A Guide to Better Preschool Toilet Design, Maintenance and Education

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Definition of “A Good Preschool Toilet”

Any visitors, especially parents, will value good preschool toilet design that caters to the needs of their children. The usual demands placed on safe, efficient and child-friendly facilities require extra thoughts for each process. Similar to all public toilets, a good preschool toilet has to be:

(a) Clean and dry
(b) Well ventilated
(c) Easy to maintain
(d) Carefully planned layout
(e) Friendly to preschoolers

There are three types of preschool toilets:

1. Toilets for preschoolers
3. Accessible toilets for persons with disabilities (more information can be found in the Building and Construction Authority’s (BCA) Code on Accessibility in the Built Environment at www.bca.gov.sg).

Preschool toilets are places where safety and hygiene are paramount. Therefore, the fundamental principles of its design, maintenance and even education should address both the psychological and physical needs of the preschoolers. The National Environment Agency’s (NEA) Code of Practice on Environmental Health (COPEH) stipulates the minimum basic design criteria to address public health concerns while the BCA’s Code on Accessibility in the Built Environment places greater emphasis on universal design concepts and provisions to benefit a wider spectrum of people. This Guide however covers some of the best practices and good examples of preschool toilet design, maintenance and education. Although preschool toilets are not covered under the NEA’s COPEH, Qualified Persons are strongly encouraged to adopt the guidelines.
I Design

1.0 Introduction

Similar to public toilets, wet and dry areas should be well designated. In this case, wet areas refer to wash basin and shower facility areas while dry areas refer to water closets (WCs) and urinals.

Placing the appliances in order of use reduces the distance travelled by the preschooler. Using sensor-operated appliances should encourage hygiene. However, installation of sensor-operated appliances is discouraged if wastage due to preschoolers playing with the appliances is anticipated. Installation of manual-operated appliances can nurture and promote independence and self-reliance of preschoolers. In either case, education and supervision will be necessary in order to ensure correct use of the facilities.

No unsupervised installation can prevent damage. Even with the most damage-resistant appliances, an unsupervised facility will eventually become sub-standard. In most cases, teachers and cleaning attendants or caretakers 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 safety and hygiene reasons.

1.1 Layout

Single entrance/exit plans work satisfactorily provided the path of the preschoolers do not cross each other and the main entrance is wide enough for at least a preschooler and an accompanying adult to enter the toilet. Dispensing with the main entrance door to the toilet not only helps to improve the ventilation within the toilet but also minimizes hand contact for hygiene reasons (See Illustration 1).

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 2).
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 toilets should not
open directly to the urinal area. Avoid entrances opening onto a wall surface with
the mirror reflecting the urinals. (See Illustration 3)

The 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.
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 4). Visit BCA's website at www.bca.gov.sg for the
latest Code.

Clear signage should be designated for each gender of required 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
preschoolers to the toilets. The design of signage should be of a commonly
recognized female/girl and/or male/boy figure in dark colour contrasted on a light
background. Clear signage should be displayed within the toilet indicating the name
of cleaning attendant/caretaker and/or cleaning company, contact details and
scheduled toilet cleaning time(s). Signage should be easily seen and distinguished
by preschoolers. Fancy signages using “Queen” and “King” or “Hat”, “High-heel
shoes” are confusing, and are thus not encouraged.
The ratio of fittings in male and female toilets shall be 3:5, for example, 1 WC and 2 Urinals for male: 5 WCs for female which is in accordance to the NEA’s COPEH. As far as possible, fixtures such as urinals and WCs should be fitted back-to-back with common pipe ducts in between.

All toilets should be mechanically ventilated. Small 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 5 and 6 for examples).

All toilets should be provided with warm-colour lighting for general lighting as well as down lights above the wash basin/mirror (Refer to Illustration 7 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 preschoolers.

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 1.14 for more details on security 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. Non-slip flooring will help to ensure the safety of preschoolers.

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, enameled 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
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 1.14 for more details on security measures.

1.4 Urinals

All urinals are strongly encouraged to 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, 1 litre and 0.5 litre of water per flush for large, medium and small size urinals respectively 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 preschooler leaves the urinal.

