

# MALAYSIA ECOLOGY SUSTAINABLE TOILET [M.E.S.T] : NEW DESIGN PARADIGM FOR GREEN & ZERO ENERGY PUBLIC TOILETS

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**ABSTRACT:** Public Toilets in Malaysia today are seen as outmoded and do not cater to the current lifestyle. The classic and current public toilet [island or free standing type] involves issues such as hygiene, health, security, vandalism, privacy, ventilation, lighting and aesthetics. In this innovation, a new ecology-green and sustainable public toilet design is being proposed. This design explores the various issues mentioned above and is uniquely developed to provide maximum comfort for an in-house habitation, sustainable, zero energy, as well as, providing for functional an aesthetically pleasing outlook.

**Keywords:** Micro-Architecture, Public Toilet, Sustainable, Ventilation, Safety & Transparency, Lighting,

## 1. INTRODUCTION

Small public building, with a small-scale facility can be defined as micro-architecture for a street space. As Richard Horden, [2005] describe, “*definition of the term of micro architecture applies to work that only lift the respective object physically, and it also implies a search for new typologies.; such as M-igloo and ‘hard tent’*”. The search for new contemporary micro-architecture that lives in its typologies and context in Malaysia has been molded by a tight budget, right location and of course political instruction via decision. As Richard Horden mentioned again, the aim of having a small building is to minimize the use of materials and energy, to link transportation and habitation, while thus, creating a tighter fit between architecture and contemporary product. Therefore, a small public building toilet should be provided with minimal cost, selective minimal materials, but with the best function and easy maintenance service.



Figure 1: Micro-architecture and public toilet: Mobile and portable public toilet in Malaysia that serves and function well. Temporary install at site base on event take place. (Photograph by author)

## 2. PROBLEMATIC: ‘TOY + LET’

Public toilet in Malaysia has been demoted as one of the worst in this region. Issues such as hygiene, health, security, vandalism, privacy, ventilation, lighting and aesthetics have increased the publics’ concerned. A simple building constructed with basic facility up-sadly ‘presented’ with poor design, and poor maintenance to the end user.



Figure 2. Public toilet at Penang, Malaysia. Issues such as hygiene, health, security, vandalism, privacy, ventilation, lighting and aesthetics have increased the publics’ concerned. (Source: <http://www.publictoilets.info>)



Figure 2: Main issue to be considered toilet space boundary can be private, semi private or public space? Transparent toilet: Installation art 'Don't Miss A Sec', at London by Monica Bonvicini. (Sources: //tokyohthead.com/ & Jennifer Carlile / MSNBC.com)

### 3. ISSUES OF PUBLIC TOILET IN MALAYSIA

The public toilet issue has been brought to the Malaysian Ministry of Housing and Local Authority's interest until they have launched a specific campaign under theme, "**Heading to Clean Toilet Culture**" [Ministry and Minister text campaign 2004] This awareness campaign was directly to stake hold in order to speed up the government's message to the public. It has been reported that the government has spent RM31.6 million in expenditure within 2003-2004, just to build and upgrade the public toilet for the local authority councils in Malaysia. The question that will be pondered around is, what is the actual strategic plan to improve current toilet conditions, and what is the future plans to create more of a sustainable toilet?

Generally below are the main and typical problems that have been raised about public toilet in Malaysia mainly at urban and suburban areas:

- **Ventilation:** Most of public toilets built today are devoid of true natural ventilation for in-house-cooling purposes. It is, at best, only a temporary solution, which works only for those who have a high profile toilet, and completely disregards health issues.
- **Natural light:** Most public toilet depends on top hung windows or a glass door for natural light. Most of public toilet in Malaysia comes with a full-size solid partition, which blocks out natural light, which promotes unhealthy environment and vandalism.
- **Security:** Safety and crime prevention issues encourage users to always leave dark, hidden toilet space layout. Worse, most public toilet is located at enclosed areas.
- **Privacy:** In order to secure a complete private space, the user needs: to have a complete enclosed lavatory space, which does not encourage claustrophobia and does not have poor ventilation

### 4. CURRENT TOILET

Some public facilities in some urban and suburban areas has never been improved, mostly because a very poor maintenance by the local authority. A very 'unpleasant' and 'dirty spaces'; commented by a Pengkalan Hulu resident [2006] about public toilet that is attached at Pengkalan Hulu's bus station shows some inconsistency services by the authority-Majlis Daerah Pengkalan Hulu (MDPH)- to maintain these public building. Similar occurrences also happen at the surau (prayer room) nearby where so much of rubbish is thrown everywhere and it creates a smelly environment. An uncivilized user is culpable for his or her action, but how about others? The question that begs now is who to be blamed: the authority, the end user, or the architect?

