Session – III

Water Supply, Sanitation, Solid Waste Management and Flood Alleviation

Session - III

PRESENTATION ON "CHALLENGES IN WATER SUPPLY AND SEWERAGE IN CHENNAI METROPOLITAN AREA

Thiru Sunil Paniwal, IAS,
Managing Director, Chennai Metropolitan Water Supply and Sewerage Board.

ABOUT CMWSS BOARD

Chennai Metropolitan Water Supply & Sewerage Board, a statutory body established in 1978, is responsible for Water Supply and Sewerage services in Chennai Metropolitan Area (CMA)

Objective

- To provide adequate supply of good quality water and safe disposal of sewage

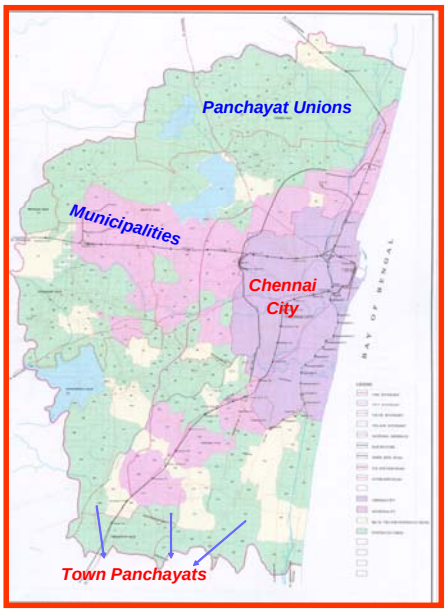
Mission

- To make a positive contribution
  - ✓ To improve the environment
  - ✓ To enhance the health and quality of life for the citizens of Chennai

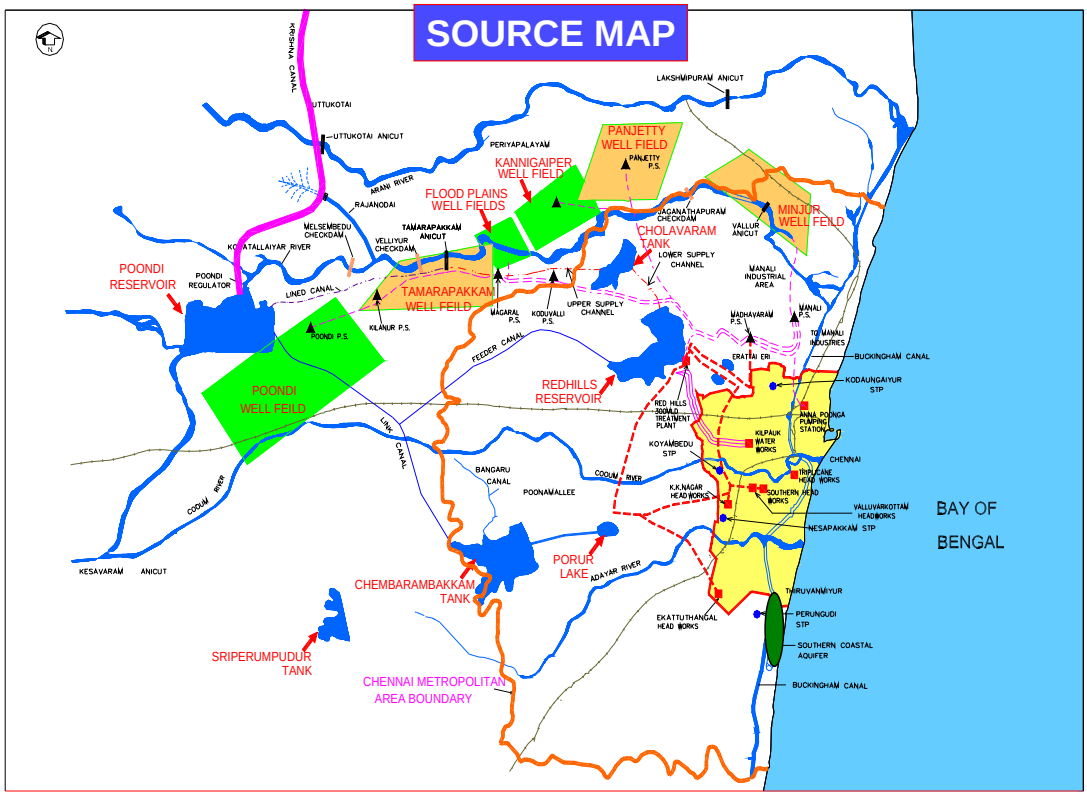
Functions

- Promoting or securing the planned development
- Efficient operation, maintenance and regulation of water supply and sewerage systems in CMA
- Preparing the long term plans to meet the future requirement of water supply and sewerage

CHENNAI METROPOLITAN AREA (CMA)



- **The Chennai Metropolitan Area comprises of Chennai City and surrounding urban and rural areas**
- **The Chennai City covers 176 Sq.km**
- **The extent of CMA is 1189 Sq.km**
- **The outlying areas consist of:**
  - **1 Cantonment**
  - **16 Municipalities**
  - **20 Town Panchayats**
  - **214 Villages Panchayats from10 Panchayat Unions of Kancheepuram and Tiruvallur Districts**



ESTIMATED WATER REQUIREMENT (CMA)- 2026

Sl.No	Category in CMA	Population in Lakhs	Rate of water supply in 'lpcd'	Total Requirement in MLD
1.	Chennai City	58.56	150	1230
2.	Municipalities and Town Panchayats in CMA	47.90	125 for Municipalities & 100 for Town Panchayat	796
3.	Rest of CMA (Village Panchayats)	19.88	80	223
	Total	126.34		2249

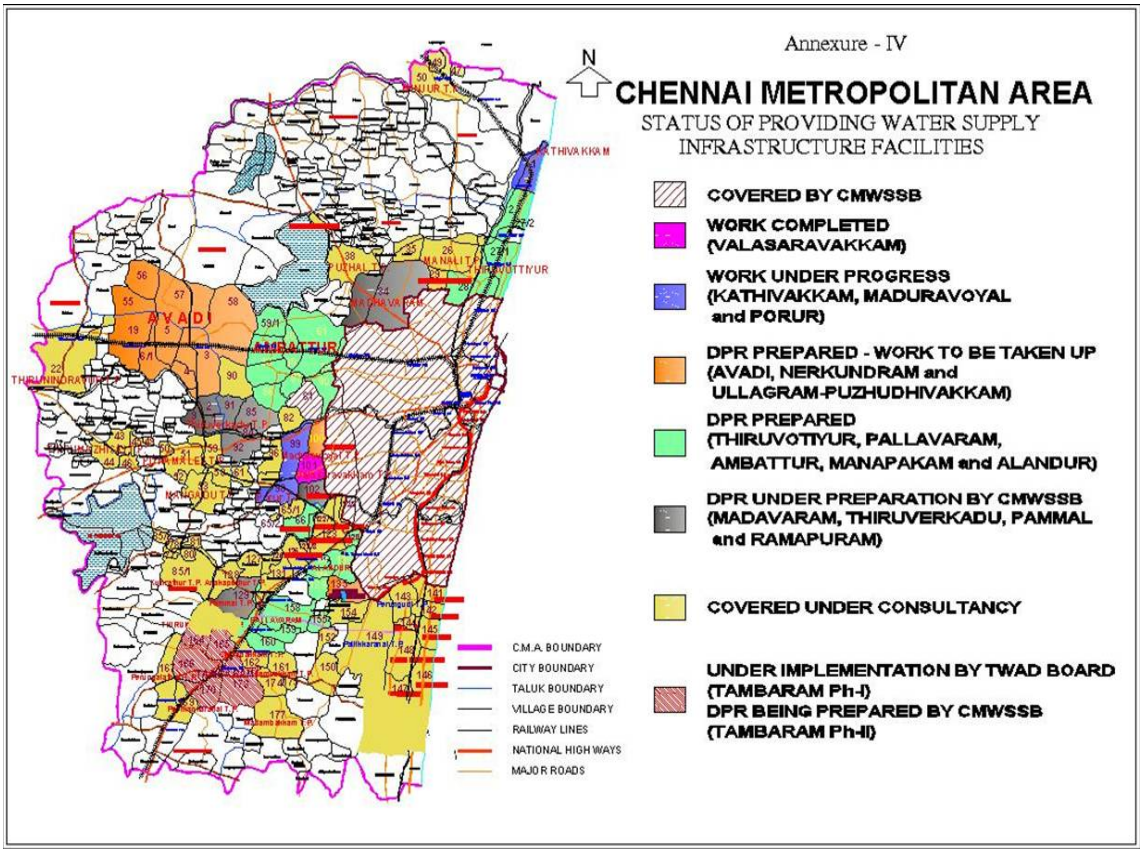
SOURCES AND AVAILABILITY OF WATER FOR MEETING DEMANDS

Sl.No	Name of Source	Safe Yield in 'mld'	Remarks
1	Poondi-Cholavaram-Redhills lake system	227	Based on assessment during 1997 revision of Master Plan for Water Supply
2	Ground water from Northern well fields	68	
3	Other sources like Southern Coastal Aquifer, Porur, Rettai Eri & R.O.Plants	5	
4	Receipt of Krishna water from Telugu Ganga Project (When full agreed quantity of 930 MLD (12 TMC) supplied)	837	10% loss from entry point to Poondi Lake has been considered

5	Veeranam Lake (CWSAP-I)	180	
6	Desalination Plant	200	a) 100 MLD in 2009 b) 100 MLD in 2011
7	Local sources including Palar River in the CMA area other than city limits	32	Based on assessment during 1997 revision of Master Plan for Water Supply
8	Abstractable quantity of local groundwater in the City for the use of other than drinking and cooking purposes	240	
9	Waste water reuse a) Already in use b) Expected in future (SIPCOT use)	 45 120	 From 2011
	Total	1954	

COVERAGE AND SERVICE DELIVERY

- **Chennai City Corporation Area : 176 sq.km**
- **Part of Ambattur Municipal Area And Manali New Town (With in CMA Area) : 7.88 sq.km**
- **Total Population served : 5.03 Million**
- **Entire Chennai City area is covered with water supply and sewerage lines serving the entire Chennai City population and part of the peripheral areas**



WATER SUPPLY BY CMWSS BOARD TO CHENNAI CITY, AND INDUSTRIES

Domestic Water Supply to Chennai City	585 MLD
Industrial Water Supply	35 MLD
TOTAL	620 MLD

BULK WATER SUPPLY TO LOCAL BODIES

Sl.No	LOCAL BODY	PRESENT SUPPLY (mld)
1	AMBATTUR MUNICIPALITY	
	Ambattur Area	2.00
	Korattur Head Works	1.80
	Thathankuppam	0.12
2	AVADI MUNICIPALITY	
	Thirumullaivoyal Head Works	0.20
	Avadi Head Works	1.00
3	Alandur Municipality	9.15
4	Anakaputhur Municipality	1.00
5	St.Thomas mount Cantonment	0.88
6	Cowl Bazaar Village Panchayat	0.15
7	Meenambakkam Spl.VCillage Panchayat	0.30
8	Munavar Avenue, Pallavaram	0.10

