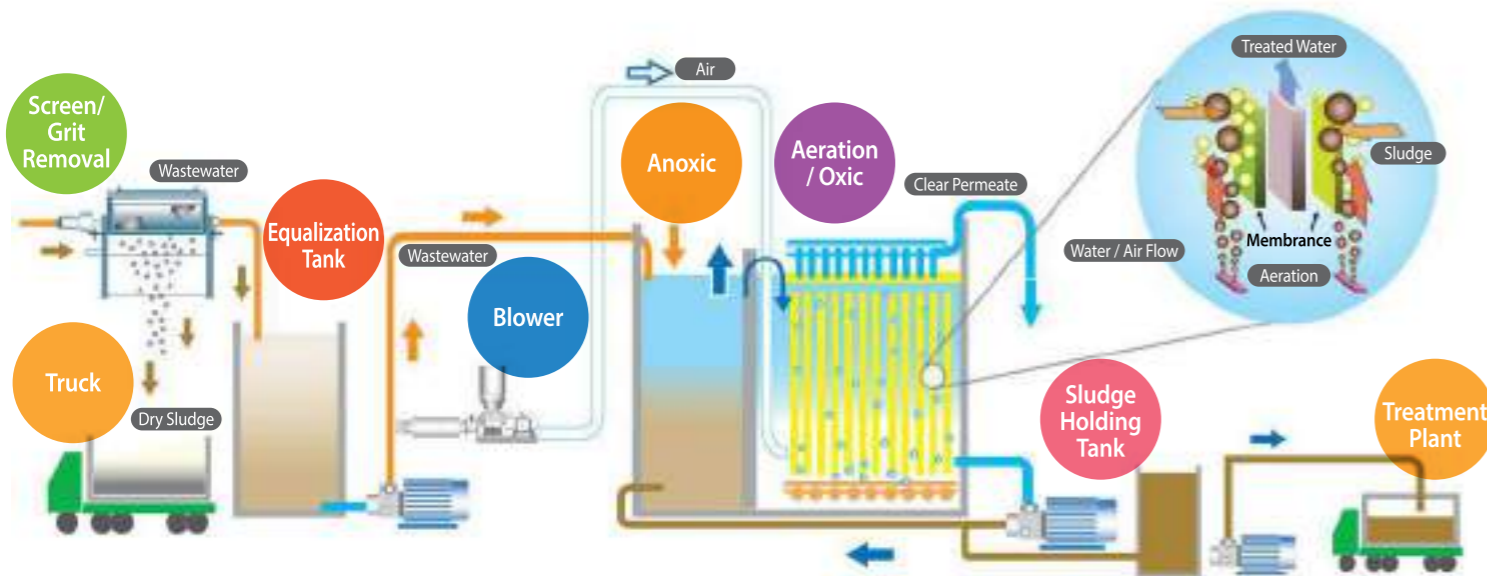


10 Advantages of Toilet in Tourist Areas

Dunwell's Bio-Toilet (DMBR) adopts the latest technology on membrane bio-reactor, combining with ultra filtration, the treated water is able to reuse or discharge within the required standard.

- ◆ On-site reuse of the treated water
- ◆ Eliminates of sewage piping
- ◆ Fully controlled by PLC
- ◆ Remote monitoring system
- ◆ Simple structure
- ◆ Small footprint
- ◆ Energy efficient
- ◆ Water saving
- ◆ Odourless
- ◆ Environmentally friendly

Bio-Toilet Process Flow



Job Reference

Public Toilets

Over 130 toilets in Hong Kong Country Parks
Reuse as flushing water Capacity: 10m³/day
EPD's Discharge Standard: BOD₅ ≤ 20mg/L
 COD ≤ 80mg/L
 Suspended Solid ≤ 30mg/L



Qing Dao Mount Lao Tourist Area, China
Reuse as flushing water Capacity: 20m³/day
China Grade A Discharge Standard: BOD₅ ≤ 10mg/L
 Turbidity ≤ 5NTU
 Ammonia Nitrogen ≤ 10mg/L



