Sectoral Perspective: Domestic Water and the Role of Metropolitan Waterworks and Sewerage System (MWSS)

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Outline

- Metropolitan Waterworks and Sewerage System (MWSS)
- Water supply projects
- Wastewater projects
- Video on sewage and septage treatment process

MWSS Mandate per RA 6234

Water Supply

- *treatment, supply and distribution*

Sewerage

- *sewage collection, treatment and disposal*

Sanitation

- *regular emptying of septic tanks and provision of appropriate treatment and disposal facilities*

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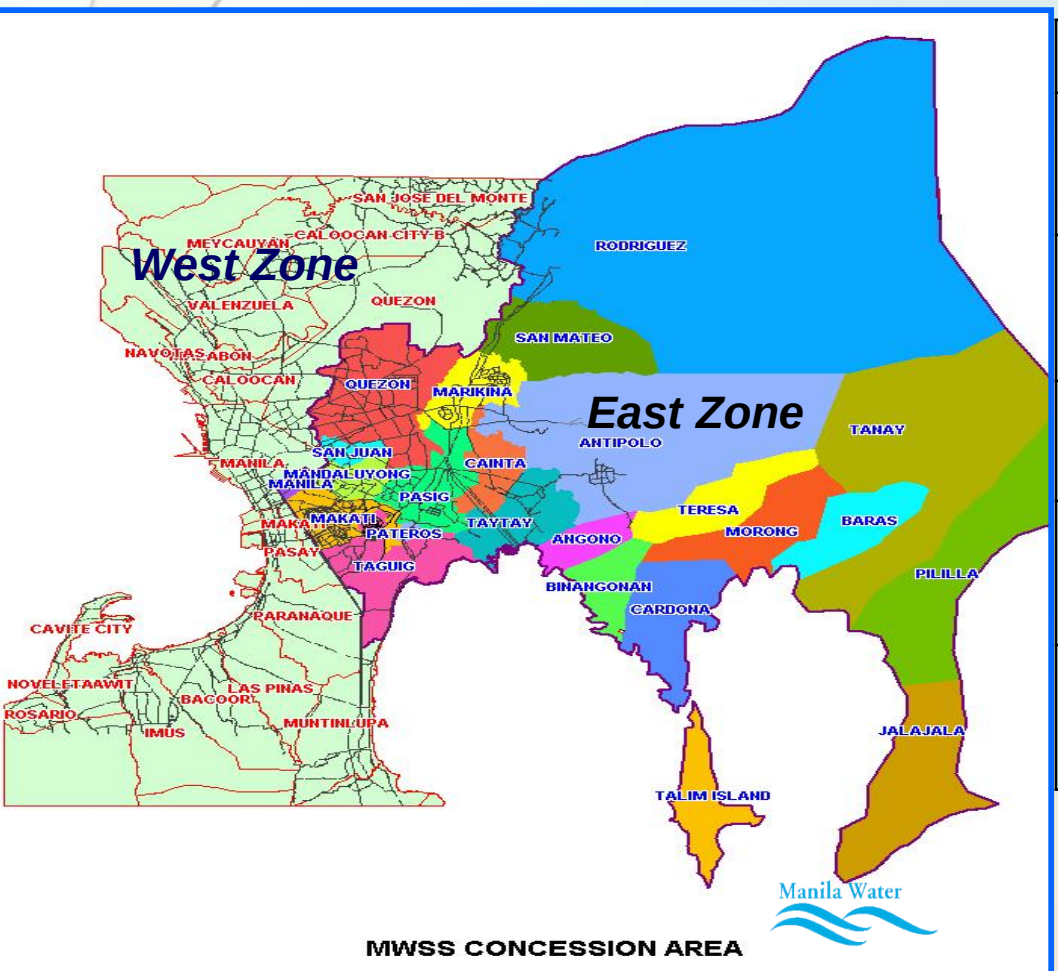
MWSS Privatization in 1997



25 (+15) - Year Concession (1997-2037)

As of December 2013		
	West Zone Maynilad	East Zone Manila Water
Service Area	17 cities/ Municipalities	23 cities/ Municipalities
Total Population	9.6 M	6.3M
% Water Supply Coverage	90%	92%
% Sewer Coverage	11%	12%

WATER SUPPLY PROJECTS

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Existing Raw Water Source

Umiray River

Sierra Madre Mountain

Angat River

97% of Domestic Water
(4000mld)

IPO DAM

UMIRAY-ANGAT TRANSBASIN TUNNEL

ANGAT DAM

3 - TUNNELS

Bicti Basins

3

2

1

AQ-6

AQ-5

AQ-4

AQ-3

AQ-2

AQ-1

LA MESA TREATMENT PLANT

MAYNILAD
West zone

NOVALICHES- LA MESA PORTAL

6 - AQUEDUCTS

LA MESA RESERVOIR

MANILA WATER
East zone

BALARA TREATMENT PLANT

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Laguna Lake Water Supply Projects

- Putatan Water Treatment Plant:

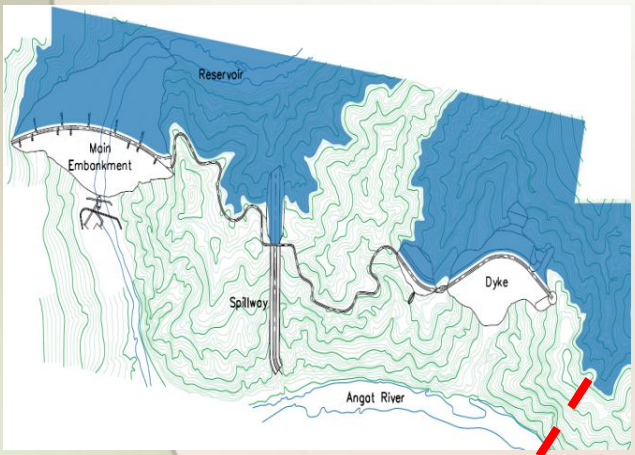
  First Phase: 100MLD

  Second Phase: 100MLD

- Rizal Province Water Supply Improvement Project

  50MLD

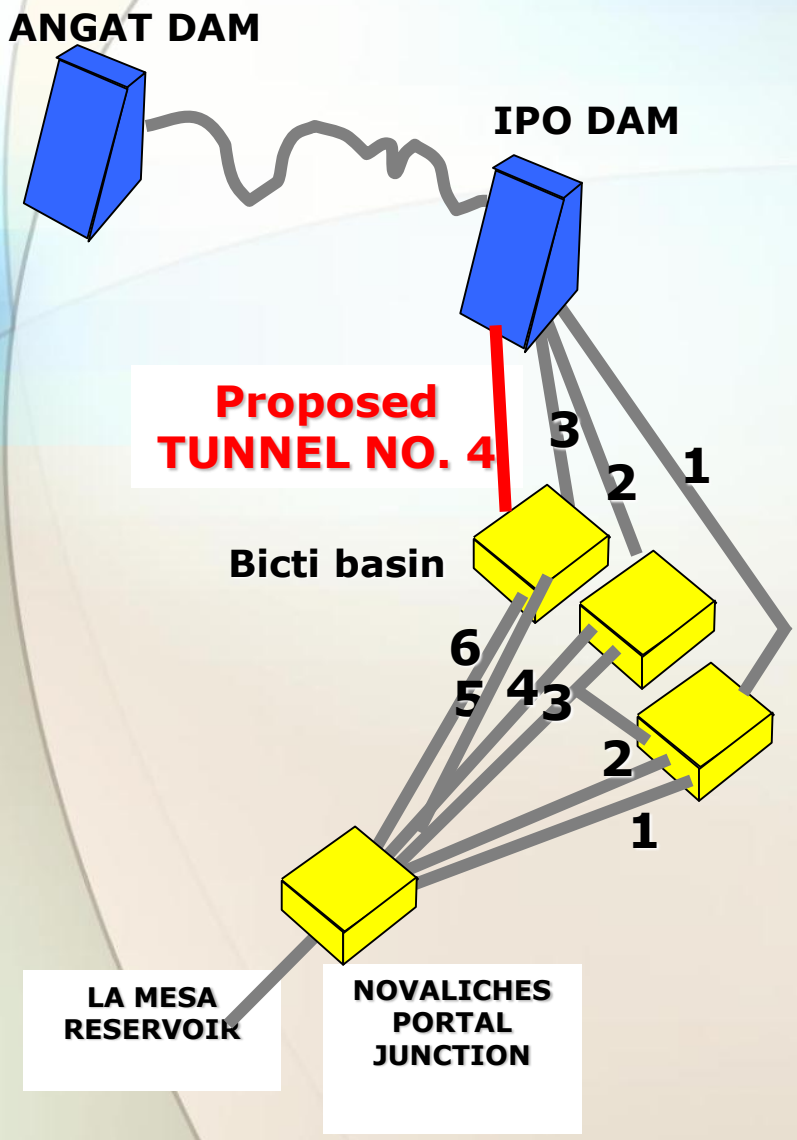
Angat Dam & Dyke Strengthening Project



WVF Splay (local fault)