Sl.No	LOCAL BODY	PRESENT SUPPLY (mld)
9	Pammal Municipality	2.40
10	Pozhichalur Village Panchayat	0.50
11	Puzhithivakkam Municipality	0.25
12	Maduravoyal Municipality	0.25
13	Ramavaram Village Panchayat	2.00
14	Porur Spl.Village Panchayat	0.25
15	Valasaravakkam Municipality	1.75
16	Puzal Panchayat	0.60
17	Puzal Jail	1.00
18	Madhavaram-Pukraj Nagar	0.20
19	Madavaram – Thanikasalam Nagar	0.30
20	Perungudi Panchayat	0.05
21	Nandambakkam	0.14
22	Thiruvottiyur Municipality	2.90
23	Kathivakkam Municipality	1.00
24	Manali 3rd grade Municipality	0.30
25	Manali New Town (CMDA)	0.90
26	Aavin (Sholinganallur)	0.33
27	Okkiyam (TNSCB Tenaments)	1.10
	Total	32.92

INITIATIVES TO PROVIDE WATER SUPPLY TO ADJACENT LOCAL BODIES

Sl.No	NAME OF LOCAL BODIES	Status of water supply system
	MUNICIPALITIES	
1	Valasaravakkam	Work completed
2	Kathivakkam	Work under execution
3	Maduravoyal	Work under execution
4	Thiruvottiyur	Posed under JnNURM
5	Avadi	Tender Stage
6	Ullagaram-Puzhuthivakkam	Tender Stage
7	Alandur	DPR Prepared and handed over to Local Body
8	Pallavaram	DPR prepared
9	Ambattur	DPR prepared
10	Poonamallee	Consultant being appointed
11	Anakaputhur	Consultant being appointed
12	Manali	Consultant being appointed
13	Thiruverkadu	DPR under preparation by CMWSSB
14	Pammal	DPR under preparation by CMWSSB
15	Madhavaram	DPR under preparation by CMWSSB
16	Tambaram	DPR under preparation by CMWSSB

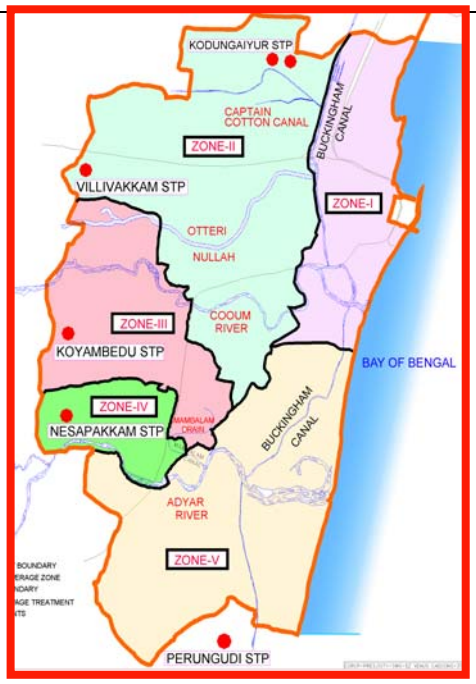
	TOWN PANCHAYATS	
1	Porur	Work under execution
2	Chinnasekkadu	DPR to be prepared
3	Meenambakkam	
4	Naravarikuppam	
5	Thiruninravur	
6	Minjur	
7	Thirumazhisai	
8	Mangadu	
9	Nandambakkam	
10	Puzhal	
11	Kundarathur	
12	Thiruneermalai	
13	Perungalathur	
14	Peerkankaranai	
15	Chitlapakkam	
16	Sembakkam	
17	Madambakkam	
18	Perungudi	
19	Pallikkaranai	
20	Sholinganallur	

Sl.No	NAME OF LOCAL BODIES	Status of water supply system
	VILLAGE PANCHAYATS	
1	Nerkundram	Tender Stage
2	Manapakkam	DPR prepared by CMWSSB
3	Ramapuram	DPR being prepared by CMWSSB
4	Kottivakkam	Consultants being appointed for preparation of DPR
5	Mugalivakkam	
6	Pozhichalur	
7	Cowl Bazaar	
8	Madipakkam	
9	Neelankarai	
10	Okkium Thoraipakkam	
11	Injambakkam	
12	Palavakkam	
13	Koilambakkam	
14	Medavakkam	
15	Karapakkam	
16	Iyyappanthangal	
17	Ayapakkam	
18	Vanagaram	
19	Nolambur	
20	Kattupakkam	
21	Senneerkuppam	
22	Mathur	

Implementation of water supply scheme

Implementation of water supply scheme Status	Municipality	Town Panchayat	Village Panchayat & Cantonment
Completed	1		
Under progress	4	1	1
DPRs completed	3		1
DPRs under preparation by CMWSSB	5		1
Schemes yet to be taken up under consultancy	3	19	20

Chennai City Sewerage System



- Installed as early as in 1891 (surface drains)
- Comprehensive sewerage plan implemented from 1910
- Improved and expanded gradually over the years
- Comprehensive zonal sewerage system implemented in the year 1961
- City divided into 5 zones
  - Kodungaiyur - 270 mld
  - Koyambedu - 94 mld
  - Nesapakkam - 63 mld
  - Perungudi - 54 mld
  - Villivakkam - 5 mld
- Sewage Pumping Stations : 188 Nos (H.T=49 Nos & L.T=139 Nos)

Estimated Sewage flow and proposed treatment capacity for 2026

Year	Total projected sewage flow in 'mld'	Total treatment capacity proposed in 'mld' in Phases
2026	1690 (80% of 2089 MLD)	1690

Out of total 2249 MLD of water required about 160 MLD is required for Industries

SEWAGE TREATMENT PLANTS

- **Considering cost economics in conveying raw sewage from distant Local Bodies, STPs for Group of LBs are proposed nearer to the LBs such as**

Sl. No	Name of the Local Body	Flow in 'MLD'	Location of STP	Remarks
1	Manali	10	Manali	New Plant
2	Thiruverkadu	32	Thirverkadu	New plant
3	Sennirkuppam			
4	Vanakaram			
5	Ayapakkam			
6	Anakaputhur	29	New STP proposed. Location yet to be finalised.	New plant
7	Pammal			
8	Meenambakkam			
9	Cowl Bazaar			
10	Pozhichalyur			
11	Kundrathur			

Sl. No	Name of the Local Body	Flow in 'MLD'	Location of STP	Remarks
12	Tambaram	31	Tambaram	New plant
13	Minjur	10	Minjur	New Plant
14	Puzhal	10	Puzhal	New Plant
15	Naravarikuppam			
16	Poonamallee	32	Poonamallee	New Plant
17	Kattupakkam			
18	Iyyapanthangal			
19	Mangadu			
20	St.Thomas Mount	10	St.Thomas Mount	New Plant
21	Nandambakkam	5	Nandambakkam	New plant
22	Madambakkam	32	Madambakkam	New Plant
23	Sembakkam			
24	Chitlapakkam			

Sl. No	Name of the Local Body	Flow in 'MLD'	Location of STP	Remarks
25	Sholinganallur	42	Sholinganallur	New Plant
26	Kottivakkam			
27	Palavakkam			
28	Pallikaranai			
29	Neelangarai			
30	Okkiyam-Thoraipakkam			
31	Karapakkam			
32	Injambakkam			
33	Kovilambakkam			
34	Medavakkam			
35	Thiruninravur	24	Thiruniravur	New plant
36	Thirumalizai	45	Thirumalizai	New plant
37	Thiruneermalai	5	Thirneermalai	New plant
38	Perungalathur	14	Perungalathur	New plant
39	Peerkankaranai			

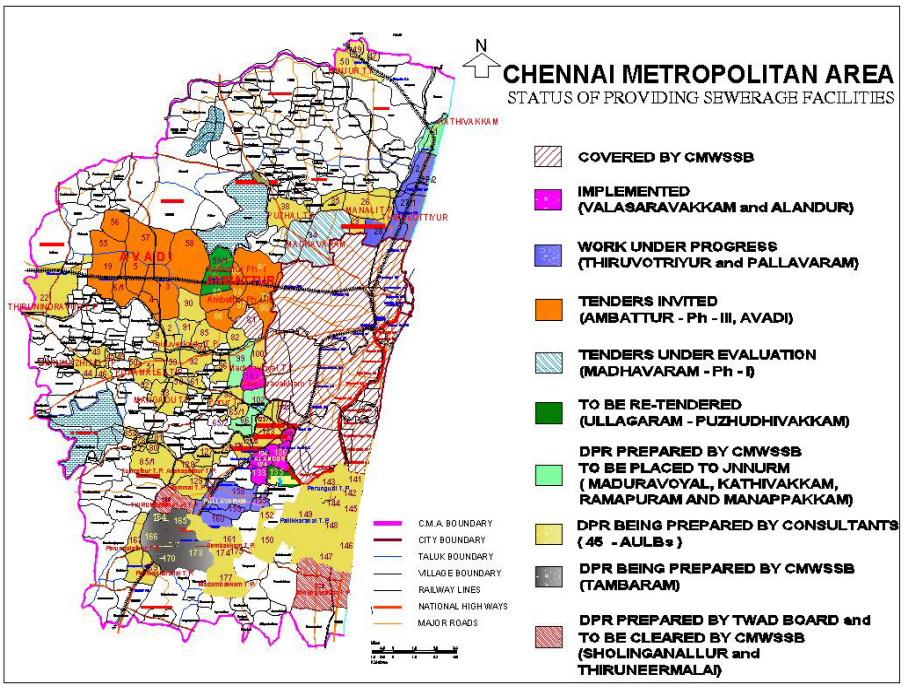
Sl. No	Name of the Local Body	Flow in 'MLD'	Location of STP	Remarks
40	Avadi	40	Avadi	New plant
41	Thiruvottiyur	38	Thiruvottiyur	New plant
42	Kathivakkam	7	Thiruvottiyur	New Plant
43	Alandur	12	Alandur	New Plant
LINKED TO CHENNAI STP				
I.KODUNGAIYUR STP				
1	Chinnasekkadu	2		
2	Mathur	3		
3	Madavaram	13		
4	Ambattur part	30		
II. KOYAMBDEU STP				
1	Nerkundram	8		
2	Nolambur	5		
3	Maduravoyal	11		
4	Ambattur Part	27		

Sl. No	Name of the Local Body	Flow in 'MLD'	Location of STP	Remarks
LINKED TO CHENNAI STP				
III.NESAPAKKAM STP				
1	Porur	11		
2	Mugalivakkam	5		Village Panchayat
3	Manapakkam	6		Village Panchayat
4	Ramavaram	7		
IV.PERUNGUDI STP				
1	Perungudi	7		Town Panchayat
2	Madipakkam	10		Town Panchayat
3	Ullagaram-Puzhithivakkam	9		
4	Pallavaram	18		

Waste Water - Reuse for Industries

1. Supply of secondary treated effluent to CPCL & MFL Ind. from Kodungaiyur STP.	36.0 mld
2. Supply of sewage to M/s. GMR Vasavi Power Corporation	8.0 mld
Total	44.0 mld

Proposed to supply 120 MLD to SIPCOT from Koyambedu and Nesapakkam Sewage Treatment Plants



