A Guide to Better Public Toilet Design and Maintenance

A Publication by the Restroom Association (Singapore)
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFINITION OF “A WELL DESIGNED TOILET”</td>
<td>2</td>
</tr>
<tr>
<td>I) DESIGN</td>
<td></td>
</tr>
<tr>
<td>1.0 Introduction</td>
<td>3</td>
</tr>
<tr>
<td>1.1 Layout</td>
<td>3</td>
</tr>
<tr>
<td>1.2 Lighting</td>
<td>5</td>
</tr>
<tr>
<td>1.3 Materials</td>
<td>6</td>
</tr>
<tr>
<td>1.4 Urinals</td>
<td>8</td>
</tr>
<tr>
<td>1.5 Water Closets (WCs)</td>
<td>9</td>
</tr>
<tr>
<td>1.6 Wash Basins</td>
<td>11</td>
</tr>
<tr>
<td>1.7 Provision of Facilities</td>
<td>12</td>
</tr>
<tr>
<td>1.8 Special Needs and User-Friendly Features</td>
<td>15</td>
</tr>
<tr>
<td>1.9 Installation Standards</td>
<td>16</td>
</tr>
<tr>
<td>1.10 Ventilation System</td>
<td>17</td>
</tr>
<tr>
<td>1.11 Plumbing and Sewerage System</td>
<td>19</td>
</tr>
<tr>
<td>1.12 Looscaping</td>
<td>20</td>
</tr>
<tr>
<td>1.13 Security and Vandalism Measures</td>
<td>21</td>
</tr>
<tr>
<td>II) MAINTENANCE</td>
<td></td>
</tr>
<tr>
<td>2.1 Sequence of Cleaning</td>
<td>23</td>
</tr>
<tr>
<td>2.2 Scheduled Cleaning</td>
<td>24</td>
</tr>
<tr>
<td>2.3 Timing and Frequency of Cleaning</td>
<td>24</td>
</tr>
<tr>
<td>2.4 Basic Equipment and Supplies</td>
<td>25</td>
</tr>
<tr>
<td>2.5 Correct Use of Cleaning Agents</td>
<td>25</td>
</tr>
<tr>
<td>2.6 Green Cleaning Agents</td>
<td>25</td>
</tr>
<tr>
<td>2.7 Mechanical Ventilation System</td>
<td>27</td>
</tr>
<tr>
<td>2.8 Training</td>
<td>27</td>
</tr>
<tr>
<td>2.9 Selecting a Cleaning Contractor</td>
<td>28</td>
</tr>
<tr>
<td>2.10 Performance-Based Contracts</td>
<td>28</td>
</tr>
<tr>
<td>2.11 Coating Technology for Ease of Cleaning</td>
<td>29</td>
</tr>
<tr>
<td>2.12 NEA’s Enhanced Clean Mark Accreditation Scheme</td>
<td>29</td>
</tr>
<tr>
<td>III) USER EDUCATION</td>
<td></td>
</tr>
<tr>
<td>3.1 Influencing Good User Behaviour</td>
<td>30</td>
</tr>
<tr>
<td>3.2 Toilet Educational Materials</td>
<td>31</td>
</tr>
<tr>
<td>3.3 Public Outreach</td>
<td>33</td>
</tr>
<tr>
<td>ILLUSTRATIONS</td>
<td>35–50</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>51–64</td>
</tr>
<tr>
<td>SUGGESTED LAYOUT OF PUBLIC TOILETS</td>
<td>65–68</td>
</tr>
<tr>
<td>DO’S AND DON’TS IN DESIGNING TOILETS</td>
<td>69–77</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>78</td>
</tr>
</tbody>
</table>
Definition of “A Well Designed Toilet”

Anyone, who has ever been in an overcrowded or uncomfortable public toilet, will value a good toilet design. The usual demands placed on a high-profile, high traffic and heavily used facility requires extra thoughts for each process. A well-designed public toilet has to be:

(a) Clean and dry
(b) Well ventilated
(c) Easy to maintain
(d) Carefully planned layout
(e) Friendly to persons with disabilities and special needs

There are various types of toilets:

1. Public toilets provided by shopping centres, supermarkets, wet markets, eating establishments, food centres, bars, nightclubs, conference halls, cinemas, theatres, parks, tourist sites, public resorts, piers, bus terminals, MRT stations, stadiums, public swimming pools and petrol stations. Use of these facilities is generally open to any member of the public or restricted to the patrons of the owner of the facility.

2. Private toilets for staff in offices, factories or occupants of buildings where the use is restricted to patrons of the service provider or by the building management.

3. Private Residences (This is beyond the scope of this guidebook)

Public toilets are places where one is obliged to ease oneself in unfamiliar surroundings among the strangers of the same sex. Therefore, the fundamental principles of design of toilets include psychological studies and not just physical clearances and space requirement. While the NEA's Code of Practice on Environmental Health (COPEH) stipulates the minimum basic design criteria to address public health concerns, this Guide covers some of the best practices and good examples of toilet design that look beyond public health concerns such as user convenience and satisfaction.
I  Design

1.0  Introduction

A number of different activity spaces are shown in the diagram (See Illustration 1): space occupied by the appliances itself, additional space required by the user and further space for their own belongings or circulation within the toilets. In many cases, these latter spaces may overlap on occasion. Common sense will dictate when this is appropriate and when it is not.

Placing the appliances in order of use simplifies the circulation and reduces the distance travelled by the user. Using sensor-operated appliances should encourage hygiene.

It is difficult and costly to insulate the toilets acoustically and this problem can be resolved by planning isolation as much as possible.

No unsupervised installation can prevent vandalism. Even with the most vandal-resistant appliances, an unsupervised facility will eventually become sub-standard. In most cases, facility engineers and cleaning attendants play an important role, which will result in well-maintained toilets. However, all designs should allow for individual items to be replaced. Pipe work, traps and electrical supplies should be concealed for aesthetic and hygiene reasons.

1.1  Layout

Single entrance/exit plans work satisfactorily provided the path of the users do not cross each other and the main entrance is wide enough. Dispensing with the main entrance door to the public toilet not only helps to improve the ventilation within the toilet but also minimizes hand contact for hygiene reasons (See Illustration 2).

The main entrance shall preferably have no door, and the cubicles, urinals and mirrors shall be away from the line of sight from the main entrance. For example, the
door can be replaced by offset entrance maze which blocks the view yet allows easier, hands-free access.

For installation of main entrance without doors, there are several screening arrangements showing the visibility from outside in each case (See Illustration 3). Consideration should be given to the positioning of the mirrors and to the gaps created by the hinges. For example, the access entrance to male public toilets should not open directly to the urinal area. Avoid entrances opening onto a wall surface with the mirror reflecting the urinals. (See Illustration 4)

Public toilets should be designed to minimise hand contact as far as possible for hygienic reasons. Electronic products for toilets such as flush valves and faucets require minimum maintenance but offer enhanced operations that promote sanitation and perceived cleanliness because of hands-free operation.

Location of accessible toilets should not be too remote from the main traffic area to avoid long travel distance. It should be easily accessible for those with urgency for the users. Directional signs leading to such toilets should meet the requirements specified in Building and Construction Authority's (BCA) Code on Accessibility in the Built Environment (See Illustration 5). Visit BCA's website at www.bca.gov.sg for the latest Code.