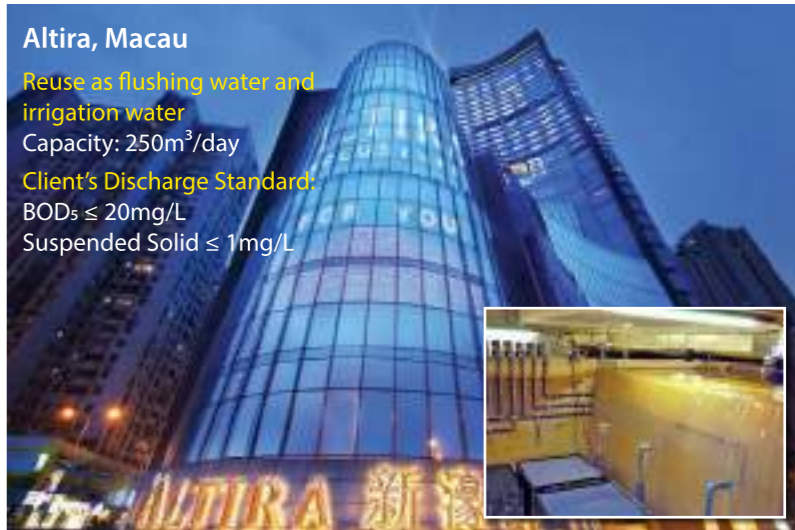
Residential Areas

Saikung Tai Po Tsai, Hong Kong
Reuse as irrigation water Capacity: 1,200m³/day (Max. flow)
EPD's Discharge Standard: Population: 2,000
 BOD₅ ≤ 20mg/L
 Suspended Solid ≤ 30mg/L



Hotels

Altira, Macau
Reuse as flushing water and irrigation water Capacity: 250m³/day
Client's Discharge Standard: BOD₅ ≤ 20mg/L
 Suspended Solid ≤ 1mg/L



Construction Sites

China State construction site, Hong Kong
Reuse as cleaning water Capacity: 10m³/day
EPD's Discharge Standard: COD ≤ 80mg/L
 Suspended Solid ≤ 30mg/L



Tourist Centers

Zero Carbon Building, Hong Kong
 Reuse as flushing water Capacity: 1m³/day
 EPD's Discharge Standard: BOD₅ ≤ 20mg/L
 COD ≤ 80mg/L



AFCD Woodside Biodiversity Education Centre, Hong Kong
 Reuse as flushing water Capacity: 15m³/day
 EPD's Discharge Standard: BOD₅ ≤ 20mg/L
 COD ≤ 80mg/L
 Suspended Solid ≤ 30mg/L



Features and Advantages of the Low Pressure, Ultra Filtration Bio-Toilet (DMBR)'s system:

- ◆ DMBR's high concentration of mixed liquor suspended solids (MLSS) improves the efficiency, reducing the treatment time, hence suitable for limited space available
- ◆ All wastewater is treated in the same DMBR unit, hence reducing space required and cost
- ◆ Ultra filtration is used to reduce space compare to traditional sedimentation method
- ◆ Simple structure, fully automated with PLC control
- ◆ Text alert and online reminders for each DMBR system's status
- ◆ Based on client's requirement, various pre-treatment equipment can be installed to DMBR
- ◆ Options to add UV light and chlorine system to meet the reuse or discharge standard



Clubhouse/ Resort

Clearwater Bay Clubhouse, Hong Kong
 Reuse as irrigation water
 Capacity: 150m³/day
 EPD's Discharge Standard: BOD₅ ≤ 20mg/L
 COD ≤ 80mg/L
 Suspended Solid ≤ 30mg/L



Power Plant

Lamma Island Power Station, Hong Kong
 Reuse as flushing water Capacity: 10m³/day
 EPD's Discharge Standard: BOD₅ ≤ 20mg/L
 COD ≤ 80mg/L
 Suspended Solid ≤ 30mg/L



Lady MacLehose Holiday Village
 Reuse as flushing water
 Capacity: 60m³/day
 EPD's Discharge Standard: COD ≤ 30mg/L
 Suspended Solid ≤ 1mg/L
 E Coli. ≤ 1/100mL



Scan to read the full document (in Chinese)

国家旅游局办公室文件

广东省人民政府办公厅

1. Target Requirement
 Within 2015-2017, there will be a total supply of 57,000 toilets (33,000 newly built & 24,000 retrofitted) installed at tourism areas in China, delivering the standards of sufficient, clean & odorless, free & practical and effectively managed.

Scan to read the full document (in Chinese)

Remote Monitoring System



Remote monitoring each bio-toilet system



Text alert and online notification when there is any abnormality in the system



DMBR effluent comparison against alternative standards

	HK Standard for discharge to Grade A+ inland water	HK Standard for discharge to Grade B++ inland water	HK Standard for discharge to Grade C+++ inland water	HK Standard for Water Reuse	Discharge from DMBR
Coliform bacteria (n/100ml)	< 1	100	1,000	< 1	<1 (with UV or Chlorine)
Total Suspended Solids (mg/l)	10	30	20	5	<1
BOD ₅ (mg/l)	10	20	20	10	<5
COD (mg/l)	50	80	80	N/A	<30
pH	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	N/A	6.5 - 8.5
Chlorine (mg/l)	N/A	N/A	N/A	>1	Depends on application

* Abstraction for potable water supply

** Irrigation

+++ Pond fish culture

DMBR is manufactured in AISI 316 stainless steel or UPVS

No. of flushing/day (10L/ flushing)		1,000	2,000
Design Capacity	m ³ /Day	10	20
Dimension (Excluding the Maintenance Space)	Length (mm)	3,000	4,900
	Width (mm)	2,200	2,200
	Height (mm)	2,200	2,000