However, installation of sensor-operated urinals is discouraged if wastage due to preschoolers playing with the fixture is anticipated. Installation of manual-operated urinals can nurture and promote independence and self-reliance of preschoolers. In addition, it is essential to educate the preschoolers to always flush after use. Please refer to section 3.3 for more details on education for preschoolers.

All flush controls, manual and/or sensor-operated, should be located at a height of between 500mm to 900mm from the floor as stated in the BCA’s Code on Accessibility in the Built Environment (See Illustration 8)

Individually wall-hung urinal units shall be at least 250mm wide and the lip of the collection area shall project from the wall by at least 250mm. According to the NEA’s COPEH, the urinal units shall be 300mm wide and the lip of the collection area shall also be at least 300m. Taking into account that children are generally smaller in size compared to adults, it may be justified for the smaller size of urinals stipulated in the
guidelines. However, should there be any adult toilets in the preschool, the urinal specifications should follow the ones stated in the COPEH.

A urinal should not be set closer than 350mm from its centre to any side wall, partition, vanity or other obstruction, or closer than 700mm centre-to-centre between adjacent fixtures. There should be at least a 700mm 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 1200mm (Height) to act as a visual barrier between urinals. The modesty boards should be high enough to block the view of other preschoolers. However, it should not extend right down to the floor as this makes cleaning considerably harder. The presence of modesty boards will help to educate preschoolers about protecting their own privacy from a young age. (See Illustration 9 and 10).

Full-length urinals (See Illustration 9) should be installed to cater for preschoolers of all ages. If non-full length urinals are installed, the urinal should be mounted at a height of not more than 400mm (See Illustration 11) from the finished floor area as stated in the BCA’s Code on Accessibility in the Built Environment.

As a further enhancement to keep the urinal areas dry and facilitate cleaning of floors, scupper drains or stainless steel grating over the drainage could be installed below the urinal bowls. (See Illustration 12). 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.

1.5 Water Closets (WCs)

Pedestal (sitting) type WCs should preferably be wall hung, without leg support, so as to facilitate cleaning. All WCs are strongly encouraged to 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.

However, installation of sensor-operated WCs is discouraged if wastage due to preschoolers playing with the fixture is anticipated. Installation of manual-operated WCs can nurture and promote independence and self-reliance of preschoolers. In addition, it is essential to educate the preschoolers to always flush after use. Please refer to section 3.3 for more details on education for preschoolers.

All flush controls, manual and/or sensor-operated, should be located at a height of between 500mm to 900mm from the floor as stated in the BCA’s Code on Accessibility in the Built Environment (See Illustration 8)

A WC should not be set closer than 350mm from its centre to any side wall, partition, vanity or other obstruction. There should be at least a 700mm 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 with the toilet lids for hygiene and safety reasons. The recommended height of the WC seat to the finished floor level is between 250mm to 350mm as stated in the BCA’s Code on Accessibility in the Built Environment (See Illustration 8).

WC cubicles should be at least 700mm (width) x 1300mm (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. Authorised outside key access is necessary as a safety measure during 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 50 mm from the floor. Partitions between cubicles should extend to at least 1400 mm above the floor level.

If there is high likelihood of injuries of preschoolers due to door-slamming incidents, doors should be replaced with shower curtains or folded doors (See Illustration 13) as a safety measure. However, such curtains should be opaque to protect the privacy of preschoolers. They also have to be regularly cleaned to prevent algae and mould as a hygiene measure.

1.6 Showers

Shower facilities shall be installed in accordance with NEA’s and PUB’s requirements as stated in section 1.10. Scupper drains with metal grating shall preferably be installed within the cubicle to facilitate the draining off of water. All shower fittings including water heaters shall be in accordance with PUB’s requirements and SPRING Singapore’s safety standards.
Shower cubicles and doors should adopt the design of WC cubicles and doors with the exception of sizes as follows:

(a) Shower cubicles should be at least 700mm (width) x 1300mm (length) for preschoolers who can shower by themselves. A hand shower should not be set closer than 350mm from its centre to any side wall, partition, vanity or other obstruction. The height of the shower controls should be located at a height of between 500mm to 900mm from the floor.

(b) Shower cubicles should be at least 1000mm (width) x 1500mm (length) for preschoolers who need to be showered by accompanying adults. A hand shower should not be set closer than 500mm from its centre to any side wall, partition, vanity or other obstruction. The height of the shower controls can be located at a height of between 500mm to 900mm from the floor so that the cubicle can also be used by preschoolers who can shower by themselves.