Background	PHIVOLCS announced that the West Valley Fault (WVF) is potentially active and that a **splay/local fault runs 200 meters east of the main Angat Dyke**; Phase 1: Safety study, conceptual design of remediation works and preparation of bid documents Phase 2: Detailed design and civil works
Location	Norzagaray, Bulacan
Benefit	Disaster risk reduction
Funding Source & Cost	Phase 1: PhP 31 Million (PSALM) Phase 2: PhP 5.70 B (National Government)
Status	• Phase 1: completed on May 2012. • Phase 2: On-going discussion with Korea Water Resources Corporation (K-water) regarding their obligation for mandatory rehabilitation of Angat Dam.

Angat Water Transmission Improvement Project (AWTIP)



Description	New tunnel No. 4 to facilitate the rehabilitation of the transmission system
Location	San Jose Del Monte and Norzagaray, Bulacan
Benefits	Reliable conveyance of raw water from Ipo to La Mesa Dams
Funding	ADB
Project Cost	PhP 5.8 Billion
Status	• Loan negotiation with ADB in progress; • Approved by NEDA

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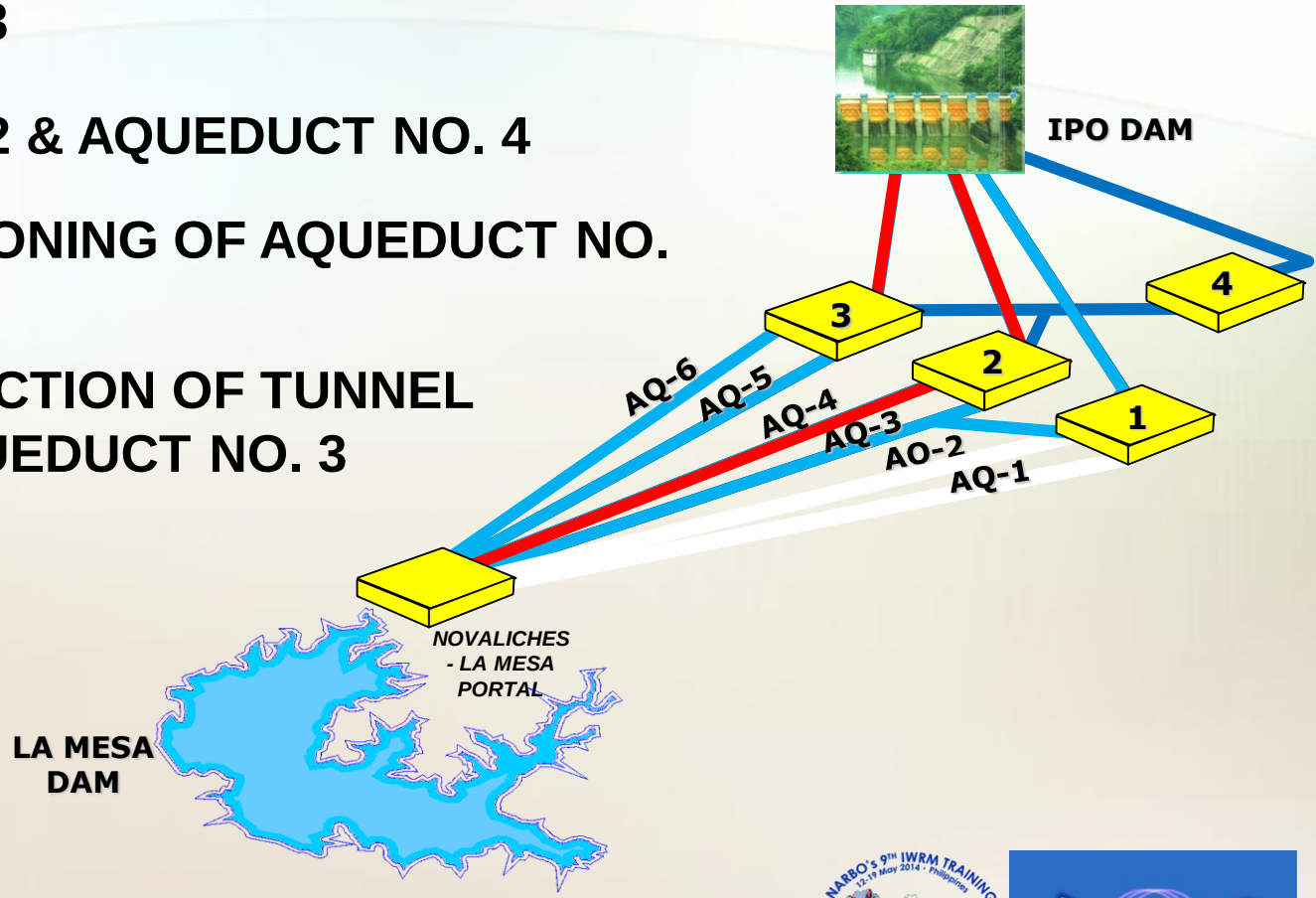
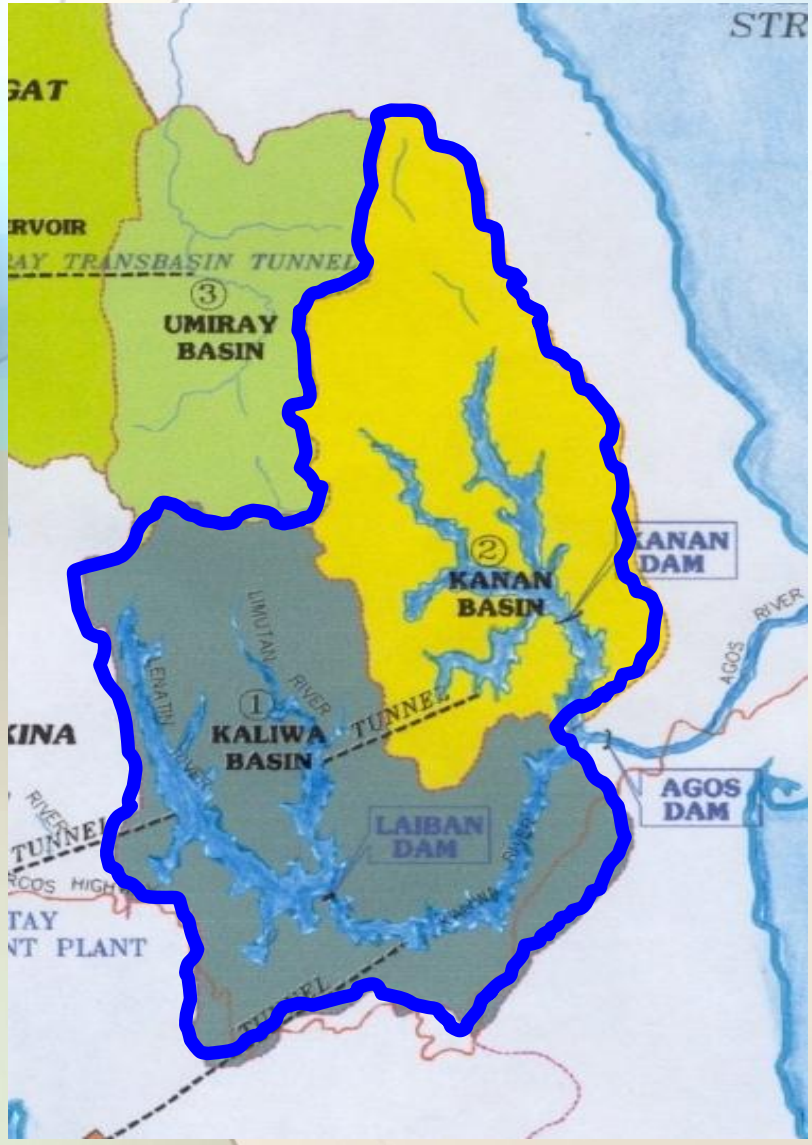
PROGRAM OF REHABILITATION AFTER COMPLETION OF AWTIP (TUNNEL NO. 4)