Clear signage should be designated for each gender of required public toilet facilities. The location of the signs should be near the entrance to each toilet facility and clearly displayed at noticeable locations in main traffic passageways to direct the public to the toilets. The design of signage should be of a commonly recognized female and/or male figure in dark colour contrasted on a light background. Clear signage should be displayed within the toilet indicating the name of cleaning attendant and/or cleaning company and scheduled toilet cleaning time(s). Signage should be easily seen and distinguished by persons with visual disabilities and the aged. Fancy signages using “Queen” and “King” or “Hat”, “High-heel shoes” are confusing, and are thus not encouraged. Clear signage should also be displayed to help toilet users report faulty water and sanitary fittings and water leakage. Such
signage shall contain the name and contact details of the toilet management to whom the user can report for quick remedial action.

The ratio of fittings in male and female toilets shall be 3:5, for example, 1 WC and 2 Urinals for male: 5 WC.s for female which is in accordance to the NEA’s COPEH.

As far as possible, fixtures such as urinals and WC.s should be fitted back-to-back with common pipe ducts in between.

All public toilets should be mechanically ventilated. Small public toilets should be fitted with an exhaust fan as minimum.

### 1.2 Lighting

A well-designed lighting system will save electrical energy and improve the appearance of the toilet. Poorly designed fixtures with discoloured diffusers go a long way to make a toilet dingy. Dark and shadowy, off-coloured lighting can create the impression that a toilet is not clean.

Natural lighting can be used to help create a softer, friendlier environment. Harsh lighting can create a cold and unwelcoming air while being inappropriate for the tasks being performed. It can also highlight hard-to-clean areas. Thoughtful selection of fixtures and lamps coupled with careful placement is essential (Refer to Illustration 6 and 7 for examples).

All public toilets should be provided with warm-colour lighting for general lighting as well as down lights above the wash basin/mirror (Refer to Illustration 8 for examples). According to the NEA’s COPEH, the minimum lighting level shall be 300 lux to ensure that areas with water closets, wash basins and urinals are sufficiently illuminated. This minimum lighting level will facilitate thorough cleaning of water closets, wash basins and urinals.

Warm-colour lighting aids in creating a better ambience in the toilets, which in turn
encourages more care and responsibility from the users.

The provision of emergency illumination devices is also necessary to illuminate the path of egress for occupants to exit the toilet safely.

Please refer to section 1.13 for more details on security and vandalism measures on lighting.

1.3 Materials

Materials used should be durable and resistant to vandalism and neglect. Applied finishes such as paint should be avoided. For all wall finishes, it shall be of materials which are impervious, durable such as ceramic tiles and phenolic panels etc which can facilitate cleaning and resource conservation (such as minimising the use of water and cleaning agents). This also applies to floors, which shall be constructed of waterproof non slip surfaces like ceramic tiles, natural stone, homogeneous tiles, terrazzo or other impervious materials, so as to facilitate cleaning and resource conservation.

Examples of good materials: -

(a) Floor
   Non-slip ceramic tiles, natural stone, homogeneous tiles, terrazzo.

(b) Wall
   Ceramic tiles, natural stone, homogeneous tiles, stainless steel, enamelled steel panels, glass block, aluminium panels, phenolic cladding.

(c) Ceiling
   Mineral fibre board, fibrous plaster board, Aluminium panels or strips

Carefully selected and durable materials reduce the need for maintenance and prevent misuse. It is highly desirable that painted finishes are avoided, together with any materials, which are affected by moisture or corrosion (e.g. woodchip products and ferrous metals).
Floor finishes are available in a wide variety of materials. When selecting a finish, it is important to note that the material supports the image being presented. The finishes must be sufficiently durable to withstand the anticipated traffic levels and the toilet-cleaning frequency should also be sufficient to keep the floor looking well maintained and clean.

Non-slip homogeneous tiles are often selected because they are durable and are relatively easy to clean. The walls should be tiled, allowing the cleaning attendants to sponge down the walls and floors thoroughly with little difficulty. Another alternative is to use ceramic tiles or wall cladding.

Wall and floor tiles of large surface areas are encouraged for easy maintenance. The tile size should be at least 100mm by 200mm. Alternatively, any of the panels listed above could also be installed at the walls.

Walls within 610mm of urinals and water closets should have a smooth, hard, non-absorbent surface to a height of 1219mm above the floor, and except for structural elements, the type of materials used in such walls should be resistant to moisture. Building codes would need to be considered. All toilets should have moisture impervious cleanable surface regardless of building code requirements.

The most common type of ceiling finishes includes calcium silicate board and suspended ceiling tiles. If there is piping above the ceiling, for example, suspended tiles will permit easy access for maintenance and are more easily repaired in the event of spot damage. Calcium silicate board may be better suited for applications where access above the ceiling is not required. When the time comes for renewal of ceiling finishes, it is far less expensive to repaint calcium silicate board than to replace ceiling tile.

Use colours to brighten the toilet, create interest, and produce a conducive environment.

Colour, achieved with materials and lighting, is one of the vital ingredients in creating
Ambience. It can be part of the tile or stone finishes, or added to the applied finishes such as the enamelling on steel or aluminium. If paint is to be used, it should be restricted to areas that are out of reach, e.g. ceilings.

Please refer to section 1.13 for more details on security and vandalism measures.

1.4 Urinals

All urinals shall be fitted with a sensor-operated flush valve coupled with manual override feature. A urinal sensor-operated flush valve is a valve with an electronic control device that is automatically actuated to supply a predetermined quantity of not more than 1.5 litres of water per flush after each use.

A urinal manual override is a built-in feature in the urinal sensor-operated flush valve to allow the user to manually actuate an immediate flushing of the urinal by pressing a button. The sensor and the manual override will not function in the event of a power supply failure. When the override button is used, the manual override feature overrides the sensor operation and discharges only a preset volume of water (not more than 1.5 litres of water per flush) even if the button continues to be held actuated. No second flush shall be activated when the user leaves the urinal.

Individually wall-hung urinal units shall be at least 300mm wide and the lip of the collection area shall project from the wall by at least 300mm.

A urinal should not be set closer than 450mm from its centre to any side wall, partition, vanity or other obstruction, or closer than 900mm centre-to-centre between adjacent fixtures. There should be at least a 900mm clearance in front of the urinal to any wall, fixture or door. (See Appendix I). Urinals should be separated by modesty boards of not less than 300mm x 1800mm (Height) to act as a visual barrier between urinals. The modesty boards should be high enough to block the view of other users. However, it should not extend right down to the floor as this makes cleaning considerably harder. The presence of modesty boards will prevent shy users from using the WCs and wetting the toilet seat. (See Illustration 9 and 10).
Full-length urinals (See Illustration 9) should be installed to cater for children’s use. If 2 or more non-full length urinals are installed, one urinal should be installed at child’s height.

As a further enhancement to keep the urinal areas dry, scupper drains or stainless steel grating over the drainage could be installed below the urinal bowls. (See Illustration 11). Handrails or grab bars provided for at least one urinal. The scupper drain/ stainless steel grating over drainage shall be placed along the wall beneath the urinals with a maximum width of not more than 150 mm.

A waterless urinal is a urinal made of urine repellent vitreous china or acrylic and requires no water (i.e. water free) for its operation. The fixture’s drain outlet includes an immiscible liquid sealant that floats on top of the urine layer. This combination seal blocks out sewer gases and urine odours. Waterless urinals of mechanical cartridge (membrane or sealant) and microbial types are also included. Where a waterless urinal is installed, it shall be maintained in accordance with the manufacturer’s instructions and not cause any odour nuisance. Only waterless urinals registered under PUB’s Mandatory Water Efficiency Labelling Scheme shall be installed. Visit the PUB’s website at www.pub.gov.sg/wels/ for more details

Litterbins (See Illustration 12) with covers operated without hand contact e.g. foot pedal or electronic motion sensor devices should also be provided near urinals for users who need to wash and clean up after urinating so as to reduce littering in urinals.