If there is high likelihood of injuries of preschoolers due to door-slamming incidents, doors should be replaced with shower curtains as a safety measure. However, such curtains have to be regularly cleaned to prevent algae and mould as a hygiene measure.

For requirements on flow rates and timings for shower taps, please refer to the Public Utilities (Water Supply) Regulations and the Singapore Standard CP 48 – Code of Practice for Water Services.

1.7 Wash Basins

Wash basins should be substantial in size. The basins should have a minimum size of 400mm in length and 300mm in width.

A wash basin should not be set closer than 350 mm from its centre to any side wall, partition, vanity or other obstruction, or closer than 700mm centre-to-centre between
adjacent fixtures. There should be at least a 700mm clearance in front of the wash basin to any wall, fixture or door. The height of the wash basin should be 550mm, as stated in the BCA’s Code on Accessibility in the Built Environment (See Appendix II)

All wash basins should be installed into vanity tops, and located beneath the vanity as shown in Appendix II and Illustration 14. Vanity tops should have backsplash and apron edges as shown in Appendix III and Illustration 15.

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. However, installation of sensor type taps is discouraged if wastage due to preschoolers playing with the fixture is anticipated. Installation of non sensor type taps can nurture and promote independence and self-reliance of preschoolers. In addition, it is essential to educate the preschoolers to always wash hands after using the toilet, as well as to conserve water. Please refer to section 3.3 for more details on education for preschoolers.

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 and the NEA’s COPEH.

In order to keep the cubicles dry, the vanity top-cum-wash basins should be installed outside for common use by all preschoolers.
1.8 Provision of Facilities

A one-stop provision (See Illustration 16) of tap, soap dispenser, litter bin and 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.

(c) 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.

(d) Litterbins
Litterbins (See Illustration 17) 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. Bins shall be operated without hand contact e.g. foot pedal or electronic motion sensor devices.

(e) 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 at a height of 500mm to 900mm from the floor. Paper towel dispensers, if provided, are to be placed between every two wash basins. Paper towel dispensers are encouraged to prevent preschoolers playing with the electronic hand-dryer.

(f) 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 18). Sturdy toilet paper dispensers will also prevent toilet paper wastage with the reduction of rolling speed.

(g) Toilet Seat Sanitisers/Covers
Liquid toilet seat sanitisers or disposable toilet seat covers should be provided in each WC cubicle to ensure better hygiene. However, installation of the sanitisers is discouraged if there is a safety concern of preschoolers playing with the sanitisers.

(h) Air Fresheners
When automatic air freshener sprays are installed, they shall be directed upwards and away from path of both adults and preschoolers. Apart from air fresheners to counter odour problem, there are also other effective products such as ozone air/water solutions system and wall-covering materials available which can efficiently traps and neutralises odours.

(i) WC / Urinal Sanitisers
The use of liquid sanitisers instead of cakes and tablets is strongly encouraged as a safety measure and it should not interfere with the proper function of the WCs and urinals. It should not be corrosive and should not degrade or stain the surface of the WCs and urinals. The connection of liquid sanitisers to the water supply of the WCs and urinals should not cause contamination of the potable water supply.

(j) Coat Hooks
As a safety measure, hooks should have no projection (See Illustration 19) and affix behind cubicle doors at a height of about 500mm. If doors are not available, towel bars affixed to the wall or cubicle should be provided.

(k) Cleaning Attendant’s Sink and Equipment Storage Space
A dedicated sink and tap-point utilized by maintenance personnel to clean toilets should be provided within or in close proximity to each toilet block. For safety precaution, an equipment room or proper storage area should be provided for cleaning attendants to store cleaning equipment and detergents.
1.9 Accessible Toilet

Where there are clusters of toilets for adults in preschool, accessible toilets (See Illustration 20) have to be provided in accordance with BCA’s Code on Accessibility in the Built Environment. Please refer to BCA’s website at www.bca.gov.sg for the latest code.

1.10 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 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 1.12 for more details.
1.11 Ventilation System

Proper ventilation is one of the highest priorities in the design of toilets. An ineffective ventilation system can make the 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 21 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 preschool occupants.

