

<b>5</b>	<b>WATER USE</b>	<b>5.2</b>	<b>EFFLUENT</b>	
		<b>WU 6</b>	<b>EFFLUENT DISCHARGE TO FOUL SEWERS</b>	
	<b>EXCLUSIONS</b>	None.		
	<b>OBJECTIVE</b>	Reduce the volumes of sewage discharged from buildings thereby reducing burdens on municipal sewage supply and treatment facilities.		
	<b>CREDITS ATTAINABLE</b>	1		
	<b>PREREQUISITES</b>	Compliance with the Water Pollution Control Ordinance, and the Building (Standards of sanitary fitments, plumbing, drainage works and latrines) Regulations Chapter 123 Regulation 17.		
	<b>CREDIT REQUIREMENT</b>	1 credit for demonstrating a reduction in annual sewage volumes by 20% or more.		
	<b>ASSESSMENT</b>	Where the Client can demonstrate that the target percentage of reduction in annual sewage volume can be achieved, either based on the default assumptions for the calculation procedure given in Appendix 8.6 or any other appropriate estimation, the credit(s) shall be awarded.		
	<b>BACKGROUND</b>	<p>Demand for flushing and potable water should be assessed with regard to Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulation 10A(4). "Potable water" refers to a supply of water for the purposes of Regulation 10A(2) [1]. The quantity of flushing water required is given in PNAP 17 [2].</p> <p>Regulation 19 of the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Drainage Regulations) requires flushing cisterns of water closet fitments to have a discharge between 9 and 14 litres. Under the current Waterworks Regulations, flushing cisterns shall be of the valveless syphonic type and the flushing volume shall be within the range of 7.5 and 15 litres [3].</p> <p>With the application of modern technology in the design of water closet flushing systems, the effectiveness of flushing can be maintained with a reduced discharge. Therefore, to conserve our valuable water resources, both the Building Authority (BA) and Water Authority would have no objection to relaxing the use of syphonic flushing cisterns with discharge less than that required by the current regulations provided that the associated toilet bowls are compatible with the cisterns and the syphonic action is sufficient for the wastes in the toilet bowls to be cleared effectively by a single flush. WSD has relaxed the requirements in respect of the flushing mechanism and minimum flushing volume as follows:</p> <ul style="list-style-type: none"> <li>the use of valve type flushing devices (mechanical or sensor type with single flush or dual flush) in addition to valveless syphonic type flushing apparatuses; and</li> <li>the use of flushing devices which are able to give a single flushing</li> </ul>		

- 1 Department of Justice, CAP 123I building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations  
[http://www.legislation.gov.hk/blis\\_pdf.nsf/6799165D2FEE3FA94825755E0033E532/182338FA79710018482575EE003F2DBE/\\$FILE/CAP\\_123I\\_e\\_b5.pdf](http://www.legislation.gov.hk/blis_pdf.nsf/6799165D2FEE3FA94825755E0033E532/182338FA79710018482575EE003F2DBE/$FILE/CAP_123I_e_b5.pdf)
- 2 Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers. PNAP No. APP-4 Water Supply and Wells.  
<http://www.bd.gov.hk/english/documents/pnap/APP/APP004.pdf>
- 3 Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers. PNAP No. APP-99 Flushing Volume for Flushing Cisterns.  
<http://www.bd.gov.hk/english/documents/pnap/APP/APP099.pdf>

volume of less than 7.5 litres.

The capacity of the flushing cistern in the case of trough water-closets and urinals shall be approved by the Water Authority subject to the discharge in the case of trough water-closets being not less than 9 litres of water for every metre of the channel and the discharge in the case of urinals being not less than 4.5 litres of water for every basin or stall, or in the case of a trough urinal, every metre thereof.

For the purposes of determining the number of persons for whom sanitary fittings should be provided in shops and department stores the determination shall be at the rate of 1 person for every 15 square metres of usable floor area [4].