A good building design that blends with surrounding and its nature will encourage human to act rationale. Misbehavior act occurs when the specific space building and environment do not achieve a minimum quality and presentable standard. Mostly, current public toilet in Malaysia has the size about 6.5 x 4.0 meters, which includes 6 numbers of water closet separated to male and female zone for 3 numbers. There will be a basic 2-3 numbers of sink / washbasin on each zone.

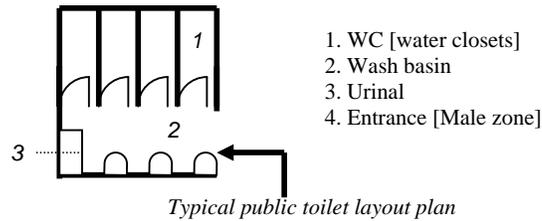


Figure 3: Typical public toilet design and condition in Malaysia  
 (Source: [www.molon.de](http://www.molon.de), Alfred Molon)

**5. PREVIOUS & NEW DESIGN PARADIGM APPROACH**

Carvings and weaving walls, such as one found in the *Kutai* house in Perak, allows cool air to circulate naturally into the internal space. Timber planks were positioned vertically or horizontally to form the walls, floor and doors. Over time the planks dries out, creating gaps that allows the wall, floor and doors to ‘breathe’. This concept idea simply can be blended towards the new sustainable toilet design allowing natural ventilation, which is better internally.



Opening at walls for natural ventilation purpose

Figure 4: Ventilation inspired from Vernacular Malay House as a main concept for new eco-green public toilet

**Open Plan Concept**

The new proposed Malaysian eco-Sustainable Toilet [MEST] is to have a small-scale public toilet with an open plan concept. In the vernacular Malay house, walls, floor and doors were being developed in such a way as to accommodate an extreme practicality that is creatively connected to the human environment. The Malay vernacular wall exhibits a minimalist approach to design. It is easy to construct, it functions well and it is cost effective.

**Lighting + Translucent**

Apart from this, opening walls also enable solar light to dance into the interior of the house, thus, radiating it. The effects of transparency elements to a public toilet space not only helps drying wet floors faster, but also will solve the total private space to become un-private or semi-private space. This will prevent vandalism and crime activities to take place in public toilet. As Werner, Frank [2000] mentioned, ‘the dialectic of covering and exposing means the transparency is only guaranteed to the extend that the covering will allow. For Coop Himmelb(L)au, transparency is half surgical, half sensual in character. We may look at the intertwined innards only where the ‘skin’ is pushed back, opened up, folded away. Transparency as a means of permitting the “forbidden glimpse”.

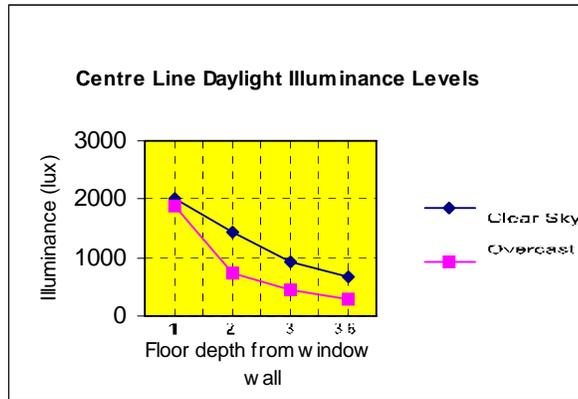


Figure 5: Amount of daylight illuminance base on the size of the opening on the MEST design measured Lumen Micro 8

### Green [eco] + Sustainability

The material used for the Malay homes were timber such as *cengal*, *merbau* and *meranti*. These timber types have been ensured durability against weather, fungi and insect resistant; and was also structurally sustainable. Sustainability suggests the achievement of balance, and a plan for a long-term growth and nurturing. As S.P.Rao [2005] highlighted about sustainability education in Malaysia; that a sustainability mind-set needs to be juxtaposed from now and in the future in order to ensure adequate resources and environmental quality for future generation.

