

# Chapter

章

Environmental Factors  
環境因素

## 5.1 HEALTH-PROMOTION

In addition to traditional and passive public health considerations, Universal Design seeks to engage with positive issues of wellness. In housing one aspect of that is to create opportunities for all residents to participate conveniently in physical exercise.

### 5.1.1 Staircases for Health-Promotion

Staircases have potential to provide more than vertical circulation and means of escape. With appropriate design, staircases can act as social spaces and encourage residents to use them for exercise. To provide user-friendly staircases, it is recommended that:

- Staircases shall be cleaned regularly.
- Rubbish bins shall not be located in staircases. This is easier to achieve when convenient designated disposal locations are available.
- Staircases shall be designated to provide natural light and ventilation. Where natural light is not available, it is recommended that illumination of not less than 120 lux shall be provided. To save energy, it is recommended that sensors and timers shall be provided to control lighting. Where natural ventilation is not available, quiet and efficient mechanical ventilation shall be provided.

### 5.1.2 Laundry for Health-Promotion

It is recommended that natural drying facilities shall be provided. To avoid nuisance in high-rise and other intensively managed developments, it is important that natural drying locations shall be designated at the design stage. The following options can be considered.

- Drying Balconies.
- Drying space on building roofs.
- Naturally-ventilated utility spaces inside flats.
- It is recommended that fixed drying racks shall be located safely and conveniently, with consideration for the elderly and people with disabilities. Soffit-hung drying racks shall be easily lowered. Window or balcony hung racks shall be accessible without leaning out. Construction shall be durable and sturdy.
- It is suggested that louvers can be utilized as part of building design, to screen hanging laundry from public view.
- It is recommended that freestanding drying racks shall have a height of between 900mm and 1200mm, foldable to save space.

## 5.1

### 5.1 促進健康的設計要素

通用設計住宅除了考慮傳統和間接促進公共衛生的設計元素外，還應注意提供促進健康的直接設計元素。其中一方面就是為所有居民提供多做運動的機會。

#### 5.1.1 促進健康的樓梯

樓梯不單供人上落或疏散之用，如果設計合宜，樓梯還可以用作提供社交空間或讓居民鍛煉身體。一條方便居民使用的樓梯，建議以下做法：

- 定期清理樓梯。
- 樓梯不應放置廢物箱。通過設置方便易達的垃圾存放處，可簡單達到此目的。
- 樓梯應使用自然採光和自然通風。如果無法提供自然採光，則建議設置照明度達120勒克斯的照明系統。建議使用感應器和定時器控制照明時間以達到節能目的。如果無法提供自然通風，則應裝置噪音低和高效能的機械通風設施。

#### 5.1.2 促進健康的曬衣處

建議裝置自然通風晾曬的設施。為免對高樓和對密度高的建築物造成滋擾，應在設計階段考慮自然通風晾曬處的設置，可考慮以下相應措施：

- 設置晾曬露台。
- 樓宇天台有晾曬空間。
- 住宅單位內有自然通風的工作平台。
- 建議裝置固定的晾曬架於容易到達和安全的位上，以方便長者和殘障人士使用。活動的晾曬架必須容易取下。置於窗口或露台的晾衣架必須容易使用，使用者無需俯身向外。結構必須穩固耐用。
- 建議在樓宇立面相應位置安裝百葉板遮擋晾曬的衣物，以減少晾曬衣物對樓宇外觀的影響。
- 建議立式晾曬架高度應介乎900毫米至1200毫米之間；並可摺疊，騰出更多空間。

- Where it is difficult to provide naturally-ventilated spaces, built-in ceiling mounted dehumidifiers can be provided as a substitute in toilets. This shortens drying time and also keeps indoor humidity at a suitable level [See Chapter 5.3].

- 如不能提供自然通風的晾曬空間，可在廁所天花設置內置抽濕機代替。這不單能減少晾曬時間，還能使室內濕度保持適中[參照第5.3章]。



Drying racks outside the building cause nuisance and dripping water to below  
露天晾衣架不但造成滋擾，亦可能向下層滴水

## 5.1.3 Landscape Garden and Open Areas for Health-Promotion

Landscape garden and open spaces as part of residential development can encourage wellness related activities:

### Planting for Health-Promotion

Planting can be far more providing than just visual amenity. It can be an element for health-promotion. With consideration for health-promotion, it is recommended that:

- Plants with thorns shall be avoided, except as a security measure.
- Plants shall be non-toxic.
- Plants shall have a variety of colours and scents to stimulate interest.