1. TUNNEL NO. 3
2. TUNNEL NO. 2 & AQUEDUCT NO. 4
3. DECOMMISSIONING OF AQUEDUCT NO. 1 & 2

   INTERCONNECTION OF TUNNEL NO. 1 TO AQUEDUCT NO. 3



New Centennial Water Source Project (NCWSP) – Kaliwa Dam Project



Description	Construction of a new water source to meet the increasing water demand
Location	Kaliwa River (Tanay, Rizal & General, Nakar, Quezon)
Funding Source	Public-Private Partnership (PPP)
Cost	PhP 19 Billion
Status	Endorsed by NEDA-ICC Technical Board; for NEDA Board approval

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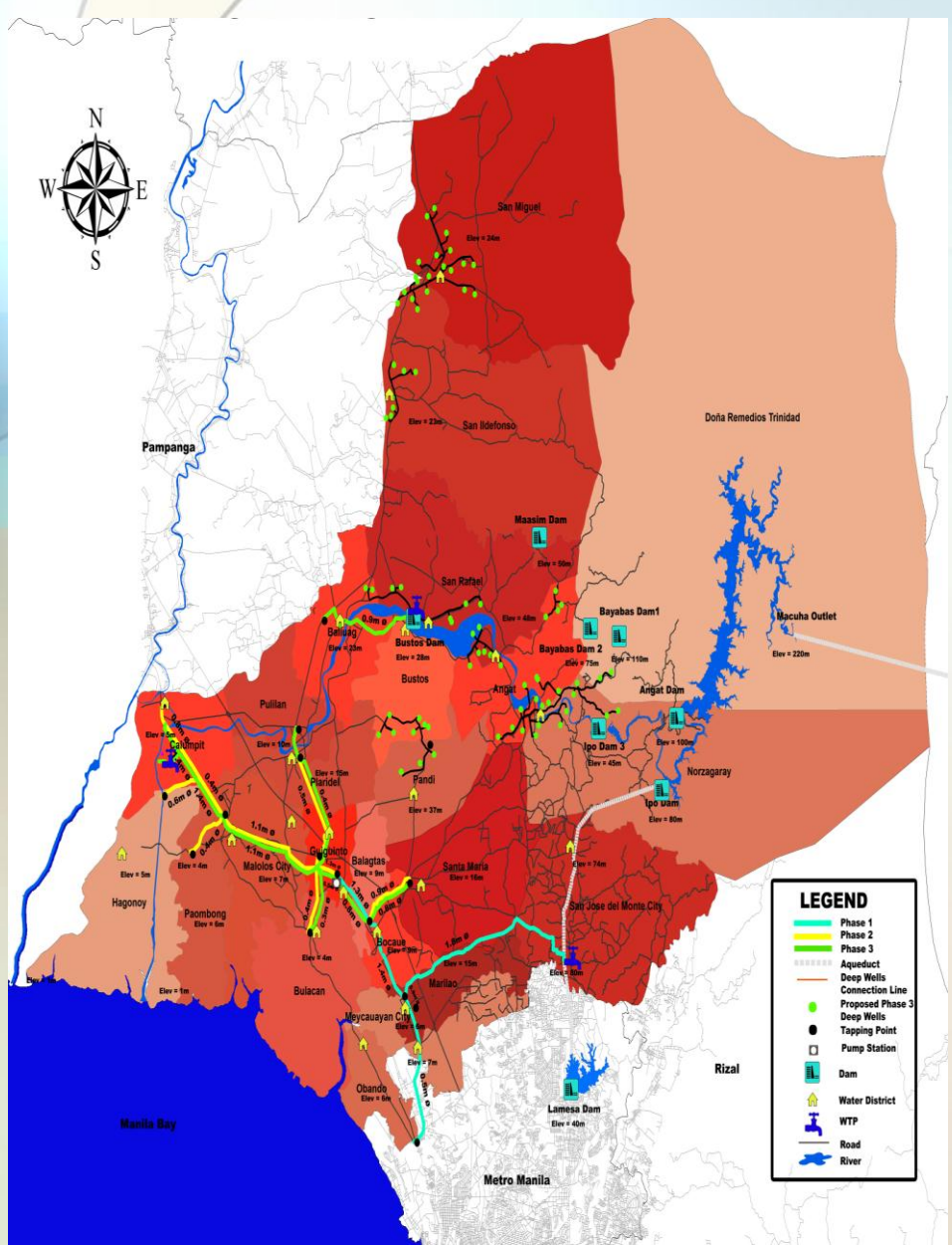
The Bulacan Bulk Water Supply Project



Legal basis: Approval of the President for the inclusion of Bulacan in the MWSS Service Area for purposes of supplying bulk water. In 1993

Project cost: 24B

Implementation: PPP

Cooperation period: 30 years

Potential Sources: Angat River, Bustos Infiltration Gallery, Ipo Dam 3, Bayabas Dam, Maasim Dam, Pampanga River, & Deep wells

WASTEWATER PROGRAM
(Sewerage and Sanitation)

Domestic Wastewater / Sewage Generation

Wastewater Generation at HOME

Toilet	Others
Yellow Water / Brown Water	Gray Water
Black Water	
SEWAGE	

Drivers for Sewerage and Sanitation Programs

- Clean Water Act-2004
- Supreme Court decision to clean-up Manila Bay
- Compliance with the Concession Agreement

Drivers for Sewerage and Sanitation Programs

DAO – 35: Effluent Standards

Parameter	Values (for class C)
Biological oxygen demand (BOD)	50mg/L
Chemical oxygen demand (COD)	100mg/L
Total suspended solids (TSS)	70mg/L
Oil and grease	5mg/L
Color	150NTU
Total coliform	10,000 MPN/100mL

Sewerage and Sanitation Services

SEWERAGE
Wastewater Treatment Plant

- network of pipes leading to a wastewater or sewage treatment plants (STP)
- treatment of sewage STPS prior to disposal to receiving bodies of water

SANITATION
Septic Tank Desludging

- Provide regular cleaning of septic tank
- Vacuum tankers are used to collect the septage
- Septage are treated at STP
- Biosolids are used as soil conditioner

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Sewerage Services

Manila Water

- 37 Sewage Treatment Plants

  Magallanes WwTP (Makati), UP WwTP (Quezon City), Olandes WwTP (Marikina),Pineda WwTP (Pasig), 31 Package WwTPs
- 260 km of sewer network
- 12% Sewerage Coverage (as of Dec 2013)

Maynilad

- 11 Sewage Treatment Plants

  Manila Central Sewerage System, Dagat-dagatan Alabang, Makati Isolated System
  QC Communal Systems, San Juan catchment STPs
- 480 km of sewer network

Sanitation Services

Manila Water

- 2 Septage Treatment Plants
  - South SpTP (Taguig City)
  - North SpTP (San Mateo, Rizal)
- Total Capacity: 1,400 cmd
- 91 vacuum desludging tankers

Maynilad

- 2 Septage Treatment Planst
  - Dagat-dagatan SpTP (Tondo)
  - Project 7 SpTP (Quezon City)
- Total Capacity: 700 cmd
- 25 vacuum desludging tankers
- 7 mobile dewatering units