1.5 Water Closets (WCs)

Pedestal (sitting) type WCs shall preferably be wall hung, without leg support, so as to facilitate cleaning. Installation of squatting type WC pans in all cubicles is discouraged so as to cater to the needs of various demographic groups and an ageing population. WCs shall be fitted with a sensor-operated flush valve and coupled with manual by-pass and manual override.
According to the NEA’s COPEH, a WC sensor-operated flush valve is a valve with an electronic control device that is automatically actuated to supply a predetermined quantity of not more than 4.5 litres of water per flush after each use. A WC manual override cum by-pass is a built-in feature in the WC sensor-operated flush valve to allow the user to manually actuate an immediate flushing of the WC by pressing a button. The sensor and the manual override will not function in the event of a power supply failure. The manual by-pass feature will enable the flush valve to continue to function manually in the event of a power supply failure. When the override cum by-pass button is used, the manual override and by-pass features override the sensor operation and discharge only a preset volume of water (not more than 4.5 litres of water per flush) even if the button continues to be held actuated. No second flush shall be activated when the user leaves the WC.

A WC should not be set closer than 450mm from its centre to any side wall, partition, vanity or other obstruction. There should be at least a 900mm clearance in front of the WC to any wall, fixture or door. The shape of WCs should be of the elongated type and equipped with seats of the elongated type. Seats should be constructed of smooth, non-absorbent material. All seats should be of the hinged open front type. Integral seats should be of the same material as the fixture. Seats should be sized properly for the WC bowl type. It is encouraged for WC to be installed without the toilet lids if they do not serve any intended purpose.

If a squatting WC is to be installed; only one should be installed in the cubicle furthest from the main entrance. For cubicles where a squatting WC is provided, grab bars shall preferably be installed. The cubicle should be kerbed such that water will not flow out of the boundary of the cubicle and the cubicle floor shall be properly graded towards the gully trap within the cubicle.

According to the NEA’s COPEH, WC cubicles shall be at least 900mm (width) x 1500mm (length). Cubicles should be provided with easily closable free-swinging doors. Doors should be fitted with latches, sliding dead-bolts or other similar locking devices. While door locks should be accessible from the inside only, authorised outside key access may be necessary in emergencies or to take an out-of-order
cubicle offline. Doors and cubicle partitions should be tightly fitted so as to avoid gaps and openings. Cubicle partitions shall be of rigid design and wall or ceiling hung, where practical, without leg support for easy cleaning of the floor. Wherever possible, all such cubicle partitions should extend to within 50mm in from the floor. Partitions between cubicles should extend to at least 2134 mm above the floor level.

A ledge or foldable shelf should be installed in the cubicles for putting personal items. However, the positioning of the ledge or foldable shelf should not be out of view from the user so as to prevent theft of personal items. Refer to 1.13 Security and Vandalism Measures for more details.

1.6 Wash Basins

Wash basins should be substantial in size. The basins should have a minimum size of 500mm in length and 400mm in width.

A wash basin should not be set closer than 450 mm from its centre to any side wall, partition, vanity or other obstruction, or closer than 900 mm centre-to-centre between adjacent fixtures. There should be at least a 900 mm clearance in front of the wash basin to any wall, fixture or door. (See Appendix II)

All wash basins should be installed into vanity tops, and located beneath the vanity as shown in Appendix II and Illustration 13. Vanity tops should have backsplash and apron edges as shown in Appendix III and Illustration 14.

The use of flat bottom wash basins is not recommended. Such wash basins do not effectively allow dirt and debris to be washed into the drain pipes. Wash basins shall be under-counter. Other designs such as a long basin trough are allowed provided that they can minimise the problem of water spilling over from the basin to the counter. For basins that sit on top of the counter or are stand-alone, these shall be deep enough to prevent water splashing out of the basins when in use.

All wash basin taps shall be self-closing delayed-action mechanical or sensor type
taps. Sensor type taps should be considered not only to ensure better hygiene but also prevent wetting of vanity tops. For requirements on flow rates and timings for taps, please refer to the Public Utilities (Water Supply) Regulations and the Singapore Standard CP 48 – Code of Practice for Water Services. In food retail outlets where toilet facilities are provided, wash basins shall preferably be provided outside the toilet. The flow rate at these basins shall be at least 2 litres per minute without exceeding 6 litres per minute. Such flow rate will effectively allow dirt and debris to be washed into the drain pipes. Where there is more than one wash basin provided, at least one shall be installed at a level to accommodate use by children. Wash basins situated in accessible individual washrooms as prescribed in BCA’s “Code on Accessibility in the Built Environment” shall have either self-closing delayed-action sensor type taps or long lever handle taps. For accessible toilets where the wash basin designated for persons with disabilities is grouped together with wash basins for general use, the wash basin designated for persons with disabilities shall also only have self-closing delayed-action sensor type taps. Please refer to section 1.8 for more details on special needs and user-friendly features.

In order to keep the cubicles dry, the vanity top-cum-wash basins should be installed outside for common use by all users. For high-traffic, wet or vandalism-prone areas such as parks, MRT stations, hawker centres, wet markets and beaches, wash basins should be installed outside the main toilet entrance.

1.7 Provision of Facilities

A one-stop provision (See Illustration 15) of auto sensor tap, auto sensor soap dispenser, litter bin and electronic hand-dryer or paper towel dispenser at wash basin area is strongly recommended to minimise wetting of floors and provide the ease of keeping the toilet clean and dry.

(a) Soap Dispensers
Instead of liquid soap, the use of foam soap, which is less soapy, is recommended to reduce water usage and prevent theft. For hygiene purpose, sensor dispensers should be considered. For every two count of wash basins, one soap dispenser shall
be provided. For a long basin trough, one soap dispenser shall be provided for every two taps. The dispenser shall be positioned at least between every two wash basins or two taps. The dispenser shall have a transparent window to clearly indicate the level of soap in the dispenser to ensure timely refilling.

(b) Litterbins
Litterbins (See Illustration 12) shall be provided directly below or in close proximity (preferably located in front of the wash basins) to the wash basins to minimise tiny bits of litter on the floor left behind by users. A sanitary bin (See Illustration 16) with cover for the disposal of sanitary pads shall be provided in each WC cubicle in female and unisex toilets. Bins shall be operated without hand contact e.g. foot pedal or electronic motion sensor devices.

(c) Electronic Hand-Dryers/Paper Towel Dispensers
Similar to soap dispensers, one electronic hand-dryers or paper towel dispensers shall be provided for every two count of wash basins or taps. The electronic hand-dryer shall be positioned directly above or immediately next to the wash basins. Paper towel dispensers, if provided, are to be placed between every two wash basins. Paper towel dispensers are encouraged as users are more inclined to use it and thus minimise the wetting of floors.

(d) Toilet Paper Dispensers
Installation of double-roll toilet paper dispensers are recommended so that replacing a roll of toilet paper is done only when it fully runs out. Since there is still another fresh roll of toilet paper to ensure sufficient supply, replacement of toilet paper is not needed even when the quantity of the first roll is low. This will help to prevent toilet paper wastage (See Illustration 16). Sturdy toilet paper dispensers will also prevent toilet paper wastage with the reduction of rolling speed.

(e) Toilet Seat Sanitizers/Covers
Liquid toilet seat sanitizers or disposable toilet seat covers should be provided in each WC cubicle not only to ensure better hygiene but also prevent toilet paper wastage as without it, users are more likely to place toilet paper over the seat cover.
(f) Water Tap Points within Cubicles
A water tap point with spring loaded nozzle should be provided in at least one cubicle in the toilet. For pedestal type WC, either a WC integrated with the bidet or the water tap point with the spring loaded nozzle should be provided. Where the spring loaded nozzle is provided, it shall be installed with a check-valve and an anti-vacuum valve to prevent backflow.

