

## CHAPTER 7

### NORMS FOR O & M AND STAFFING

**3.7.1.** In the past, emphasis has always been on capital expenditure, neglecting totally the O&M aspects. This has led to inefficient management and premature aging of the assets. The constraint was mainly resources. Therefore, the thrust is now on closing the gaps to the extent possible by investment in operation and maintenance of service. In this Part III, SFC has subscribed to the view that for better level of operation and maintenance of services, additional manpower for the civic services is indispensable.

#### Approach:

**3.7.2.** Now, the issue involved is estimation of Manpower-cost and operation and maintenance cost on a normative basis vis-a-vis the existing position. The existing staff position has been taken by universalizing the sample. The norms for staff have been arrived at for the water supply by considering CPHEEO norms, for public health on the basis of Norms Committee of Government of Tamilnadu and for Roads on the basis of Highways and Rural Works department's norms. For sewerage and sanitation, the staff requirements in term of numbers have been clubbed with O&M and not segregated and for the storm water drains, manpower has been suggested on a temporary basis only for the period before and after the monsoons. The norms on manpower have been finalized after a detailed discussion with the officials of the line departments. For existing expenditure on establishments, the universal figures as computed by the Government Data Centre out of the detailed questionnaires, have been taken and for the normative establishment expenditure, it has been derived from the proposed staff strength except for Corporations where the levels were found reasonable and have been assumed to remain the same. For the O&M, the existing cost has been taken from the universal figures as computed by Government Data Centre except for Storm Water Drains, where no figures were available. The normative O&M cost have been derived from the universal figures except for water-supply, where the norms were fixed after due deliberations with TWAD/Metro Water officials.

#### Water Supply

**3.7.3.** Man power norms for water-supply operation is based on Central Public Health Engineering and Environmental Organization (CPHEEO) norms. These norms have been adopted for all local bodies except for Chennai Corporation. In case of Chennai Corporation, the Metro Water Board (MMWSSB) caters to the water supply requirements, and the existing manpower is taken as the normative level.

**3.7.4.** Operation and Maintenance expenditure has been estimated for all categories based on the source of water; Corporations will need a source of surface water in the range of 75 to 150 MLD, Municipalities in 5 to 25 MLD, Town and Village Panchayats in the order of less than 5 MLD. It is assumed that 30% of water requirements

in Town Panchayats and 80% in Village Panchayats is not met from ground water. For Man-power, it is assumed that each Village Panchayat will have more than 10 wells. The O&M expenditure per unit quantity of water produced is arrived at on the basis of TWAD Board projects, which works out to Rs.3.20 lakh per MLD (1993-94 prices). The estimation of Man-power cost and O&M cost by 1995-96 on a Normative basis vis-a-vis the existing position is given below:

**Table 3.52 Water Supply**  
**A. Estimation of Manpower and Establishment Cost**

Local body category	Quantity of water supplied MLD	Distri- bution Length Km.	Total Existing Manpower		Total Manpower required for Existing level of Services (Normative) - Nos.			Additional Manpower required (Nos.)		Establishment Expenditure Rs. Lakhs	
			Tech- nical	Semi skilled	Tech- nical	Skilled	Semi skilled	Tech- nical	Skilled	Existing	Normative
Chennai (MMWSSB)	298	1598	507	1699	-	-	-	-	-	1993-94	1995-96
Other Corporations	272	1938	54	797	25	135	2422	0	1790	1400.00	1694.00
Municipalities	364	2844	146	728	104	936	1244	0	499	392.84	475.34
Town Panchayats	311	6310	168	795	635	1013	2761	467	2978	1042.56	1261.50
Village Panch. (PU)	761	6371	381	20014	384	3465	2787	3	2476	419.96	508.15
<b>Total</b>	<b>2006</b>	<b>19061</b>	<b>1256</b>	<b>24033</b>	<b>1148</b>	<b>5549</b>	<b>9214</b>	<b>470</b>	<b>3677</b>	<b>3524.92</b>	<b>4265.16</b>

  

B. Estimation of Operation Maintenance Expenditure						(Amount - Rs. in lakhs)		
Local body Category	Quantity of Water Supplied MLD	Annual Establishment Expenditure per MLD 1995-96		Annual Operation and Maintenance Expenditure per MLD 1995-96		Total Expenditure including Establishment Expenditure		
		Existing	Normative	Existing	Normative	Existing	Normative	Additional
Chennai Corporation	298	5.7	5.7	3.5	3.5	2736.40	2736.40	0.00
Other Corporations	272	1.7	2.9	2.7	4.3	1206.40	1961.82	755.42
Municipalities	364	4.2	3.8	5.0	4.3	3342.00	2915.92	0.00
Town Panchayats	311	2.1	3.3	4.3	4.0	1988.00	2267.89	279.89
Village Panchayats	761	0.4	2.2	3.3	3.7	2838.70	4428.33	1589.63
<b>Total</b>	<b>2006</b>					<b>12111.50</b>	<b>14310.36</b>	<b>2624.94</b>

