Development of Klongs (Canals) and History of Sewage works in Bangkok

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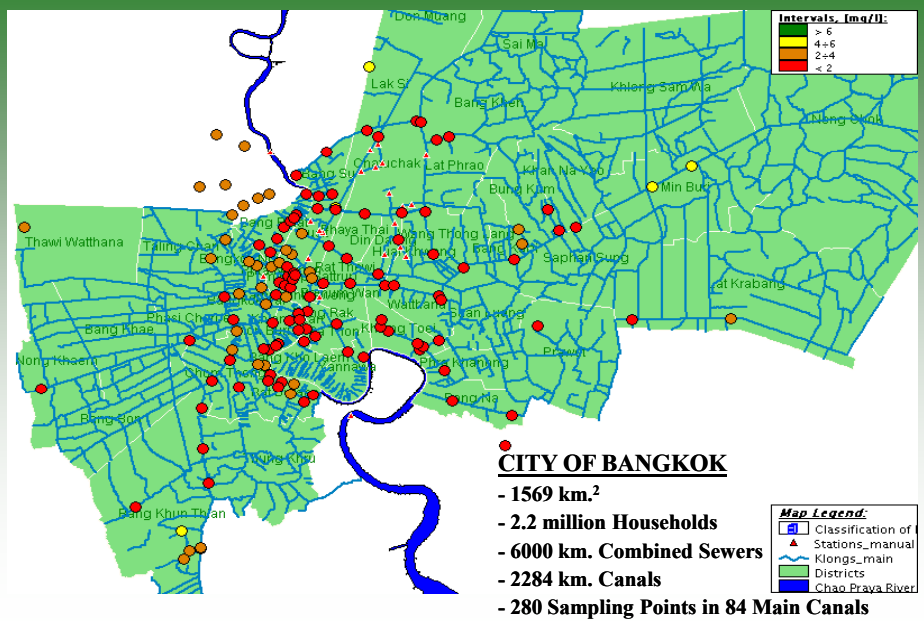
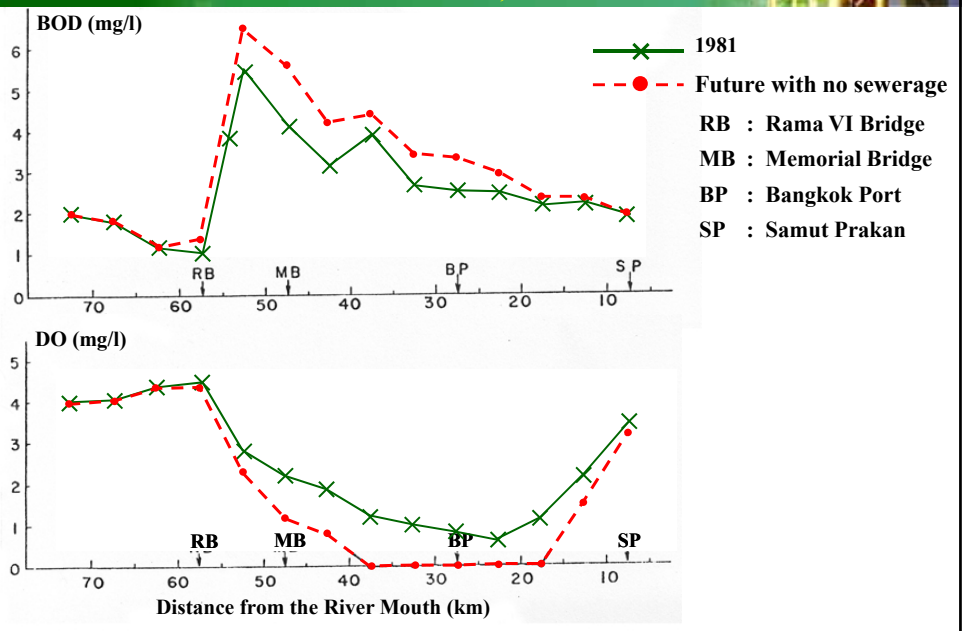
DO in major canals, mg/l



