



MUNTINLUPA CITY LAKE REHABILITATION & WASTEWATER MGT. PROGRAM



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MUNTINLUPA CITY



***The SOUTHERN
GATEWAY to
Metro Manila &
CALABARZON***

***“The New Growth
Center & The Most
Livable City South
of Metro Manila”
Hon. Aldrin L. San Pedro
City Mayor***



PROFILE

- Area: 46.7 square kms.
- Nine barangays
- Population: 480,000+
- Classified as a Highly Urbanized City
- Residential/Commercial/Light to Medium Industry
- No. of Households: 110,000+
- No. of Business Establishments: 9,000+
- Population concentrated at the eastern portion (lakeshore area)
- No. of densely populated areas (depressed areas):184
- No. of subdivision/villages: 80
- Major growth area: 1) Ayala Alabang/Madrigal Area 2) Filinvest Corporate City Area

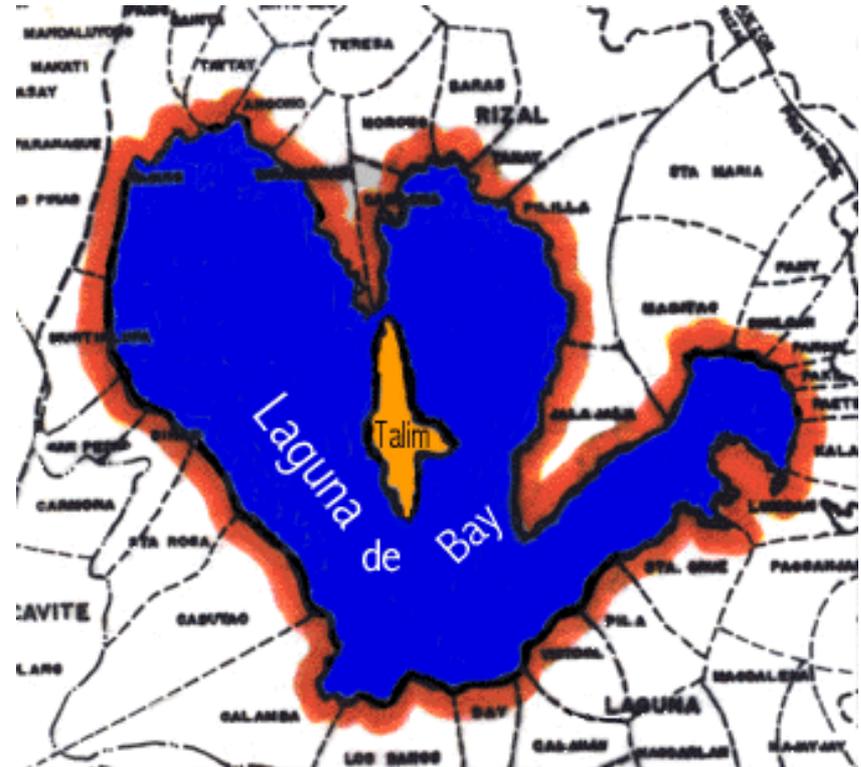


WATER RESOURCE

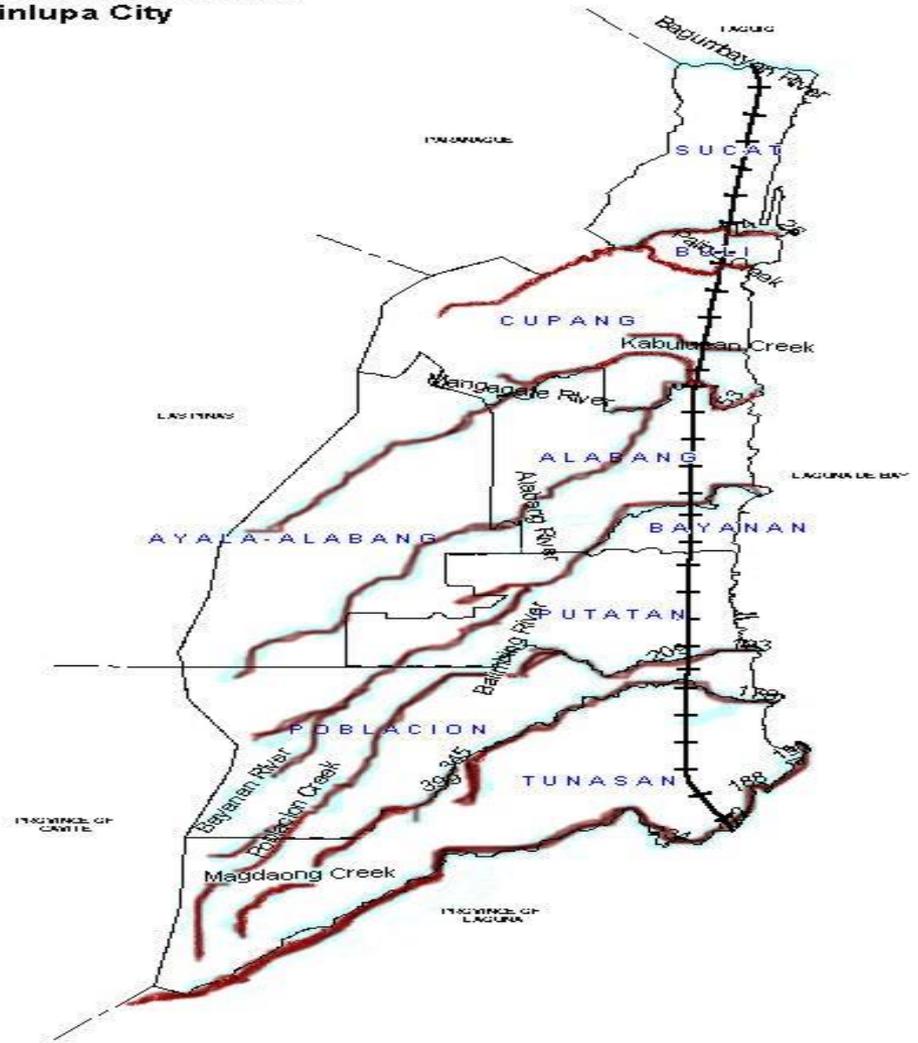


**Laguna Lake: +90,000 HAS.
(City of Muntinlupa = +5,900 HAS.)**

- * **AQUACULTURE/FISHERIES**
- * **NAVIGATION**
- * **DOMESTIC H₂O SUPPLY**
 - Ayala Alabang Village
 - 100 MLD (Maynilad): Operational
 - 200 MLD 2nd phase



**Map showing Rivers and Creeks
in Muntinlupa City**



Source: City Planning and Development Office/GIS Division-ian/pitz

VULNERABLE AREA



TYPHOON ONDOY



ONDOY/SANTI EXPERIENCE



LAKE MANAGEMENT OFFICE

KAUTUSANG PANLUNGSOD 95-51

Kautusang Panglungsod na nagtatatag ng Tanggapan para sa Lawa ng Laguna (Lake Management Office)

By:

Hon. Aldrin L. San Pedro

- Management of lake waters of Muntinlupa City
- Formulate & recommend to the mayor policies concerning Laguna Lake
- Implementation of Anti-Illegal Fishing Laws & Ordinances
- Maintenance of Peace & Order
- Pollution Control & Response
- Assist in Water Rescue Operation
- Coordinate with LLDA/BFAR/PNP/Coast Guard/Brgys.
- Coordinate & Assist Fishpen Optrs. & Fisherfolks Org.

