

Appendix 15.5

**WASTE WATER TREATMENT PLANTS MONITORING AND
REPORTING PROGRAM**

RECOMMENDED PROCEDURE

A) General Monitoring and Reporting Provisions (GMRP)

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored waste stream. All samples shall be taken at the monitoring points specified in Order No. or this MRP and, unless otherwise specified, before the waste stream joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall be subject to the approval of the HWSDB and shall not be changed without notification to and the approval of the Executive Officer. Samples shall be collected at times representative of "worst case" conditions with respect to compliance with the requirements of Order No.....

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ± 5 percent from true discharge rates throughout the range of expected discharge volumes.

Monitoring must be conducted according to Central Environmental Authority test procedures, if existing.

Monitoring results must be reported on Discharge Monitoring Report (DMR) forms approved by the Executive Officer of the HWSDB.

If the discharger monitors any pollutant more frequently than required using test procedures approved by CEA/HWSDB, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. The increased frequency of monitoring shall also be reported.

The discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this MRP, any enforcement order issued by the CEA or the HWSDB and records of all data used to complete the application. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer. It is recommended that the discharger maintain the results of all analyses indefinitely (until the dismissal of the plant).

Records of monitoring information shall include ;

- the date, exact location, and time of sampling or measurements;
- the individual(s) who performed the sampling or measurements;
- the date(s) analyses were performed;
- the laboratory and individual(s) who performed the analyses;
- the analytical techniques or methods used; and
- the results of all such analyses.

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this MRP. The discharger shall report the analysis results, calculation results, data, and equation used in calculations.

All monitoring instruments and devices used by the discharger to fulfil the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices. Annually, the discharger shall submit to the Executive Officer a written statement signed by a registered professional engineer certifying that all flow measurement devices have been calibrated and will reliably achieve the accuracy required under CEB/HWSDB procedures.

All analyses shall be performed in a laboratory certified to perform such analyses, or a laboratory approved by the HWSDB Executive Officer.

If only measurement is made during the time period associated with a discharge specification, effluent limitation, or receiving water limit (e.g. 30-day average or 6-month median), that single measurement shall be used to determine compliance with the discharge specification, effluent limitation, or receiving water limitation for the entire time period.

The discharger shall have, and implement, an acceptable written quality assurance (QA) plan for laboratory analyses. An annual report shall be submitted by March 30 of each year, which summarizes the QA activities for the previous year. Duplicate chemical analyses must be conducted on a minimum of ten percent of the samples or at least one sample per month, whichever is greater. The discharger must have a success rate equal to or greater than 80 percent. A similar frequency shall be maintained for analyzing spiked samples.

The discharger shall report all instances of noncompliance at the time monitoring reports are submitted.

The monitoring reports shall be signed by an authorized person, as required by CEA procedures.

Laboratory method detection limits (MDLs) and practical quantitation levels (PQLs) shall be identified for each constituent in the matrix being analyzed with all reported analytical data. Acceptance of data shall be based on demonstrated laboratory performance.

A composite sample is defined as a combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24-hour period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional, either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

A grab sample is an individual sample of at least 100 milliliters collected at a randomly selected time over a period not exceeding 15 minutes.

For all bacterial analyses, sample dilutions shall be performed so the range of values extends from 2 to 16,000. The detection method used for each analysis shall be reported with the results of the analysis.

Detection methods used for coliforms (total and fecal) shall be those presented in the most recent edition of Standard Methods for the Examination of Water and Wastewater (USA), or any improved method determined by the HWSDB and approved by CEA to be appropriate. Detection methods used for enterococcus shall be those presented in Test Method for Escherichia coli and Enterococcus in Water by Membrane Filter Procedure or any improved method determined by the HWSDB to be appropriate.

Revisions to this MRP may be made by the Executive Officer at any time, and may include a change in the location of sampling stations and/or a reduction or increase in the number of parameters to be monitored, the frequency of monitoring, the number of sampling stations and/or the number and/or size of samples collected.

By of each year, the discharger shall submit an annual report to the Regional Board which contains tabular and graphical summaries of the monitoring data obtained during the previous year. The discharger shall discuss the compliance record and corrective actions taken, or which may be needed, to bring the discharge into full compliance with the requirements of CEA. The report shall address operator certification and provide a list of current operating personnel and their grade of certification. The report shall include the date of the facilities' Operations and Maintenance Manual, the date the manual was last reviewed, and a statement as to whether the manual is complete and valid for the current facilities. The report shall restate, for the record, the laboratories used by the discharger to monitor compliance with admitted parameters and provide a summary of performance relative to the requirements in this MRP.

The sampling frequency of “daily” means that samples shall be collected seven days per week. “Weekly” samples shall be collected such that each day of the week is represented during a seven week period.

Monitoring results shall be reported at intervals and in a manner specified in this MRP. Monitoring reports shall be submitted to the HWSDB according to the following schedule:

Reporting

MONTHLY Influent, Effluent, sludge analysis, and Receiving water, including all continuous, daily, weekly, and monthly monitoring results.

ANNUAL: Pretreatment Report and sludge analysis.

ANNUAL Report described in General Monitoring and Reporting Provision under this MRP, QA, flow measurement report, and receiving water reports.

B) Influent Monitoring

Influent monitoring is required to determine compliance with CEA permit conditions and water quality standards, to determine the effectiveness of pretreatment and nonindustrial source control programs, to assess the performance of the treatment plant, and to evaluate compliance with effluent limitations (eg. percent removal). The influent sampling station shall be located where representative samples of the influent can be obtained. The sampling station shall be located upstream of any in-plant return flows, recycle flows, or the addition of treatment chemicals. Influent samples shall be collected on the same day as, and shortly before the collection of effluent samples.