**Note:** i) Existing Manpower sample expanded to universe.

ii) Technical AEE/AE Supervisor, Skilled Operators, Helpers, Electricians, Mechanics; Semi-skilled - unskilled Watchman etc.

iii) Existing Expenditure (1993-94 level) inflated to 1995-96 level by 10%;

iv) O&M for Madras (MMWSSB) is taken at the existing levels and manpower is adequate;

v) For other local bodies, it is assumed based on few projects of TWAD Board which works out to be 3.2 lakhs per MLD at 1993-94 prices;

vi) In case of Village Panchayats, Panchayat Union is taken as entity for estimation of Manpower;

vii) Wherever normative number of staff is less than existing staff, there existing staff is considered for estimating establishment cost;

viii) Existing establishment is based on data computed by Government Data Centre.

## Sewerage & Sanitation

3.7.5. The expenditure requirements to operate and maintain Sewerage and Sanitation systems are dependent on the types of systems adopted. In the absence of these information, the expenditure norms have been assumed at 25% more than the existing level. In case of Chennai Corporation, the expenditure includes both Corporation and Metro Water Board. The expenditure for other Corporations has been derived based on the Chennai Corporation expenditure but related to the coverage through different systems. The level of expenditure in the Village Panchayats is assumed to be same as that in Town Panchayats. The estimates of Manpower cost and O&M costs are given below.

**Table 3.53 O&M Costs for Sewerage and Sanitation (1995-96)  
(including the Manpower Cost)**

	Annual O&M Expenditure		1995 Population	Existing Per Capita 1995-96	Normative 1995-96	Annual O&M Expenditure
	1993-94	1995/96				
	Rs. Lakhs	Lakhs		Rs.		Rs. Lakhs
Chennai Corporation	2562.6	3100.7	41.1	75.5	94	3875.9
Other Corporations	236.0	285.6	33.3	8.6	57	1888.2
Municipalities	1436.6	1737.6	75.9	22.9	29	2172.0
Town Panchayats	470.0	568.7	91.3	6.2	8	710.9
Village Panchayats	625.0	756.3	346.1	2.2	8	2693.4
<b>Total</b>	<b>5329.56</b>	<b>6448.77</b>				<b>11340.32</b>

**Note:**

- i. Based on actual expenditure incurred during 1993/94
- ii. 10% escalation over Normative
- iii. Chennai expenditure includes both Corporation and Metro Water iv. Other Corporation  
60% of Chennai, Based on existing coverage with reference to Chennai.
- v. Village Panchayats norms were considered equal to Town Panchayats
- vi. In absence of Normative expenditure, Normative was assumed 25% excess of existing.

## SOLID WASTE MANAGEMENT

### Technologies :

**3.7.6.** Insanitary land disposal of solid waste could lead to the emission of pollutants like leachate and land fill gas containing various gasses like CO, methane, etc. Hence any land disposal option should aim at reducing this potential pollution hazards. Various technologies have been developed for effective disposal of waste, which include one or more of the following processes:

- Homogenisation
- Composting
- Vermi Composting
- Material Separation
- Anaerobic Digestion
- Mass Burn Incineration
- Fluidised Bed Combustion
- Waste Derived Fuel
- Aggregate Production
- Containment Engineering
- Dilution and Dispersal
- Ocean Dumping

All the above methods may not be directly applicable in the present context, due to various constraints ranging from the nature of waste to financial constraints to socio-cultural aspects. However, these technologies need to be explored and experimented with so as to adopt them to local conditions.

### Suitability of the Technologies:

**3.7.7.** The suitability of the above discussed technologies depends upon various factors like

- Waste Composition
- Waste Characteristics
- Total Waste available
- Unit costs of the Technology

Implementation of any of the above technologies requires an in-depth analysis of the above factors in relation to the local conditions. The following table gives the general prerequisites of some of these technologies, which are prevalent in India and their unit costs.

**Table 3.54 Comparative Evaluation of Solid Waste Treatment Technologies**

Technology	Main Features	Land Requirements	Min.Waste Qty	Cost/Tone
1. Sanitary Landfill	<ul style="list-style-type: none"> <li>▪ Use of soil cover to minimise infiltration of rain water.</li> <li>▪ Compaction of deposits to minimise voids.</li> <li>▪ Engineering designs to minimise the surface ground water entry.</li> <li>▪ Control of leachate and gas emissions through suitable mitigative measures.</li> </ul>	1.25 cu.m/tonne	No requirement	Minimum Rs.1 - 1.25 lakhs (for 100 tonnes per day)
2. Organic Manure (Composting)	<ul style="list-style-type: none"> <li>▪ Treatment of garbage with biological inoculum.</li> <li>▪ Organic manure is use full for agriculture and horticulture purposes</li> <li>▪ Rejected waste free from pollutants due to sanitisation treatment.</li> </ul>	30,000 sft.	150 tonnes per day	Capital - Rs.0.8 - 1 lakh O&M - Rs.1200-1250  Manure Price- Rs.2100
3. Pelletisation (Refuse Derived Technology)	<ul style="list-style-type: none"> <li>▪ Segregation of recyclables and natural comostable materials.</li> <li>▪ Heating system helps in Sterilisation of waste, avoiding health hazard.</li> <li>▪ Process time is 30 min.</li> </ul>	40,000 sft (Indoor & Outdoor requirements)	100 tonnes per day	Capital Rs.31500 O&M Rs.35000 Pellets price - Rs.1200