PROGRAMS/PROJECTS

- **Lake Ecosystem Rehabilitation and Protection**
 - Bantay Lawa/Lake Guards
 - Quarterly Lake Seeding
 - Paliko Creek Constructed Wetland Project (up to FS stage)
- **River Rehabilitation Program**
 - Sagip Ilog/Environmental Armies
 - Trash Interceptor System
 - Fencing/Declogging/De-silting Projects
 - Treeplanting
- **Shore Land Development**
 - Shore Land Tree Planting/Wetland Area Restoration
 - Shore Land Rehabilitation and Development
- **Enforcement/Legislation**
 - City Ordinances No. 98-013 & 02-070

SPECIFIC ORDINANCES & RESOLUTIONS

- **KAUTUSANG PANLUNGSOD BLG. 98-013**
- Kautusang panlungsod na ipinagbabawal sa sinuman ang gumamit ng labag na pamamaraan sa pangangisda sa Lawa ng Laguna na nasasakupan ng Lungsod ng Muntinlupa.
- **ORDINANCE NO. 02-070**
- An ordinance prohibiting any person to discharge or dispose any untreated wastewater, sludge, oil, chemical, or other waste to any part of the City of Muntinlupa that will endanger the environmental condition of the City's Lake, Rivers, Creeks and waterways with the corresponding penalties thereof.

BANTAY LAWA

21 Bantay Lawa Personnel
24/7 duty: patrolling & monitoring
lake waters of Muntinlupa City



BANTAY LAWA

2011

Number of Apprehension: 32 persons
involving illegal trawlers “suro” & illegal
active fishing methods



QUARTERLY LAKE SEEDING



100,000 fingerlings per quarter
In Cooperation with BFAR & LLDA



QUARTERLY LAKE SEEDING



SAGIP ILOG/RIVER REHABILITATION



- 14 Environmental Army
- Regular Clean Up on 8 Tributaries

River Clean Up at Alabang River



SAGIP ILOG/RIVER REHABILITATION



River Clean Up at Tunasan River



SAGIP ILOG/RIVER REHABILITATION

**Clean Up & Dredging Operation
at Tunasan River**



In cooperation with DPWH

SAGIP ILOG/RIVER REHABILITATION



River Clean Up at Putatan River



SAGIP ILOG/RIVER REHABILITATION

**River Desilting at Tunasan River & other
Tributaries
In Cooperation w/ MMDA**



SAGIP ILOG/RIVER REHABILITATION



**Desilting of Sto. Nino Village Creek, Lodora
Subdivision, Camella Homes IV, Brgy. Putatan
Esteros
In Cooperation w/ MMDA**



