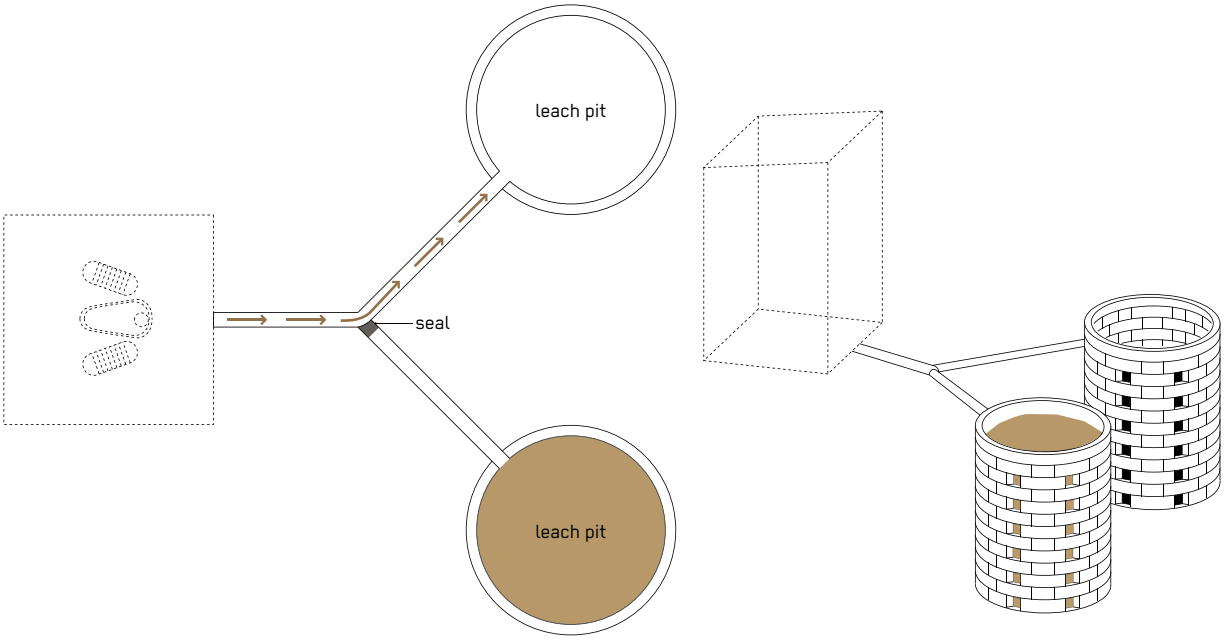
Twin Pits for Pour Flush

Phase of Emergency	Application Level / Scale	Management Level	Objectives / Key Features
Acute Response * Stabilisation ** Recovery	** Household ** Neighbourhood City	** Household ** Shared * Public	Excreta containment, Sludge volume reduction, Extended treatment time
Space Required	**Technical Complexity**	**Inputs**	**Outputs**
** Medium	* Low	● Blackwater, (● Greywater)	● Pit Humus



This technology consists of two alternating pits connected to a Flush Toilet **(U.4)**. The blackwater (and in some cases greywater) is collected in one pit and allowed to slowly infiltrate into the surrounding soil. When full, one pit is closed and with time the solids are sufficiently dewatered and enabling manual removal, while the other pit is used.

While one pit fills, the other full pit settles and dewaters. This technology allows water to be used for toilet flushing and soil or organic material is not added to the pits. As the pit sludge can be quite liquid, the full pits require a longer retention time (two years or more is recommended) to degrade the material before it can be safely emptied. This technology can be a more cost-effective alternative to the Septic Tank **(S.13)** as an on-site water-based technology, where a water flush system is required.

Design Considerations: The pits are usually shallower than Single Pit Latrines **(S.3)** with a depth of around 1–2 m. They should be of an adequate size to accommodate an excreta volume generated over two years. The resting period of the full pit allows the contents to transform into a partially sanitised, soil-like material. It is recommended that the twin pits are constructed at least 1 m apart to minimise cross-contamination between the maturing pit and the one in use. Pits should be constructed over 1 m from any structural foundation as leachate can negatively impact structural supports. The full depth of the pit walls should be lined to prevent collapse and the top 30 cm should be fully mortared to prevent direct infiltration. To ensure that only one of the two pits is used at any time, the idle pipe of the junction connecting to the out-of-use pit should be closed (e.g. with cement or bricks). Alternatively, the Flush Toilet **(U.4)** could also be directly connected to the pit in use by a single straight pipe fixed in place with light mortar and covered with earth.

