION THAT ENSURES SUPERVISION IS POSSIBLE
3. ALL FITTINGS AND FACILITIES TO BE AT A HEIGHT APPROPRIATE TO THE EXPECTED USERS: CONSIDER INSTALLING TOILETS, BASINS ETC. AT DIFFERING HEIGHTS AS APPROPRIATE
4. WHEN SELECTING MATERIALS CONSIDER THE NEED FOR ROBUSTNESS (E.G. CERAMIC IS NOT AS ROBUST AS STEEL), PERHAPS FAVOURING PRACTICALITY OVER AESTHETICS

EXAMPLE LAYOUT:
HAND-WASH AREAS IN PUBLIC SPACE OUTSIDE GENDER AREAS

NOTES CONTINUED:
3. SOAP TO BE PROVIDED AT ALL HAND-WASH AREAS. MAKE AS VANDAL AND THEFT-PROOF AS FEASIBLE.
4. HAND-DRYING MATERIALS TO BE PROVIDED; PAPER TOWELS REQUIRE BINS PREferably PEDAL OPERATED NEARBY WHICH MUST BE REGULARLY EMPTYED;
5. NON-DISPOSABLE TOWELS HARBOUR PATHOGENS AND SHOULD NOT BE USED.

CONSIDER USE OF "NUDGES" SUCH AS BRIGHTLY PAINTED GUIDANCE TOWARDS HAND-WASH AREAS, PARTICULARLY FOR CHILDREN

WASH BASINS AT VARYING HEIGHTS IN AREAS WHERE THE USERS ARE LIKELY TO COVER A WIDE RANGE OF AGES. NOTE IT IS POSSIBLE TO CONSTRUCT WASH BASINS WITH ADJUSTABLE HEIGHT, WHICH CAN ALSO BE CONSIDERED.
PLAN ON TOILET WITH MENSTRUAL HYGIENE MANAGEMENT (MHM) PROVISION

NECESSARY IN ALL INSTITUTIONAL TOILETS AND SHOULD BE INCLUDED IN PUBLIC TOILETS WHEREVER POSSIBLE.

NOTE THAT LACK OF MHM FACILITIES IN SCHOOLS CAN RESULT IN GIRLS DROPPING OUT.

NOTES:
1. CONSIDER PROVIDING DISPENSERS OF SANITARY PADS (WHETHER FREE OR FOR PURCHASE) WHERE SHOWERS ARE NOT PROVIDED, CONSIDER INCREASING THE SIZE OF WASHING AREA PROVIDED.
2. ALTERNATIVELY, CONVENTIONAL CUBICLES WITH INDIVIDUAL WASH BASINS (AND HOOKS, SHELVES ETC. AS USER PREFERENCE FOLLOWING COMMUNITY CONSULTATION) CAN ALSO BE USED FOR MHM.
3. INCLUDE FLEXIBLE HAND-HELD SHOWER HEAD WHERE PRACTICAL.
4. CONSIDER SUPPLYING RESERVOIR BY CONNECTION TO RAINWATER COLLECTION SYSTEM.
5. IF NO DIRECT CONNECTION TO INCINERATOR, PROVIDE AN ENCLOSED CONTAINER WHICH WILL BE PERIODICALLY EMPTIED FOR INCINERATION OR FORMAL DISPOSAL.