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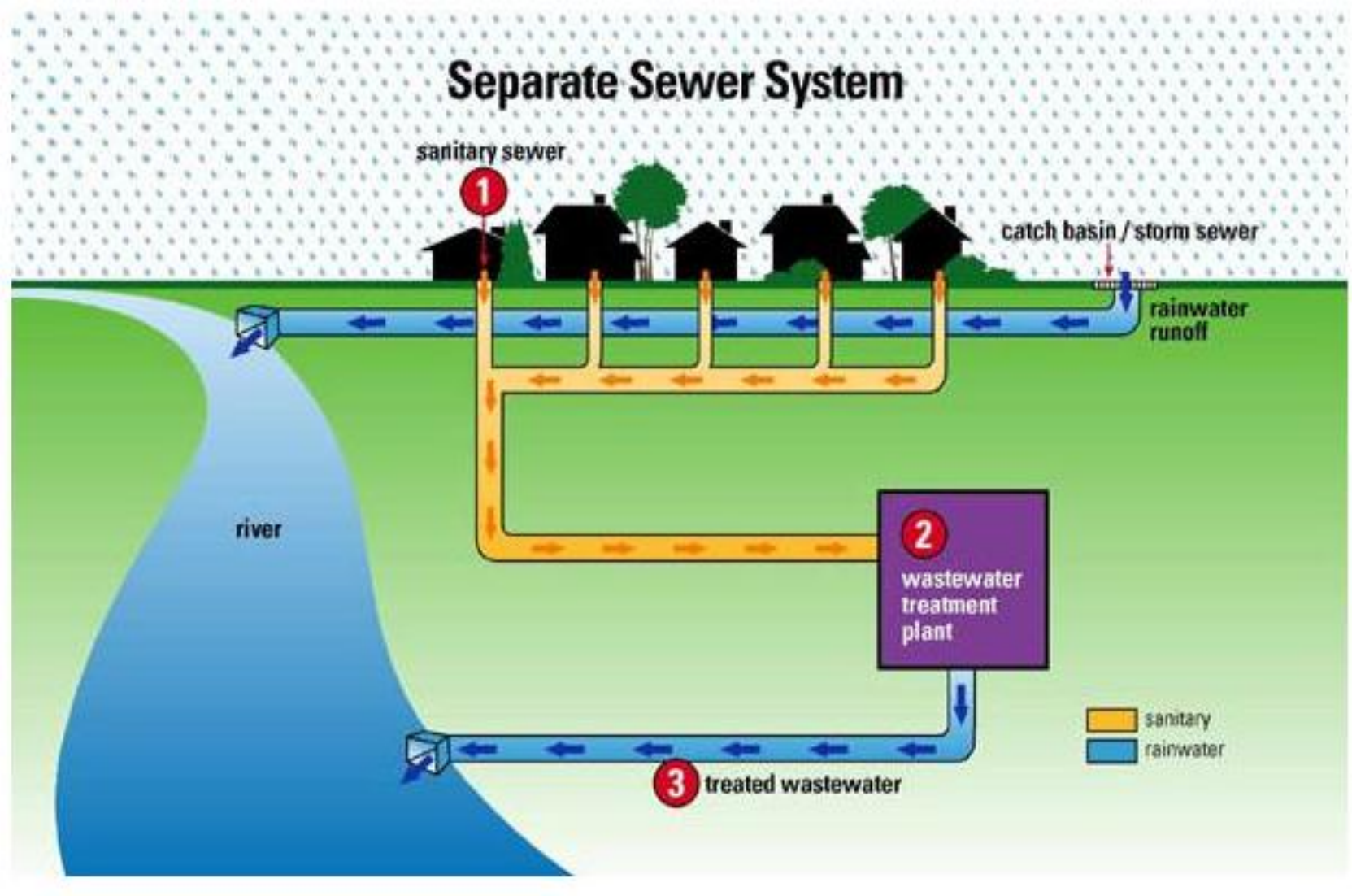
Separate Sewer System



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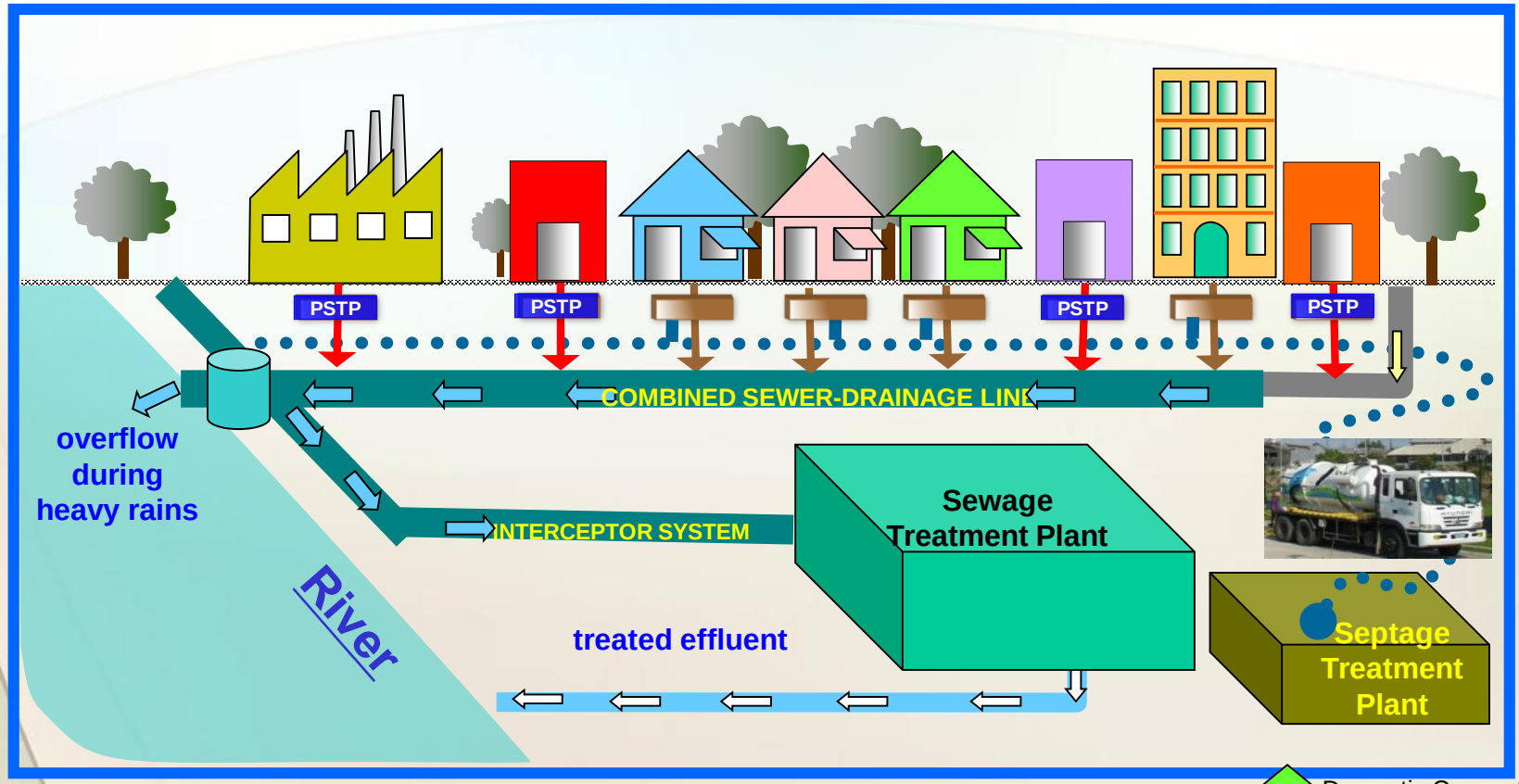
Strategies

Combined Sewer System and Septage Management



- Commercial and Industrial connections should have pre-treatment for their wastewater