INITIATIVES TO PROVIDE SEWERAGE SYSTEM TO ADJACENT LOCAL BODIES

Sl. No.	NAME OF LOCAL BODIES	Status of sewerage system provided
	Municipalities	
1	Valasaravakkam	Completed
2	Alandur	
3	Thiruvottiyur	Under implementation
4	Pallavaram	Under implementation
5	Madhavaram	Tenders under evaluation
6	Avadi	Tenders under evaluation
7	Ullagaram-Puzhuthivakkam	Tenders invited
8	Amabattur – phase-III	Tenders invited
9	Kathivakkam	Funds to be tied up
10	Maduravoyal	Funds to be tied up
11	Poonamallee	DPR prepared by Consultants
12	Thiruverkadu	
13	Pammal	
14	Anakaputhur	
15	Tambaram	
16	Manali	DPR prepared by consultants

Sl.No	Town Panchayats	Status of UGSS
1	Porur	Posed under JNNURM
2	Chinnasekkadu	DPR prepared by consultants
3	Meenambakkam	
4	Naravarikuppam	
5	Thiruninravur	
6	Minjur	
7	Thirumazhisai	DPR prepared by consultants and handed over to Local Body
8	Mangadu	
9	Nandambakkam	DPR prepared by consultants and handed over to Local Body
10	Puzhal	DPR prepared by Consultants
11	Kundarathur	
12	Thiruneermalai	
13	Perungalathur	DPR prepared by consultants and handed over to Local Body
14	Peerkankaranai	DPR prepared by consultants and handed over to Local Body
15	Chitlapakkam	DPR prepared by consultants and handed over to Local Body
16	Sembakkam	DPR prepared by consultants and handed over to Local Body
17	Madambakkam	DPR prepared by consultants and handed over to Local Body
18	Perungudi	
19	Pallikkaranai	DPR prepared by consultants and handed over to Local Body
20	Sholinganallur	

Sl.No	NAME OF LOCAL BODIES	Status of UGSS
	VILLAGE PANCHAYATS	
1	Manapakkam	DPR prepared by CMWSSB
2	Ramapuram	DPR prepared by CMWSSB
3	Kottivakkam	DPR prepared by consultants and handed over to Local Body
4	Mugalivakkam	
5	Pozhichalur	
6	Cowl Bazaar	
7	Nerkundram	DPR prepared by consultants and handed over to Local Body
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10	Okkium Thoraipakkam	
11	Injambakkam	
12	Palavakkam	
13	Kovilambakkam	
14	Medavakkam	
15	Karapakkam	
16	Iyyappanthangal	DPR prepared by consultants
17	Ayapakkam	DPR prepared by consultants and handed over to Local Body
18	Vanagaram	DPR prepared by consultants
19	Nolambur	
20	Kattupakkam	DPR prepared by consultants
21	Senneerkuppam	
22	Mathur	
	CANTONMENT	
1	St. Thomas Mount	DPR prepared by consultants

Implementation of Sewerage scheme

Status	Municipality	Town Panchayat	Cantonment & Village Panchayat
Completed	2		
Under progress	4		
DPRs completed	6	10	18
DPRs under preparation	4	10	5

Bridging the Supply and Demand gap

- A gap exists between Demand and Supply (300 MLD)
- Rainwater Harvesting
- Grey water reuse for Special / Multistoried buildings
- Use of Secondary Sewage for industries (Secondary uses)
- Efficient water management practices
  - Reduction of UFW
  - Volumetric Tariff
  - Water Audit

Long Term Plan

- Storage of additional water for the future requirement
- Identification of new sources up to 15 TMC
- Conjunctive use of Surface, Ground water and Reclaimed waste water

Issues

- Developmental activities taking place in catchment areas of the lakes affecting the characteristics Reduced inflow
- Vertical development causing stress to the existing infrastructure affecting the service delivery- Requires additional investment for improvement
- Material, labour and qualified man power scarcity leading to additional costs

Catchment areas

Sl.No	Villages covered under catchment area	Sl.No	Villages covered under catchment area
1	Attanthangal	15	Vellacheri
2	Pammadukulam	16	Pakkam
3	Pothur	17	Palavedu
4	Vellanur	18	Mittanamallee
5	Morai	19	Mukthapudupattu
6	Pulikutti	20	Kovil Padagai
7	Thennambakkam	21	Vijayanallur
8	Arakkambakkam	22	Palaya eumaivetti palayam
9	Pondeswaram	23	Alamadi
10	Melpakkam	24	Thirumullaivoyal (part) All S.Nos North of MTH road
11	Kadavur	25	Nallur (Part) All S.Nos West of G.N.T.Road
12	Karlambakkam	26	Oragadam (Part) All S.Nos North of Ambattur Redhills Road
13	Kilkondaiyur	27	Padianallur (Part) All S.Nos.West of G.N.T.Road
14	Alathur		

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Session - III

MACRO DRAINAGE SYSTEM IN CHENNAI METROPOLITAN AREA

Thiru N.Ramasamy,
Superintending Engineer (Palar Basin),
Public Works Department, Chennai.

CHENNAI METROPOLITAN AREA

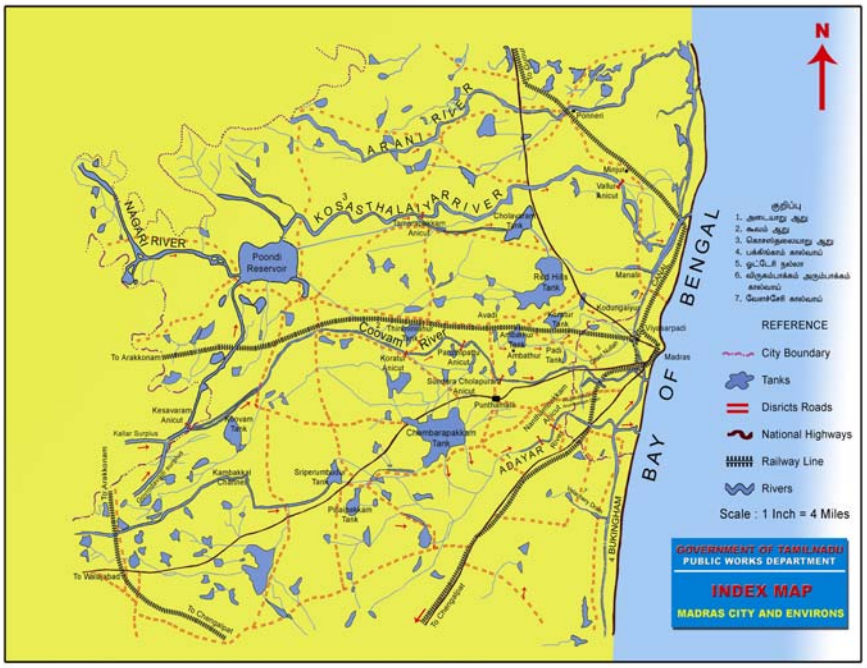
- Chennai Metropolitan Area (CMA) covers 1189 Sq. Km.
  present population about 75 Lakhs
  projected to 98 Lakhs in 2011

- Chennai City covers 176 Sq. Km. Ground slope 1:10,000 (Average)

- The City is drained by 2 rivers besides a number of major & minor drains through Buckingham Canal into Sea via Ennore Creek, Cooum mouth, Adyar mouth and Kovalam Creek.

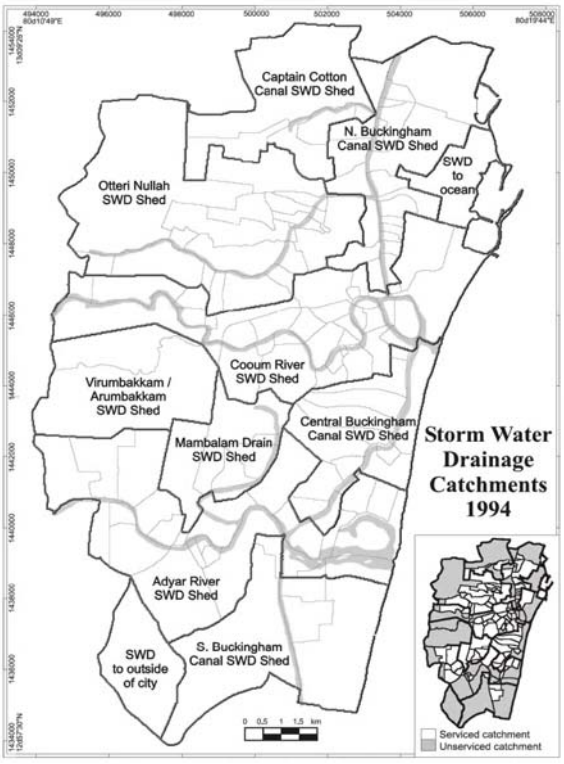
- Major Flood Events in Chennai City during 1943, 1976, 1985,1996 & 2005

MACRO DRAINAGES IN CMA



Rivers and Drainage system of Chennai Metropolitan Area									
River / Drainage System	Orgin	Location of confluence with Bay of Bengal	Total Length in Km	Length in City limits in Km	Length in CMA in Km	Total Catchment Area in Sq Km	Bed width in M	Designed flood discharge in C/s	Flood discharge in 2005 in C/s
RIVERS									
Kosasthalaiyar	Krishnapuram (A.P) / Kaveripakkam (Vellore district)	Ennore Creek	136	-	16	3757	150 to 250	125000	90000
Cooum	Cooum tank (Thiruvallur district) / Kesavaram	Cooum mouth near Nappier bridge	72	18	40	682	40 to 120	35000	25000
Adyar	Adanur tank near Guduvancherry	Adyar mouth	42.50	15	24	860	10.50 to 200	72000	60000
MAJOR DRAINAGES									
North Buckingham Canal	Pulicat	Cooum North arm	58	7.1	17.1	89.88	15	1500	9900
Central Buckingham Canal	Cooum South arm	Adyar Creek	7.2	7.2	7.2	-	15	1500	3500
South Buckingham Canal	Adyar Creek	Marakkanam	108	4.2	16.1	-	15	1500	5660
Otteri Nullah	Padi & Villivakkam tanks (Abadoned)	Bunkingham Canal near Basin bridge	10.2	10.2	10.2	38.40	4 to 20	600	1800
Virugambakkam - Arumbakkam	Virugambakkam tank (Abadoned)	Cooum river near Nungambakkam	6.36	6.36	6.36	-	15 to 7.50	600	1700
OTHER DRAINAGES									
Kodungaiyur drain	Kolathur tank, Madhavaram tank	Bunkingham Canal through Kodungaiyur tank	6.9	6.9	6.9	-	-	-	-
Captain Cotton Canal	Vyasarpadi tank	Bunkingham Canal near Tondiarpet	6.9	6.9	6.9	-	-	-	-
Velachery drain	Velachery tank	Pallikarnai Swamp	2.14	2.14	2.14	3.88	5.6	655	750
Veerangal odai	Adambakkam tank	Pallikarnai Swamp	2.78	-	2.78	-	-	654	654

