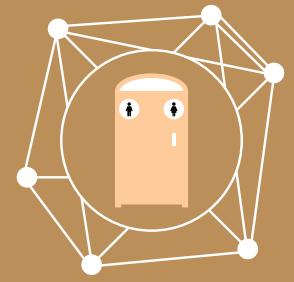


Decision-Making Framework (Technology & Design)



Why is this important

Effective planning and public toilet design is critical to safety, accessibility and long-term usability of public toilets. PT solutions need to be adapted to the local conditions and demands. User needs and what is possible has to guide the toilet design choices as well as maintenance approaches to ensure demand-oriented and functional toilet facilities and services.

2.2 million

(approximately)

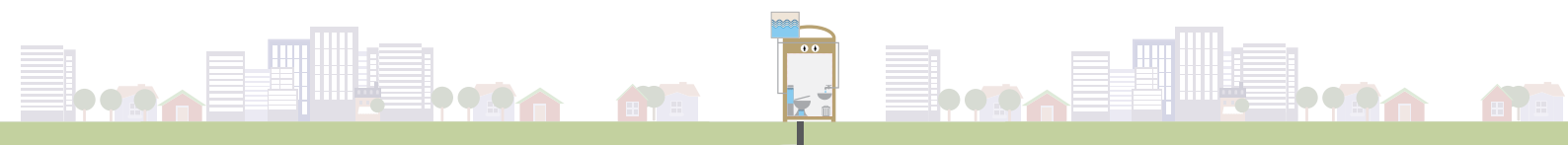
people die every year worldwide due to sanitation related ailments



How to go about it

To establish an effective citywide public toilet system (restoration and new facilities) requires a series of inter-connected decisions to be taken step by step. Once feasible sites have been identified (supply and demand assessment), the technical team carries out a detailed site assessment and prepares technical designs and site plan layouts for each project. It is essential to consider the following:

1. User needs and demands decide the public toilet model
2. Planning and design norms impact design and site plan layouts
3. Local context and site conditions decide the technical model
4. Design and technical model affect the cost of public toilet improvements and construction
5. Clustering according to economic and operational viability affects the project structuring



1. USER NEEDS AND DEMANDS DECIDE THE PUBLIC TOILET MODEL

One critical part of the planning process is who the asset is being designed for (target group) and what the solution aims to address (e.g. urination, defecation). Based on this and the demand (categorized according to footfall), the toilet design and nature of service levels differ accordingly. The public toilet model should be chosen based on:

PT gender-specific facilities & design parameters:

- Accessibility (esp. for women and the disabled)
- Privacy and security (esp. for women)
- Separate toilet blocks for men & women
- Separate showers for men & women
- External signage (visibility, usage)
- Internal signage (foster cleanliness)

User needs and demands decide the public toilet model

| Category | Demand (footfall / daily usage* range per day) | Typical user catchment (target group) | Typical problems observed in the vicinity | Public toilet model based on user category ** |
|----------|--|--|---|---|
| A | > 600 | Near railway station, bus stand, religious places, busy commercial areas | Open urination / defecation | Combined model |
| B | 300 to 600 | Near commercial areas, offices, public spaces, parking areas | Open urination / defecation | Combined / direct model |
| C | < 300 | Near slums, in residential neighbourhoods, low-density commercial areas | Open defecation | Direct model |

* Usage means for urination, toilets, shower

** Direct model caters to single user type (slums, commercial, tourists, general population); Combined model refers to multiple user types within catchment (i.e. slums + commercial + tourist + general population)

2. PLANNING AND DESIGN NORMS IMPACT DESIGN AND SITE PLAN LAYOUTS

The design and site plan layouts (unit computation) need to be in line with the national planning norms (i.e. the National Building Code of India such as CPHEEO,

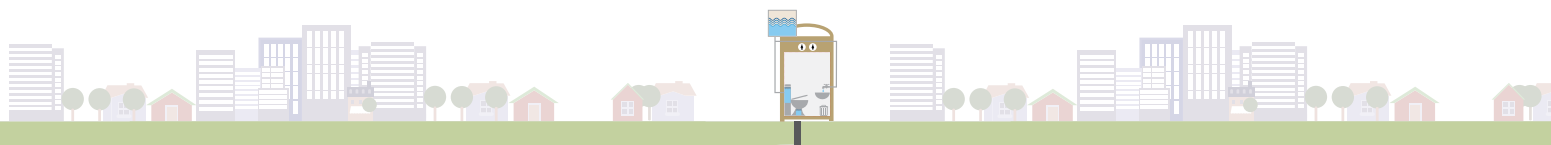
building byelaws; standards such as Bureau of Indian Standards (BIS) – see Table). Moreover, each public toilet needs to provide gender-specific basic facilities (Box). Besides using quality construction material, stringent management and maintenance standards need to be adopted to ensure lasting quality and usability.