Usage of bare and plain concrete surface, rubber stones, as main construction materials would also create a natural appearance and sustainable toilet architecture. These less or free maintenance materials, will also give a good aesthetic impact to a toilet building, especially in tropical region. The current architecture design should be based on the successful regional [vernacular] architecture from the past to maintain the evergreen and neo- avant-garde element. As been said by Brugno Stagno [2001], that those regional architecture has been able to integrate the notion of progress into the values without abandoning interrelation between architecture and environment to take place.

Vegetation depicts very useful elements in Malay house environment. Plants like: *pandan* [Pandanus Odorus], lemon grass / *Serai Wangi* [Cymbopogon Nardus]yarn [Alocasia Denudata Enggler], provides a good smell and is pleasant to the eye. By planting this species as internal landscape within the public toilet, it helps to create a natural and fresh aromatherapy to the user.

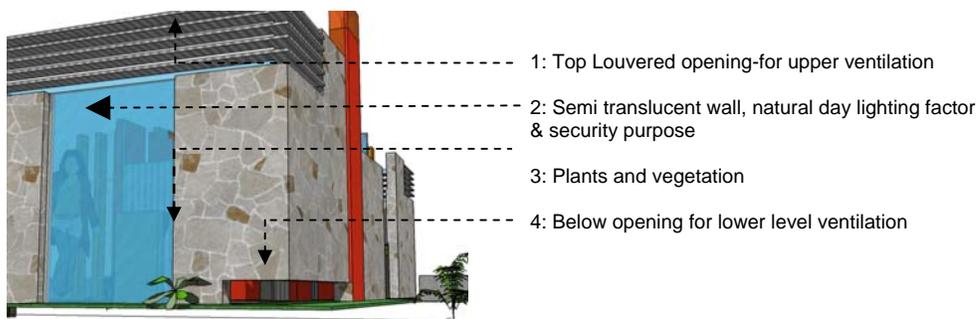


Figure 6: Author's design prototypes for Malaysia Eco-Sustainable Toilet [Pattern pending 2006] Concept for new eco-green public toilet

The MEST toilet is practically considered as both, a Passive Solar Design [PSD] and an Active Solar Design [ASD] approach. As been reported by Raha Sulaiman [2005], the application of passive and active solar strategies together with adoption of energy conservation measures and integration of new materials and technologies, can lead to a tremendous reduction of 75% - 90% in energy consumption of a building. For Active Solar Design [ASD], solar collectors come in various shapes and sizes and will deliver heat across a broad temperature. In solar electric, the natural light will be converted by solar heat to generate the electricity in which, semi conducting photovoltaic cells [PV cell] is being used. The consideration for a Photovoltaic cell to be used is approximately 1kW, which is sufficient enough for the MEST.

Table 1: Active Solar Design (ASD) Module. Source: Flood M (1983)

	TYPES	APPLICATION
Solar Collector	<ul style="list-style-type: none"> <li>■ Low Temperature Heat: &lt; 90°C ■</li> <li>■ Temperature Heat: 90°C - 300°C</li> <li>■ High Temperature Heat: 300°C</li> </ul>	<ul style="list-style-type: none"> <li>■ Solar space heating</li> <li>■ Solar water heating</li> <li>■ Medium &amp; High Temperature heat for wide range of industrial application</li> </ul>
Solar Electric	<ul style="list-style-type: none"> <li>■ Thermal – Electric</li> <li>■ Photo – Electric</li> <li>■ Building Integrated Photovoltaic (BIPV)</li> </ul>	<ul style="list-style-type: none"> <li>■ Remote site system used with batteries &amp; electronic charger</li> <li>■ Grid connected system used in architectural application such as rooftop, rain screen cladding, sun shading, and curtain walling and sky lights</li> </ul>

Therefore, the main principles for Malaysia Eco-Sustainable Toilet are:

- 1] Open Plan Concept
- 2] ‘Breathing’ wall elements and barriers [ventilations]
- 3] Lighting and illumination
- 4] Low / Zero Energy
- 5] Vegetation and plants
- 6] Materiality

## 5. CONCLUSION

This ideal design explores the various issues mentioned above and is uniquely developed to provide maximum comfort for an in-house habitation, sustainable, zero energy, as well as providing for functional an aesthetically pleasing outlook. The other aspect consideration focus on low energy such as: ventilation, lighting, aesthetics, comfort, health and economy. Furthermore, these would accommodate and serve Malaysian users to be more open minded and having the right attitude when using the public toilet. We can look forward to a more comfortable, user friendly, hygienic and safe, public toilet with this new concept of MEST. Overall, the successful implementation for this sustainable toilet to develop would only be with the fullest support from the relevant authority and the users.

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