MACRO DRAINAGE'S IN CHENNAI CITY LIMITS



Linking of Rivers for Chennai City Water needs during the Century

Palar to Kosasthalaiyar	:	From Palar Anicut near Walajah to Poondi reservoir across Kosasthalaiyar through – Govindavadi channel, Kaveripakkam tank surplus, Cooum River, Kesavaram Anicut, Kosasthalaiyar River, Poondi Reservoir
Palar to Adayar	:	From Palar Anicut near Walajah to Adyar river (Near Thiruneermalai) through Govindhavadi Cannel-Kambakkal Channel, Sriperumbudur tank and its Surplus, Chembarambakkam tank and its Surplus
Araniyar to Kosasthalaiyar	:	From Araniyar Syphon across Araniyar river to Poondi reservoir across Kosasthalaiyar river through Kandaleru-Poondi Canal Anicut and in turn to Poondi reservoir.
Cooum to Adayar	:	From Zamin Korattur Anicut across Cooum River (between Poonamallee and Tiruvallur) to Adyar through New Bangaru channel, Chembarambakkam tank and it's surplus course

Function of Rivers and Drainages during Last Half Century

- Strom water & Flood conveyance during monsoon period
- Conveying untreated sullage, sewage and industrial effluents
- Dumping place for all sorts of solid wastes
- Place for Slums by encroachments

Inlets into Rivers and Drainages in CMA

- 512 micro drains falling into rivers & drainages
- 84% infalls are sewage & 11% storm water drainage.
- 27% infalls received by Cooum
- 29% infalls received by Buckingham Canal
- 19% infalls received by Adayar River

Flood Experiences during last three decades

1976	Heavy Flood Submergence in Adayar-Kotturpuram TNHB Qtrs. Flood could not enter into sea due to High & Storm tide. Chembarambakkam Tank surplused into Adayar – 28,000 C/s
1985	Floods in Adayar - 63,000 c/s submergence of encroached flood plains
1996	Floods in Adayar, Cooum and Kosasthalaiyar Rivers Poondi Dam surplussed around - 80,000 c/s Karanodai Bridge collapsed Chembarambakkam Tank surplused into Adayar – 20,000 C/s
1998	3 persons Marooned in Thanikachalam Nagar - a residential colony in the flood plains of Kodungaiyur drain
2005	100 year RF 40 cm in a day, Flood in Coum 19,000 C/S, Adayar 40,000 C/S, Otteri Nullah, Cooum, Adayar, B'Canal, Virugambakkam- Arumbakkam Drain over flown, 50,000 people evacuated.

Problems Associated with Waterways

- Acute hindrance to hydraulic functions, restricted vent way in old arch bridges causing flood hazards.
- Formation of sand bars in the river mouths causing stagnation in Cooum and Adayar.
- Inflow of untreated sewage.
- Inadequate tidal influence for periodical flushing
- Disposal of solid waste and construction debris.
- Slums in the flood plains directly feed sewage and solid waste.

Environmental Status

- Absence of minimum Ecological flows in the rivers
- The BOD is very High due to direct infall of sewage – 17 to 375 mg / litre
- High Deposits of solid waste & silt causing restriction of tidal flows into river
- Presence of disease causing Bacteria & Virus – high, besides mosquito breeding, bad odour etc.

Details of Encroachments in City Waterways As per 2002 – 03 Enumeration by TNSCB & PWD

Sl. No.	Name of Waterway	No. of Families on the Banks and bed of River / Canal	No. of Families already evicted	Balance No. of Families to be evicted
1	Cooum River	9562	--	9562
2	Adayar River	6624	1153	5471
3	Buckingham Canal	15354	3492	11862
	Total	31540	4645	26895

- The Enumeration have been done during 2002 – 2003, at present it may increase by 10%
- Non availability of moving space for heavy machineries to work and inspection

Encroachments at Saidapet bridge in Adyar river

ZONES OF NEW PROBLEMS

- The recently developing IT corridor should be drained faster by adequate culverts across OMR (Rajiv Gandhi Road) to Discharge into B'Canal.
- The Chennai Bye pass connecting Tambaram to Red hills (NH 45 to NH4) interferes with drainage flowing East eg. Inundation in IRR, Anna nagar, Porur, Vanagaram, Maduravoyal, Mugapppair, Ambattur etc.
- Solid waste and Sewage disposal by the local bodies around Chennai Metropolitan Area into water bodies.
- Human introduced flood in East Tambaram lakes.
- Interference due to radial roads and new roads across tanks obstruct flood flow.
- Inadequate ventway for culvert in new roads
- Raising the existing top level of road without provision of adequate culverts

Rainfall – Tide and Storm Tide

Average Annual Rainfall – N.E.Monsoon 700 mm
S.W.Monsoon 400 mm
Total = 1100 mm

Max. Rainfall in 27 years 1980-2006 Nungambakkam 2566 mm in 2005

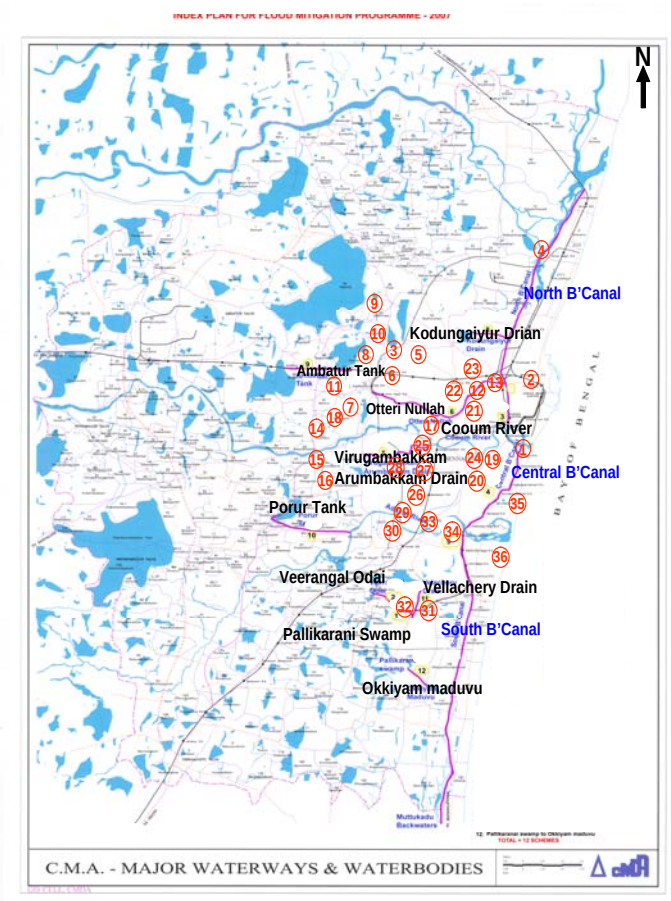
Normal Tide - 0.60 m

High Tide - 1.20 m

Storm Tide - 3.00 m (Ave.)

- In any rainfall more than 20 cm. in 24 hours causes inundation in low lying areas.
- Storm Tide occurs invariably during any North East Monsoon rain
- High Tide with storm reaches 4 m above MSL (eg.1976)

Inundation Prone Area in CMA



1. Tondiarpet
2. Royapuram
3. MKB Nagar
4. Sathiyamoorthy Nagar
5. Kannadasan Nagar
6. Muthamizh Nagar
7. Pulianthope
8. Perambur
9. Kolathur
10. Villivakkam
11. Ayanavaram
12. Choolai
13. Periyamet
14. T.P.Chathram
15. Virugambakkam
16. Arumbakkam
17. Choolaimedu
18. Anna Nagar
19. Ice House
20. Nammalwarpet
21. Purasavakkam
22. S.S. Puram
23. Kosapettai
24. Mirashaibpet
25. Valluvarkottam
26. Mambalam
27. Rangarajapuram
28. Trustpuram
29. Ashok Nagar
30. K.K. Nagar
31. East Velachery
32. West Velachery
33. Saidapet
34. Adayar
35. Foreshore Estate
36. Thiruvanmiyur

SUSTAINED OPENING OF RIVER MOUTHS

1189 Sq.Km. Of Chennai Metropolitan Area (Chennai City 175 Sq.Km.) is drained through the mouths of

1.	Kosasthalaiyar at Ennore Creek	120 m (Maximum)
2.	Cooum	150 m "
3.	Adayar	300 m "
4.	Muttukkadu	100 m "

- Keeping these four mouths open for adequate width during storms for receiving floods against high storm tide is difficult.
- Hence delay in flood drainage and in turn prolonged inundation.
- Sustaining open river mouth by Groynes and Training wall
- Creation of additional openings by straight cuts from Buckingham canal to Sea wherever technically feasible.

Suggestions for sustained opening of Cooum mouth

1.1890,	**Link canal to connect Cooum and Harbour**
1.1905,	**Pumping sea water upto Harris Bridge and Flushing the River**
2.1921,	**Maintaining a deep river course to have tidal effect**
3.1922,	**Construction of 400 m long tidal weir at Napier Bridge**
4.1923,	**Connecting Cooum with the sea through arch culverts, closing the North arm of Cooum**
5.1925,	**To maintain a deep channel from Commander-in-Chief Bridge to Napier Bridge**
6.1927,	**Pumping Scheme from Timber pond at Harbour to Cooum above Wallajah Bridge**
7.1933,	**Removal of shoals in the river bed and a central channel to eliminate local ponds and to give effective flushing.**
8.1958,	**High Power Technical Committee, To stop sewage overflow; To relocate slums; To improve Cooum stretch between Chetpet Bridge and mouth**
10. 1976, 1996	**P.V. Sahadevan Recommendation, PWD, Formation of reservoir to release artificial floods to flush Cooum.**
11. 1982,	**P.V. Indiresan Recommendation, Director-IIT, Introduction of Break water to the South of Cooum mouth to open it.**
12. 2000,	**NIOT, IIT**

Works done to Sustainable open of the Cooum mouth

- **1968-73, Cooum Improvement Scheme**

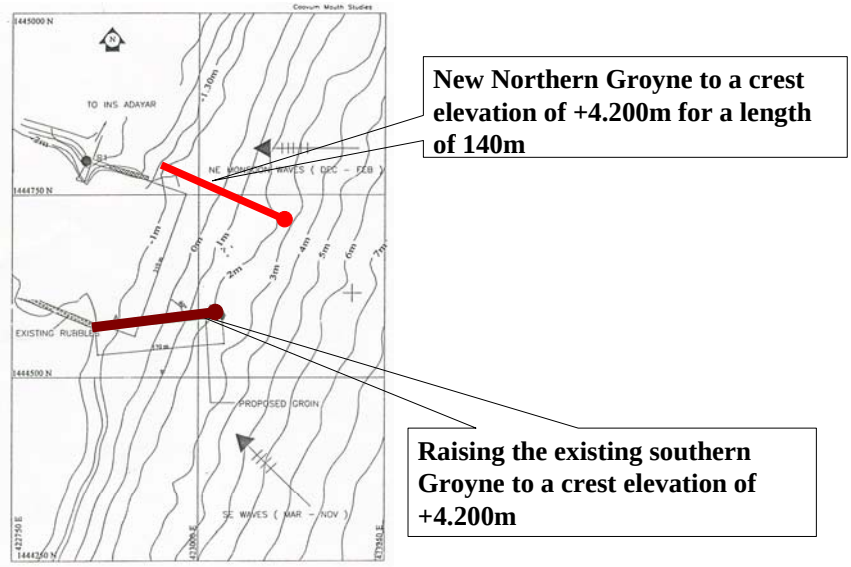
  Stage-I : Construction of Tidal weir and Jetty at Mouth; Installation of a sand pump at mouth