TUNASAN RIVER DE-CLOGGING & CLEAN-UP





USAID | **ASIA**
FROM THE AMERICAN PEOPLE



**City of Government of
Muntinlupa**



Local Initiative for Affordable Wastewater Treatment LINAW Project



Project Info

Muntinlupa Public Market

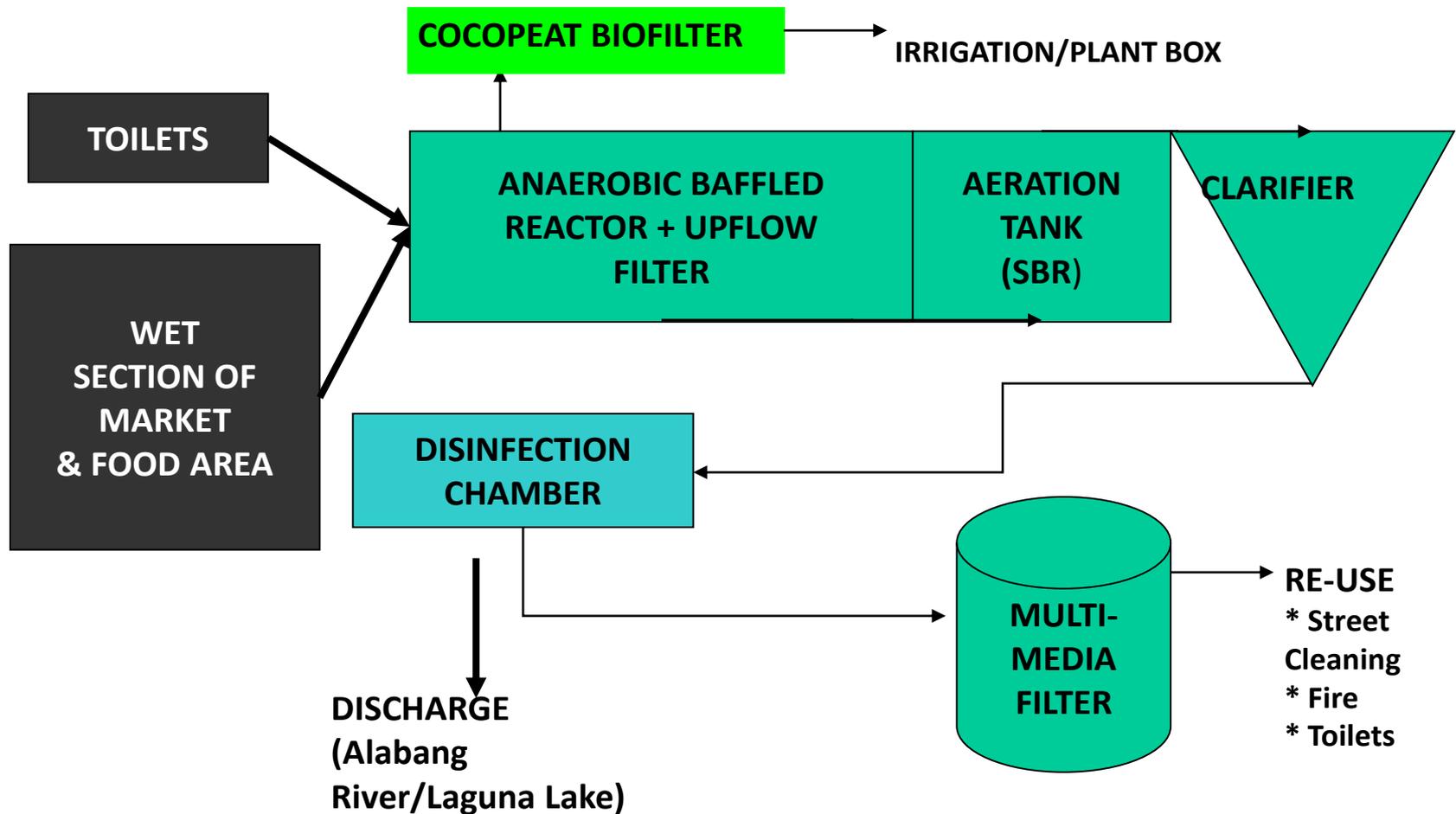
- Flow: 210 cu. meters/day
- Stalls: 1445 wet and dry
- Influent: 600 mg/l+ BOD
- Effluent discharge: 15 mg/l
BOD (Class "C" limit + 50mg/l)
- Area: 160 sq. m (underground)
- Timeframe: 7 months
construction; operation started
February 2006



Technology Selection

Technology	Capital Cost	O&M/Month	Land Requirements	Remarks
ABR/SBR Hybrid	\$140,000	\$500	150 sq. meters	Selected
Lagoon	\$80,000	\$175	2000 sq. meters	Too large
Constructed Wetlands	\$120,000	\$175	1500 sq. meters	Too large
Activated Sludge	\$200,000	\$700	150 sq. meters	High cost and couldn't keep parking lot
Trickling Filter	\$200,000	\$700	150 sq. meters	High cost and couldn't keep parking lot

Plant Layout Schematic



Treatment Components

- * Raw wastewater pumping
- * Anaerobic Baffled Reactor
- * Sequencing Batch Reactor
- * Media Filtration System
- * Chlorine Contact and Reuse System
- * Coco-Based Media Filtration System (side project: 3 cu. m.)