Typical planning and design norms for public toilet construction

| Norms | PT Unit | For Male | For Female* | Area |
|--------|--------------|---|--|--|
| CPHEEO | Water closet | ≤ 400 men: 1/100; > 400 men: add 1/250 men or part thereof | ≤ 200 women: 2/10 women; > 200 women: add 1/100 women or part thereof | Sizing for toilet is constant: 1.2 x 1.5 m |
| | Urinals | 1/50 men or part thereof | Nil | Basin opening 450mm/size 0.65 x 0.95m |
| | Shower | No specified norms | No specified norms | 1.2 x 1.5 mt |
| | Ablution tap | 1/water closet | 1/water closet | - |

* Norms assume 2/3 men and 1/3 female ratio

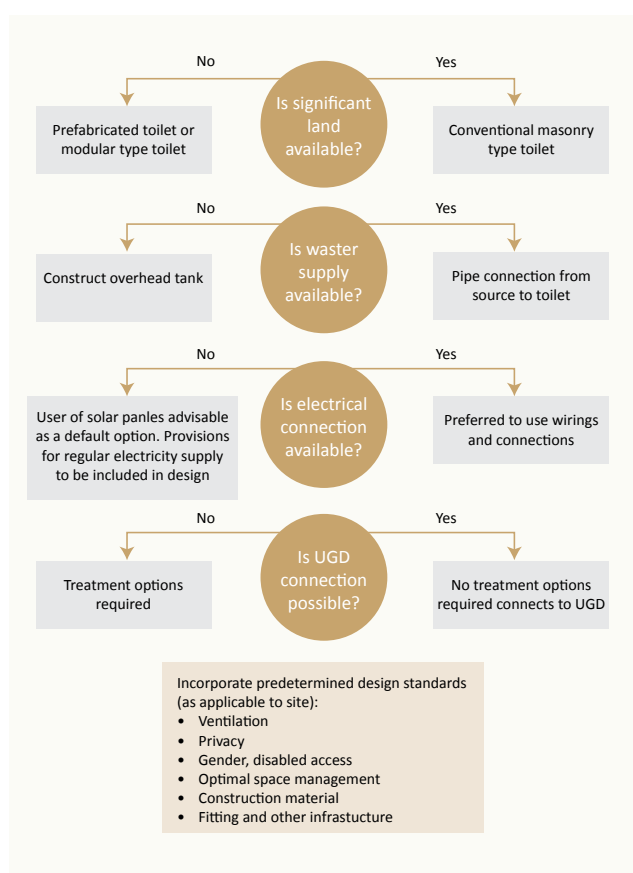
Source: Manual for Sewerage & Sewage Treatment, 2012, CPHEEO, MoUD



3. LOCAL CONTEXT AND SITE CONDITIONS DECIDE THE TECHNICAL MODEL

The decision-making framework for technical model selection (Figure) guides planners and decisions makers in selecting the most suitable technical model based on local conditions such as land availability, water supply, electricity, and UGD connection. For instance, public toilets at the roadside can only be constructed if the road is sufficiently wide for PT users not to interfere with vehicular or pedestrian traffic. In general, locations with the highest support infrastructure (water, wastewater, electricity, drainage, etc.) should be chosen to minimise the toilet project cost.