  Stage-II : Improving and Beautifying stretch between Chetpet & Napier Bridge

  Stage-III : Construction of Regulator

- **1998-99, National Institute of Ocean Technology (NIOT), Construction of groynes in stages at Mouth**
- **2000-01, Construction of a 170m long Rubble mound Groyne south of Cooum mouth**
- **2003-04, Further studies to extend the Groyne by 170m and formation of another 140m long Groyne North of Cooum mouth**
- **2003-04 Developing Cooum River in two stages**
  Sea Mouth to Periyar Bridge 1.59 Km (Stage –I)
  Periyar Bridge to Koyambedu Bridge (Stage – II after evicting the encroachments)
- **2005-07 Construction of a 140m long Rubble Mound Groyne North of Cooum Mouth and raising the South Groyne to (+) 4.200m to prevent sand bye-passing and simultaneous removal of sand bar in mouth**

IIT/NIOT – FINAL PROPOSAL



BUCKINGHAM CANAL AND ITS INFLUENCE ON DRAINAGE

- Formed as Drought Relief work in 1806
- Intercepts all the East flowing drains
- Constant Bed level - (-) 1.83 M (Below MSL)
  Length in CMA - 44 km
- Connects Araniyar, Kosasthalaiyar, Cooum and Adayar River
- Major Drains falling in Buckingham Canal : Kodungaiyur Drain
  - Captain Cotton Canal
  - Otteri Nullah
  - And other Minor Drains between Cooum and Adayar

- Maximum Capacity 1500 C/S
- Disrupted by Solid waste and anaerobic growth in sewage
- 25 m wide waterway restricted in many places to 10m due to MRTS stations and pile caps of MRTS pillars. Century old arch bridges across the canal prevent free flood flow (Elephant gate, Ice house, Kutcheri Road, Adams Road).

INADEQUACIES IN THE MACRO DRAINAGE

- Width reduced due to encroachment
- Bed Slopes flattened due to siltation and solid waste dumping
- Drains are obstructed by massive construction of inadequate culverts
- Low lying cause ways
- Make shift foot bridges
- Shoals and projecting foundation, toilets of near by houses.
- Vegetations in bed and banks.
- Low level banks weakened by Pedestrian and Cattle walk

STUDIES MADE BY VARIOUS AGENCIES FOR DRAINAGE IMPROVEMENTS IN CMA

1943	Av. Venkatachari (CE, PWD) Report
1977	P. Sivalingam (CE, PWD) Committee Report
1978	J.H. Hop (World Bank)
1979	Nucleous Cell CMDA
1991	M/S. Severn Trent INC for Greater Madras
1992-94	M/S. Mott Mac Donald, International UK (CMA Drainage)
1994	Sludge disposal consultancy by M/S. MMI
1995	M/S. KBN Engg. Applied Science INC (Florida)
	Environmental Impact Evaluation Report
	- M/S. Wardrop Engg.
1997	- M/S, Neeri for PDA

Drainage study for Pallikkaranai

Pallikkaranai Drainage area (PDA) – 30 Sq.Km. M/s. NEERI has studied the recommendations of various consultants during 1998 for development of PDA.

Proposal-I

Formation of Reservoir in Pallikkaranai swamp as suggested is not desirable either for drinking water supply or for recreational purpose due to

The Catchment area a besides the Western part of swamp are fully habited and hence the runoff that flows is contaminated the effluent from Perungudi STP and the leachate from dumped solid waste of Perunkudi also flow into the swamp.

The treating for raw water is difficult and highly expensive hence dropped.

Proposal-II.

The peak flow from the study area is 350m3/sec 11542 Cusec. is passing thro' Okkiyam Maduvu and reaches South B'Canal enters Kovalam estuary and reaches sea at Muttukadu.

A straight cut canal from South B'Canal near Okkiyam Maduvu to sea is proposed at a cost of Rs.138.00 Crores under Jawaharlal Nehru National Urban Revival Mission to relieve the flood in PDA on the lines of the Adayar Estuary, part of PDA may be declared as protected marshy land forest and prohibited for urban development

ACTION TAKEN SO FAR UNDER CCW & CCRCP

CCRCP Under Execution by CMWSSB
CCW Project under Execution by PWD

- Formation of banks and restoration of bed levels to improve hydraulic conditions of Rivers to convey the floods
- Construction of masonry walls where space is not available to form banks
- Desilting and providing flood protection walls for Waterways and Macro Drainages
- Removal of Sand bars, based on recommendation made by the National Institute of Ocean Technology (NIOT), at Cooum Mouth to be followed for Adayar Mouth.
- Provision of inlet structures for storm water disposal
- Prevention of solid waste disposal into the rivers and Waterways
- Prevention of inflow of untreated sewage into the rivers and waterways
- Beautifying river banks and providing recreational facilities including promotion of tourism, navigation along Cooum and Adayar rivers.
- Forming the surplus courses for the tanks namely Redhills, Madhavaram, Korattur, Ambathur & Chembrambakkam in the Chennai Metropolitan Area
- Total Project outlay of Rs.300 Crores to be shared by PWD, Corporation of Chennai and TNSCB.

AVENUES and OPPORTUNITIES

Strategies with reference to New Developments

1. The new Elevated Expressway from Chennai Port (Gate No.10) connecting the Chennai Bye pass Road (Maduravoyal) under consideration along the Banks of Cooum River.
2. The Cooum Sub Basin Restoration and Management has just been taken up for implementation in a Multi Disciplinary approach under the World Bank Assistance under IAMWARM Project for which a separate CSRM unit is functioning at Chepauk
3. Adyar & Kosasthalaiyar river sub basins will also be taken up for third year implementation under IAMWARM Project
4. For under taking Flood Risk Mapping for Chennai City and it's Suburbs using ALTM (Airborne Laser Terrain Mapper) technology through Institute of Remote Sensing, Anna University, the Government of Tamil Nadu have accorded Administrative Sanction for Rs.217 Lakhs during July 2008. {Contour mapping at the interval of 30 Cm in 1:2000 Scale}
5. The Bill for Restoration of Buckingham Canal as National Waterway has been passed in the floor of Parliament recently for which necessary proposals are under process
6. The Government of Tamil Nadu has enacted "The Tank Protection Act – 2007" for restoration of PWD tanks in Tamil Nadu by which WRD is taking necessary action for eviction of encroachments and rehabilitation of PWD tanks in CMA area also

STRATEGIES AND RECOMMENDATIONS

- Continuous assessment of vulnerable locations & new zone of settlement to be watched and anticipatory measures should be built in during development
- Removal and further prevention of encroachments and in Rivers, Drains and Lakes.
- Comprehensive planning of storm drains and waterways jointly by local bodies and Public Works Department.
- M / s. AARVEE Associates consultant has been entrusted by Chennai Corporation with the work of detailed field investigation, analysis and preparation of Detailed Project Report for

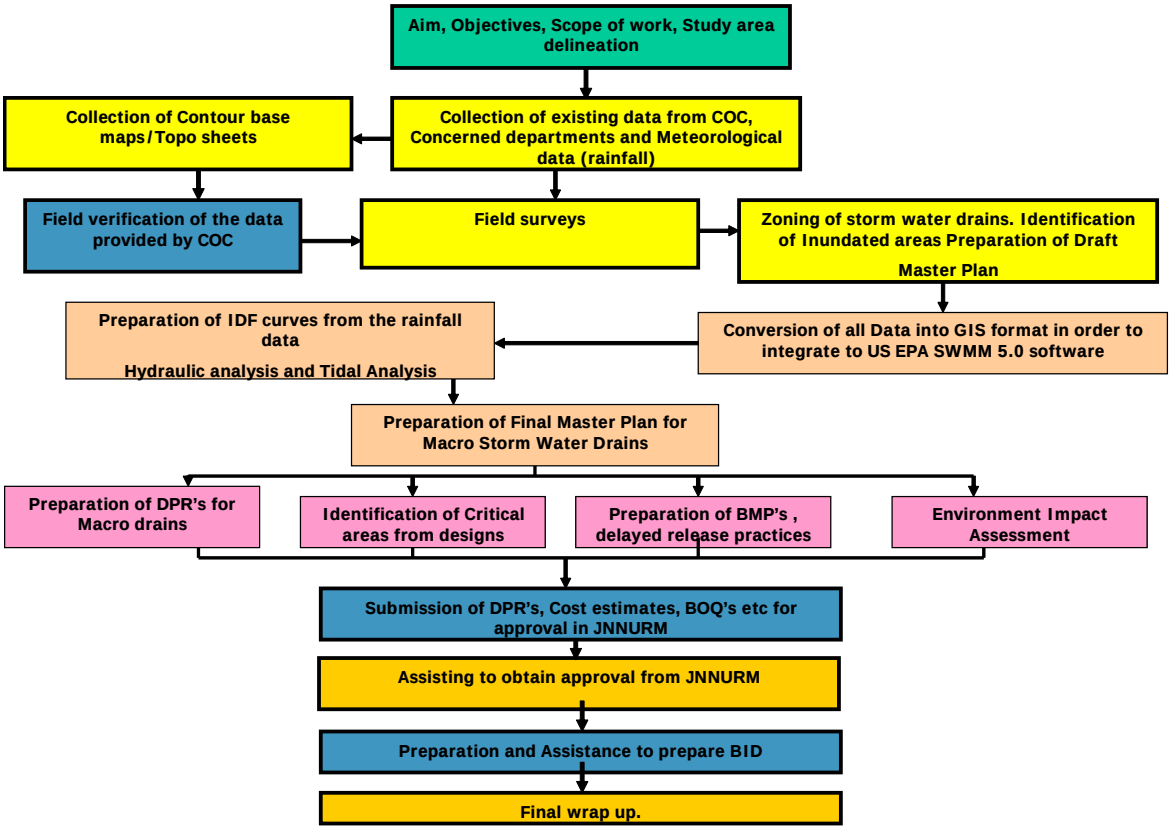
improving the Macro as well as Micro drainage system, for getting the approval from Government of India under JNNURM

- Annual pre monsoon cleaning in front of bridges, culverts, river mouth etc. compulsory.
- During 2008 temporary measures for desilting and channelising the macro drainages have been taken up and are under progress to a tune of Rs.405 Lakhs through WRD

Pre-Monsoon works at Jaffarkhanpet bridge in Adyar river

Pre-Monsoon works at Jaffarkhanpet bridge in Adyar river

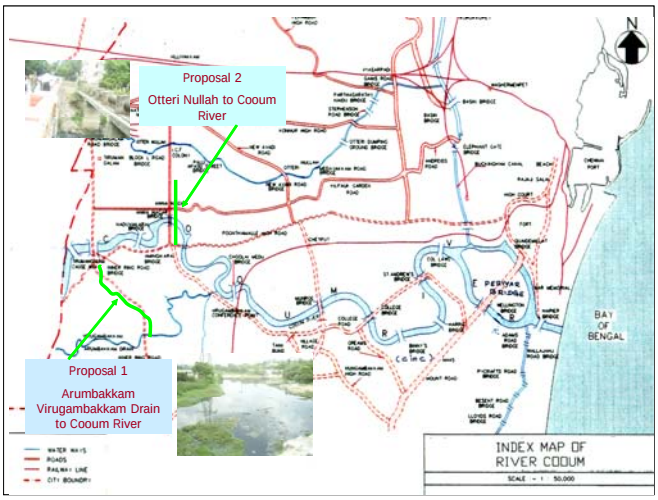
Approach and Methodology for Macro Drains