1.12 Plumbing and Sewerage System

All water supply pipe works should be concealed, except for final connections to the fixtures. Water 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/general/code 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/general/watersupply/LicensedPlumbers.

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/conserve/CommercialOperatorsAndOther/WEB.

1.13 Looscaping

The ambience of the toilets can be enhanced further by:
(a) Introducing plants which can be easily maintained inside the toilets as well as surrounding the toilets. If there is a risk of mosquito breeding, it should be replaced with artificial plants.

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

*Note: For the use of decorations, please refer to section 1.14 Security and Vandalism Measures (a) (ii) for avoiding areas of concealment.*

### 1.14 Security 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 preschool occupants may be accessing. As a security measure, lighting should be directed at areas of concealment.

(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 toilets comprising architectural elements such as walls, partitions and ledges.

(iii) Durability

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

(iv) 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 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.

(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 preschool occupants may be accessing and prevent trips or falls.

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. Centre 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/paper towel dispensers
(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 22.

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 everyone. 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 everyone.

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 not be less than 2 to 3 times a day.

2.4 Basic Equipment and Supplies

Different equipment for different joints and corners, as well as different cleaning agents and sanitisers, 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 V.

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 VI.

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/sgls/ 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>
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<tr>
<th>Oral lethal dose 50 (LD50)</th>
<th>&gt;2,000 mg/kg</th>
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<tr>
<td>Inhalation lethal concentration</td>
<td>&gt;20 mg/L</td>
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</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 P2 05 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

The Restroom Association (Singapore) or RAS has introduced a customised double-certificate course that will equip cleaning attendants with the WSQ and RAS certification. Visit the RAS’ website at [http://toilet.org.sg/projects3_1.html#OJT](http://toilet.org.sg/projects3_1.html#OJT) for more details.

Preschool teachers and staff 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](http://www.toilet.org.sg/projects3_1.html) for more details.

To educate cleaning attendants in the maintenance of the toilet for better water use efficiency and to prevent water wastage, the following guidelines should be adhere to:

**For Cleaning Attendants**

- Use mop and pail for toilet cleaning. Use a hose only when thorough washing is required. When a hose is used, it must be equipped with a spring loaded nozzle to conserve water.
- Do not let water run to waste.
- Do not flush things down the toilet to dispose of them. To prevent unnecessary choking, flushing and wasting of water, throw away tissues and other bathroom waste in the garbage can.
- Keep a lookout for leaks and faulty water fittings such as taps, flushing cisterns and flush valves and report water leakages and faulty water fittings to management immediately.

**For Centre Supervisors / Preschool Operators**

- Hoses must be fitted with a spring loaded nozzle to ensure water supply is cut
off immediately after end of use

- Display fault reporting posters/notices in the toilets to inform users of the number to call if any leaks or faulty fittings are spotted to facilitate prompt rectification

- Conduct regular checks for leaks and faulty water fittings

- Isolate water supply to faulty water fittings immediately to prevent water wastage and follow-up to repair any leaks or rectify/replace faulty fittings immediately

- Supervise cleaning attendants closely to prevent water wastages during toilet washing

- Install water meter to monitor and manage water usage for washing

- Provide shoe mattress and dirt pool washers at toilet entrances to minimise dirt collection on toilet floors

- Check sensing distance of sensor operated flush valves as shown in Appendix VII to prevent unwanted or repeated flushing and water wastage

- Should the sensing distance be different from PUB’s requirements above or if there are unwanted or repeated flushing, please contact the authorised supplier for servicing of the flush valves. Alternatively, you can refer to the manufacturer’s instruction manual to adjust the timing of flow and sensing distance. A copy of the instruction manual can be obtained from the supplier of the flush valves. An example of how to adjust the sensing distance and flush timing is shown in Appendix VIII.

- Regularly check and ensure that the timing and flow rates at the various water fittings do not exceed the maximum allowable given in the table below. For better and enhanced water efficiency, the water efficient flow rates shown in Appendix IX are strongly encouraged.

- Install water fittings with two or more ticks under the Water Efficiency Labelling Scheme (WELS) for better and enhanced water efficiency. A list of water fittings with 2 or more ticks water efficiency rating under WELS can be found at PUB’s website at [www.pub.gov/WELS](http://www.pub.gov/WELS).
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](http://www.mom.gov.sg/BestSourcing) for more details on the guide.