Technology	Main Features	Land Requirements	Min.Waste Qty	Cost/Tone
4. Incineration	<ul style="list-style-type: none"> <li>▪ Segregation of combustible and non-combustible materials.</li> <li>▪ Burning the combustibles through incineration</li> <li>▪ 90% of waste volume is reduced.</li> <li>▪ High capital investment &amp; demands skilled labour.</li> </ul>	Negligible	100 tonnes per day	Rs.1-2 lakhs
5. Power Generation	5 - 10 MW power generation		500-600 tonnes per day	Rs.2 - 2.5 lakhs

**3.7.8.** Norms for manpower requirement for Solid Waste Management are in terms of road length per conservancy staff and number of drivers per vehicle. In case of Corporations and Municipalities, the manpower Norms are as adopted by local bodies and in Town Panchayats and Village Panchayats, recommendations of the Norms Committee (Government of Tamilnadu) have been adopted after adjustments for reduced collection frequency and lower population densities. The total number of supervisory staff is assumed at 10 per cent of the conservancy staff. O&M expenditure from collection to disposal stage has been arrived at, based on the average distance and tonnage carried by a vehicle per trip. In addition to fuel cost and repairs, a 10% provision is made for other accessories such as maintenance of dustbins, and equipments for collection.

**Table 3.55 Solid Waste Management 1995-96**  
**A. Estimation of Manpower and Establishment Cost**

Local body category	Road Length	Existing Vehicles	Total Existing Staff		Norms	Total Staff required			Additional Staff		Normative Annual Estt. Cost		
			Conservancy staff	Drivers		Conservancy staff	Drivers	Supervisory staff	Conservancy staff	Drivers	Total	Pertonne	
Km.	Nos.	Nos.	Nos.	Nos.	Road length per vehicle	Conservancy staff	Drivers	Supervisory staff	Conservancy staff	Drivers	Nos. Rs. Lakhs		
Chennai Corporation	2228	429	7305	687	300	1.25	7427	537	743	122	0	2746.02	0.96
Other Corporations	2484	110	7437	167	300	1.25	8280	138	828	843	0	2881.90	2.36
Municipalities	6052	329	14307	359	400	1.25	15130	411	1513	823	53	5207.03	1.88
Town Panchayats	13312	974	11663	497	1600	1.25	8320	1218	832	7157	721	1317.40	0.88
Village Panchayats	45504	0	2047	0	5600	1.25	8126	0	813	6079	0	1072.59	0.56
<b>B. Estimation of O &amp; M Cost (1995-96)</b> (Rs. in lakhs)													
Local Body Category	Waste Generated Tons/day	Establishment cost per tonne per annum		Only O & M per tonne per annum		Total Annual Cost							
		Existing	Normative	Existing	Normative	Existing	Normative	Additional					
Chennai Corporation	2852	0.71	0.96	0.08	0.09	4069.60	3016.86	0.00					
Other Corporations	1222	1.12	2.36	0.05	0.09	1564.20	2997.95	1433.75					
Municipalities	2771	1.08	1.88	0.06	0.06	3229.50	5381.18	2151.68					
Town Panchayats	1489	0.48	0.88	0.13	0.05	1197.90	1388.24	190.34					
Village Panchayats	1925	NA	0.56	NA	0.05	NA	1164.18	1164.18					

**Note:** Sample expanded to Universe Supervisory staff assumed 10% of Conservancy Staff.

## **Roads:**

**3.7.9.** Norms for manpower requirement for regular and periodic maintenance of roads have been assumed as those followed by the Highways and Rural Works Department, Government of Tamilnadu. O&M expenditure includes bi-annual maintenance (Patch Works) and periodic maintenance of BT roads i.e. resurfacing once in six years. Normative expenditure per KM. of road is estimated based on the distribution of roads by width for different categories of local bodies. This is arrived at based on the existing widths in Madras and Tiruppur. O&M expenditure is very high in comparison to that of the norm. This is because as per present practice, local bodies account the periodic renewals and replacements as part of Revenue expenditure.