### Design for Health-Promotion

- To encourage regular exercises, it is suggested that physical exercise settings, such as exercise stations and foot massage paths, can be provided in open areas.
- For exercise and personal expression, it is suggested that self-planting corners can be made available to entertain residents.
- To provide opportunities for social activities, it is suggested that features are able to act as a social focus, such as chess tables, and can be provided in open areas.

### Ancillary Facilities in Neighbouring Open Areas

- It is recommended that seating and social areas shall be provided, with opportunities for sun and shade.
- It is recommended that adequate rubbish bins shall be provided.
- It is recommended that vending machines shall be provided.
- It is recommended that accessible public toilets shall be provided.
- It is recommended that lightings shall be provided at a sufficient illumination level, ideally 75 ~ 120 lux.

# 5.1



A self-planting corner in neighbouring open area  
附近開放空間的自行栽植地



Rubbish bins in neighbouring open area  
附近空地的廢物箱

## 5.1.3 促進健康的園林花園及開放空間

園林花園和開放空間作為住宅建設的一部分，可以促進優質生活：

### 促進健康的植物

植物不單可增進視覺享受，更是促進健康的元素。促進健康的建議如下：

- 除非作為保安措施，應避免栽種有刺植物。
- 栽種無毒植物。
- 栽種不同顏色和香味的植物，以刺激官感。

### 促進健康的設計

- 建議在露天場地設置健身器和足部按摩徑等運動設施，以鼓勵居民堅持鍛鍊身體。
- 建議設置可供住戶自行栽種植物的地方，以增添居民的生活樂趣和增加居民運動的機會。
- 建議在露天開放空間放置棋桌等社交設施，以增加社交活動的機會。

### 隣近露天開放空間的附屬設施

- 建議設置座椅和社交區，使其有陽光照射，並附設雨棚等遮蔭設施。
- 建議擺放足夠的廢物箱。
- 建議設置自動售賣機。
- 建議設置無障礙公共廁所。
- 建議提供充足的街燈照明，理想照明度為75 ~ 120勒克斯。



Exercise stations in neighbouring open area  
附近空地的健身設施

A massage path in an neighbouring open area  
住宅附近開放空間的按摩徑

## 5.1.4 Indoor Communal Spaces for Health-Promotion

In order to facilitate family activities and encourage neighbour's interaction, it is recommended to provide:

- Quality indoor communal space within residential blocks or within clubhouses;
- Comfortable seating and social corners in indoor communal spaces;
- Physical exercise equipment in indoor communal spaces; and
- Facilities to encourage family and social activities.

## 5.1.5 Facilities for Pets for Health-Promotion

Pets could provide emotional support to people and facilitate psychological health. Where residential developments allow pets, it is recommended that acceptable parameters shall clearly be defined for issues such as species, likelihood of injury, noise, odour, disease and waste. Within these acceptable parameters, it is recommended that facilities shall be provided for the convenience of pet owners and other residents:

- Pets may generate a wide variety of waste, some of it with potential to communicate disease. Thus, acceptable means of disposal need to be identified and notified to pet owners.
- The presence of some pets may be acceptable for periods in communal areas. To facilitate use by the weak or people with disabilities, it is suggested that leash points can be provided for dogs in locations such as communal seating areas.
- It is suggested that hanging points can be provided for birdcages in communal open areas.
- It is suggested that service lifts can be used by residents with pets.

## 5.2 INDOOR AIR QUALITY

Indoor air quality (IAQ) has an immediate impact on the health and wellbeing of all building users, through a combination of factors such as temperature, humidity, flow rate and airborne materials. All of these are mediated by buildings, though how and to what extent may vary considerably. In the Hong Kong urban area, airborne particulates from diesel exhausts have been a significant pollutant which can be largely avoided in sealed buildings with mechanical ventilation. In other circumstances, buildings can contribute to airborne pollution too. Notably, many building materials, furnishing, and household cleaning and maintenance materials continuously leak small quantities of chemicals into the air.