WORKS PROPOSED BY PWD UNDER JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION (JNNURM)

Sl. No.	Name of work	Tentative Amount "Rs. in Crores"
1	Widening and Deepening of Central Buckingham Canal between Cooum river to Adayar river to maintain the level	8.76
2	Providing the flood protection RCC retaining wall on both sides of Central B'canal except MRTS railway station points from Adams Road Bridge to Mundakkanni Amman Koil Road Bridge LS.0m to 3706m	25.44
3	Providing the flood protection RCC retaining wall on both sides of Central B'canal except MRTS railway station points from Mundakkanni Amman Koil Road Bridge to Adayar North Lock (LS.3706m to 7100m)	16.68
4	Widening the South Buckingham Canal and Deepening to the original bed level from Adayar South Lock to Lattice Bridge (From LS.0m to 4100m)	25.20
5	Widening the South Buckingham canal from Lattice Bridge to Okkiyam Maduvu (From LS.4100m to 10500m)	18.48
6	Widening the South Buckingham canal Western side from Okkiyaam Maduvu to Muttukadu (From LS.10500m to 24000m)	33.97
7	Improvements to North Buckingham canal from Cooum confluence point to Elephant Gate Road Bridge by deepening the canal and providing lining and Retaining wall from LS.0m to LS.1450m	6.80
8	Widening the North Buckingham canal (From 1450 to 17300m)	43.20
9	Construction of Straight cut Drainage canal across Buckingham canal from Okkiyam Maduvu to the sea	128.00
10	Improvements to Kodungaiyur drain 400m	1.12
11	Improvements to Avadi tank and forming the surplus course from Avadi tank to Aayapakkam tank	10.00
12	Rehabilitation and Improvements to the Chennai Metropolitan area tanks. 1), Nadukkuthagai Tank, 2) Arapatheri Tank, 3). Ambathur Tank, 4). Ayapakkam Tank, 5). Korattur Tank, 6). Ayanampakkam Tank, 7). Kovilambakkam Tank 8). Tambaram Puduthangal, 9). Tambaram Periya Eri, 10). Peerkankaranai Tank, 11). Irumpuliyur Tank, 12). Kadapperi Tank, 13). Pallikarani Anai Eri, 14). Narayanapuram Tank,	17.14
13	Construction of retaining wall from Aminjikarai Bridge to Anna Nagar Bridge of the Cooum River	12.12
14	Providing surplus arrangement and surplus course to Porur tank	24.00
15	Construction of Check dams and flood protection and training of kosasthalaiyar river from Napalayam to river Mouth	22.14
16	Renovation of Veerangal Odai from Alandur Municipal limits to Velachery MRTS Bridge	10.00

Sl. No.	Name of work	Tentative Amount "Rs. in Crores"
17	Rehabilitation and Renovation of tanks and enlarging linking of the Drain of city affecting tanks to carry floods to Pallikkaranai Swamp. 1) Kilkattalai Tank, 2) Sembakkam Tank, 3) Selaiyur Tank, 4) Rajakilpakkam Tank, 5) Jalladampettai Tank, 6) S.Kolathur Tank, 7) Moovarasampattu Tank, 8) Pallikkaranai Periya Eri, 9) Nanmangalam Tank, 10) Madipakkam Tank, 11) Medavakkam tank, 12) Perumbakkam Tank, 13) Chithalapakkam Tank	40.76
18	Improvement to Coastal canal, Otteri Nullah for directing flood water by constructing a straight cut, drainage canal from Otteri Nullah to Cooum River	15.75
19	Improvement to Coastal canal, Virugambakkam, Arumbakkam drain for directing flood water by construction a straight cut, drainage canal from Virugambakkam Arumbakkam Drain to Cooum River at 100ft. Road.	21.40
20	Renovation of surplus course channel from Ambattur tank	3.72
21	Renovation and construction of straight cut canal for Maduravoyal tank surplus course and other drains from culverts across NH4 from CH 9/218 to CH 13/494 fro directing flood flow into river cooum	14.30
	TOTAL	**498.98**



CONCLUSION

- Eviction of encroachments & Protection of retrieved lands [Flood Plains]
- Comprehensive planning of drainages in CMA
- Restoration & Rehabilitation of tanks in CMA
- Linking the surpluses of tanks and routing them to river besides Interlinking
- Maintaining of ecological flows in the river for better environment
- Sustained opening of river mouths
- Creation of straight cuts to sea as well as between watercourse
- Development of water corridor for Navigation
- During plan approval for any development regulation of drainage network plan should be emphasized
- Wherever the rainfall exceeds 20 Cm in 24 hours during monsoon periods, inundation in the residential zones located in low lying areas could not be avoided. Only the inundation period could be minimized by the above flood mitigation measures

-ooo-

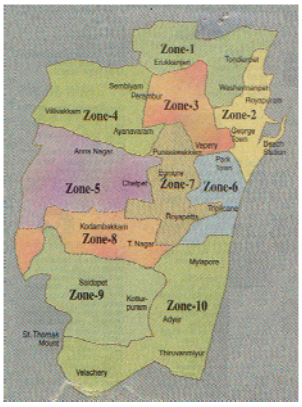
Session - III

SOLID WASTE MANAGEMENT

Thiru Rajesh Lakhoni, IAS,
Commissioner, Corporation of Chennai.

Organisation of Corporation of Chennai

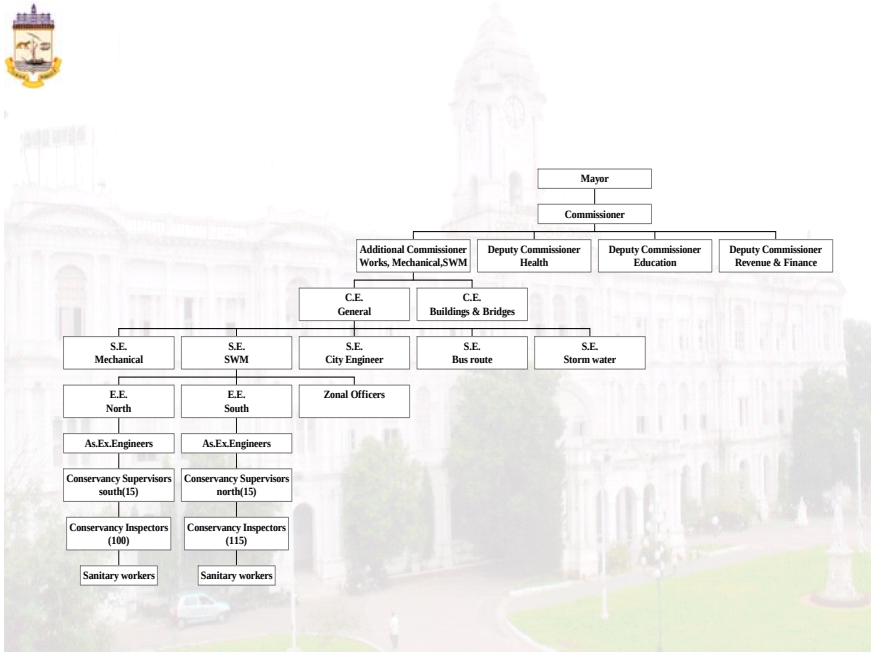
- 155 wards – 30-35,000 population /division
- 30 units – 5-6 wards per unit
- 10 zones – 3 units in one zone



Solid Waste ??

- Household Waste
  - Individual houses
  - Hotels & Kalyanmandapams
- Construction Waste (Debris)
- Garden Waste
  - Tree Pruning
  - Park
  - Leaves
- Hospital Waste
- E Waste

Management Structure



Basic Operation

- Primary Collection
  - House To house collection
  - Street Sweeping
  - Debri Removal
  - Bulk Generators
- Secondary Collection
- Dumping Grounds

Infrastructure

No. of sanitary workers: Permanent - 10130

No. of drivers: Permanent - 1157

No. of vehicles

Compactors		80
HMV	-	306
LMV	-	146
Autos trailers	-	25
Front end loaders	-	19
Bull dozers	-	10

Primary Collection

- House to House collection
  - Easier Said Than done
  - 8 laks household
  - Collection before specific time
  - Ensuring Daily collection for 8 laks households at specific times
  - Collection of waste thrown on 2800 km of roads
- Management Issues
  - 1800 tricycles to march out
    - Absenteeism
    - Allocate area
  - March out of Trucks to match Their operations

Issues

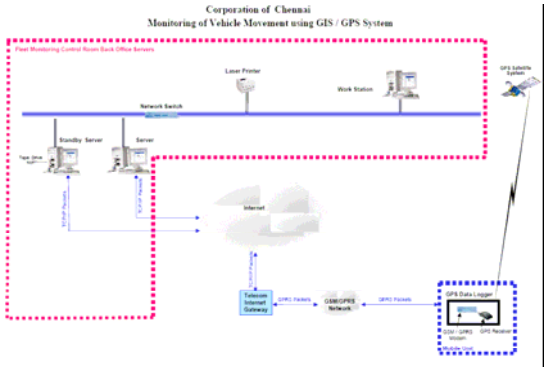
- Littering
- Irregular throwing
- Non segregation
- Penalty Vs Pride

Source segregation

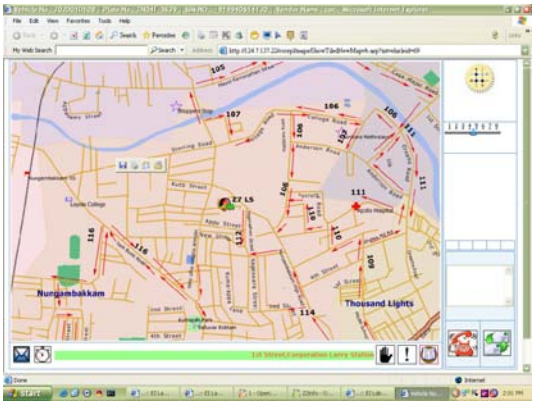
- Segreation at source is already done in many housing Colonies
- Segregation as Bio degradable and Non bio-degradable
- Incentives To tricycle operators to
- Providing Two separate bins in Slum Areas.