**Table 3.56 Roads**  
**A. Estimation of Manpower requirement: (1995-96)**

Local body category	Road Length Km.	Total Existing staff		Norms for staff per Km. (Highways norms)		Total Staff Required		Additional Required		Total Estab- shment cost Rs. Lakhs	Per Km.
		Tech- nical	Un- Skilled	Tech- nical	Un- Skilled	Tech- nical	Skilled	Un- skilled	Un- skilled		
		Nos.	Nos.	@ 1/100 @ 1/25 @ 2/8	Nos.	Nos.	Nos.	Nos.	Nos.		
Chennai Corporation	2159	281	151	0	-	281	151	0	0	290.17	0.13
Other Corporations	2484	389	199	115	0.01	25	99	621	0	547.47	0.22
Municipalities	6052	182	182	303	0.01	104	242	1513	0	312.28	0.05
Town Panchayats	13312	266	266	133	0.01	635	532	3328	369	815.98	0.06
Village Panchayats	105252	1053	2105	1053	0.01	1053	4210	26313	0	5052.10	0.05
Panchayat Unions	45504	455	910	455	0.01	455	1820	11376	0	2184.19	0.05

**B. Estimation of O&M Expenditure (1995-96)**

Local body category	Existing Road Length Km.	Total Road Length Km.	Existing Annual Maintenance Cost (Including Establishment Cost)	Normative Annual Maintenance Cost (Patch Works)/Km.	Normative Bi-annual Maintenance Cost (Patch Works)/Km.	Normative Total Annually (Patch Works) Per km.	Normative Total Annually Maintenance Per km.	Normative Total Patch Works and Periodic Mainten- ance	Per Km.					
										BT	WBM	Others	Km.	Existing/ Km.
Chennai Corporation	2131	3	25	2159	0.55	1074.6	0.92	0.29	0.20	652.71	3.23	1147.19	1799.90	0.83
Other Corporations	1624	423	437	2484	0.30	1233.7	0.92	0.29	0.20	565.77	3.23	874.25	1440.02	0.58
Municipalities	4164	958	930	6052	0.15	2197.4	0.87	0.28	0.19	1352.58	2.90	2009.13	3361.71	0.56
Town Panchayats	3846	3186	6280	13312	0.21	2035.2	0.41	0.15	0.09	879.32	1.36	874.32	1753.64	0.13
Village Panchayats	15931	17020	72301	105252	0.01	1130.1	0.41	0.15	0.09	5248.78	1.36	3621.65	8870.43	0.08
Panchayat Unions	8797	20563	16144	45504	0.04	1678.3	0.41	0.15	0.09	2716.97	1.15	1689.02	4406.00	0.16

**Note:**

- i. Manpower expanded to Universe
- ii. Existing manpower in Panchayat Union is assumed as in Village Panchayats.
- iii. In case Technical Staff requirement is less than 1 per local body, minimum 1 per one local body is considered.

## Storm Water Drains:

3.7.10. Cleaning of drains before and after monsoon and minor repairs are the major maintenance expenditures. At present local bodies book this expenditure as part of Public works, hence the details of existing expenditure levels is not available. SFC recommends no permanent staff for storm water drains as this is an annual activity, which can be carried out by temporary workers (NMR). It is recommended that drains should be cleaned twice in a year, i.e. before and after the monsoon. It is assumed that a worker can clean 200m of drain per day. At the daily wage of Rs.60/- annual maintenance expenditure in case of open drain works out to 1% of the capital costs.

**Table 3.57 O & M Costs for Storm Water Drains (1995-96)**

Local body category	Drain Length		Existing Annual Maintenance Cost (including labour)		Normative Annual Maintenance Cost (including labour)	
	Open	Closed	Existing/	Total	O&M/Km.	Total
	Km.		Km.		(Rupees in lakhs)	
Chennai Corporation	0	628	NA	NA	0.26	80.38
Other Corporations	636	0	NA	NA	0.07	20.99
Municipalities	4760	0	NA	NA	0.07	157.08
Town Panchayats	5152	0	NA	NA	0.07	170.02
Village Panchayats	5263	0	NA	NA	0.07	173.67
<b>Total</b>	<b>15811</b>	<b>628</b>				<b>602.14</b>

**Note:**

- i. Manpower to be on Temporary basis.
- ii. O&M Expenditure towards drains is for Cleaning and Repairs
- iii. Cleaning twice a year (Before and after Monsoon)
- iv. Cleaning per Km. Rs.300 for 200m of Drains per manday
- v. Maintenance of Open Drains - Rs.3000 per km./year
- vi. Maintenance Closed Drains - Rs.12500 per km/once.

## Street Lighting:

3.7.11. Manpower requirements for operation and maintenance of street lighting have been worked out based on the field observations. In case of Town and Village Panchayats, the street light maintenance is currently being done by the Electricity Department. In calculating the total manpower requirements, these two categories of local bodies are assumed to have their own manpower for street lighting operations. The O&M expenditure for street lights has been calculated separately for Corporations, Municipalities and Town Panchayats and Village Panchayats.