2.10 Performance-Based Contracts

Preschool 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](http://www.toilet.org.sg/projects3_2.html) for more details.

2.11 Coating Technology for Ease of Cleaning

To optimize the use of toilet facilities and enable easier cleaning and maintenance, preschool 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 Education

3.1 Toilet Educational Materials

(a) Message Design

Use of visuals is an important part of message design. Generally, visuals should be

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

Examples of good visuals can be 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.

(b) Language Use
The language of toilet education has to be kept simple for preschoolers. This will ensure that the message is attended to, understood and remembered for future action.

(i) The reading level should not be more advanced than that of a preschooler.

(ii) Jargon, big words and long sentences should be avoided. Examples of messages are as follows:

- Keep the toilet/floor clean and dry
- Flush after use
- Use hand dryer/hand towels
- Please put litter into bins
- Aim properly

(c) Message Placement
The usual means of message placement 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
- 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](http://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/events/Stakeholder/](http://www.pub.gov.sg/events/Stakeholder/) for more details.
3.2 Happy Toilets @ Preschools Programme

The Happy Toilets @ Preschools Programme (HTPP) is a new holistic programme, renewable annually, that aims at encouraging preschools to achieve the highest accreditation (see Appendix X) of completing the three phases on Design, Maintenance and Education within a six-month period. To encourage and recognise sustained achievement, preschools will be accredited with the Platinum Award if they achieve the highest accreditation for three consecutive years.

It is mandatory for participating preschools to complete the Design phase to meet the minimum accreditation. This means preschools that have completed the Maintenance and/or Education phase(s) without completing the Design phase will not be accredited. The completion of the design phase is to ensure all preschool toilets meet the minimum standard equivalent to the three-star rating of the Happy Toilet Programme. Visit the Restroom Association (Singapore) website at www.toilet.org.sg/projects3_2.html for more details.

3.3 Happy Toilets @ Preschools Programme: Education Phase

The education phase of HTPP will also adopt a holistic approach in its execution. This method complements the maintenance and design phases of the programme by exploring all avenues to educate all user stakeholders. The stakeholders form the three main target groups. Separate talks and workshops will be conducted for each target group. Taking into consideration the age levels of each target demographic, each talk or workshop will be customised to appeal to each group and achieve the necessary outcomes.

(a) Target Group 1: K1, K2 and Nursery Levels

A 45 minute talk will be conducted for this target group at the venue of the preschool. In this setting, students will be made aware of the need to practise good hygiene habits and adopt the desired restroom etiquette. The talk is structured to be interactive and allow preschoolers to exercise moral judgements when prompted to make choices and decide on what the correct
practices are. This form of teaching empowers preschoolers to exercise their thinking skills while embracing positive restroom practices. There will be games and quiz questions built into the talk to test for understanding and reinforce what was taught. The content of the talk will include the following components:

- Steps taken from start to finish inside the toilet
- Importance of hand washing
- Showing grace and consideration to fellow users
- Consequences of exposure to bad bacteria (HFMD, H1N1, etc.)
- Environmental considerations relating to toilets (wastage, electricity, etc.)

An optional hands-on activity will be introduced upon completion of the talk. Preschoolers will either be brought to the washrooms to physically practise washing their hands or they will be given printout papers to colour (see Appendix XI) and decorate posters that would be placed in their school washrooms to enhance them.

(b) Target Group 2: Preschool Teachers and Associated Staff

A 45 minute workshop will be conducted at the preschool for all staff. This workshop serves to engage staff members on matters relating to toilet standards, general etiquette awareness and behavioural practices of preschoolers in toilets. During the presentation of content, the trainer will gather and address feedback and provide a guide to checking washrooms using the RAS self-assessment checklist (see Appendix XII).

This workshop also informs staff about the breakdown of the entire programme and stresses on the important role they play in ensuring the cleanliness standards of the school’s toilets. It is envisioned that after the workshop, staff members are better equipped to follow up on what was taught to preschoolers.