Scupper drains with metal grating shall preferably be installed within the cubicle to facilitate the draining off of water. There shall be signage on the cubicle door to indicate the provision of the washing facility in the case where not all cubicles are provided with the washing facility.

(g) Air Fresheners
When automatic air freshener sprays are installed, they shall be directed upwards and away from path of users. Apart from air fresheners to counter odour problem, there are also wall-covering materials available which can efficiently traps and neutralises odours. The material is cleanable, stain resistant and long lasting. Moreover, it can be applied to toilets with wallpaper decorations.

(h) WC / Urinal Sanitizers
The use of cakes, tablets and liquid sanitizers should not interfere with the proper function of the WCs and urinals. It should not be corrosive and should not degrade the surface of the WCs and urinals. The connection of liquid sanitizers to the water supply of the WCs and urinals should not cause contamination of the potable water supply.

(i) Coat Hooks
Double hooks (See Illustration 17) should be affixed behind cubicle doors at a convenient height for all users. The hook should be able to support a minimum of 6.8 kilograms.

(j) Cleaning Attendant’s Sink and Equipment Storage Space
A dedicated sink and tap-point utilized by maintenance personnel to clean public
toilets should be provided within or in close proximity to each toilet block. Where practical, an equipment room should be provided for cleaners to store cleaning equipment.

1.8 Special Needs and User-Friendly Features

The application of Universal Design (UD) is to cater to the needs of various demographic groups and persons with different needs. UD, in the broadest term, is “design for all people”. The Building and Construction Authority (BCA) introduced a UD Guide that provides a more complete set of guidelines for adoption in all building designs. Visit BCA’s website at www.bca.gov.sg for more details on the guide.

For toilets, the provision of the following user-friendly features is strongly recommended.

(a) Accessible Toilet
Where sanitary provisions are to be made for persons with disabilities, such provisions shall be in accordance with the requirements stipulated under BCA’s Code on Accessibility in the Built Environment (See Illustration 18). Visit BCA’s website at www.bca.gov.sg for the latest code.

(b) Toilet for the Ostomates
   i) Ostomates are persons who have had an ostomy, a surgical operation to create an opening in the body for the discharge of body wastes. The facilities are usually installed in accessible toilets. Such facilities for the ostomates are still in the developing process and mostly available at government buildings, airports and train stations in Japan.


(c) Baby Seats
In both male and female toilets, a minimum of one baby seat should be provided in
the WC cubicle. Signage should be displayed on cubicle doors to indicate the presence of a baby seat. (See Illustration 19)

(d) Diaper Changing Stations
Diaper changing stations, benches or tables (See Illustration 20) should be placed in toilets where families may utilize the facility.

(e) Urinals for Children
In female toilet, a minimum of one urinal with modesty board should be provided for male children accompanied by their female parents/guardians.

(f) WCs for Children
In both male and female toilets, a minimum of one WC for children should be provided in the WC cubicle. Alternatively, dual adult and child seat cover (See Illustration 21) can be provided for adult WCs.

(g) Signages for cubicle doors
Signages (See Illustration 22) should be displayed on cubicle doors to indicate sit or squat-type WCs. This facilitates the public users to queue up in front of the cubicle for their preferred type of WCs when the toilet is under heavy usage.

(h) Full-Length Mirrors
Full-length mirrors should be provided for proper grooming.

(i) Waiting Areas
Where practical, seats should be provided at waiting areas but it should not obstruct toilet access.

1.9 Installation Standards

Surface mounting of cables should be avoided and cables should be fully concealed. Sharp corners or edges should be avoided. Covered tiles or PVC strips should be provided along these edges as far as possible. Access panels to pipe ducts should
be located as far as possible in inconspicuous areas. Mirrors should be flush with the wall surface.

According to the NEA’s COPEH, sanitary and water appliances and fittings installed in public toilets shall be of heavy-duty classification and quality and shall be easily-cleaned. Water fittings shall comply with the relevant standards and requirements stipulated by PUB and their installation shall be in accordance with the latest Public Utilities (Water Supply) Regulations and Singapore Standard CP 48 – Code of Practice for Water Services. For water fittings, appliances and products covered under PUB’s Mandatory Water Efficiency Labelling Scheme, only fittings, appliances and products registered under the Scheme shall be installed. The standards and requirements for water fittings stipulated by PUB and fittings, appliances and products registered under PUB’s Mandatory Water Efficiency Labelling Scheme can be found at PUB’s website at www.pub.gov.sg. Where sanitary provisions are to be made for persons with disabilities, such provisions shall also be in accordance with the requirements stipulated in BCA’s “Code on Accessibility in the Built Environment”.

For installation standards of the plumbing system and sewerage system, please refer to section 1.11 for more details.

### 1.10 Ventilation System

Proper ventilation of a public toilet is one of the highest priorities in the design of toilets. An ineffective ventilation system can make a public toilet unbearable, even if it is well designed. An effective ventilation system ensures that vitiated air is quickly extracted, and helps to avoid dampness and subsequent growth of mould on floors and walls. However, the system shall dispel the air directly outdoors without causing any nuisance to neighbouring premises.

(a) Mechanical Ventilation

Where mechanical means are used for ventilation, there should be cross ventilation and the air exchange rate should have a minimum of 15 air changes per hour.
Service access ducts, if fully enclosed, shall be connected to the mechanical ventilation system.

The mechanical ventilation system of exhaust fans and, where applicable, ventilation ducts and grilles should ensure that every part of the toilet is within 3m of the fan inlet or an intake grille, measured horizontally. Preferably, intake grilles should also be provided at low levels near the WCs to enable foul-air to be extracted quickly before diffusing into other areas of the toilet.

Where service access ducts are provided, these should be connected to the toilet exhaust ducts to extract air at a rate of 5 air changes per hour. The make-up air to the service access ducts may be taken through extract grilles installed at low level on the walls between the WC compartments and the access duct. (Refer to Illustration 23 for more examples)

The exhaust air should be discharged to the exterior of the building at a position at least 2 m above the pavement level and at least 5 m from any window or fresh air intake.

Replacement air should be supplied to the toilet to make up for the exhaust air. The replacement air may be taken directly from the exterior, or from adjacent spaces that are permanently air-conditioned or naturally ventilated. The replacement air may be drawn through louvres in the doors, cuttings under the door, or other openings. If replacement air is taken from the exterior, the quantity should be lower than that of the exhaust air so that a lower pressure is created in the toilet, which minimises the possibility of vitiated air entering the adjacent spaces.

Replacement air should preferably be discharged close to the floor level near the wash basins to help keep the floor dry.

Air locks should be incorporated to separate the toilet areas from food consumption or preparation areas.
(b) Natural Ventilation
For natural ventilation, suitable fresh air inlet grilles shall be provided to ensure an air exchange rate of 5 air changes per hour.

Natural ventilation should be achieved through windows, doors, louvers or other openings to the outdoors. Such openings should be accessible and controllable by the building occupants. It should also be securable in the event the toilet is prone to vandalism.

1.11 Plumbing and Sewerage System

All pipe works should be concealed, except for final connections to the fixtures. Pipe work exposed to view should be chrome-plated. The supply lines and fittings for every plumbing fixture should be installed to prevent backflow. Plumbing fixtures should be installed to facilitate access for cleaning both the fixture and the area around the fixture. Fixtures should be set level and in proper alignment with reference to adjacent walls. For proper planning and design of the sanitary and sewerage system, refer to PUB’s website at www.pub.gov.sg for the Code of Practice on Sewerage and Sanitary Works. In addition to the minimum requirements, some good engineering practices in the planning, design and construction of the sanitary and sewerage system are also given in this code.