**Table 3.58 Street Lighting  
A. Estimation of Manpower (1995-96)**

Local body Category	Total Existing Staff		Norms for 1000 Lights		Total Requirement		Gap	Total Estt. cost	Estt. Cost per light	
	Technical	Helper	Technical @ 1/1000	Helper @ 1/100	Technical	Helper				Rs.Lakhs
Chennai Corporation	100	1022	1	10	79	790	0	47.91	61	
Other Corporations	43	482	1	10	79	790	36	22.32	28	
Municipalities	201	1348	1	10	178	1779	0	54.52	31	
Town Panchayats	0	0	1	10	635	2141	635	51.16	24	
Village Panchayats	0	0	1	10	870	8700	870	156.60	18	
<b>B. Estimation of O&amp;M Cost (1995-96)</b>										
Local body category	Street Lighting			Existing Annual Maintenance Cost		Normative Cost per light			Annual Expenditure including Estt. (Normative)	
	SV lamps	Tubelights	Others	Per light	Total	Establishment	SV Lamps	Tubelights	Others	Total Per Light
				Rs.	Rs.lakhs	Rs.				Rs.
Chennai Corporation	26540	52450	0	1872	1479.00	61	2027	469	559	832.12
Other Corporations	11657	65263	2086	319	252.00	28	2027	469	559	576.57
Municipalities	18660	157780	1434	494	878.50	31	1943	469	559	1165.52
Town Panchayats	9441	196455	8173	379	811.90	24	1640	440	515	1113.17
Village Panchayats	11976	815322	42682	304	2648.70	18	1640	440	515	4163.20

**Note:**

Manpower: Sample expanded to universe  
At present in Town Panchayats and Village Panchayats TNEB staff maintains them and Establishment cost is paid by TNEB.

**Table 3.59 Existing and Normative O&M Expenditure for all Core Civic Services as by 1995-96**

(Rs. in lakhs)

Local body category	Water Supply		Sewerage & Sanitation		Solid Waste Management		Roads		Stormwater Drains		Street lighting		Total	
	Existing	Normative	Existing	Normative	Existing	Normative	Existing	Normative	Existing	Normative	Existing	Normative	Existing	Normative
Chennai Corpn.	2736.4	2736.4	3100.7	3875.9	4069.6	3016.9	1074.6	1799.9	--	80.4	1479.0	832.1	12460.3	12341.6
Other Corpn.	1206.4	1961.8	285.6	1888.2	1564.2	2998.0	1233.7	1440.0	--	21.0	252.0	576.6	4541.8	8885.6
Municipalities	3342.0	2915.6	1737.6	2172.0	3229.5	5381.2	2197.4	3361.7	--	157.1	878.5	1165.5	11384.9	15153.1
T. Panchayats	1988.0	2267.9	568.7	710.9	1197.9	1388.2	2035.2	1753.6	--	170.0	811.9	1113.2	6601.8	7403.7
P.Unions	-	-	-	-	-	-	1678.3	8870.4	--	-	-	-	1678.3	8870.4
V.Panchayats	2838.7	4428.3	756.3	2693.4	-	1164.2	1130.1	4406.0	--	173.7	2648.7	4163.2	7373.7	17028.7
<b>Total</b>	<b>12111.5</b>	<b>14310.0</b>	<b>6448.9</b>	<b>11340.4</b>	<b>10061.2</b>	<b>13948.5</b>	<b>9349.3</b>	<b>21631.6</b>	<b>--</b>	<b>602.2</b>	<b>6070.1</b>	<b>7850.6</b>	<b>44040.8</b>	<b>69683.1</b>
<b>Rs. Per Capita</b>	<b>20</b>	<b>24</b>	<b>11</b>	<b>19</b>	<b>17</b>	<b>23</b>	<b>16</b>	<b>36</b>	<b>--</b>	<b>1</b>	<b>10</b>	<b>13</b>	<b>74</b>	<b>122</b>

**Note:** For year wara break-up from 1997-98 to 2001-2002, add 10% per year.

**Table 3.60 Total O&M Expenditure for Core Civic Services at the Existing level of Investment**

(Rs. in lakhs)

Local body Category	Existing	Normative	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Chennai Corporation	12460.3	12341.6	13575.7	14933.3	16426.6	18069.3	19876.2	21863.8
Other Corporations	4541.9	8885.5	9774.1	10751.5	11826.6	13009.3	14310.2	15741.2
Municipalities	11385.0	15153.4	16668.7	18335.6	20169.1	22186.0	24404.6	26845.1
Town Panchayats	6601.7	7403.8	8144.2	8958.6	9854.5	10839.9	11923.9	13116.3
Village Panchayats	7373.8	21493.2	23642.6	26006.8	28607.5	31468.3	34615.1	38076.6
Panchayat Unions	1678.3	4406.0	4846.6	5331.3	5864.4	6450.8	7095.9	7805.5
<b>Total</b>	<b>44041.0</b>	<b>69683.5</b>	<b>76651.9</b>	<b>84317.1</b>	<b>92748.7</b>	<b>102023.6</b>	<b>112225.9</b>	<b>123448.5</b>
<b>Rs. Per Capita</b>	<b>75</b>	<b>119</b>	<b>129</b>	<b>140</b>	<b>151</b>	<b>165</b>	<b>179</b>	<b>195</b>