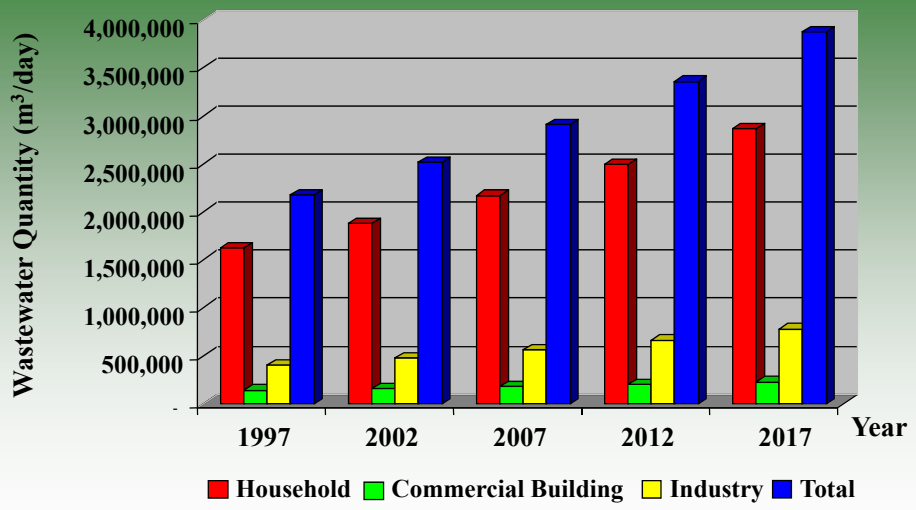
CITY OF BANGKOK

- **1569 km.²**
- **2.2 million Households**
- **6000 km. Combined Sewers**
- **2284 km. Canals**
- **280 Sampling Points in 84 Main Canals**