(c) Target Group 3: Parents and Other Family Members of Preschoolers

Family members of preschoolers will be invited for a separate 45 minute talk at
the preschool. This talk serves to inform them about the preschool’s efforts within the HTPP and provide general information about restroom etiquette and proper hygiene practices. Family members would be made aware of the need to maintain clean toilets in preschool and at home to preserve what preschoolers learn during their separate talk. There will be opportunities for participants to clarify any queries and provide feedback to the Trainer to discuss and troubleshoot any problems. It is envisioned that this talk would allow the reinforcement of what preschoolers learn in school with repeated practice at home.

In order to complete the education phase of the HTPP, preschools need to successfully complete at least two out of three Target Group talks and workshops.

Furthermore, of the 2 completed Target Groups, it is mandatory that the talk for Target Group 1 be completed. This means that preschools can either arrange for workshops for Target Group 2 or 3 or both, but they must complete the talk for the first Target Group. Visit the Restroom Association (Singapore) website at www.toilet.org.sg/projects1_1.html for more details.
Illustration 1: Off-set entrance maze without doors

Illustration 2: Various Screening arrangements for toilets showing the visibility from external area
Illustration 3: Avoid entrances opening onto a wall surface with the mirror reflecting the urinals
Illustration 4: Directional signage

Illustration 5: Natural Lighting
Illustration 6: Non-suspended PLC downlight, mounted onto ceiling

Illustration 6.1: 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 7: Use of warm-colour lighting for general lighting

Illustration 8: Height of flush control and WC
Illustration 9: Wall hung full-length urinals separated by modesty board

Illustration 10: Wall-hung with built-in-sensor urinal
Illustration 11: Height of urinal

Illustration 12: Urinal with stainless steel grating over drainage
Illustration 13: Shower Curtains
Illustration 14: Under counter wash basin

Illustration 14.1: Under counter wash basin
Illustration 15: Vanity top with back splash and apron edge

Illustration 15.1: Vanity top with back splash and apron edge
Illustration 16: One-stop provision of auto sensor tap, soap dispenser, litter bin and paper towel dispenser or electronic hand-dryer at wash basin area.
Illustration 17: 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 18: Wall hung WC with double-roll toilet paper dispenser

Illustration 19: Hooks should be without projection for safety purpose
Illustration 20: Accessible Toilet

Illustration 21: Low level mechanical exhaust
### Washroom Inspection Card

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LOCATION: ................................................................. MONTH: _____