Cross-Sectional View

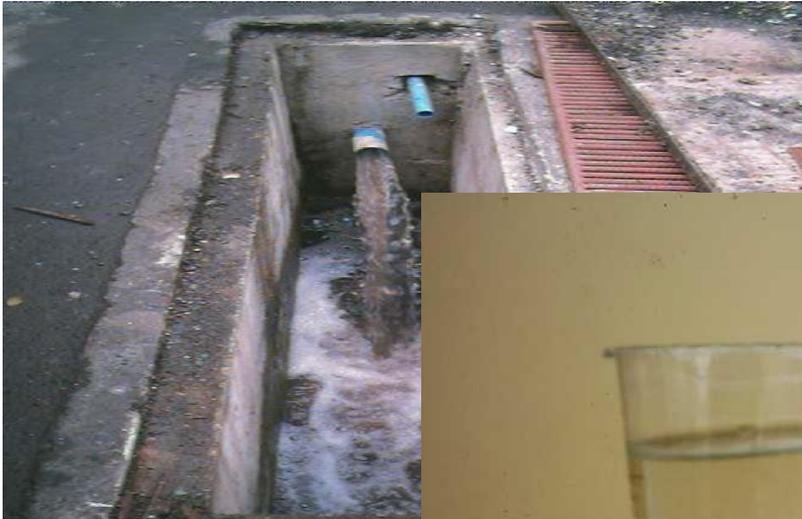


Treatment system installed completely underground so there is no loss of parking lot and delivery area

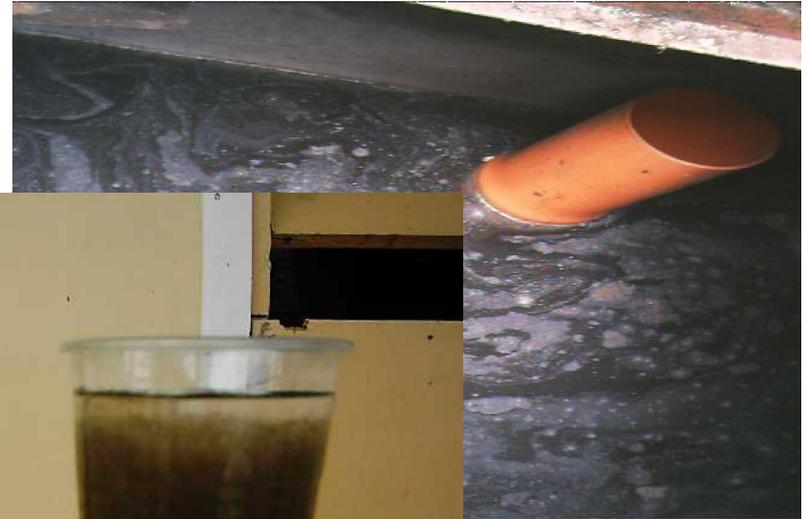
Influent and Effluent Baffles and Flow Control Structures



Treatment Process



RAW WASTEWATER



AERATED REACTOR



SBR AERATION



RECLAIMED WATER REUSE

Recycled Water System



- Filtered and disinfected water is pumped to a gravity holding tank then into the urinal/toilet flushing system
- Reclaimed effluent is also used for street washing/plant watering/fire water.
- Using reclaimed water saves on pumping costs and use of potable water obtained from deep wells (50% = Php 525/day = Php 15,750/month)

Project Cost: Public Market WW Treatment Facility

(amounts in thousand pesos)

Description	Cost
Concrete Masonry	2,639.0
Others	754.0
Sub-total Materials	3,393.0
40% labor	1,357.2
10% tax	339.3
Earthworks	266.0
	5,355.5
21%	1,124.7
Total Direct costs	6,480.2
Electro mechanical equipment	320.0
Total capital outlay	6,800.2
One Year Operating Costs	336.0
Total Costs	7,136.2

Full Cost Recovery

- **Cost to construct: 6.8 million pesos**
- **Operational costs: 27,000 pesos/month**
- **Reuse savings: 15,000 pesos/month**