All potable water service design and plumbing work shall only be carried out by a water service plumber licensed by PUB. Where the work involves the design of a pumping system or storage tank, a professional engineer registered by the Professional Engineers Board, Singapore shall also be engaged for the design and supervision before the licensed water service plumber can proceed with the work. All potable water service design and plumbing work shall comply with the requirements in the Public Utilities Act, the Public Utilities (Water Supply) Regulations and the Singapore Standard CP48 - Code of Practice for Water Services. The list of water service plumbers licensed by PUB can be found at PUB’s website at www.pub.gov.sg.
Water pipes and fittings shall comply with the relevant standards and requirements stipulated by PUB. Flow rates and timings and flush volume requirements for taps, urinals and WCs shall be in accordance with the latest Public Utilities (Water Supply) Regulations and Singapore Standard CP 48 – Code of Practice for Water Services. For water fittings, appliances and products covered under PUB’s Mandatory Water Efficiency Labelling Scheme, only fittings, appliances and products registered under the Scheme with at least a 1-tick water efficiency rating shall be installed. For better water efficiency and to qualify as a Water Efficient Toilet under PUB’s Water Efficient Building Certification Programme, wash basin taps with 3-tick water efficiency rating and other taps, urinals and WCs with at least 2-tick water efficiency rating under the Scheme should be considered. PUB has developed a Handbook on Application for Water Supply to assist developers, architects, professional engineers, licensed plumbers, government departments and statutory boards in their application for water supply. This Handbook together with the standards and requirements for water fittings stipulated by PUB, fittings, appliances and products registered under PUB’s Mandatory Water Efficiency Labelling Scheme and more details on PUB’s Water Efficient Building Certification Programme can be found at PUB’s website at www.pub.gov.sg.

1.12 Looscaping

The ambience of public toilets can be enhanced further by:

(a) Introducing plants which can be easily maintained inside the toilets as well as surrounding the public toilets.

(b) Placing of wall pictures and illuminated with delicate lighting. The pictures or wallpapers should be waterproof (e.g. made of impervious material).

(c) Placing of ornaments or sculptures at the ‘dead’ corners of the toilets.

*Note: For the use of decorations, please refer to section 1.13 Security and Vandalism Measures (a) (ii) for avoiding areas of concealment.*
1.13 Security and Vandalism Measures

(a) Interior

(i) Lighting
Interior lighting should be provided at all times during operational hours when natural lighting is not available. It should also be bright enough to illuminate entrances, exits, washing areas, cubicle spaces and other areas where the public may be accessing. As a security measure, lighting should be directed at areas of concealment or vandalism-prone areas.

(ii) Concealment
Size of decorations such as live or artificial trees, plants, flowers, etc. should not constitute to areas of concealment. Attention should be paid to avoid areas of concealment when designing public toilets comprising architectural elements such as walls, partitions and ledges.

(iii) Graffiti
Wherever possible, surfaces of walls, vanity tops, toilet cubicle partitions and other surfaces in and around all public toilets should use graffiti resistant materials (e.g. materials including spray paints, markers, etc.), graffiti discouraging decoration and coloration schemes.

(iv) Durability
Durable materials should be used for all fixtures, accessories, and surfaces so as to withstand heavy usage, excessive weight, and possible abuse.

(v) Piping
Wherever possible, all interior water supply and drainage piping connected to fixtures such as WCs and wash basins should be concealed to protect against public contact. Durable materials resistant to human impact should be used for all exposed piping. It should be secured with sturdy fasteners, hangers and supports. There shall be no sharp or abrasive surfaces under wash basins and mop sinks.
(vi) Theft Prevention

When a ledge or foldable shelf is installed in the cubicles for putting personal items, it should not be out of view from the user so as to prevent theft of personal items. The most effective anti-theft measure is the installation of higher partitions between cubicles to prevent adjacent users from committing the theft.

(b) Exterior

(i) Lighting

Exterior lighting should be provided at all times during operational hours when natural lighting is not available. It should also be bright enough to illuminate entrances, exits, washing areas, cubicle spaces and other areas where the public may be accessing and prevent trips or falls.

(ii) Graffiti

Exterior surfaces of public toilets should be covered or constructed of durable materials resistant to graffiti (e.g. materials including spray paints, markers, etc.) wherever possible.

(iii) Security

During non-operational hours, toilet entrances and windows should be secured by shutters, locks or dead bolts to discourage vandalism.
II Maintenance

2.1 Sequence of Cleaning

General cleaning should be carried out daily. It should follow a systematic sequence to prevent areas, which have been previously cleaned from becoming wet and soiled again before the cleaning process is completed. A systematic sequence will also prevent lapses in the cleaning works. Supervisors and cleaning attendants shall also ensure that water used for cleaning is used efficiently to prevent water wastage and unnecessary wetting of floors, walls, vanity tops, etc to help keep the toilet dry and clean.

The general cleaning should be divided into spot and thorough cleaning. Spot cleaning refers to the process whereby only specific elements of the washroom are cleaned (i.e. those that are soiled). Thorough cleaning refers to the cleaning of the entire washroom and is usually carried out once a day.

The sequence of thorough cleaning should follow the following sequence (NEA developed a pictorial guide as a quick and easy-to-use guide on the right procedures to follow, the correct cleaning agents and tools to use and the use of the right personal protective equipment for safety reasons. A soft copy of the guide is available on the NEA’s website at www.nea.gov.sg):

(a) Display safety signage before starting work and check for defects
(b) Replenish all consumables
(c) Clean the interior and exterior of toilet bowls and urinals
(d) Clean walls and partitions of cubicles, vanity-top, mirrors, wash-hand basins, soap dispensers and hand-dryers
(e) Empty waste bins and sweep the floor
(f) Damp mop the floor
(g) Conduct final inspection and update work records

An inspection card should be used in the supervising and monitoring of the daily
maintenance of the toilet. This card should be placed at the back of the entrance door to the toilet. A copy of the inspection card is shown in Illustration 24.

If any errors discovered during the inspection can only be rectified by a qualified person such as a plumber, the building management should be notified immediately. For faulty urinals, while waiting for repair works to be carried out, it should first be fully covered with an “Out-of-order” message clearly displayed to alert users. This applies to other faulty sanitary wares and fittings except the WCs. The cubicle door should be locked with an “Out-of-order” message clearly displayed to alert users.

2.2 Scheduled Cleaning

Scheduled cleaning should be carried out periodically on a weekly, fortnightly or monthly basis (different surfaces, wares and fittings require different cleaning periods to maintain their cleanliness).

Scheduled thorough cleaning should be carried out during off-peak hours as practical as possible to avoid inconveniencing the user. The periodic cleaning schedule shown in Appendix IV should be adopted.

2.3 Timing and Frequency of Cleaning

The timing and frequency of cleaning should be determined by the crowd flow. Thorough cleaning of toilets should be carried out during off-peak hours when toilet usage is low. Touch up cleaning should be done more often during peak hours. Frequency of cleaning is usually determined by expectation and standard of maintenance required by the management of the property and also the budget available for the maintenance of toilets.

The frequency of cleaning should vary for different building types. Toilets in shopping centres will require more frequent cleaning than toilets in common areas of condominiums. Appendix V should be used as a guide for different building types.

The management of the property should clearly indicate the timing of cleaning (cleaning schedule) of toilet and display the timing at conspicuous spots at the
toilets’ entrances whereby toilet users may easily view them. An example is appended below.