## 5.1

### 5.1.4 促進健康的室內共用空間

建議提供下列設施，以促進家庭和鄰舍的關係：

- 在樓宇或會所內，設置優質共用空間。
- 在室內共用空間設置舒適座椅和交誼區
- 在室內共用空間，提供運動設施。
- 提供鼓勵家庭和社交活動的設施。

### 5.1.5 促進健康的寵物設施

寵物可提供情感支援，並促進心理健康。如在居住環境飼養寵物，建議須考慮一些認可條件，如寵物品種、寵物會否受傷害、寵物的聲音、氣味、疾病和排泄物等。在符合有關認可條件下，建議應向寵物主人和居民提供方便的設施。

- 寵物會排出各種排泄物，有些可能會傳播疾病。應該指示寵物主人處理排泄物的認可方法。
- 在某些時段和在某些共用地方，攜帶寵物是可以接受的。建議在共用地方設置杆柱圍欄，以捆綁狗隻的鏈帶，以方便體弱和殘障人士。
- 建議在露天的公共地方設置柵架，供懸掛鳥籠。
- 建議攜帶寵物的居民，應使用專用或服務升降機。

## 5.2

### 5.2 室內空氣質量

室內的空氣質量會直接影響所有居民的健康，這些影響來自多種結合的因素，如溫度、濕度、氣流和空氣傳播的物質等。這些影響因素都來自建築物本身，縱然影響的程度和方式各有不同。在香港市區，空氣所傳播來自油渣廢氣的微粒是最主要的污染物，但在密封的設有機械通風系統的建築物內，這種污染可以減少。但在另一些情況下，建築物本身也可造成空氣傳播的污染，最明顯的例子是建築物料、裝修物料和家居清潔用品及維修物料等，都會不斷在空氣釋出少量的化學物質。

室內的空氣污染物包括空氣浮塵、懸浮生物微粒、二氧化碳、一氧化碳、二手煙、甲醛、臭氧、揮發性的有機化合物和氡。要去除污染物的源頭，建議應用下列策略：

#### 5.2.1 去除污染源

- 漆油是由顏料、媒劑和其他化學品合成的，這些物品中的任何一種都可能包含毒素。徹底解決的方法就是去除有毒油漆，因為在一些情況下，油漆的主要功用只是為了裝飾，但是有些時候，使用油漆也是為了延長所用物料的壽命。在這種情況下，耐用與毒素二者的優劣便只能選擇其一了。有些時候，在近海的環境或在歷史建築物內不容易到達的地方，便必須使用較耐用的油漆，而毒素須減至最低水平。為了盡量減低揮發性的有機溶劑釋入空氣中，我們建議在大多數的室內設施，避免使用礦物性的油性漆油。很多時候，是可以採用傳統的高性能水性油漆取而代之的。
- 在所有塑料和塗上塑料的物質都含有揮發性的有機溶劑，特別是包含人造纖維的地氈和紡織品，包括衣物。塗上防滲漏劑的木塊或石塊不一定會較好。因此必須在每個特定環境下作出取捨。可是一般來說，我們建議在室內應盡量避免使用塑膠塗料或人造纖維的物質。

## 5.2

### 5.2.1 Removal of Pollutants' Sources

Indoor air pollutants include airborne dust, bioaerosols, carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), environmental tobacco smoke, formaldehyde, ozone (O<sub>3</sub>), volatile organic compounds (VOC's) and radon. To remove the source of pollutants, the following strategies are recommended:

- Paints are a combination of pigments, media and other chemicals, any of which can be toxic. Thus, elimination of toxic painted finishes is a fundamental approach to this issue in circumstances where paint is primarily decorative. Where however the function of paints is to prolong the useful life of materials to which they are applied, a judgement sometimes has to be made between the durability and toxicity of the coating. It might be necessary to use a more durable paint in a marine environment or an inaccessible location in an historic building, whereas toxicity would undoubtedly be the priority at low level. In order to minimise the emission of volatile organic solvent, it is suggested that mineral oil-based paints can be avoided in most internal applications. A variety of traditional and high performance modern water-based paints is available to deal with most situations.
- Volatile organic solvents are present in all plastic and plastic coated materials, particularly carpets and textiles containing manmade fibres, including clothing of users. Timber or stone are not necessarily friendlier if treated with sealants. Judgement has to be exercised in each circumstance to determine a viable natural alternative. In general however, it is suggested that plastic and plastic coated materials and man-made fibres can be avoided in most internal applications.