User fee structure: 5 pesos/stall/day

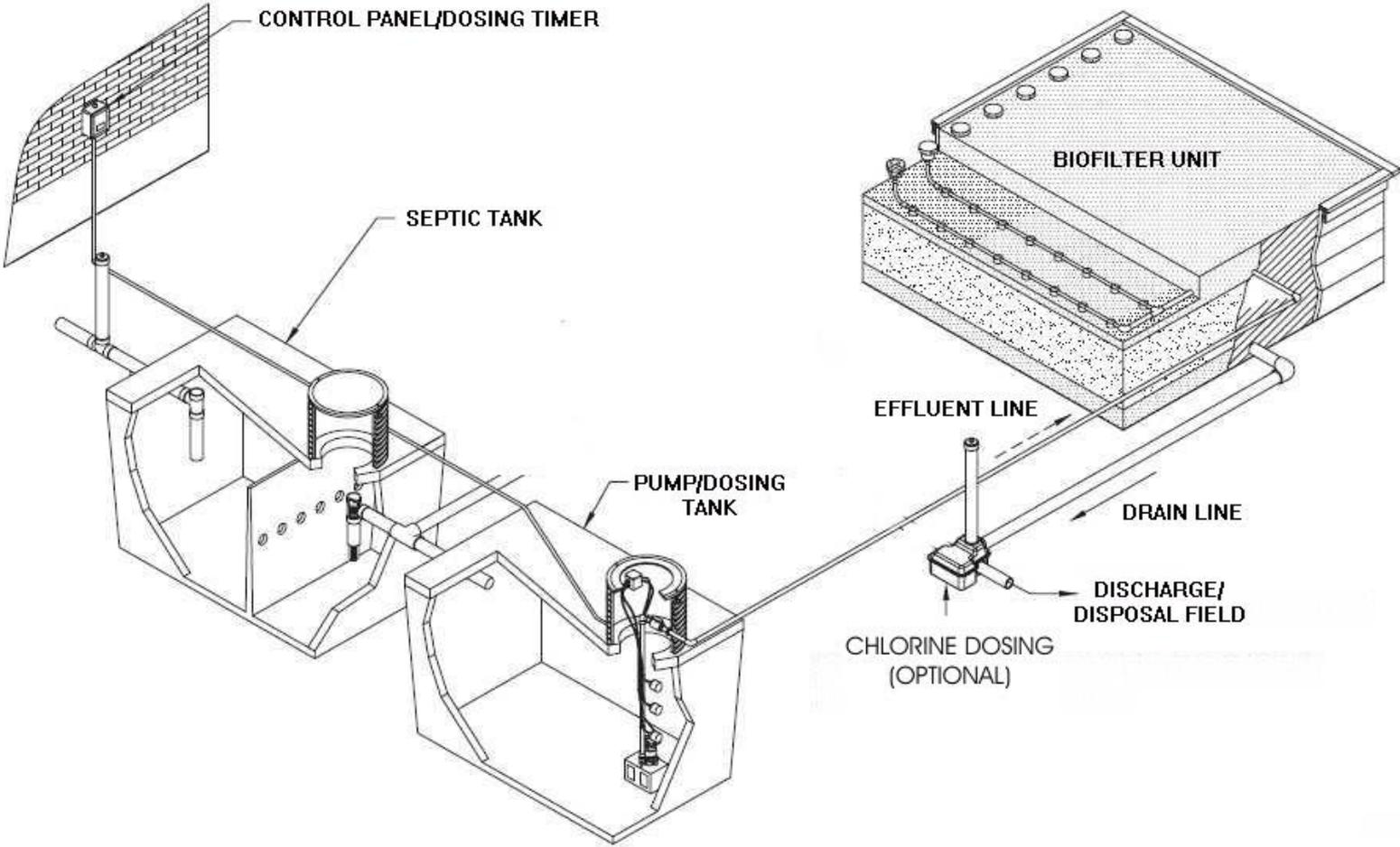
1440 stalls * P 5.00/day * 365 days

= P 2,628,000/year

Full cost recovery period = 3 years



COCOPEAT BIOFILTER FOR WASTEWATER TREATMENT PROJECT



COCOPEAT BIOFILTER FOR WASTEWATER TREATMENT PROJECT

Putatan Elementary School
&
Muntinlupa Science High School



Lessons Learned/Conclusions

- Interest and replication have been high because many facilities face the same problems
- Full cost recovery is feasible with low-cost technology and user fees
- Local government leadership and ownership is key
- Important to build support and willingness to pay fees using effective social marketing campaigns thus encouraging stakeholders participation





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THANK YOU!



"Muntinlupa... Nagkakaisa, May Disiplina!"
Mayor Aldrin L. San Pedro