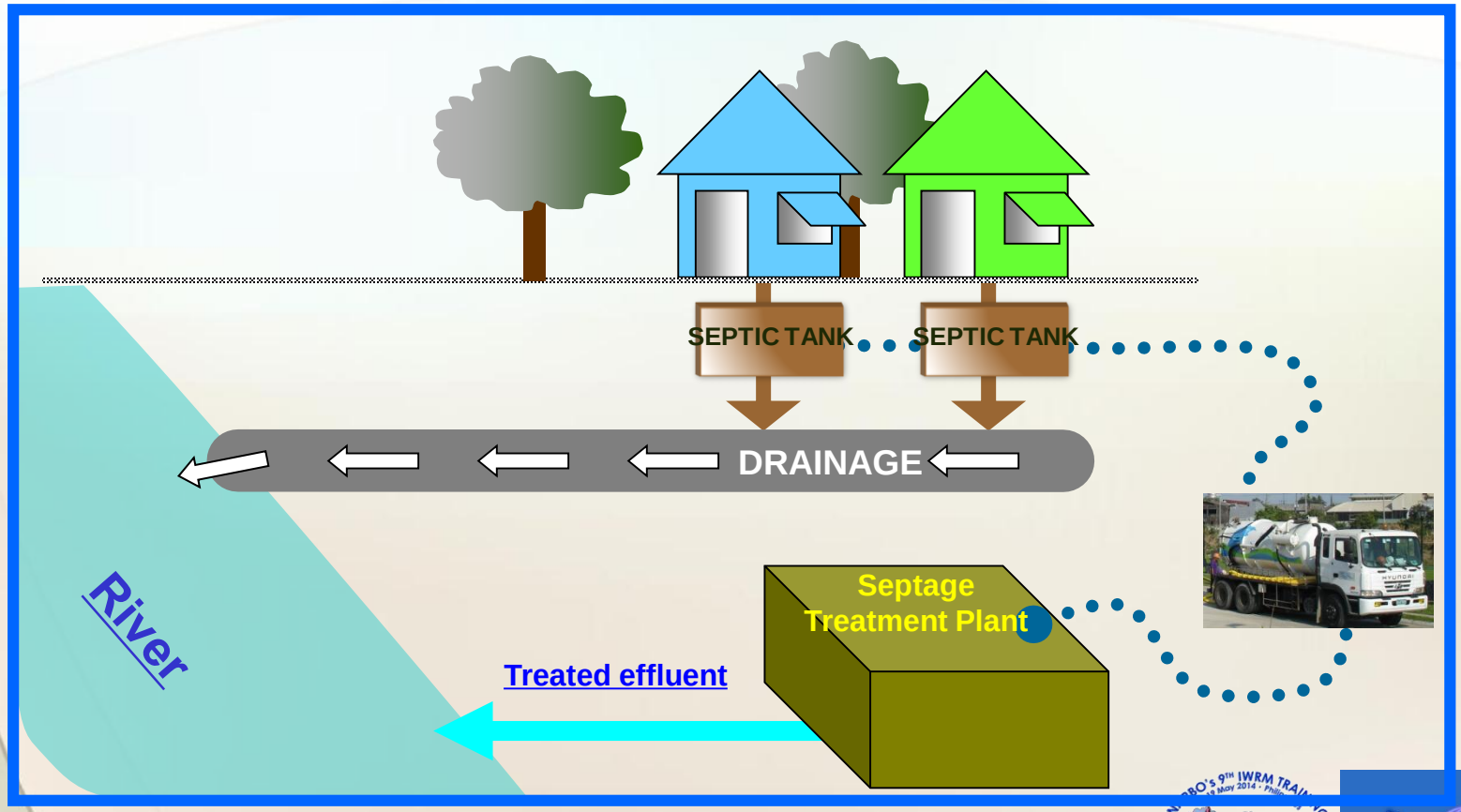
Domestic Connections

Commercial Connections

Industrial Connections

Strategies

Septage Management



The River Basin Approach

RIVER SYSTEMS (EAST ZONE)

- **Marikina-San Juan-Pasig Rivers**
- **Laguna Lake**

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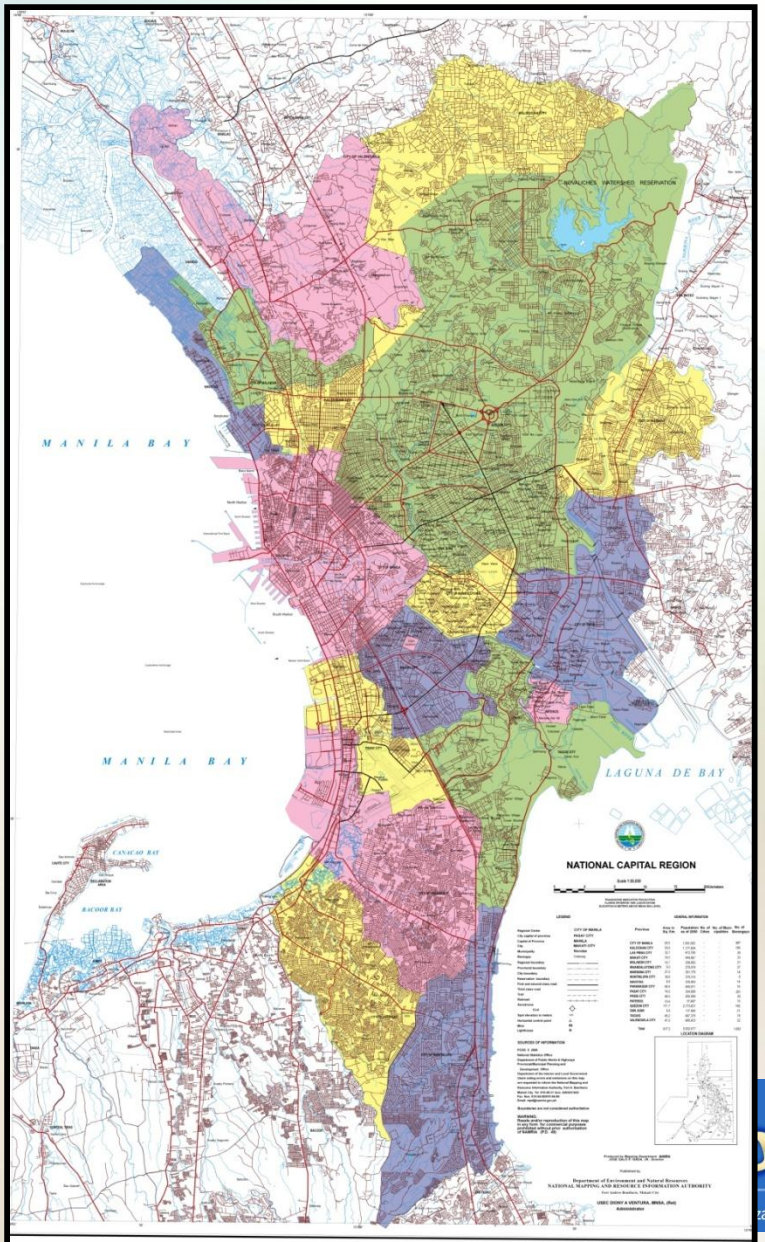
The River Basin Approach

River Systems (West Zone)

1. Meycauayan-Marilao-Obando (Bulacan) Rivers
   Areas : Valenzuela
2. Navotas-Malabon-Tullahan-Tenejeros Rivers
   Areas: Navotas, Valenzuela, Malabon, Caloocan, Quezon City
3. Pasig-Marikina-San Juan Rivers
   Areas : Quezon City, Manila
4. Parañaque-Zapote-Las Piñas Rivers
   Areas : Pasay, Parañaque, Las Piñas
5. Imus (Cavite) River
   Areas : Bacoor, Imus, Kawit, Cavite City, Rosario, Noveleta



The Goal

Sewerage and Sanitation 100% → **2037**

Sewerage Roadmap

Period	MWCI	MWSI
	Percentage	Percentage
As of 2012	12%	9%
2013-2017	33%	27%
2018-2022	50%	58%
2023-2027	61%	73%
2028-2037	100%	100%