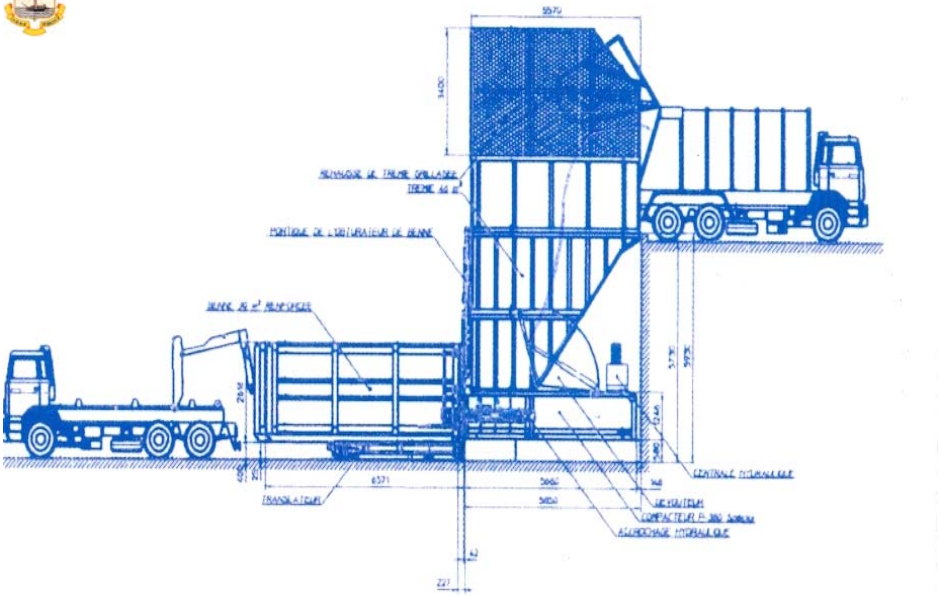
Compactor Bins

- Symbol of efficiency
  - High density Poly ethylene bins tough and comparatively durable
  - Deployed in 3200 places at strategic locations
  - Simplified operations – reduces the carrying over distance of a sweeper and utilisation of more working hours in effective sweeping.
  - Tricycle shuttle distance squeezed – running distance reduced.



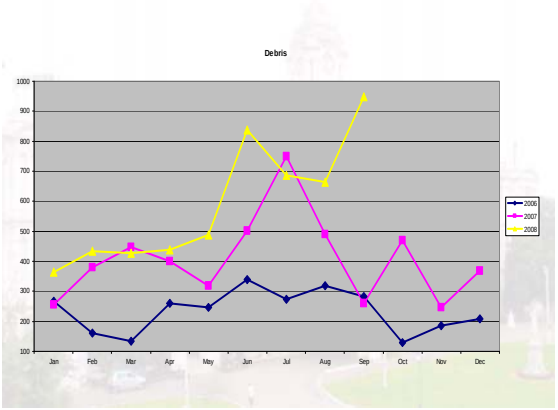
Zone III Modern Transfer Station

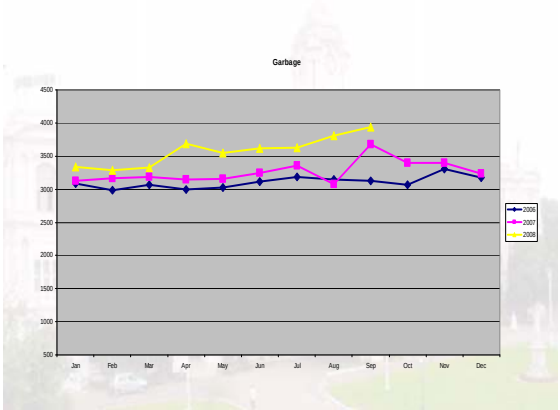




Authentication System	Optical Sensor based Fingerprint Authentication System		
FAR	False Acceptance Rate is 0.00001%		
Available users in various models	Unlimited Users for (Card + Fingerprint) authentication	1000 Users for (Pin + Fingerprint) authentication	200 Users for Fingerprint authentication
Super Admin	One		
Relay compatibility	Stand alone functionality with single door control or siren control		

Biometric System in Six Zones about Ten Thousand Staff.





Initiatives by Chennai Corporation
Modern Technology in SWM

- Hardware Side
- Compactors
- GPS vehicle monitoring system on SW carriers
- Modern Refuse transfer Stations.
- Heavy Earth movers like Grappler, Excavators, Mechanical Sweepers
- Integrated SWM facility
- Software Side
- Biometric Finger Identification module for conservancy staff'
- Uniforms to inspire the conservancy fleet
- EPR – Extended Producer Responsibility sensitization
- E Waste Handling Facility

Ground Breaking Migration in to Modern Era

- Primary Collection
  - Door to Door collection in Tricycle – Cutting Edge Source Segregation
  - Campaigns to Transition the minds
  - AVM Sponsored, Director SP. Muthuraman, Artist Manorama. CD released and Screened in 1825 places .
  - Migration of Open Carrier Mode to Closed Compactor Mode
  - This transforms the city environment and image.
  - Eighty 14 cubic meter compactors ordered, 64 of them on road.
  - New era and ease in handling the garbage, labour well utilised and efficiency improved.
  - Addresses unattended corners of SWM issues – Better reach Corporation Cares !
  - Fourty 6 cubic metre compactors ordered, to take care of the smaller lanes.

Zero Garbage

- Creating awareness programme
- Involving NGO's , Exnora and Welfare Associations.
- Encouraging home composting
- Encouragement for delivering the recyclable materials to the purchasers of waste materials by the generators themselves
- Separate collection of waste by the waste collectors while receiving waste from the house-holds.

Decentralised Composting – A Back of the envelope calculation to Analyse Applicability

- Pammal Plan – Practicable ?
  - Pammal composting done on 2 acre land for 1 tpd (tonnes per day) sw (solid waste)
  - On an average each ten Zones produce 350 tpd , sw.
  - Composting is a VOLUMINOUS process necessitates minimum 6 weeks of time (40-50 days) in Windrow method.
  - Simple arithmetic's shows 2*350 = 700 acres of land requirement per Zone, to store 350*40=14000 tonnes in a single place unimaginable– Illogical and vertical expansion Impractical – Decentralised composting inside city in a NIMBY mindset background is not possible.

Decentralising composting Yards

- Least thing citizen likes near his residential, commercial establishment is a swm facility.
- Twenty places in a Zone means at least hundred tonnes per pit- may generate foul odour, rodent menace., etc
- Moreover in this modern era such practice of internal composting in a city like Chennai is seen Nowhere around the World.
- Whereas, The Corporation of Chennai do support and encourage composting- the self sufficient model -Multi Storied Buildings (MSBs)
- Institutional Biomethanisation for sustainable environmentally friendly energy generation.

Composting at Micro Level

- Composting at Multi storey Buildings
- Composting at Individual houses

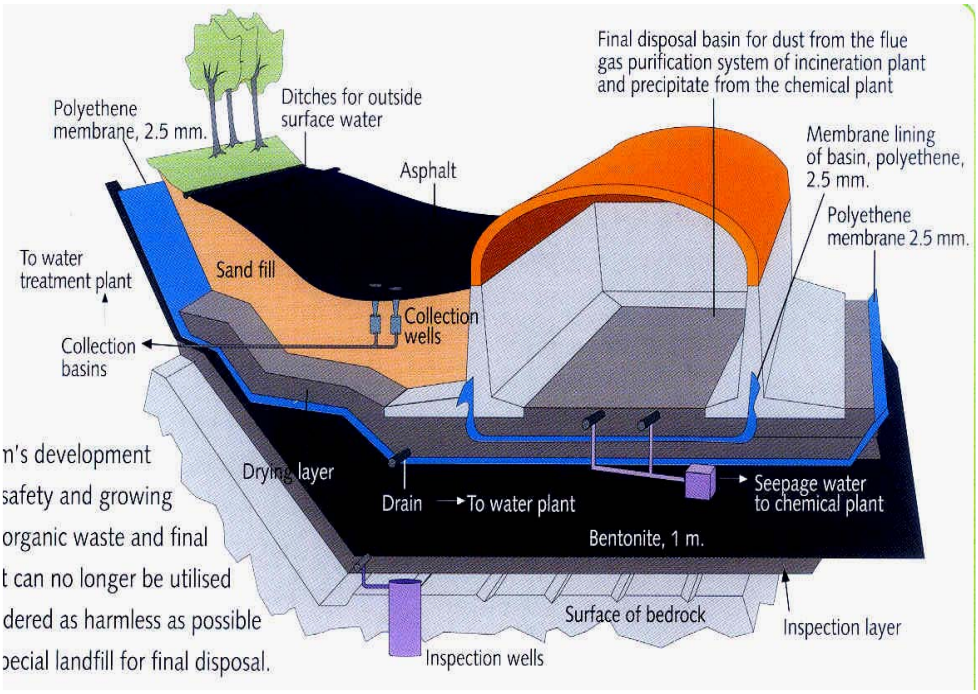
Issues, Faced

- NIMBY (Not In My Back Yard) an internationally observed phenomenon wherein people do not want a swm facility near their residential area.
- Examples of Valluvar Kottam, Otteri Garden, Dasaprkash Hotel, Bogun villa park in Anna Nagar are closed transfer stations and dumping points .

Indispensability of the ISWM plant at Perungudi

- Ariel Satellite images show no land area suitable, free and available for dumping yard in a surrounding area of 100 kilometers.
- The marsh land is not disturbed and the Integrated Solid Waste Management (ISWM) plant will scientifically maintain the landmass in a sustainable manner besides preventing pollution.
- The surrounding town panchayats were recently precluded &stopped from using the dumping yard – No area is available for them to dump. Also, SWM is a burgeoning field and ISWM plant is a panacea for all practical questions of Garbage Menace.
- Perungudi Scientific SWM facility is indispensable from all points of view.

A classical Sanitary Landfill site



Landfill at Konungaiyur

- Landfill at Kodungaiyur
  - Area - 141 HA
  - Landfilled from the year 1980's
  - Expected life time upto 2010
  - Daily MSW received 1600 to 1900 tpd
  - Compound wall has been constructed to avoid entry of antisocial elements.

Kodungaiyur Land Fill Site

Perungudi Dumping Yard- Integrated SWM Plant

HERBAL & BIOENZYME TREATMENT

MACHINERIES FOR PROCESSING

FINE GRADE

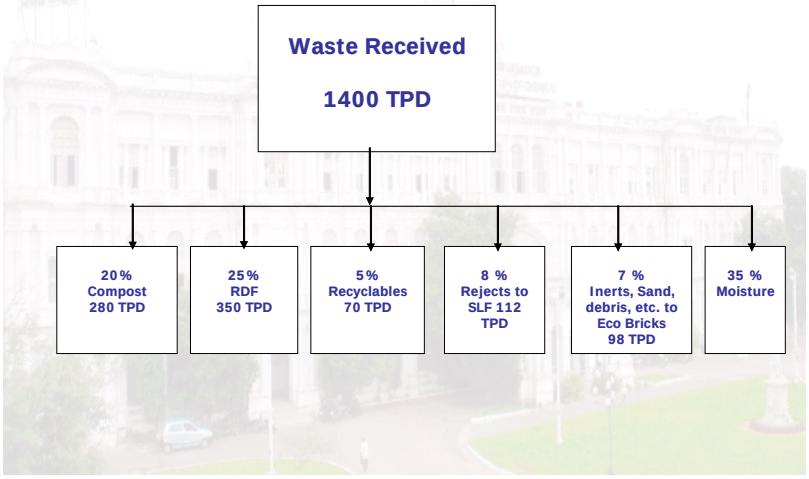
FUEL PELLETS RECOVERED FROM HARD WOODY & LIGNITIC WASTES

3200 Tons Per Day Integrated Municipal Solid Waste (MSW) Processing Project (Compost & RDF Plant) Perungudi @ Kodanguiur Chennai

PROPOSED METHODOLOGY

Stage 1:	Waste Segregation
Stage 2:	Composting
Stage 3:	RDF Manufacturing
Stage 4:	Plastic Recycling
Stage 5:	Inert Processing to Civil Bricks
Stage 6:	Development of Sanitary Landfill sites

MATERIAL BALANCE SHEET **(Moisture losses will be 30-40%.)**



Composting

- Major Stages:
- *Phase 1- Sanitization*
- *Phase 2- Bioconversion*
- *Phase 3- Fortification & value Enhancement*
- *Phase 4- Mechanical processing*

THE PROCESS IN BRIEF – COMPOSTING

- Pre-sorting of MSW into compostable, Combustible, recyclable and currently unusable.
- Treatment with herbals & enzymes for sanitization and accelerated biological conversion cycle.
- Windrow formation for proper aeration and process control.
- Weekly turning and moisture maintenance.
- Control of process parameters like pH, Temp., odors, porosity.
- Processing of fermented biomass through on-line machines for separation grading & recovery.
- Quality control analysis and release of the product for market.