4 Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineer. PNAP No. APP-6 Shops and Department Stores Building Regulation 5.  
<http://www.bd.gov.hk/english/documents/pnap/APP/APP006.pdf>

## 8.6 ASSUMPTIONS AND BASELINES FOR WATER CONSUMPTION

**NUMBER OF WORKING OR OPERATIONAL DAYS** The number of operational days per annum (Nop) shall be obtained from the design brief or Owner's Project Requirement (OPR) document.

The number of non-operational days is equal to 365-Nop.

3

The same values of operational and non-operational days will be used for both the project space and the base line space.

4

### OCCUPANCY CONSIDERATIONS

The number of occupants shall be taken from the design brief, or owner's project requirements (OPR). If this data is not obtainable then, in the absence of any other data, the occupant space allowance shall be taken as 9 m<sup>2</sup>/person. [1]

5

The male:female ratio shall be determined from the design brief or OPR. If the data is not available then the default assumptions are as follows:

- In offices, the male to female occupancy ratio is 1:1 [2]
- In public places, the male to female occupancy ratio is 1:1.25 [2]

6

The same occupancy load shall apply to the project space and the baseline space.

### WC WATER USE

The base line building will have a single flush WC (i.e. no low flush option) with a flushing volume of 7.5 litres per flush. [3] The water closet, cistern and flushing fitting shall be of compatible types.

7

For non-residential,

Males use the WC once per day. If a dual flush system is installed in the project space, it is assumed that the WC will be flushed using the high flush volume.

Females use the WC five (5) times per day. If a dual flush system is installed in the project space, it is assumed that the average flush volume is equal to the average of one full flush and four low volume flushes for both males and females.

For residential,

Residents use the WC five (5) times per day. If a dual flush system is installed in the project space, it is assumed that the average flush volume is equal to the average of one full flush and four low volume flushes for both males and females.

The flow rate of the water appliance shall be read as an absolute figure irrespective of the working pressure in predicting the water consumption.

**WATER USE IN URINALS** For the purposes of calculation, the baseline building would have urinals fitted with 4.5 litres flush and manual controls. The urinal would be

- Hong Kong Buildings Department (1996), Code of Practice for the Provision of Means of Escape in Case of Fire, Building Authority, Hong Kong.
- Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers. PNAP No. ADV-28 Provision of Sanitary Fittings in Offices, Shopping Arcades and Department Store, Places of Public Entertainment and Cinemas, May 2005.
- Buildings Department. Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers. PNAP No. APP-99 Flushing Volume for Flushing Cisterns.

flushed after every use. Each male employees use the urinal on average four (4) times per day.

The water use in the project building would be based on the same number of male employees each using the urinals four (4) times per day. The calculation shall consider the actual flushing strategy employed.

An estimate of the potential water savings is not able to be determined as it would be influenced by the number of male employees and the time interval of flushing.

#### **HAND WASHING IN REST ROOMS**

- Number of hand wash operations per occupant per day = 5
- Hand washing time = 10 seconds

For the baseline building, the tap flow rate is 8.3 litres/min [4]

Note that to obtain significant savings the project space would need to install automatic controls such as proximity sensors to reduce the tap operation time to less than the default assumption of 10 seconds per hand washing operation.

#### **WATER USE IN PANTRIES/ KITCHEN**

For non-residential,

- Number of pantry tap operations per occupant per day = 1
- Baseline faucet flow rate = 8.3 litres/min [4]
- Duration of use = 15 seconds
- Utensil washing operation carried out by hand = 6 litres of water per operation

For residential,

- Number of use per resident per day = 4
- Baseline faucet flow rate = 8.3 litres/min [4]
- Duration of use = 60 seconds

#### **SHOWERS**

- Number of use of shower per occupant per day = 0.1 (for non-residential)
- Number of use of shower per resident per day = 1 (for residential)
- The baseline shower flow rate = 9.5 litres/min [4]
- Shower duration = 5 minutes (300 seconds)

#### **OTHER APPLIANCES/ EQUIPMENT**

Justification for capacities of appliance/equipment used in the benchmark building shall be provided by making reference to regulations, standards, guides and other publication published by various authorities.