The risk of failure and misuse is minimised by ensuring that the junction and pipes are not easily accessible.

Materials: If possible, materials should be used that are locally available. The latrine superstructure can be made from local materials, such as bamboo, grass matting, cloth or wood, plastic or metal sheeting (though this often heats up the interior). The pit lining can be made of concrete or bricks among other materials. Moreover, piping is needed as is a technique of sealing the out-of-use pit, as described above. As this is a flush based technology, a reliable water supply for flushing is required.

Applicability: Twin Pits for Pour Flush are appropriate for areas where it is not possible to continuously build new pit latrines or regular desludging might be an issue and where there is water available and desired for flushing. It is recommended not to concentrate pits in a small area as the soil may not have sufficient capacity to absorb the liquid and the ground could become water-logged (oversaturated). Clay, tightly packed or rocky soils are not appropriate for the use of pour flush pits. This technology is not suitable for areas with a high groundwater table or where frequent flooding occurs. Greywater can be co-managed along with the blackwater in the twin pits, especially if the greywater quantities are relatively small, however this should then be accounted for in dimensioning the pits. The dewatered, solid material is manually emptied from the pits **(C.1)**. This technology is only recommended as a longer-term solution in a stable environment.

Operation and Maintenance: General operation and maintenance (O & M) measures include regular cleaning, routine operational tasks such as checking availability of water, hygiene items, soap and dry cleansing materials, providing advice on proper use, conducting minor repairs and monitoring of pit filling level. As pits are often misused for solid waste disposal, which can complicate pit emptying, awareness raising measures **(X.12)** should be considered. The pits require regular emptying (after the recommended two years' resting time), and care must be taken to ensure that they do not flood during rainy seasons. Emptying is done manually, e.g. using long handled shovels and proper personal protective equipment or emptying can be done with mobile desludging machines **(C.1, C.2)**.

Health and Safety: Twin Pits for Pour Flush need to be equipped with Handwashing Facilities **(U.7)** and proper handwashing with soap after toilet use needs to be addressed as part of hygiene promotion activities **(X.12)**. As with all pit-based systems, groundwater contamination can be an issue and soil properties such as the permeability of the soil and groundwater level should be properly assessed **(X.3)** to limit exposure of water sources to microbial contamination. The Sphere minimum standards on excreta management should be consulted for further guidance. The slab covering the pit should be of a solid and sturdy material, for example from concrete, to prevent people from falling in and prevent animals from entering.

Costs: As the complete depth of the pit should be lined with bricks and the top 30 cm with mortar, the costs for this technology are higher than for Twin Pit Dry Systems, but lower than for other water-based on-site technologies, such as a Septic Tank **(S.13)** or an Anaerobic Baffled Reactor **(S.14)**.

Social Considerations: This is a commonly accepted sanitation option that works best in rural and peri-urban areas, and where people are used to flush toilets. It should reflect local user preferences (sitter vs. squatter, anal cleansing practices, direction, positioning etc.) and should account for the accessibility and safety of all users, including men, women, children, elderly and disabled people **(X.10)**. The potential handing over to beneficiaries and the roles and responsibilities for O & M need to be agreed upon early on and closely linked to respective hygiene promotion activities **(X.12)** to ensure appropriate use and O & M of the facilities.

Strengths and Weaknesses:

- ⊕ Because double pits are used alternately, they can have a long life
- ⊕ Potential for use of stored faecal material as soil conditioner
- ⊕ Flies and odours are significantly reduced (compared to pits without a water seal)
- ⊕ Can be built and repaired with locally available materials

- ⊖ Manual removal of humus is required
- ⊖ Clogging is frequent when bulky cleansing materials are used
- ⊖ Higher risk of groundwater contamination due to more leachate than with waterless systems

→ **References and further reading material for this technology can be found on page 191**