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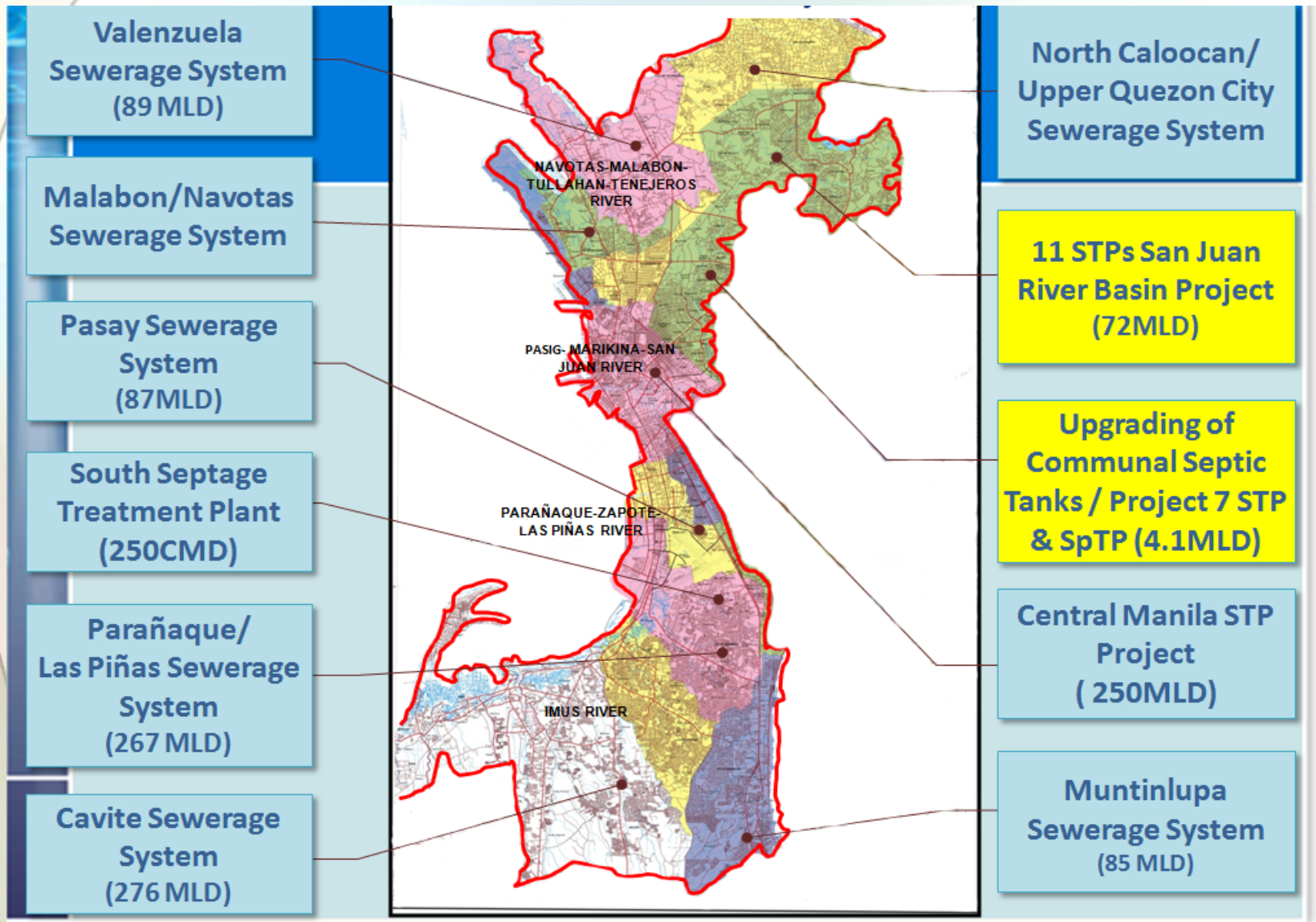
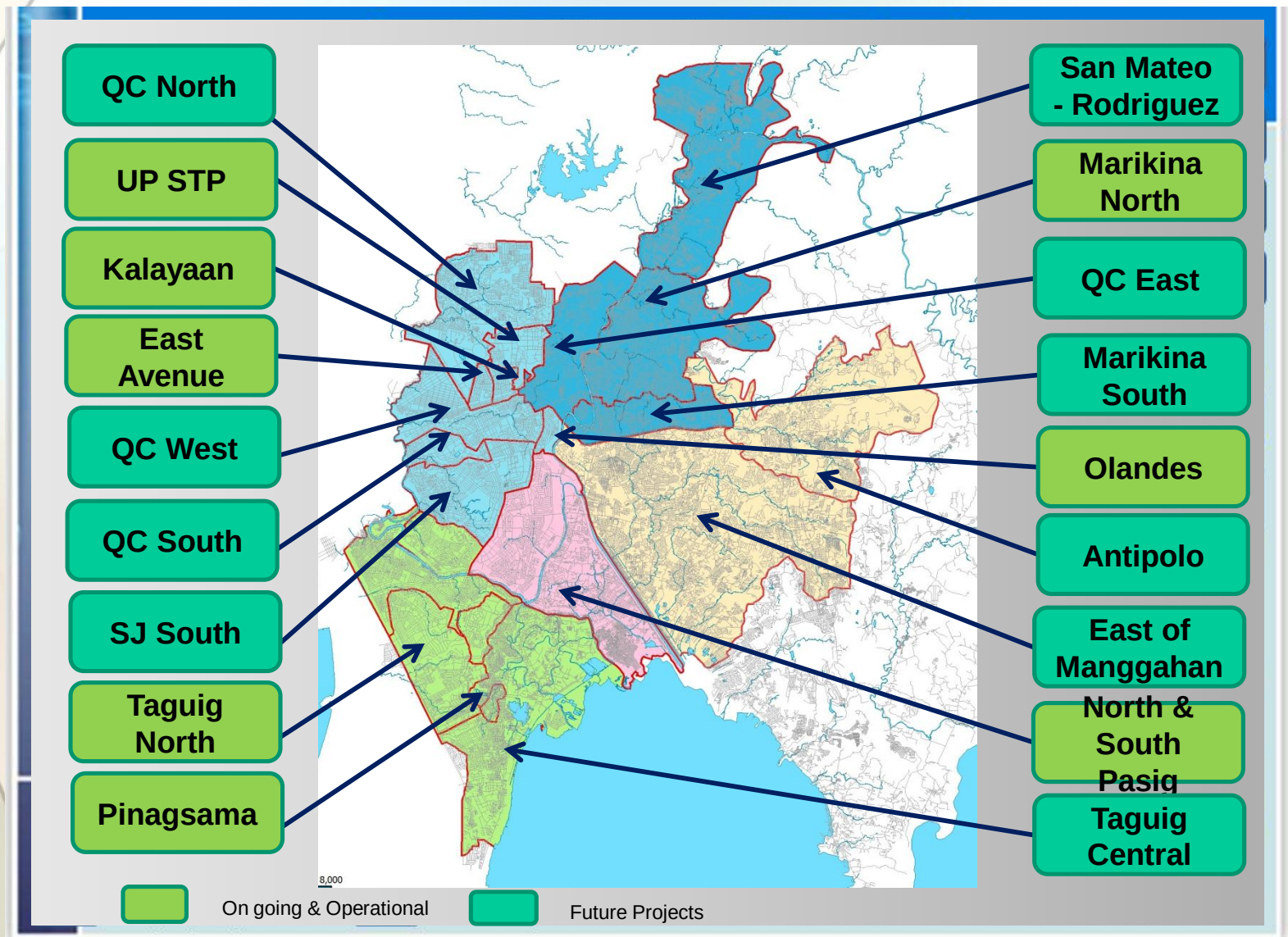
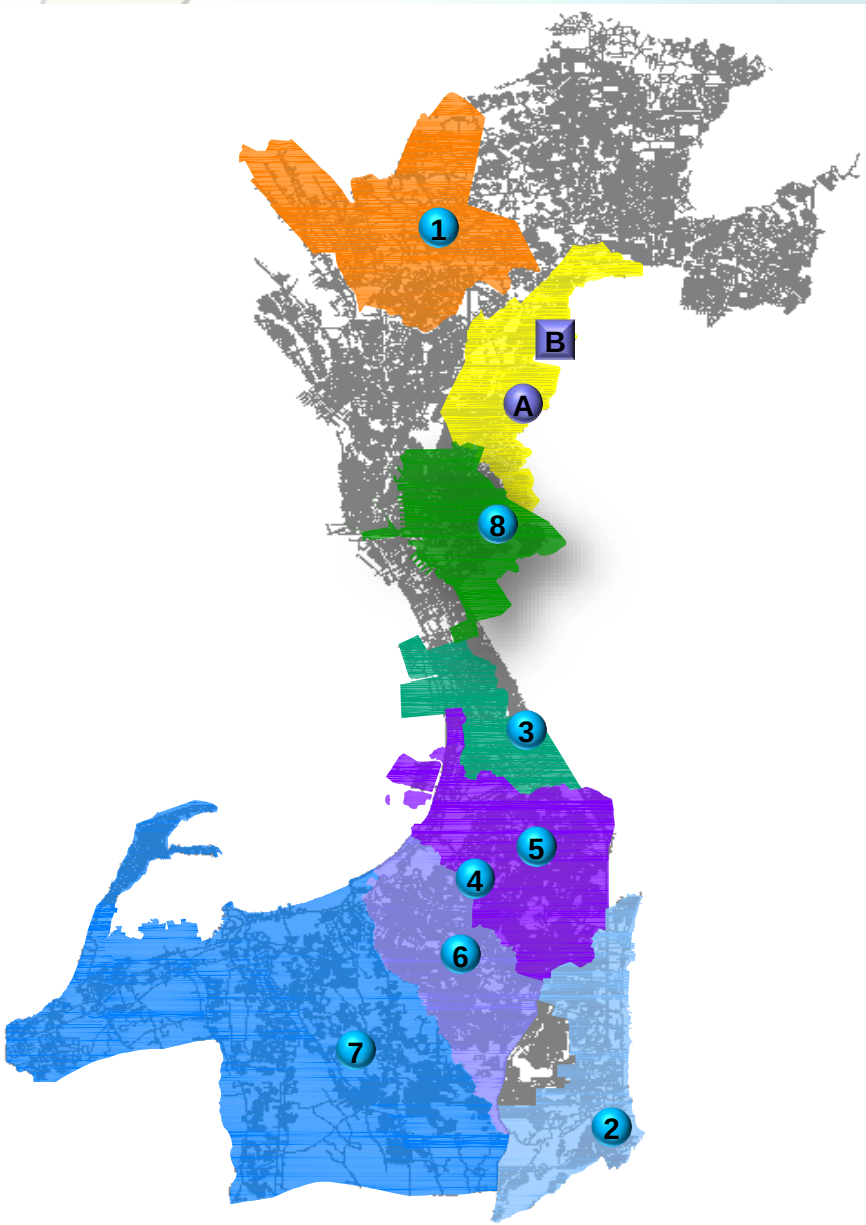
Sewerage Master Plan - Maynilad