- Similar concerns apply to cleaning materials. Judgement has to be exercised in each circumstance. An unfinished natural material is not necessarily friendlier if it has to be bleached regularly with powerful chemical throughout its working life.
- Airborne dust may be unavoidable where natural ventilation is used, especially where there is heavy traffic. Dust is also generated by the natural dispersal of human skin. Where low maintenance or high standards of hygiene are required, it is recommended that the building interior shall be designed with smooth surfaces and no unnecessary projections.
- Where low maintenance or high standards of hygiene are required, it is recommended that
  - (a) Furniture shall be designed with smooth surfaces and no unnecessary projections.
  - (b) Fabric hangings shall be omitted or cleaned regularly.
  - (c) Smooth-surface flooring materials shall be used, such as wood and linoleum. Where carpet is preferred, it shall be vacuumed daily.
  - (d) Decorative elements shall be reduced to a minimum.
  - (e) Kitchen worktops shall be designed with smooth, and continuous surfaces.
  - (f) Painted finishes on walls shall be washable.
  - (g) Duct cleaning devices shall be used regularly to maintain mechanical ventilation systems.

## 5.2

- 同樣的顧慮也存在於清潔用品的使用中。在每種情況下要作出不同的判斷，一件未有裝飾面的天然物料不一定較好，如果這物料必須定時使用強力的化學品加以漂白。
- 在自然通風和交通頻密的環境下，空氣傳播塵垢似是無可避免的。塵垢其實也會由人的皮膚自然產生。如要盡量減少維修，又要保持高度衛生，建議室內的設計要盡量平滑，減少不必要的凸出物。
- 如要盡量減少維修，又要保持高度衛生，建議：
  - (a) 傢具設計要表面平滑，盡量減少凸出物。
  - (b) 避免使用纖維懸掛物或定期清潔。
  - (c) 盡量使用表面平滑的地板，如木塊和漆地膠等。如要鋪設地毯，則須每天吸塵清潔。
  - (d) 飾物應減至最少。
  - (e) 廚房櫥櫃的表面應平滑及連續。
  - (f) 牆壁上的漆油應可洗刷。
  - (g) 要安裝風管的清洗裝置，定期清理通風系統。

### 5.2.2 通風

- 建議所有的臥室、客/飯廳和廚房都使用自然通風。
- 建議廁所應使用自然通風，或設置機動通風系統。
- 建議利用對流通風。

## 5.3

### 5.3 熱環境

- It is recommended that the temperature of all exposed surfaces and water supplies shall be less than 43°C.
- Where there is an imbalance of radiant heat resource, it is recommended that such imbalance shall not be more than a range of 10°C.
- Where floor heating systems are used, it is recommended that floor temperatures shall not exceed 29°C and shall be not more than 5°C higher than the ceiling temperature.

- 建議所有外露表面及水源的溫度，不應超過攝氏43度。
- 遇有輻射熱源溫度不平衡，溫差不應大於攝氏10度。
- 如果使用地板供熱系統，建議地板溫度應保持在攝氏29度以下；且地面的溫度不應較天花的溫度高出攝氏5度。

- 建議浴室應設置合適的暖氣設備，以方便長者和體弱人士。
- 建議室內最佳溫度應保持在攝氏22度至攝氏24度之間。
- 建議室內濕度應保持在70%以下。可使用抽濕機，以減低濕度。

### 5.4 視覺環境

有效的照明能改善生活環境的素質，特別是在晚上：

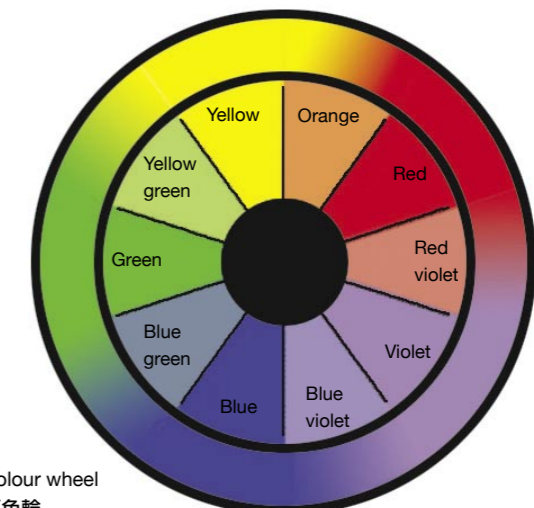
- 建議背景光綫應有足夠照明度並且光照均勻。
- 在市區，周遭樓宇的燈光或街燈可對居民造成滋擾，特別是來自一些閃動性的光源，如霓虹燈或大型光管招牌。如有這類滋擾發生，建議使用可調較的窗簾。
- 為方便視障人士，建議在大門入口、升降機門、扶手、指示牌和燈掣等位置使用對比色區分。「對比色」是指使用在顏色輪上對立的顏色，例如紅與綠和藍與黃都是對比色的搭配。如以影印或別的方法把顏色影像轉為灰度，便可以看到顏色對比度是否足夠。