DECISION MAKING FRAMEWORK: TECHNICAL MODEL SELECTION

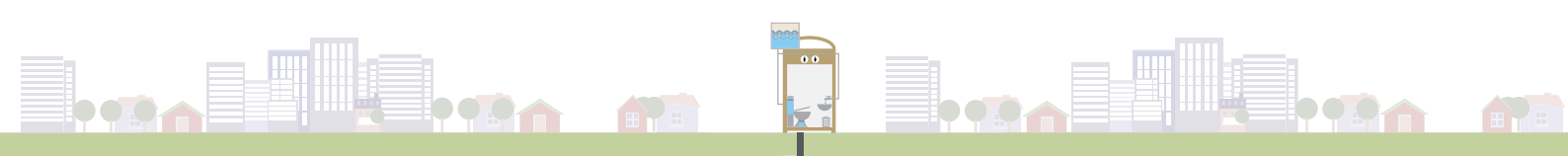


4. DESIGN AND TECHNICAL MODEL AFFECT THE COST OF PUBLIC TOILET IMPROVEMENTS AND CONSTRUCTION

The planning unit and sanitation profile (e.g. location, availability of land, demands and need of the users) decide possible design options. The technical designs and layout determine the cost of each public toilet facility. Industry practices, guidelines and benchmarks should be considered to set design standards and help to estimate the respective cost (capital investment, operations and maintenance (O&M) and marketing). The indicative cost heads and standard annual O&M costs should be tabulated in the Detailed Project Report (DPR). The variations between the different technical public toilet models stem from multiple aspects – material used, treatment options, type of toilet seat and power supply provision – and affect the costs of construction and maintenance (between Rs. 1,000–70,000). Availability and suitability should be the decisive factor. For instance, owing to India’s weather conditions, it is advisable to use reinforced cement structures (as opposed to pre-fabricated facilities).

5. CLUSTERING ACCORDING TO ECONOMIC AND OPERATIONAL VIABILITY AFFECTS THE PROJECT STRUCTURING

To identify the most suitable operation and business model, toilets are grouped (clustered) based on certain parameters (i.e. spatial aspects, revenue, footfalls, user characteristics, extent of rehabilitation required, etc.). The data of individual toilets is aggregated for each cluster to identify the most appropriate cluster approach (Table). The inventory database forms the basis for the cluster analysis. The financial analysis of each cluster shows if the revenue from footfalls is sufficient to cover the costs for operating all toilets within the cluster (advertisement revenue excluded) or if the municipality needs to provide additional funding support. This also helps in defining the bid parameters that need to be included into the contract (like royalty, O&M fee). Cross-subsidizing is an option to ensure viability across all clusters. The clustering options selected during the assessment and planning stage need to be reconfirmed after the business model selection. The size and number of clusters is key to finalizing the procurement strategy.



Possible cluster approaches

| Basis for Clustering | Homogeneity | Diversity |
|--|--|---|
| 1. Spatial Distribution (Geography / Location) | Based on spatial distribution of toilets in the city | Mixing up toilets from zones and wards so as to make equal distance among toilets in all clusters |
| 2. Revenue Potential | High, medium & low potential | Averaging out to ensure cross subsidization |
| 3. Extent of Rehabilitation Required | Clustering based on cost of renovation | |
| 4. Value Clustering | High, medium, low value | Average value across all |

Parameters considered for determining the number of clusters are:

- Number of potential operators in the market
- Capabilities of potential operators
- Ability of municipality to administer and monitor the contracts

Application on the ground

Tirupati: The city finalized the technical designs for the 5 public toilets projects.

Shimla: The city analysed different cluster options to ensure improved public toilet management. The findings from the inventory study, user perception studies and secondary research guided the selection of the public toilet model and formulation of planning and design norms and technical design. The clustering approach helped towards understanding the economics of operating toilets by defining the pros and cons, risks

and financial viability of the different toilet types and cluster options as well as choosing the correct business model. The city shortlisted three cluster options (revenue potential based clustering – high, medium, low). Each has different qualification criteria as per the respective operational and business models, to help select the most suitable operator for each Renovate, Operate, Maintain, Transfer (ROMT) or O&M contract for clusters 1 & 2 (high & medium footfall); Community-based model for Cluster 3 (low footfall).

Reference documents

- *Universal service standards and norms along the pillars for public toilet management*
- *Pillars for public toilet management*
- *Various cluster approaches*
- *Basic facilities and design parameter*
- *Decision-making framework for technical model selection*
- *Design approaches, construction costs for various technical models of public and community toilets in India*
- *Typical cost heads for public toilets (CAPEX and OMEX)*
- *Comparison of the three shortlisted clustering approaches in Shimla*

Reference documents are available on the website www.publicsanitation.org

For more information contact

Dirk Walther
Project Director
Support to the National Urban Sanitation Policy Programme – II

E: dirk.walther@giz.de
I: www.giz.de/India
www.publicsanitation.org
www.urbansanitation.org