Sewerage Master Plan – Manila Water



Maynilad Ongoing Projects



- Construction Stage
  A,B : San Juan River Basin Project
- Detailed Design Stage
  1. Valenzuela Sewerage System
  2. Muntinlupa Sewerage System
- Tendering Stage
  3. Pasay Sewerage System
  4, 5. South Sewage and Septage Facility
- Completed Feasibility Studie
  Lot acquisition on-going
  6. Paranaque -Las Pinas Sewerage Syst
  7. Cavite Sewerage System
  8. Central Manila Sewerage System

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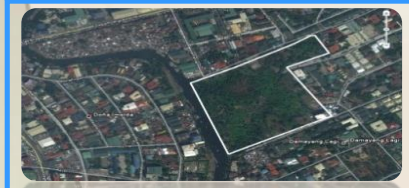
Manila Water On-going Projects

Marikina North
100 MLD STP
(Ongoing Construction)
Population 470,704

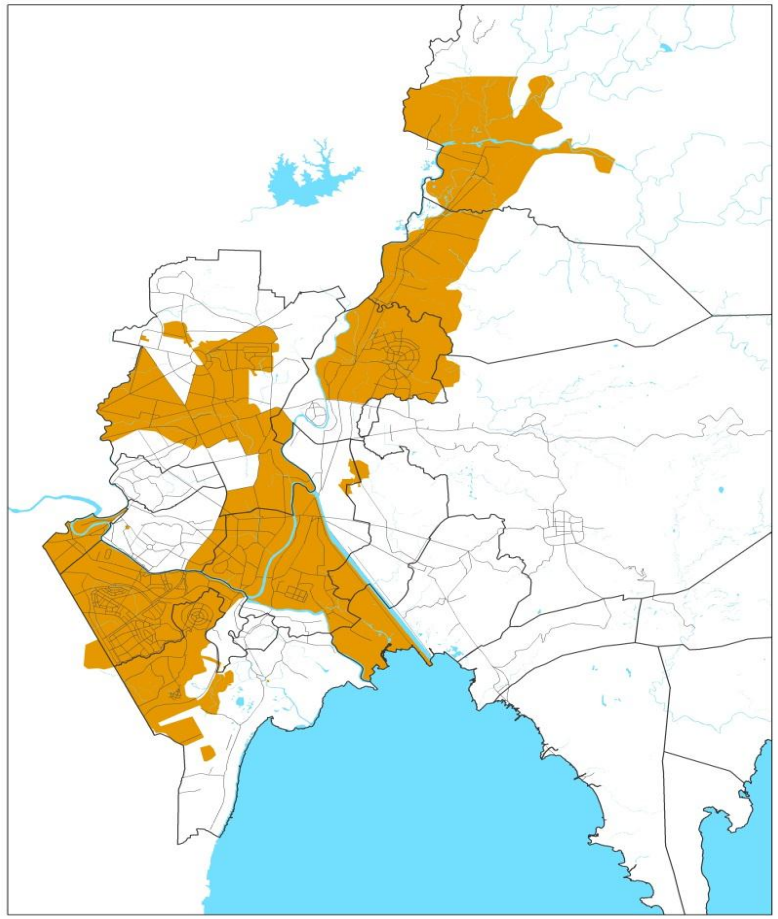
Taguig North (LNMB)
75 MLD STP
(Ongoing Construction)
Population 245,677

North & South Pasig
100MLD expandable to
165 MLD STP
(Ongoing Construction)
Population : 630,885



QC West
55 MLD STP
(Ongoing Reference Design)
Population : 198,777

San Mateo/ Rodriguez
60 MLD STP
(Ongoing Reference design)
Population : 637,858



*Subject to Rate Rebasing 2013 exercises, which will still be agreed upon with MWSS

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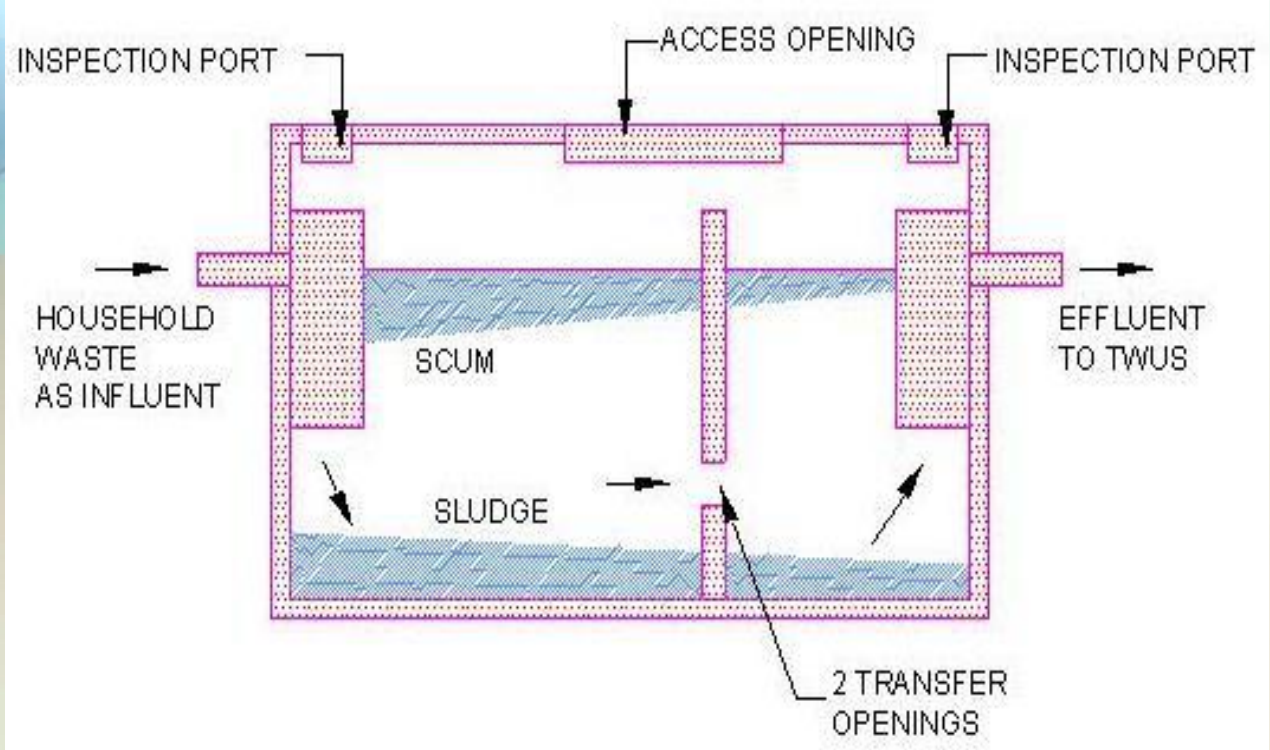
SANITATION SERVICES: Desludging of septic tanks