Note: Rate of Inflation 10.0 %

**Table 3.61 O & M For Additional Investment**

Local body Category	Services	Sectorwise Allotment 1995-96	Normative 1995-96	1998/99	1999/2000	2000/01	2001/02
Chennai Corporation	Water Supply	14310.4	2141.5	570.1	1254.1	1881.2	2508.3
Other Corporations	Sewerage & Sanitation	11340.3	5284.9	1406.8	3095.1	4642.6	6190.1
Municipalities	Solid Waste Management	13948.4	6475.5	1723.8	3792.3	5688.4	7584.6
Town Panchayats	Roads	21631.7	2926.1	778.9	1713.7	2570.5	3427.3
Village Panchayats	Storm Water Drain	602.1	6269.7	1669.0	3671.8	5507.7	7343.6
Panchayat Unions	Street Lights	7850.6	1004.4	267.4	588.2	882.4	1176.5
<b>Total</b>		<b>69683.5</b>	<b>24102.1</b>	<b>6416.0</b>	<b>14115.2</b>	<b>21172.8</b>	<b>28230.4</b>
<b>Rs.Per Capita</b>		<b>119</b>	<b>41</b>	<b>10</b>	<b>23</b>	<b>34</b>	<b>45</b>

O&M Normative 1995-96 for Additional Services is if full investment is made. 1996-97 & 1997-98 will have no need for Operation and Maintenance as the infrastructure are new and investment phased out.

**Table 3.62 A. Total O&M Expenditure for Core Civic Services**

**A. Water Supply:**

(Rs. in lakhs)

Local body category	Existing	Normative	1996/97		1997/98		1998/99		1999/2000		2000/01		2001/02		Rs. per capita 1996-97
			1995-96	1995-96	1995-96	1995-96	1999/2000	2000/01	2000/01	2001/02					
Chennai Corporation	2736.4	2736.4	3010.0	3311.0	3642.2	4006.4	4407.0	4847.7	72						
Other Corporations	1206.4	1961.8	2158.0	2373.8	2611.2	2872.3	3159.5	3475.5	64						
Municipalities	3342.0	2915.9	3207.5	3528.3	3881.1	4269.2	4696.1	5165.7	42						
Town Panchayats	1988.0	2267.9	2494.7	2744.1	3018.6	3320.4	3652.5	4017.7	27						
Village Panchayats	2838.7	4428.3	4871.2	5358.3	5894.1	6483.5	7131.9	7845.1	14						
<b>Total</b>	<b>12111.5</b>	<b>14310.3</b>	<b>15741.4</b>	<b>17315.5</b>	<b>19047.2</b>	<b>20951.8</b>	<b>23047.0</b>	<b>25351.7</b>	<b>26</b>						
<b>Rs. Per Capita</b>	<b>21</b>	<b>24</b>	<b>26</b>	<b>29</b>	<b>31</b>	<b>34</b>	<b>37</b>	<b>40</b>							

**B. Sewerage and Sanitation:**

(Rs. in lakhs)

Local body category	Existing	Normative	1996/97		1997/98		1998/99		1999/2000		2000/01		2001/02		Rs. per capita 1996-97
			1995-96	1995-96	1995-96	1995-96	1999/2000	2000/01	2000/01	2001/02					
Chennai Corporation	3100.7	3875.9	4263.5	4689.8	5158.8	5674.7	6242.1	6866.3	103						
Other Corporations	285.6	1888.2	2077.0	2284.7	2513.2	2764.5	3040.9	3345.0	62						
Municipalities	1737.6	2172.0	2389.1	2628.1	2890.9	3180.0	3497.9	3847.7	31						
Town Panchayats	568.7	710.9	782.0	860.2	946.2	1040.8	1144.9	1259.4	8						
Village Panchayats	756.3	2693.4	2962.8	3259.1	3585.0	3943.5	4337.8	4771.6	8						
<b>Total</b>	<b>6448.9</b>	<b>11340.4</b>	<b>12474.4</b>	<b>13721.9</b>	<b>15094.1</b>	<b>16603.5</b>	<b>18263.6</b>	<b>20090.0</b>	<b>21</b>						
<b>Rs. Per Capita</b>	<b>11</b>	<b>19</b>	<b>21</b>	<b>23</b>	<b>25</b>	<b>27</b>	<b>29</b>	<b>32</b>							

**C. Solid Waste Management:**

(Rs. in lakhs)

Local body category	Existing 1995-96	Normative 1995-96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	Rs. per capita 1996-97
Chennai Corporation	4069.6	3016.9	3318.6	3650.4	4015.4	4417.0	4858.7	5344.6	80
Other Corporations	1564.2	2998.0	3297.7	3627.5	3990.3	4389.3	4828.2	5311.1	98
Municipalities	3229.5	5381.2	5919.3	6511.2	7162.3	7878.6	8666.4	9533.1	77
Town Panchayats	1197.9	1388.2	1527.1	1679.8	1847.7	2032.5	2235.8	2459.3	17
Village Panchayats		1164.2	1280.6	1408.7	1549.5	1704.5	1874.9	2062.4	4
<b>Total</b>	<b>10061.2</b>	<b>13948.5</b>	<b>15343.3</b>	<b>16877.6</b>	<b>18565.2</b>	<b>20421.9</b>	<b>22464.0</b>	<b>24710.5</b>	<b>26</b>
<b>Rs. Per Capita</b>	<b>17</b>	<b>24</b>	<b>26</b>	<b>28</b>	<b>30</b>	<b>33</b>	<b>36</b>	<b>39</b>	