## 5.4

### 5.4 VISUAL ENVIRONMENT

Efficient lighting is necessary to the quality of living environment, particularly at night:

- It is recommended that even background lighting shall be provided at sufficient illumination levels.
- In urban area, lighting from neighbouring buildings or streetlights can be a source of nuisance to residents, particularly if the source is intermittent, as with flashing signs or giant video screens. It is recommended to provide adjustable window screening where such avoiding of nuisance is envisaged.
- To facilitate use by people with visual impairments, it is recommended that access features, such as entrance doors, lift doors, handrails, signboards and light switches shall be provided in contrasting colours. "Contrasting colours" refer to opposite colours on a colour wheel. For example, green and red or blue and yellow, are contrasting. By photocopying or other methods to convert the images to a grey scale, it can be judged if the colours of the images are at a sufficient contrasting level.

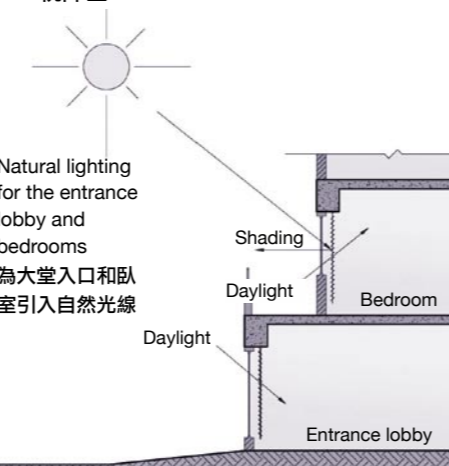


Colour wheel  
顏色輪

- It is recommended natural lighting shall be provided in all bedrooms, living / dining rooms, kitchens and toilets.
- It is recommended to avoid source of glare, such as large windows at the end of dark corridors.
- It is recommended that natural lighting shall be provided in entrance lobbies to provide a transition between outdoor and indoor illumination levels.
- It is recommended that directional task lighting shall be provided at workplaces, such as food preparation areas in kitchens or reading places in bedrooms or living rooms. It is desirable that the position and illumination level of task lighting can be adjusted by users themselves.
- It is recommended to provide spot lighting to room signages, keyholes and handles at flat entrances.
- To facilitate use by people with visual impairments, it is recommended to minimise overall visual congestion.

## 5.4

- 建議所有臥室、客/飯廳、廚房和廁所都使用自然採光。
- 建議須避免眩光，如避免在漆黑的走廊末端設置大型窗戶。
- 建議在入口大堂提供自然採光，作為室外照明度與室內照明度的過渡區。
- 建議在工作地點應設置指向工作燈，例如在廚房準備食物或在臥室或客廳的閱讀處，並最好應能自行調較工作燈的位置和照明。
- 建議在樓層入口設置照明燈，以照亮門牌、匙孔和扶手。
- 建議應盡量減少視覺上的負荷，以方便視障人士。



A large window at the end of a dark corridor is a source of glare  
在漆黑走廊末端的大型窗戶會引至眩光

## 5.5 ACOUSTIC ENVIRONMENT

## 5.5

The elderly and the weak have a high sensitivity to noise in the living environment. To mitigate environmental noise, it is recommended that:

- Residential development shall be located away from busy vehicular traffic.
- Trees shall be planted around buildings to act as noise barriers.
- Acoustically absorbent materials shall be used for walls and floors.
- Internal walls shall have acoustic proof level of greater than 40dB.
- Hard floor surfaces that produce echoes shall be avoided.
- Alarm signal shall be no less than 65dB. However, this can be reduced to 60dB in enclosed staircases and enclosures of no more than 60m<sup>2</sup> in area.
- Where background noise is more than 60dB, the alarm signal shall be increased to be 5dB more than background noise.
- Alarm signals in bedrooms should be not less than 75dB.
- Where ambient noise in the external environment exceeds 60dB, double-glazed windows shall be provided to achieve 40dB or less.