<table>
<thead>
<tr>
<th>Toilet Operation Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dear Customers</td>
</tr>
<tr>
<td>These toilets will be <strong>closed</strong> for cleaning at the following times:</td>
</tr>
<tr>
<td>9.00AM to 9.30AM</td>
</tr>
<tr>
<td>2.00PM to 2.30PM</td>
</tr>
<tr>
<td>10.30PM to 11.00PM</td>
</tr>
<tr>
<td>We apologize for any inconvenience caused.</td>
</tr>
<tr>
<td>If you have any feedback about our toilets, please approach our staff for assistance.</td>
</tr>
<tr>
<td>Thank you.</td>
</tr>
</tbody>
</table>

2.4 Basic Equipment and Supplies

Different equipment for different joints and corners, as well as different cleaning agents and sanitizers, should be used in the cleaning of different sanitary wares and fittings.

To carry out proper toilet maintenance, cleaning attendants should have the equipment listed in Appendix VI

2.5 Correct Use of Cleaning Agents

Cleaning attendants of public toilets should be trained in the proper usage of specific cleaning agents and equipment for different types of materials and finishes in the toilets, e.g. tiles, mirrors, stainless steel. A recommended list of the appropriate type of cleaning agents for the different types of finish is shown in Appendix VII

2.6 Green Cleaning Agents

The service provider is encouraged to use green cleaning agents to lessen the adverse impact on the environment. The cleaning agents shall be used in accordance to the manufacturers’ recommendations with regards to dilution, application and safety precautions. Please refer to Singapore Environment Council
(SEC) website at www.sec.org.sg/sqls/ for a list of the certified green cleaning agents. Cleaning agents shall comply with the standard and criteria set by SEC, as follows:

(a) The product must not contain any type of hazardous substances (i.e. carcinogenic, allergenic or teratogenic). The service provider shall also comply with the Environmental Protection and Management (Hazardous Substances) Regulations.

(b) The product must be at least 90% biodegradable.

(c) The pH value of the product must not exceed 11.

(d) The product must complete the relevant tests required by SEC for different products and certified by the accredited SAC-SINGLAS (The Singapore Laboratory Accreditation Scheme) Laboratories. Please refer to SAC's website at www.sac-accreditation.gov.sg on the list of accredited laboratories.

(e) The product(s) must be made from at least 30% recycled material.

(f) The product shall not be toxic to humans. A product is considered toxic if any of the following criteria apply:

<table>
<thead>
<tr>
<th>Oral lethal dose 50 (LD50)</th>
<th>&gt;2,000 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation lethal concentration (LC50)</td>
<td>&gt;20 mg/L</td>
</tr>
</tbody>
</table>

(g) The Singapore Green Label shall appear on the product.

(h) The product must have the declaration of manufacturing process (i.e. main processes involved to manufacture the product).
(i) All product/s manufacturing in overseas are required to have an ISO 14001 certification or be in the process of obtaining it (within 2 years) from the manufacturer. Or else company must provide a copy of their management environmental guidelines.

(j) The phosphate as of P205 concentrations of the product must be less than 5% the total weight of the product.

(k) The Volatile organic compounds (VOCs) of the product must be less than 10% the total weight of the product.

2.7 Mechanical Ventilation System

Mechanical ventilation systems should be:

(a) Properly maintained to ensure maximum efficiency and optimal operating conditions.

(b) Checked and serviced on a monthly basis. Cleaning of the systems should also be done weekly via wiping or dusting.

2.8 Training

Washroom cleaning attendants should be properly trained and certified to perform the task well. One such certification is the Environmental Cleaning Workforce Skills Qualifications (WSQ), developed by the Singapore Workforce Development Agency (WDA) in consultation with the cleaning industry and National Environment Agency (NEA). The Environmental Cleaning WSQ comprises three levels of qualifications namely Certificate, Higher Certificate and Advanced Certificate and caters to the training of cleaning crews, stewards and supervisors. Learners can choose to complete a full qualification or an individual module such as “Perform Basic Cleaning of Washrooms”. Visit the WDA’s website at www.wda.gov.sg/wsq for more details on the guide.
Supervisors should be trained with the right knowledge and skills not only to effectively supervise the cleaning attendants but also inspect the cleanliness and functionality of the facilities. The Restroom Association (Singapore) or RAS provides training on such inspections. Training is also provided on the use of portable test kits to inspect and monitor the effectiveness of the cleaning. Visit the RAS’ website at www.toilet.org.sg/projects3_1.html for more details on the guide.

2.9 Selecting a Cleaning Contractor

Where the toilet cleaning services are to be provided by a third-party cleaning company, the Tripartite Advisory on Best Sourcing Practices and accompanying Step-By-Step Guidebook for Service Buyers provides guidance on choosing and managing the cleaning contractor. For example, the contract can specify the expected performance level and maintenance requirements, such as those mentioned above in this section. This encourages the cleaning contractors to focus on service quality, including providing better employment terms to attract and retain trained cleaning attendants to provide good service. Visit the Ministry of Manpower (MOM) website at www.mom.gov.sg/BestSourcing for more details on the guide.

2.10 Performance-Based Contracts

Toilet operators who engage cleaning contractors for toilet cleaning should specify in their contract a performance-based outcome rather than headcount-based outcome. The performance-based contract should also stipulate a requirement for trained cleaning attendants (e.g. WSQ certified)

One of the performance-based outcomes is the participation of the Happy Toilet Programme which serves as an effective gauge on the performance of the cleaning contractors in terms of toilet cleanliness and maintenance. Visit the Restroom Association (Singapore) website at www.toilet.org.sg/projects3_2.html for more details on the guide.
2.11 Coating Technology for Ease of Cleaning

To optimize the use of toilet facilities and enable easier cleaning and maintenance, toilet operators are encouraged to adopt new technology, such as the application of a shield sealant, that provides a layer of coating to prevent moisture, dirt and grim from penetrating the surface of such facilities.

2.12 NEA’s Enhanced Clean Mark Accreditation Scheme

The NEA Clean Mark Accreditation Scheme (previously known as Voluntary Accreditation Scheme) was launched on 21 July 2010. Through the two-tiered Clean Mark Silver and Gold Awards, the scheme recognises companies that deliver high standards of cleaning through the training of workers, use of equipment to improve work processes, and fair employment practices. Since its first launch, the scheme has been enhanced to raise the overall standards and professionalism of the cleaning industry through better employment practices and productivity initiatives, together with a new accreditation requirement on progressive wages.

For cleaning companies, the accreditation scheme provides a benchmark on the desired level of professionalism, gives recognition to companies who take active steps towards providing quality services, and provides favourable employment conditions and avenues for appropriate skills training for workers in cleaning companies. The scheme also allows service buyers to differentiate the quality of the various cleaning services before engaging them.

Buyers of cleaning services who are interested in engaging accredited companies could visit the NEA’s website at www.nea.gov.sg for further information.
III User Education

3.1 Influencing Good User Behaviour

Besides providing the right toilet infrastructure, the sections listed below highlighted some tips on influencing good user behaviour.

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
<th>Ways to Influence Good User Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Lighting</td>
<td>5</td>
<td>Warm-colour lighting creates a better ambience in the toilets which encourages more care and responsibility from the users.</td>
</tr>
<tr>
<td>1.3 Materials</td>
<td>6</td>
<td>Toilets brightened with colours produce an appealing environment for the users.</td>
</tr>
<tr>
<td>1.5 Water Closets</td>
<td>9</td>
<td>Provision of integrated bidet instead of squatted WC pan and hose allows the users to keep the toilets dry.</td>
</tr>
<tr>
<td>1.7 Provision of Facilities</td>
<td>12</td>
<td>A one-stop provision of auto sensor tap, soap dispenser, litter bin and electronic hand-dryer or paper towel dispenser at wash basin area can minimise wetting of floors and provide the ease of keeping the toilet clean and dry.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Provision of liquid toilet seat sanitizers or disposable toilet seat covers to prevent users from using excess toilet paper to cover the toilet seat and littering it on the floor.</td>
</tr>
<tr>
<td>1.12 Looscaping</td>
<td>20</td>
<td>Decorations could enhance the ambience of the toilet and provide a more conducive environment for the users.</td>
</tr>
</tbody>
</table>

Having public education messages in the toilets can also help persuade users to do their part in keeping toilets clean.