**D. Roads:**

(Rs. in lakhs)

Local body category	Existing 1995-96	Normative 1995-96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	Rs. per capita 1996-97
Chennai Corporation	1074.6	1799.9	1979.9	2177.9	2395.7	2635.2	2898.8	3188.6	48
Other Corporations	1233.7	1440.0	1584.0	1742.4	1916.7	2108.3	2319.2	2551.1	47
Municipalities	2197.4	3361.7	3697.9	4067.7	4474.4	4921.9	5414.1	5955.5	48
Town Panchayats	2035.2	1753.6	1929.0	2121.9	2334.1	2567.5	2824.3	3106.7	21
Village Panchayats	1130.1	8870.4	9757.5	10733.2	11806.5	12987.2	14285.9	15714.5	28
Panchayat Unions	1678.3	4406.0	4846.6	5331.3	5864.4	6450.8	7095.9	7805.5	14
<b>Total</b>	<b>9349.3</b>	<b>21631.6</b>	<b>23794.9</b>	<b>26174.4</b>	<b>28791.9</b>	<b>31670.9</b>	<b>34838.1</b>	<b>38321.9</b>	<b>40</b>
<b>Rs. Per Capita</b>	<b>16</b>	<b>37</b>	<b>40</b>	<b>43</b>	<b>47</b>	<b>51</b>	<b>56</b>	<b>60</b>	

### E. Storm Water Drains

(Rs. in lakhs)

Local body category	Existing 1995-96	Normative 1995-96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	Rs. per capita 1996-97
Chennai Corporation		80.4	88.4	97.3	107.0	117.7	129.5	142.4	2
Other Corporations		21.0	23.1	25.4	27.9	30.7	33.8	37.2	1
Municipalities		157.1	172.8	190.1	209.1	230.0	253.0	278.3	2
Town Panchayats		170.0	187.0	205.7	226.3	248.9	273.8	301.2	2
Village Panchayats		173.7	191.0	210.1	231.1	254.3	279.7	307.7	1
<b>Total</b>		<b>602.2</b>	<b>662.3</b>	<b>728.6</b>	<b>801.4</b>	<b>881.6</b>	<b>969.8</b>	<b>1066.8</b>	<b>1</b>
<b>Rs. Per Capita</b>		<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>

### F. Street Lighting:

(Rs. in lakhs)

Local body category	Existing 1995-96	Normative 1995-96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	Rs. per capita 1996-97
Chennai Corporation	1479.0	832.1	915.3	1006.9	1107.6	1218.3	1340.1	1474.2	22
Other Corporations	252.0	576.6	634.2	697.6	767.4	844.2	928.6	1021.4	19
Municipalities	878.5	1165.5	1282.1	1410.3	1551.3	1706.4	1877.1	2064.8	17
Town Panchayats	811.9	1113.2	1224.5	1346.9	1481.6	1629.8	1792.8	1972.0	13
Village Panchayats	2648.7	4163.2	4579.5	5037.5	5541.2	6095.3	6704.9	7375.4	13
<b>Total</b>	<b>6070.1</b>	<b>7850.6</b>	<b>8635.6</b>	<b>9499.2</b>	<b>10449.1</b>	<b>11494.0</b>	<b>12643.5</b>	<b>13907.8</b>	<b>15</b>
<b>Rs. Per Capita</b>	<b>10</b>	<b>13</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>19</b>	<b>20</b>	<b>22</b>	<b>22</b>

**Table 3.63 O&M Expenditure for Core Civic Services for Additional Investment**

**A. Water Supply:**

(Rs. in Lakhs)

Local body Category	Water Quantity MLD	Total O&M Per MLD Rs. Lakhs	Annual Total Rs. Lakhs	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
Chennai Corporation	66.0	9.2	606.0	-	-	161.3	354.9	532.4	709.86
Other Corporations	41.0	7.2	295.7	-	-	78.7	173.2	259.8	346.40
Municipalities	161.0	8.0	1289.7	-	-	343.3	755.3	1133.0	1510.66
Town Panchayats	128.0	7.3	934.2	-	-	248.7	547.1	820.7	1094.00
Village Panchayats	71.0	5.8	413.2	-	-	110.0	242.0	362.9	483.86
<b>Total</b>	<b>467.0</b>	<b>37.5</b>	<b>3538.8</b>	<b>-</b>	<b>-</b>	<b>942.1</b>	<b>2072.5</b>	<b>3108.8</b>	<b>4144.78</b>

272

**B. Sewerage and Sanitation:**

(Rs. in lakhs)