Forecasted Water Quality in Chao Phraya River JICA, 1981



Wastewater Quantity in Bangkok Area



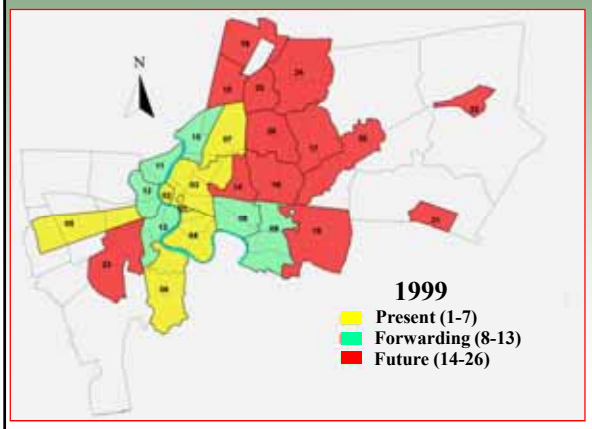
2.7 million m^3/day in 2007

BMA Master Plan

1968 Sewerage Master Plan by CDM Cover 370 km²

1981 Sewerage Master Plan by JICA 37,000 ha divided into 10 Zones

1992 Master Plan of Wastewater Management by PCD and Macro Consult

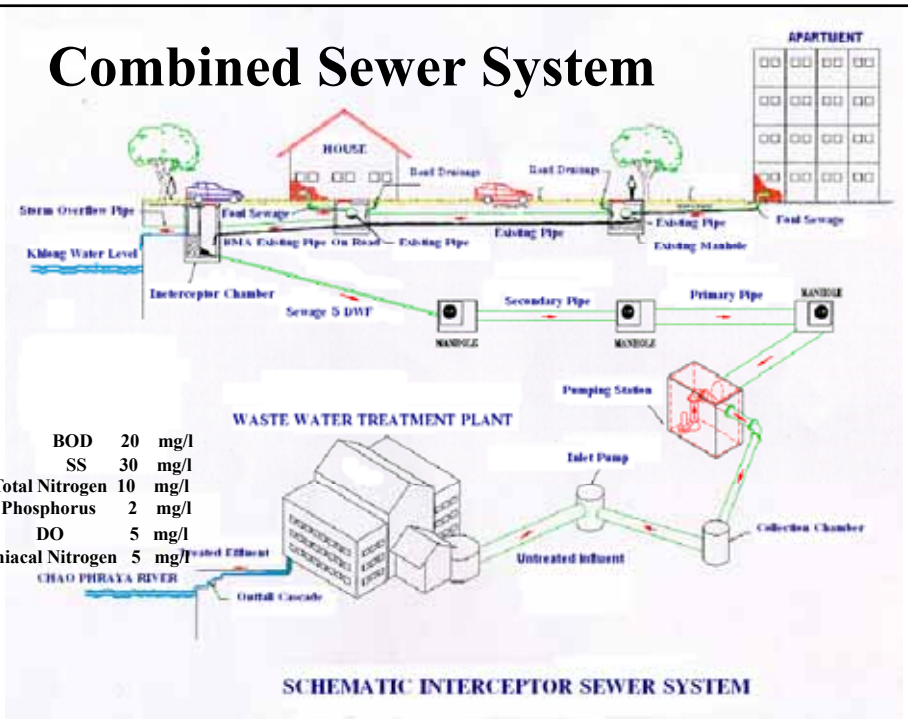


1992 National Environmental Quality ACT

1998 Cabinet Resolution to Construct Wastewater Treatment Plant Cover 100 km² (inner city)

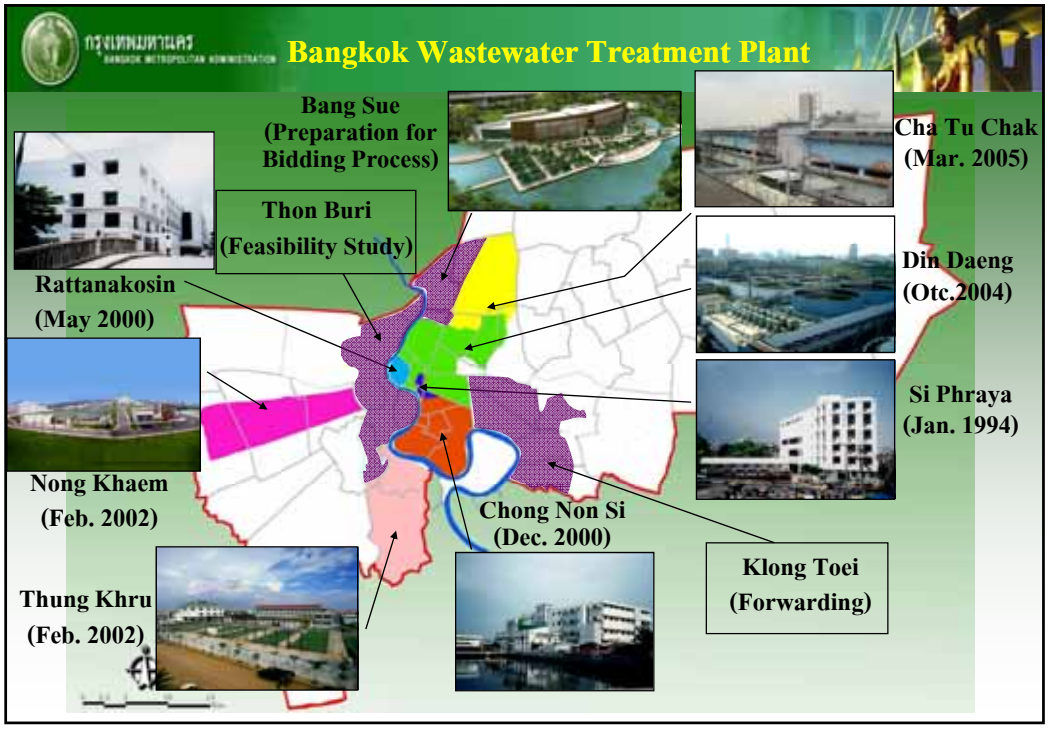
1999 Master Plan of Wastewater Sludge and Effluent Reuse by JICA Propose 20 Zones in Bangkok

Combined Sewer System



BOD	20	mg/l
SS	30	mg/l
Total Nitrogen	10	mg/l
Total Phosphorus	2	mg/l
DO	5	mg/l
Ammoniacal Nitrogen	5	mg/l

Bangkok Wastewater Treatment Plant



Muti Stories or Underground WTPs
Require 0.10 – 0.50 m^2 / m^3 per day

Chong Non Si Water Environment Control Plant

Bang Sue Environmental Education and Conservation Project

Water Environment Control Plant	Area (km^2)	Population	System	Capacity (m^3/day)	Source of Fund	Cost (Million Baht)
Bangkok Wastewater Treatment Project					BMA. : GOV.	
1. Si Phraya	2.7	120,000	Contact Stabilization A.S.	30,000	BMA. 100 %	464
2. Rattanakosin	4.1	70,000	Two Stage A.S.	40,000	GOV. 100 %	883
3. Din Daeng	37	1,080,000	Activated Sludge	350,000	25 : 75	6,382
4. Chong Non Si	28.5	580,000	Cyclic Activated Sludge System	200,000	40 : 60	4,552
5. Nong Khaem	44	520,000	Vertical Loop Reactor A.S.	157,000	40 : 60	2,348
6. Thung Khru	42	177,000	Vertical Loop Reactor A.S.	65,000	40 : 60	1,760
7. Cha Tu Chak	33.4	432,000	Cyclic Activated Sludge System	150,000	60 : 40	3,482
8. Community Plant 12 Plants	-			25,700		
SUM	191.7	2,979,000		1,017,700		19,871
Future BMA. Wastewater Treatment Project						
1. Bang Sue EECP	21	250,000	Step Feed A.S.	120,000	BMA. 100 %	4,732
2. Klong Toei	56	485,000	Activated Sludge	360,000	60 : 40	9,896
3. Thon Buri	59	704,000	Activated Sludge	305,000		11,561
SUM	136	1,439,000		785,000		26,189

Thank You For Your Attention