In order to be effective in persuading people to do their part, a message has to be attended to assimilated
3.2 Toilet Educational Materials

(a) Message Design
People readily attend to visuals. This makes the use of visuals an important part of the design of the message. Generally, visuals should be

(i) Simple and uncluttered
(ii) Attractive
(iii) Eye-catching

(b) Language Use
The language of public education has to be kept simple. This helps ensure that the message reaches all Singaporeans regardless of their educational level. It also ensures that the message is attended to, understood and remembered for future action.

(i) The reading level (in any of the four official languages) should not be more advanced than that of a Primary Six reader.

(ii) Jargon, big words and long sentences should be avoided. Examples of messages are as follows:
- Keep toilet seat clean and dry
- Check that the toilet is properly flushed thoroughly after use
- Keep the floor clean and dry
- Use hand dryer or hand towels
- Please put litter into bins
- Aim properly
- Use amenities with care, etc.
(iii) Slogans can be very effective because they are short, catchy and easy to remember.

(iv) Subtle humour can be used to deal with the personal and sensitive issues surrounding toilet use. Humour can be successfully tapped through cartoon characterizations of toilet fixtures such as wash basin, toilet bowl and litter bin. An additional benefit of cartoon characters is that they can be used with minimal text, reducing the need for translation to other languages.

(v) As the public may not associate dirty toilets with food hygiene and safety, the messages/pictures should adopt the deterrent approach such as showing the fatal consequences of unhygienic practices. Besides reminding users to practise care and consideration when using public toilets, users are also encouraged to leave the toilet clean, dry and sparkling for the next user.

(c) Message Placement
The usual means of message placement in public toilets are posters and stickers. To maximize the effectiveness of the message, the right medium and manner of display should be selected.

(i) Generally, stickers should be used if:
- The main purpose of user education is to address specific behavioural concerns such as littering, careless aiming or the flicking of water onto the floor
- Subtlety is preferred
- For display, stickers should be:
  ⇒ Made of vinyl material, rather than paper.
  ⇒ Made with adhesive than can be peeled off without leaving unsightly marks.
  ⇒ Placed strategically at the spot where the problem behaviour occurs. For example: on the wall above the urinal – to encourage better aiming; At the wash basin area – to discourage flicking of water onto the floor
(ii) Posters can be used to convey generic messages such as “Help Keep This Toilet Clean, Dry and Sparkling”. Posters should only be used when:
- Displayed in a way that makes them repellent to water e.g. Laminated on both sides or protected by acrylic sheets
- Mounted with non-marking adhesives. Adhesives such as scotch tape and double-sided tape may damage certain types of wall surfaces and should therefore be avoided.

(d) Provision of Educational Materials
The NEA provides free educational posters to be put up at public toilets. To request for the posters, please proceed to the NEA Customer Service Centre for self collection:

NEA Customer Service Centre
Address: 40 Scotts Road
        Environment Building #02-00
        Singapore 228231
Hotline: 1800 CALL NEA
         1800-255 5632

Toilet educational materials can be downloaded from the Public Hygiene Council (PHC) website at www.publichygienecouncil.sg/clean-public-toilets.

Free educational posters on water conservation to be put up at toilets can also be obtained from PUB. Visit the PUB’s website at www.pub.gov.sg for more details.

The Restroom Association (Singapore) or RAS also provides educational posters (see Appendix VIII) with messages on hand, foot and mouth disease (HFMD), health hazards, restroom cleaning attendants and fun facts. Visit the RAS' website at www.toilet.org.sg/resources.html for more details.

3.3 Public Outreach
Besides putting up educational materials, the Restroom Association (Singapore) or RAS provides education programmes and talks for preschools schools, organisations and individuals. An educational game called the LOO (Let’s Observe Ourselves) Whiz is also available on RAS Facebook page at www.facebook.com/RestroomAssociation. Gamers get to experience the demanding work of a restroom cleaning attendant due to poor user behaviour. The purpose of this game is to educate the public to better appreciate the efforts of the restroom attendants by acting responsibly.

The programmes are as follows:

<table>
<thead>
<tr>
<th>Target Groups</th>
<th>Programmes</th>
</tr>
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<tbody>
<tr>
<td>Preschools</td>
<td>Happy Toilet School Education for Preschools (HTSEP)</td>
</tr>
<tr>
<td></td>
<td>URL: <a href="http://www.toilet.org.sg/projects1_1.html">www.toilet.org.sg/projects1_1.html</a></td>
</tr>
<tr>
<td>Primary and Secondary Schools</td>
<td>Sustaining Toilets As Restrooms (STAR) Awards Programme</td>
</tr>
<tr>
<td></td>
<td>URL: <a href="http://www.toilet.org.sg/projects1_2.html">www.toilet.org.sg/projects1_2.html</a></td>
</tr>
<tr>
<td>Organisations and Individuals</td>
<td>Eco-Assessor Programme:</td>
</tr>
<tr>
<td></td>
<td>URL: <a href="http://toilet.org.sg/projects3_1.html">http://toilet.org.sg/projects3_1.html</a></td>
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</tbody>
</table>
Illustration 1: Space Occupied by appliances, wet areas and dry areas
Illustration 2: Off-set entrance maze without doors

Illustration 3: Various Screening arrangements for toilets showing the visibility from external area
Illustration 4: Avoid entrances opening onto a wall surface with the mirror reflecting the urinals
Illustration 5: Directional signage

Illustration 6: Natural Lighting
Illustration 7: Non-suspended PLC downlight, mounted onto ceiling

Illustration 7.1: Suspended fitting for low voltage downlighting and halogen uplighting with the option of twin feeds. All the electrical components are built into the extruded aluminium profile. Finish white, black, yellow, grey and red.
Illustration 8: Use of warm-colour lighting for general lighting

Illustration 9: Wall hung full-length urinals separated by modesty board
Illustration 10: Wall-hung with built-in-sensor urinal

Illustration 11: Adult height and child height urinals
Stainless steel grating over drainage
Illustration 12: Untouchable Square

Conveniently sized receptacle offers maximum flexibility so that it can be used in virtually every area of your facility. No-touch lid funnels trash into container, keeping floor free of debris.
Illustration 13: Under counter wash basin

Illustration 13.1: Under counter wash basin
Illustration 14: Vanity top with back splash and apron edge

Illustration 14.1: Vanity top with back splash and apron edge
Illustration 15: One-stop provision of auto sensor tap, soap dispenser, litter bin and paper towel dispenser or electronic hand-dryer at wash basin area.
Illustration 16: Wall hung WC with double-roll toilet paper dispenser and foot operated sanitary bin

Illustration 17: Double hooks provide users with the convenience of hanging personal belongings such as handbags and any extra clothing
Illustration 18: Accessible Toilet

Illustration 19: Baby Seat
Illustration 20: Diaper changing station (closed)

Illustration 20.1: Diaper changing station (opened)
Illustration 21: Dual adult and child seat cover

Illustration 22: Signages for cubicle doors to indicate sit or squat-type WCs
Illustration 23: Low level mechanical exhaust