Local body Category	Additional Investment Rs.Lakhs	O&M Per Capita Rs.	Annual Total Rs. Lakhs	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
Chennai Corporation	15681.7	100.0	724.0	-	-	192.7	424.0	636.0	848.00
Other Corporations	54044.1	100.0	2578.0	-	-	686.3	1509.8	2264.7	3019.59
Municipalities	41474.3	100.0	2550.0	-	-	678.8	1493.4	2240.1	2986.78
Town Panchayats	10096.7	12.0	179.9	-	-	47.9	105.3	158.0	210.66
Village Panchayats	25746.2	12.0	579.6	-	-	154.3	339.4	509.2	678.93
<b>Total</b>	<b>147043.0</b>	<b>-</b>	<b>6611.5</b>	<b>-</b>	<b>-</b>	<b>1760.0</b>	<b>3871.9</b>	<b>5808.0</b>	<b>7743.96</b>

(Rs. in lakhs)

**C. Solid Waste Management:**

Local body Category	Additional Waste to be Collected Tonnes	O&M Per tonne	Annual Total	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
		Rs. Lakhs	Rs. Lakhs						
Chennai Corporation	513	1.1	542.65	-	-	144.5	317.8	476.7	635.59
Other Corporations	600	2.5	1471.99	-	-	391.8	862.1	1293.1	1724.13
Municipalities	964	1.9	1872.05	-	-	498.3	1096.3	1644.5	2192.66
Town Panchayats	508	0.9	473.62	-	-	126.1	277.4	416.1	554.80
Village Panchayats	1858	0.6	1123.66	-	-	299.1	658.1	987.1	1316.13
<b>Total</b>	<b>4443</b>		<b>5483.97</b>			<b>1459.8</b>	<b>3211.7</b>	<b>4817.5</b>	<b>6423.31</b>

(Rs. in lakhs)

**D. Roads:**

Local body Category	New BT Road Km.	Annual Total	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
		Rs. Lakhs						
Chennai Corporation	3	12.8	-	-	3.4	7.5	11.3	15.07
Other Corporations	423	394.0	-	-	104.9	230.7	346.1	461.47
Municipalities	375	240.1	-	-	63.9	140.6	210.9	281.20
Town Panchayats	1479	463.3	-	-	123.3	271.4	407.0	542.66
Village Panchayats	5119	1743.0	-	-	464.0	1020.8	1531.2	2041.59
Panchayat Unions	2361	1004.4	-	-	267.4	588.2	882.4	1176.53
<b>Total</b>	<b>9760</b>	<b>3857.6</b>			<b>1026.9</b>	<b>2259.2</b>	<b>3388.9</b>	<b>4518.52</b>

Includes only Patch Works Resourcing will be incurred only in year 2002/2003.

**E. Storm Water Drains:**

(Rs. in lakhs)

Local body Category	Additional Drains Open	Additional Drains Closed	Annual Total	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
				Rs. Lakhs					
Chennai Corporation	432	236	88.8	-	-	23.6	52.0	78.0	104.00
Other Corporations	358	497	150.8	-	-	40.1	88.3	132.5	176.67
Municipalities	0	303	77.5	-	-	20.6	45.4	68.1	90.80
Town Panchayats	0	0	0.0	-	-	0.0	0.0	0.0	-
Village Panchayats	0	0	0.0	-	-	0.0	0.0	0.0	-
<b>Total</b>	<b>790</b>	<b>1036</b>	<b>317.1</b>	<b>-</b>	<b>-</b>	<b>84.3</b>	<b>185.7</b>	<b>278.6</b>	<b>371.47</b>

**F. Street Lighting:**

(Rs. in lakhs)

Local body Category	Additional Lights Nos.	Annual Total	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02
			Rs. Lakhs					
Chennai Corporation	8004	167.1	-	-	44.5	97.9	146.8	195.73
Other Corporations	22440	394.5	-	-	105.0	231.0	346.5	462.00
Municipalities	25293	446.1	-	-	118.7	261.2	391.9	522.53
Town Panchayats	126904	875.0	-	-	232.9	512.5	768.7	1024.92
Village Panchayats	488352	2410.3	-	-	641.6	1411.6	2117.4	2823.19
<b>Total</b>	<b>670993</b>	<b>4293.0</b>	<b>-</b>	<b>-</b>	<b>1142.7</b>	<b>2514.2</b>	<b>3771.3</b>	<b>5028.37</b>

Note: Since these are new assets, the maintenance cost has been provided from second year onwards.

**3.7.12.** To what extent the O&M requirements at a normative level for the existing assets of Core Civic Services can be met out of Own Resources (Tax and Non-tax) of the local bodies and further how the gaps can be breached with the state assistance by way of Assignments or grants-in-aid, has been dealt exhaustively in Part I and V. Now the additional O&M requirements of Rs.242.03 crores at 1995-96 price level has to be met. We have not made any provision for this, as we expect that we should be able to recover a return of atleast 4.64% on the capital investment for the O&M. This should definitely be possible by increase use of cost recovery through user charges and by Privatization of Civic Services wherever feasible. This is dealt at length in the following pages.