## 5.5 聽覺環境

長者及體弱人士很需要有寧靜的居住環境。為減低噪音滋擾，建議實行下列措施：

- 居住建築應遠離繁忙的交通。
- 在樓宇周邊種植樹木，作為隔聲屏障。
- 牆和地板均使用隔音物料。
- 內牆的隔音量應多於40分貝。
- 避免使用會發出回音的硬地板。
- 警報器音量一般要達到65分貝以上；可是在密封的樓梯或圍封範圍少於60平方米的地方，則可減至60分貝。
- 周遭嘈音如高於60分貝，警報響鬧應較周遭嘈音高出5分貝。
- 臥室的警報器音量不低於75分貝。
- 如室外噪音聲響高於60分貝，則應安裝雙層玻璃窗戶，使噪音減至低於40分貝。

## 5.6 生活空間

## 5.6

生活空間的大小會影響居民的心理健康，特別是那些長時間留在家中的人。淨空高度和室內面積是兩大重要因素。今建議如下：

- 客/飯廳和臥室的淨空高度應不少於2500毫米。
- 房間面積不少於下表所示：

房間	建議最小面積 (平方米)
客/飯廳	14 (3.5米 x 4米)
單人房	5 (2米 x 2.5米)
雙人房	9.5 (2.7米 x 3.5米)
主人房	11 (2.9米 x 3.8米)
廚房	4 (1.8米 x 2.7米)
有淋浴間的廁所	3.3 (1.8米 x 1.8米)

## 5.7 水管及渠道

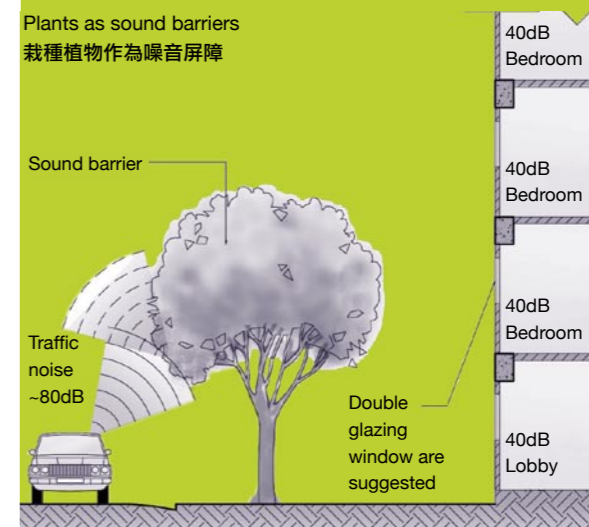
## 5.7

- 下水道口應有水封滿。
- 建議在洗滌盆、洗面盆、淋浴間和浴缸附近裝置容易清理垃圾的下水道蓋。
- 建議應清楚標示喉掣和水龍頭。
- 建議應定期檢查所有喉管和渠道，確定是否滲漏，並妥善維修。

Easily cleaned floor drain fittings for showers/ bathrooms  
容易清理的浴室地漏配件



Easily cleaned drain fitting for sinks  
容易清理的洗滌盆下水配件



## 5.6 Living Spaces

The dimension of living space can affect the psychological health and well being of residents, particularly those who spend long periods at home. Headroom and room areas are two essential factors. It is recommended that:

- The clear headroom of living / dining rooms and bedrooms shall be not less than 2500mm.
- Minimum room areas shall be as follows:

Room	Recommended minimum areas [m <sup>2</sup> ]
Living / dining room	14 (3.5m x 4m)
Single-bed room	5 (2m x 2.5m)
Double-bed room	9.5 (2.7m x 3.5m)
Master bedroom	11 (2.9m x 3.8m)
Kitchen	4 (1.8m x 2.7m)
Toilet with shower	3.3 (1.8m x 1.8m)

## 5.7 Plumbing and Drainage

- Drainage traps should be always kept sealed with water.
- It is recommended that easily cleaned and operated waste traps shall be provided to sinks, basins, showers and bathtubs.
- It is recommended that valve and taps / faucets shall be clearly labelled.
- It is recommended that regular inspection shall be undertaken to identify leaking pipes and proper maintenance of all plumbing and drainage fittings and fixtures.