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<th>DATE</th>
<th>TIME</th>
<th>Sanit.</th>
<th>Dry.</th>
<th>Wash.</th>
<th>Hot w.</th>
<th>Cold w.</th>
<th>LOLLIPOP</th>
<th>DRAIN</th>
<th>TANK</th>
<th>DRAIN</th>
<th>DEFECTS</th>
<th>CHECKED BY</th>
<th>REMARKS</th>
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</table>
```

*Illustration 22: Washroom Inspection Card*
APPENDIX I
MULTIPLE URINALS
URINALS IN RIGHT ANGLE
APPENDIX II
SINGLE WASH BASIN

DOUBLE WASH BASINS
WASH BASIN IN RIGHT ANGLE
APPENDIX III
APPENDIX III

TYPICAL VANITY

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

**EQUIPMENT AND SUPPLIES LIST FOR CLEANERS**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></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 VI**

**CLEANING AGENTS FOR DIFFERENT FINISHES**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wall/Floor (ceramic, granite and marble tiles)</td>
</tr>
<tr>
<td></td>
<td>Use neutral-based cleaners or disinfectants. Do not use</td>
</tr>
<tr>
<td></td>
<td>acid-based cleaner on marble</td>
</tr>
<tr>
<td>2</td>
<td>Glass/Mirror</td>
</tr>
<tr>
<td></td>
<td>Use ammonia- or neutral-based cleaners</td>
</tr>
<tr>
<td>3</td>
<td>Sanitary Wares</td>
</tr>
<tr>
<td></td>
<td>Use disinfectant cleaners</td>
</tr>
<tr>
<td>4</td>
<td>Stainless Steel/Chrome</td>
</tr>
<tr>
<td></td>
<td>Use stainless steel/chrome polish</td>
</tr>
<tr>
<td>5</td>
<td>Plastic/PVC</td>
</tr>
<tr>
<td></td>
<td>Use neutral based cleaners</td>
</tr>
<tr>
<td>6</td>
<td>Toilet Bowls</td>
</tr>
<tr>
<td></td>
<td>Use disinfectant or mild abrasive liquid cleaners</td>
</tr>
</tbody>
</table>
### APPENDIX VII

<table>
<thead>
<tr>
<th>Test</th>
<th>PUB requirements for sensor flush valve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) Urinal</td>
</tr>
<tr>
<td></td>
<td>b) WC</td>
</tr>
<tr>
<td>Sensing Distance</td>
<td>Urinal: 500mm to 700mm</td>
</tr>
<tr>
<td></td>
<td>WC: 800mm to 900mm</td>
</tr>
<tr>
<td>Time delay before activation of sensor</td>
<td>Urinal</td>
</tr>
<tr>
<td></td>
<td>WC</td>
</tr>
<tr>
<td></td>
<td>5.1 Sec</td>
</tr>
<tr>
<td>Time delay for activation of flush</td>
<td>Urinal</td>
</tr>
<tr>
<td></td>
<td>WC</td>
</tr>
<tr>
<td></td>
<td>1 Sec</td>
</tr>
<tr>
<td>Pre-flush/flushing at fixed interval</td>
<td>Shall have no Pre-flush/flushing</td>
</tr>
</tbody>
</table>
APPENDIX VIII

SENSING DISTANCE ADJUSTMENT

To increase the sensing distance, turn the trim pot clockwise. To reduce, turn it counter clockwise.

WATER VOLUME ADJUSTMENT

<table>
<thead>
<tr>
<th>Position</th>
<th>Flushing Timing/ Water Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1.8 sec</td>
</tr>
<tr>
<td>9</td>
<td>2.0 sec</td>
</tr>
<tr>
<td>A</td>
<td>2.2 sec</td>
</tr>
<tr>
<td>B</td>
<td>2.4 sec</td>
</tr>
<tr>
<td>C</td>
<td>3.0 sec</td>
</tr>
<tr>
<td>D</td>
<td>4.0 sec</td>
</tr>
<tr>
<td>E</td>
<td>5.0 sec</td>
</tr>
<tr>
<td>F</td>
<td>Test mode (light blinks non-stop)</td>
</tr>
</tbody>
</table>
## MAXIMUM ALLOWABLE & WATER EFFICIENT FLOW RATES

<table>
<thead>
<tr>
<th>Area of Usage</th>
<th>Maximum Allowable Flow Rate (litres/min)</th>
<th>WATER EFFICIENT Flow Rate (litres/min)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For fittings installed prior to 1.10.04</td>
<td>For fittings from 1.10.04 onwards&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Basin tap &amp; Self-Closing Delayed Action Basin tap&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>8</td>
<td>6</td>
<td>2 (Public/staff toilets) 4 (Other areas) For Self-Closing Delayed Action Basin tap, the timing shall remain at between 2 and 3 sec</td>
</tr>
<tr>
<td>Sink/kitchen tap and wash area</td>
<td>12</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Shower tap &amp; Self-Closing Delayed Action Shower tap</td>
<td>12</td>
<td>9&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>7 For Self-Closing Delayed Action shower tap, the timing shall remain at between 13 and 15 sec</td>
</tr>
<tr>
<td>Other areas</td>
<td>12</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> It is allowable to use sensor taps with 2 litres/min flow rate which cut off water supply when the hand is removed from the wash basins or when the preset timing of not more than 30 or 60 seconds is reached, whichever is earlier.

<sup>(2)</sup> Implementation dates of the new maximum flow rates are:

a) Development Control Submissions for all new developments approved on or after 1 Jan 03 must incorporate the use of water fittings complying with the new maximum flow rate requirement.

b) From 1 Oct 03, all premises undergoing renovations which involve the replacement of water fittings must be fitted with water fittings complying with the new maximum flow rate requirement.

c) From 1 Oct 04, only water fittings complying with the new maximum flow rate requirements can be installed in new and on-going building projects.

<sup>(3)</sup> Maximum flow rate requirement for showers at hotels is 12 litres/min. However, hotels are strongly encouraged to install low flow showerheads which give flow rates of not more than 9 litres/min.