Septic Tank

Septic Tank Design



Typical Design Parameters

- ✓ Two chamber
- ✓ 5 cu.meter volume
- ✓ Lined bottom
- ✓ with access manhole
- ✓ desludging period:

  5 to 7 years

Challenges

- Tariff increases due to large investment

- Commitment of other agencies for:

  - provision of adequate housing and toilets to the urban poor
  - relocation of unauthorized structures on the river banks
  - solid waste management
  - maintenance of street drainage

Challenges

- Land
  - Large tracts of land required for STPs and network
  - CWA: LGUs to allocate land for STPs

- Addressing the other sources of pollution entering the waterways
  - Non-point sources: agricultural runoff, urban runoff, land erosion
  - Landfill leachate, industrial and commercial sources

Call for Action from the Community

- Construct properly designed septic tanks
- Participate in desludging program
- Practice proper solid waste disposal
- Report illegal disposal of wastewater
- Support the construction of wastewater or sewage treatment plants
- Connect houses to existing sewer lines

SUMMARY

- Water Supply:

  Ensure long term water supply

- Sewerage:

  Provide full coverage by 2037

Video on Sewage and Septage Treatment

Veterans Village Sewage and Septage Treatment Plant

Sewage – wastewater collected from houses through pipes

Septage – wastewater collected from septic tanks by trucks

VIDEO

Thank you!

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Maynilad's Sewerage Projects 2013-2037 (1/2)

Period	Projects	Coverage (%)
2013-2017	Valenzuela Sewerage System-1st Stage	27%
	Pasay Sewerage System-1st Stage	
	Muntinlupa Sewerage System-1st Stage	
	Paranaque-Las Pinas Sewerage System-1st Stage	
	Cavite City Sewerage System – 1st stage	
	Upgrading & Expansion of Manila Central Sewerage System	
	South Septage Treatment Plant	
2018-2022	North Caloocan Sewerage System-1st Stage	58%
	Quezon City Sewerage System-1st Stage	
	Malabon- Navotas	

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Maynilad's Sewerage Projects 2013-2037 (2/2)

Period	Projects	Coverage (%)
2022-2027	Valenzuela Sewerage System-2nd Stage	78%
	Pasay Sewerage System-2nd Stage	
	Paranaque-Las Pinas Sewerage System-2nd Stage	
	Cavite Sewerage – 2nd stage	
2028-2037	Expansion of Manila Central Sewerage System	100%
	Quezon City Sewerage	
	Paranaque-Las Pinas Sewerage System-3rd and 4th Stage	
	Cavite City Sewerage System a. Bacoor Expansion b. Imus Expansion	

Manila Water's Sewerage Projects 2013-2037 (1/2)

Period	Projects	Coverage (%)
2013-2017	Marikina North Sewerage System	33%
	Taguig North Sewerage System	
	Quezon City West Sewerage System	
	Rodriguez-San Mateo Sewerage System	
	Pasig North and South Sewerage System	
2018-2022	Makati-Manila Sewerage System	50%
	Taguig Central Sewerage System	

Pending resolution of Rate Rebasing 2013

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Manila Water's Sewerage Projects 2013-2037 (2/2)

Period	Projects	Coverage (%)
2023-2027	San Juan South Sewerage System	61%
	Sewer Line Extensions	
2028-2037	San Juan South Sewerage System	100%
	Marikina South Sewerage System	
	Quezon City East Sewerage System	
	Mandaluyong West Sewerage System	
	Quezon City North & South Sewerage System	
	Antipolo Sewerage System	
	East of Manggahan Sewerage System	

Pending resolution of Rate Rebasing 2013

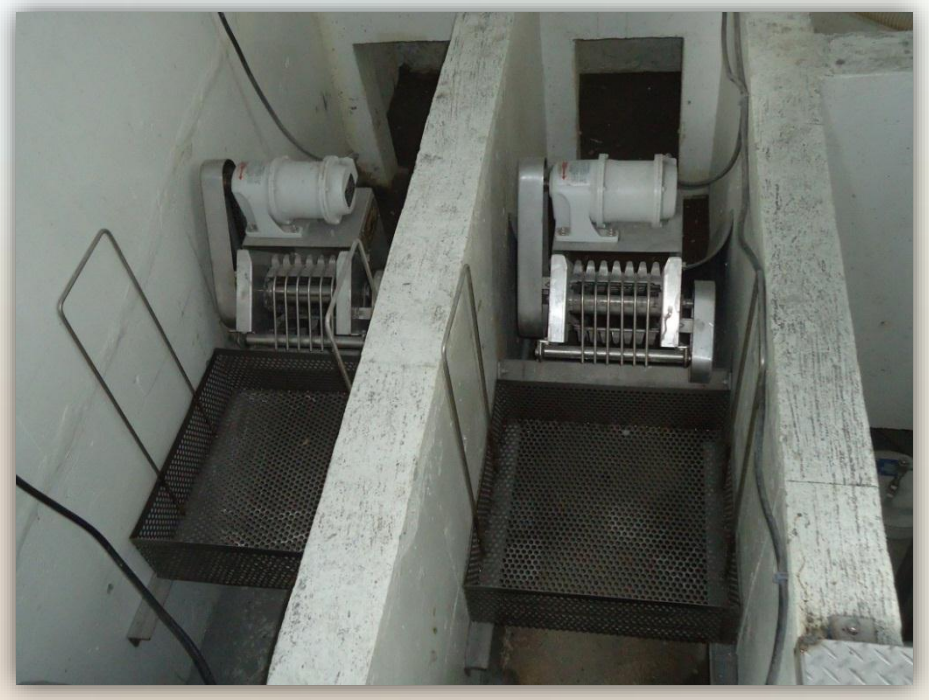
Treatment Processes

- Preliminary treatment: removal of solids and oil + grease
- Primary treatment: chemical treatment and dewatering
- Secondary treatment: takes place in SBR basins
- Tertiary treatment: by filtration using sand and activated carbon
- Disinfection: addition of chlorine

Preliminary Treatment

Preliminary treatment : removal of solids and oil + grease

- bar screen – removes solids, garbage
- grit remover – removes sand, metal chips
- oil and grease separator – collects oil and scum



Primary Treatment

Primary treatment:

- addition of chemicals to form flocs
- dewatering press to produce dewatered sludge cakes

Secondary Treatment

Secondary treatment: takes place in SBR basins

Cycles:

- Fill : basin is filled with sewage
- React: supply air to grow microorganism
- Settle: to separate the clear water
- Decant: clear water flows out of the SBR basin

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Tertiary Treatment

Tertiary treatment: filtration using sand and activated carbon

Disinfection: add chlorine to remove pathogens

Water reuse: for toilet flushing, cleaning of vehicles and watering the garden (within the treatment plant)