PROCESS FOR RDF

- Hand sorting of large size high calorific value material from tipping floor
- Pass mixed garbage through screening cum cutting trommel, Carry forward woody material including pre-separated material / and paper products for shredding
- Dry the shredded material
- Crushing of dry material for size reduction
- Pass the crushed material through sand removal and ADS
- Compress the fluff for densification, & then converted to bail form which can be feed directly to boiler or can be put for open sale.

Future Proposal

- RFID Controlled Petrol Bunks
- ERP for SWM
- Automatic Weighing trucks
- 2 hour digesters

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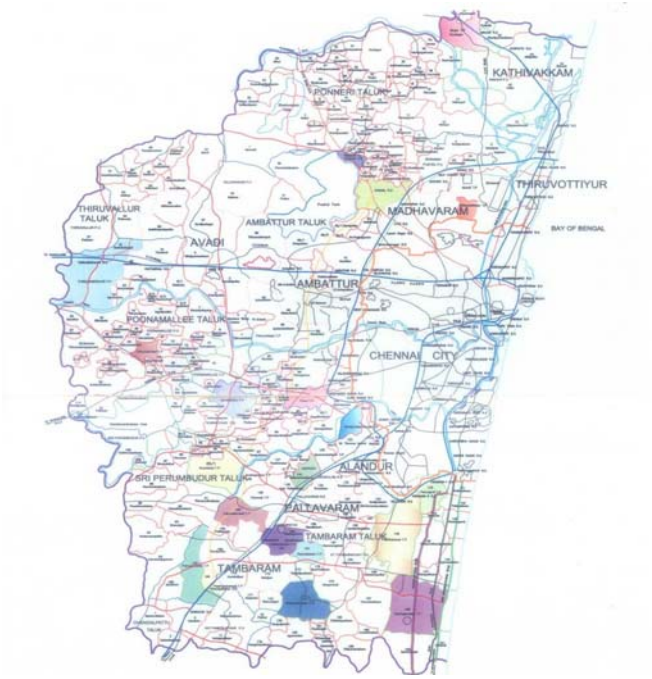
Session - III

Initiatives for Infrastructure Improvement in Town Panchayats in CMDA limit

Dr. K. GOPAL, I.A.S.,
Commissioner of Town Panchayats
Municipal Administration & Water Supply Department.

Town Panchayats in CMDA areas



Population of Towns
Kancheepuram : 13 Town Panchayats

Chitlapakkam	25314
Kundrathur	25007
Perungudi	23581
Pallikaranai	22070
Sembakkam	21492
Perungalathur	19594
Mangadu	19420
Thiruneermalai	19228
Peerkankaranai	17511
Madambakkam	16996
Sholinganallur	15557
Nandambakkam	9343
Meenambakkam	3609

Population of Towns
Thiruvallur : 7 Town Panchayats

Thirunindravur	29332
Porur	28924
Minjur	23742
Puzhal	20639
Naravarikuppam	18331
Thirumazhisai	16291
Chinnasekkadu	9738

Town Panchayats in CMDA

Number of Towns - 20

Population 2001 - 5.89 Lakhs
2016 – 7.41 Lakhs
2021 – 9.45 Lakhs
2026 – 12.21 Lakhs

Waste generation per Day - 109.15 M.T (@ 200 - 350 grams per day)

No. of -- Residents - 112620
-- Commercial - 7387
-- Industrial units - 543

Profile of Town Panchayats

- Small & medium size Towns
- Population ranging from 7,000-28,000
- Highest dicennial growth rate (3.62%)
- Part of IT corridor & Industrial hubs
- First level urban growth centers in CMDA limit / Transitional bodies
- Preferred destination for all Employees & youth
- Some of best urban practices
- Certain towns saturated with infrastructure & limited scope for expansion
- Bright Future, if we put proper investment

Growth Rate in CMDA limits

Local Body	No	Dicennial Growth Rate
Corporation	1	1.23
Municipalities	16	2.91
Town Panchayats	20	3.62
Village Panchayats	218	3.58

Infrastructure in Town Panchayats

" According to its priority "

- Water supply
- Roads & Link roads
- Street Lighting
- Drainage / Under ground sewerage system
- Parks, Play fields & Public Toilets
- Parking lots, Bus shelters
- Burial / Cremation places
- SWM Infrastructure

Existing Infrastructure in Town Panchayats

- BT & CC Roads
- Drains
- Parks & Play fields
- Street lights
- Compost Parks
- Water supply Systems (up to 80 LPCD)
- Burial & cremation sheds

Infrastructure in Town Panchayats

Roads length	-	987.263 Kms
Drains Length	-	193.742 Kms
Parks	-	225 Nos.
Crematorium Places	-	90 Nos.
Water supply service Connections	-	15827 Nos. (Huge gap)
Water supply public Taps	-	8264 Nos.
Street lights	-	15202 Nos.


பாம்பன் சுவாமிகள் சாலை கால்வாய் அமைத்தல்
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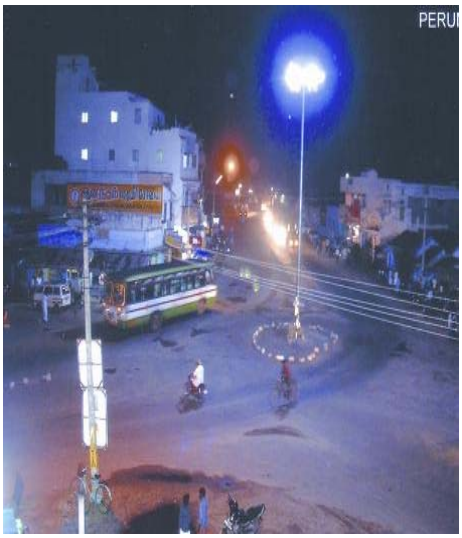

Mobile Toilet

Sanitary Complex

Renovation of Ponds - Kundrathur Town Panchayat

Burial & Cremation Ground

Constraints

- Periodical Maintenance due to paucity of funds
- Un- covered areas are still existing
- Gap in demand and supply

Infrastructure of Towns – Existing & Proposed

Infrastructure	Existing	Initiated/ Proposed	Schemes
Water supply	- Stand alone - 70 LPCD & Less - Few by CMWSSB	- 130 LPCD - By CMWSSB	JNNURM
UGSS	- Nil - Only septic tank - Public health hazards	- In all Town Panchayats - By CMWSSB - DRR stage	JNNURM
Street Roads	- Well laid in certain places - Inadequate in newly developed areas	To be implemented in a phased manner	CMDA to help local bodies
Infrastructure	Existing	Initiated/ Proposed	Schemes
Trunk line infrastructure / Major roads	- Grossly Inadequate - No traffic plan	CMDA should come up with comprehensive plan	CMDA to help local bodies
Parks	Satisfactory	Number to be increased	General Fund, LAP/ CBED
Street Lighting	Satisfactory	- CFL in all places - Energy savers	Own fund
Shelter / Housing	Initiated under BSUP	To be expanded	BSUP of JNURM
SWM	- Compost parks - well designed systems	-Linking with major land fill sites	Own fund / Govt Grant

Water Supply Infrastructure

Currently (Service Level)	**Up to 70 LPCD**
Future (Service Level)	**130 LPCD**
Existing system	**Predominantly stand alone System (Local sources, Bore wells, Mini Power Pumps, OHT, Taps, connections)**
Future	**Combined Water Supply System by CMWSSB**
Time line	**2 to 3 Years**

Over Head Tank

Under Ground Sewerage System

Currently	–	No UGSS
	-	Only Septic Tanks
	-	Common drainages
	-	Liquid Waste Management systems on pilot basis
Future	-	UGSS in all 20 Town Panchayats
	-	By CMWSSB
	-	DPR stage
	-	JNNURM Scheme

DECENTRALISED WASTE WATER TREATMENT SYSTEM
Chitlapakkam Town Panchayat

Recycling Cost

Sl.no.	Item Description	Cost in Rupees
1	Design & Engineering	75,000
2	Civil works	6,50,000
3	Mechanical works	4,50,000
4	Electrical works	75,000
5	Piping & Valves	9,00,000
6	Total plant cost	21,00,000

Impact of Major Infrastructure on the growth of Towns

- Outer ring road
- Four laning of Chennai bye pass road
- MRTS expansion
- Metro link
- Proposed / Up coming Industrial & Automobile hubs in periphery
- Proposed New Airport

Sectoral responsibility to make Towns self sufficient

Linkages & Networking to enhance Access & Mobility

- *Bus ways*
- *Rail projects*
- *Metro Link*

❖ Traffic Management is to be strengthened further

❖ Establishing all purpose Tickets (Bus, Metro & Rail)

Other Constraints & Infra structural gaps

- Management of Macro Drainage System
- Flood Alleviation measures (Decongesting channels)
- Environmental friendly Town Management
- Shelter / Affordable Housing & Decongestion of slums

Housing **Kuntrathur Town Panchayat**

Housing Sembakkam Town Panchayat

Housing Minjur Town Panchayat

Vision plan for SWM in Town Panchayats

Activity	2006	2008 - 2009	By 2010	2015
Source Segregation	20%	40%	75%	100%
Door To Door Collection	30%	50%	75%	100%
Quantity of Solid Waste dumped in Landfills	80%	40%	15%	10%
Recovery Target (Increasing the quantity of Solid Waste to be Composted / Recycled)	30%	50%	50-60%	70%
Household recycling Targets	10%	20%	40%	33%
Enforcement of :				
a) Polluter's pay principle	-	a	a	a
b) Extended Producer Responsibilities	-		a	a

Kundrathur Town Panchayat

Naravarikuppam Town Panchayat

Madampakkam Town Panchayat

Kitchen Garden in the compost park of Sholinganallur

Role of stakeholders in providing infrastructure creation in Town Panchayats

- CMDA
- Town Panchayats
- Private Builders / Developers
- Sectoral responsibility (Highway, PWD – WRO etc)
- Fact ?
- Town Panchayats only providing everything from its general fund
- CMDA contribution ? (Except LAP / CBED small grants)
- Developers role?

Challenge OR Opportunity !!

- Too many Local bodies !
- Inter Local body Variations !
- Coordination issues !

Solution

- One single unit, may be in the form of one more Corporation

Together With Community…….

Kundrathur Town Panchayat

Sembakkam Town Panchayat

Sembakkam Town Panchayat

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