Note: Recommended flush volume for standard size urinal (300mm width) is 0.5 litres per flush.
APPENDIX X
GRADING SYSTEM FOR HAPPY TOILETS @ PRESCHOOLS

To resonate better with parents, teachers and preschoolers, a simple grading system will be employed for preschools participating in the programme.

A plaque with the Happy Toilet logo will be presented to each preschool upon completion of the three phases of the Happy Toilets @ Preschools Programme. The three phases are:

1. Design phase
2. Maintenance phase
3. Education phase

A ‘Thumbs up’ icon will be displayed to determine the completion of a phase of the Happy Toilets @ Preschools programme.

As there are three phases in total, preschools are able to get a maximum of three ‘thumbs up’. Preschools that successfully complete only two phases will be awarded two ‘thumbs up’ and only one ‘thumbs up’ icon will be displayed if only one phase was successfully attempted.

*Award conferred is only valid for a period of one year and renewable every year
Don't make a mess!

Keep this place clean!

How do we wash our hands?

1. Put some soap and rub your hands together.
2. Rub the back of both your hands.
3. Rub between your fingers.
4. Wash your hands with soap.
5. Say 'NO!' to harmful germs.

Please flush the toilet after using it.

Wash your hands with soap.

Say 'NO!' to harmful germs.
APPENDIX XII
# APPENDIX XII

## Toilet Self-assessment Checklist

<table>
<thead>
<tr>
<th>Address:</th>
<th>Date:</th>
<th>Done by:</th>
<th>Contact number:</th>
</tr>
</thead>
</table>

Please tick the boxes accordingly.

### Entrance

<table>
<thead>
<tr>
<th>Q1</th>
<th>There are prominent signages and the entrance looks clean.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

### Hand Wash Area

<table>
<thead>
<tr>
<th>Q2</th>
<th>All the taps at the basin and hand dryers are in working condition.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q3</td>
<td>The hand soap dispensers are filled and in working condition.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q4</td>
<td>Overall, the hand wash area is clean and tidy, with no litter.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### Water Closet (WC)

<table>
<thead>
<tr>
<th>Q5</th>
<th>The cubicle door is clean and free of graffiti.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6</td>
<td>The door lock and coat hook are intact and functional.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q7</td>
<td>The toilet bowl seat and cover/squat pan is intact and stain free.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q8</td>
<td>The WC flush/sensor flush is functional and free of dust and stain.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q9</td>
<td>The toilet paper dispenser is intact and functional with toilet paper.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q10</td>
<td>Sanitary bin (for ladies only, one in each cubicle) is clean, intact and lined with plastic bag.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### Urinals (for gents only)

<table>
<thead>
<tr>
<th>Q11</th>
<th>The urinals are intact and functional without chokage.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q12</td>
<td>The urinal flush/sensor flush is functional and free of dust and stain.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### General Areas

<table>
<thead>
<tr>
<th>Q13</th>
<th>The floor, walls, wall tiles and ceiling are free from dust, stains and litter.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q14</td>
<td>The lightings are intact and functional, and of appropriate brightness.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q15</td>
<td>The toilet is odour free, the floor is dry and no water leakages.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### Q16 Are there any other areas to improve on?

### Q17 Any other comments?
DO’S AND DON’TS IN DESIGNING TOILETS
DO’S

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

- Task Lighting
- Down Lighting
- Colourful Artworks
- Colourful Tiles
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.
Absent of vanity top; exposed pipeworks, surface mounting of cables; urinals of inadequate size.
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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Ms Alice Ow  Branch Director  Generation Kidz @ Limau Private Limited  
Miss Siti Suriani  Deputy Director  National Environment Agency  
Mrs Choo Sir Mori  Principal  PCF Sparkletots Preschool @ Telok Blangah Blk 44 (CC)  
Mr Ramahad Singh  Deputy Director  PUB  
Mr Tony Soh  Council Member  Public Hygiene Council  
Mr Kenneth Loo  First Vice President  Singapore Contractors Association Limited  
Mr Ng Meng Hui  Council Member  Singapore Institute of Architects  
Mr Jack Sim  Founder  World Toilet Organization  

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Golden Mile Food Centre  
Fajar Shopping Centre  
Mount Vernon Sanctuary  
PCF Sparkletots Preschool @ Telok Blangah Blk 44 (CC)  
Sunshine Place