Washroom Inspection Card

LOCATION: ________________________________ MONTH: _____

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>Slot</th>
<th>Roof</th>
<th>Ceiling</th>
<th>Light</th>
<th>Shelves</th>
<th>Lock</th>
<th>Window</th>
<th>Floor</th>
<th>Door</th>
<th>Walls</th>
<th>SOIL</th>
<th>SEAT</th>
<th>DEFECTS</th>
<th>CHECKED</th>
<th>REMARKS</th>
</tr>
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Illustration 24: Washroom Inspection Card
APPENDIX I
MULTIPLE URINAL
URINAL IN RIGHT ANGLE
SINGLE URINAL

DOUBLE URINAL
APPENDIX II
APPENDIX II

SINGLE WASH BASIN

DOUBLE WASH BASIN
WASH BASIN IN RIGHT ANGLE
APPENDIX III
TYPICAL VANITY

SECTION
APPENDIX IV, V, VI & VII
### APPENDIX IV

**PERIODIC CLEANING SCHEDULE**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>ACTIVITY</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>Machine scrub to ensure removal of soil from grouting</td>
<td>Fortnightly</td>
</tr>
<tr>
<td>Walls</td>
<td>Hand scrub to ensure removal of soil from grouting</td>
<td>Monthly</td>
</tr>
<tr>
<td>Bins</td>
<td>Hand scrub to ensure removal of soil from grouting</td>
<td>Fortnightly</td>
</tr>
<tr>
<td>Basins</td>
<td>Scrub with scrubbing pad to remove stubborn stains</td>
<td>Weekly</td>
</tr>
<tr>
<td>Bowls/Urinals</td>
<td>Scrub with scrubbing pad to remove stubborn stains</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td>Scrub beneath rim to ensure removal of yellow stains</td>
<td></td>
</tr>
<tr>
<td>Soap Dispensers</td>
<td>Dismantle and check/clear chokes</td>
<td>Weekly</td>
</tr>
<tr>
<td>Exhaust Fans</td>
<td>Wipe clean to remove dust</td>
<td>Weekly</td>
</tr>
</tbody>
</table>

### APPENDIX V

**FREQUENCY OF CLEANING**

<table>
<thead>
<tr>
<th>Location</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Industry Building</td>
<td>once or twice a day</td>
</tr>
<tr>
<td>Condominium</td>
<td>twice a day and increase to 4 times a day during weekend</td>
</tr>
<tr>
<td>Office Building</td>
<td>4 to 5 times a day</td>
</tr>
<tr>
<td>Hotel</td>
<td>6 times a day</td>
</tr>
<tr>
<td>Shopping Centre</td>
<td>6 to 8 times a day</td>
</tr>
<tr>
<td>Hawker Centre</td>
<td>1 to 2 hourly cleaning during non peak hours every 1/2 an hour cleaning during peak hours</td>
</tr>
</tbody>
</table>

**NOTE:**
The above frequencies refer to thorough cleaning once a day and spot cleaning for the remaining "cleans". E.g. the frequency of cleaning toilets in hotel is six times a day. This is equal to one thorough cleaning plus five spot cleanings a day.
### APPENDIX VI

**EQUIPMENT AND SUPPLIES LIST FOR CLEANERS**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Service tray or cart</td>
</tr>
<tr>
<td>2</td>
<td>Premixed glass cleaner (with spray bottle)</td>
</tr>
<tr>
<td>3</td>
<td>Premixed disinfectant cleaner (with spray bottle)</td>
</tr>
<tr>
<td>4</td>
<td>Disinfectant cleaner concentrate</td>
</tr>
<tr>
<td>5</td>
<td>Scouring power</td>
</tr>
<tr>
<td>6</td>
<td>Stainless steel cleaner (if necessary)</td>
</tr>
<tr>
<td>7</td>
<td>Toilet bowl swab and container</td>
</tr>
<tr>
<td>8</td>
<td>Putty knife</td>
</tr>
<tr>
<td>9</td>
<td>Broom</td>
</tr>
<tr>
<td>10</td>
<td>Dust-pan corner brush</td>
</tr>
<tr>
<td>11</td>
<td>Mop/bucket/wringer</td>
</tr>
<tr>
<td>12</td>
<td>Signages such as 'wet floor' and 'closed for cleaning'</td>
</tr>
<tr>
<td>13</td>
<td>Duster (feather/lamb’s wool)</td>
</tr>
<tr>
<td>14</td>
<td>Clean cloth</td>
</tr>
<tr>
<td>15</td>
<td>Paper towels/toilet paper/soap</td>
</tr>
<tr>
<td>16</td>
<td>Gloves</td>
</tr>
</tbody>
</table>

### APPENDIX VII

**CLEANING AGENTS FOR DIFFERENT FINISHES**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wall/Floor (ceramic, granite and marble tiles)</td>
</tr>
<tr>
<td>2</td>
<td>Glass/Mirror</td>
</tr>
<tr>
<td>3</td>
<td>Sanitary Wares</td>
</tr>
<tr>
<td>4</td>
<td>Stainless Steel/Chrome</td>
</tr>
<tr>
<td>5</td>
<td>Plastic/PVC</td>
</tr>
<tr>
<td>6</td>
<td>Toilet Bowls</td>
</tr>
</tbody>
</table>
APPENDIX VIII
Her childhood is at stake.
And you’re the cause of it.

The little angels
Always cheerful and lively
But due to our negligent habits in the toilet
Leaves them vulnerable to bacteria and germs
Viruses particularly hand-foot-mouth disease will make
With no awareness
Their happy childhood might be at stake
Their joyful expressions might vanish
The little angels deserve better, much better

They’re losing their appetite.
And you’re the cause of it.

Earning just $800 a month
They work exceedingly hard for their rice bowls
But due to our negligent habits
They are not enjoying what they slug to keep
Their jobs are courageously tough
Restroom cleaners deserve better, much better
Don’t make them do more than their jobs require
Keep their workplace clean and dry
Have them look forward to their meals

Show a little consideration and responsibility
It makes a big difference

They’re diagnosed with health problems.
And you’re the cause of it.

Turning away from unhygienic and dirty toilets
Some would rather hold their bladder
With much possibilities of having kidney problems
And bladder malfunction
Stop these appalling consequences
These people deserve better, much better
Don’t make their lives difficult
Keep the toilets clean for everyone’s usage

An average person spends 3 years of their lives in a toilet
Have fun the RIGHT way
READY
AIM
RESET
(FLUSH & CLEAN UP)
SUGGESTED LAYOUT OF PUBLIC TOILETS
Holland Road Market Toilet
DO’S AND DON’TS IN DESIGNING TOILETS
DO’S

Use of task lighting, down lighting, colourful tiles and colourful artworks to create ambience.

a. Task Lighting
b. Down Lighting

a. Colourful Artworks

a. Colourful Tiles
Provision of modesty boards; wash basin at child height.
DO'S

Example of features and amenities that should be found in the toilets of coffee shops.

- a. Sensor Flush
- b. Toilet Paper Dispenser
- c. Litter Bin

- a. Soap Dispenser
- b. Back Splash
- c. Wash Basin Rim below Vanity Top
- d. Vanity Top
- e. Apron Edge
- f. Hand Dryer
Correct positioning of soap dispensers, hand dryers and waste bins

a. Soap Dispenser
b. Waste Bin
c. Hand Dryer
Intake grilles at low levels near W.C.s.
DON'TS

Wrong positioning of mirrors and absence of modesty boards.
Absence of vanity top; exposed pipeworks, surface mounting of cables; urinals of inadequate size.

a. Absence of Vanity Tap
b. Exposed Piping
c. Surface Mounting of Cables
DON'TS

Presence of painted surface; exposed piping; no apron edge to vanity top and basin rim projecting above vanity top.

a. Painted Surface
b. Exposed Piping

a. Basin Rim Projecting Above Vanity Top
b. No Apron Edge
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