During periods when no effluent is discharged from the WITP, no influent monitoring, except for flowrate monitoring, is required.

Influent monitoring shall be conducted as shown in the following table:

INFLUENT SAMPLING AND ANALYSIS MINIMUM REQUIREMENTS

Parameter	Units	Sample Type	Sample/Analyses Frequency	Report Frequency
Flow rate	MC/Day	Record / totaliser	continuous	monthly
Total Dissolved Solids	mg/l	24 hr. composite	weekly	monthly
Temperature	°C	grab	weekly	monthly
Floating particulate	mg/l	24 hr. composite	weekly	monthly
Grease & oil	mg/l	grab	weekly	monthly
Total Suspended Solids	mg/l	24 hr. composite	weekly	monthly
Settable Solids	ml/l	grab	weekly	monthly
Turbidity	NTU	24 hr. composite	weekly	monthly
pH	units	grab	weekly	monthly
Ammonia (as N)	mg/l	24 hr. composite	weekly	monthly

C) Sludge Monitoring Requirements

C1) General Requirements

The discharge of sludge from the WTP at a location where the sludge or sludge constituents could be conveyed to surface or ground water is prohibited.

All sludge generated by the discharger's wastewater treatment facilities shall be removed from the plant site within 6 months. Any site where sludge generated by the discharger is stored for more than two years will be classified as a surface disposal site, and/subject to relevant The discharger must ensure that the operator of any such surface disposal site submits the notification required in to CEA 180 days before the site becomes a surface disposal site, and that the site operator begins complying fully with the requirements surface disposal sites at the two-year start date. If the discharger wants to store sludge for over two years, or allow a contractor to stone sludge for over two years, the discharger must submit the information in writing to CEA 180 days prior to the date at which the site becomes a surface disposal site.

Duty to mitigate : The discharger shall take all reasonable steps to prevent or minimize any sludge handling, use or disposal which has a likelihood of adversely affecting human health or the environment.

Good management practices will be implemented to minimize production of odors, dust, and vector attraction during sludge treatment, transfer and storage.

The solids and sludge treatment and storage site shall have facilities adequate to divert surface water runoff from adjacent areas, to protect the boundaries of the site from erosion, to prevent drainage from the treatment and storage site, and to prevent ground water contamination. Adequate protection is defined as protection from at least a 100 year storm and protection from the highest possible tidal stage that may occur.

Proper Operation and Maintenance : The discharger shall at all times properly operate and maintain all facilities and systems of sludge treatment and control, including adequate laboratory controls and quality assurance procedures. The discharger shall ensure that any person who takes the discharger's sludge for further treatment shall also properly operate and maintain their facilities.

C2) Monitoring

The sludge shall be tested for all pollutants indicated by CEA procedures.

The discharger shall develop a sampling plan for collection of representative samples for monitoring pollutants, pathogens (for land application or surface disposal), and vector attraction reduction (for land application or surface disposal). The plan should include number and location of sampling points. If pathogen reduction is determined by time and temperature, the plan must be designed to determine the representative temperature of the process.

Samples of sludge shall be collected according to the procedures for compositing samples adopted by CEA (if existing). Samples shall be split, and a portion of the sample preserved, in the event that the results show concentrations of waste constituents that exceed 10 times ... admitted....

Results of analyses shall be reported in mg/kg, wet weight and 100 percent dry weight. If the results indicate that the total concentration of any waste constituent is greater than 10 times the fixed value for the constituent, then the discharger shall also perform a Waste Extraction Test on the sludge sample.

C3) Notification of Non-compliance

The discharger shall notify CEA and the HWSDB of any non-compliance which may seriously endanger health or environment as soon as possible, but no later than 24 hours from the time the discharger first become aware of the circumstances. A written report shall be submitted to CEA and the HWSDB within five days. For other instances of non-compliance, the discharger shall notify CEA and the HWSDB in writing within five working days of becoming aware of the non-compliance.

C4) Reporting Requirements

The discharger shall submit an annual report to CEA and the HWSDB by (March 30)¹ of each year for the period from January 1 through December 31. The report shall include :

1. Amount of sludge generated that year at the WITP, in dry metric tons, and amount of sludge leaving the WITP;
2. A description or certification of the ultimate destination of the sludge;
3. Results of all monitoring performed during the past 12 months.

D) Effluent Monitoring

Effluent monitoring is required to determine compliance with CEA permit conditions and water quality standards, to identify operational problems in order to improve plant performance, and to provide information on waste characteristics and flows for use in interpreting water quality and biological data.

The effluent sampling station shall be located where representative samples of the effluent discharged through the ocean outfall can be obtained. The sampling station shall be located downstream from any in-plant return flows, disinfection units, and from the last connection through which wastes can be admitted to the outfall.

During periods when no effluent is discharged from the WITP no effluent monitoring, except for flowrate monitoring, is required.

Effluent monitoring shall be conducted as shown in the following table:

¹ A different date can be specified

EFFLUENT SAMPLING AND ANALYSIS REQUIREMENTS

Parameter	Units	Sample Type	Sample/Analyses Frequency	Report Frequency
Flow rate	MC/Day	Record/totalizer	continuous	monthly
BOD ₅ @20°C	mg/l	24 hr. composite	daily	monthly
Total dissolved solids	mg/l	24 hr. composite	daily	monthly
Temperature	°C	grab	daily	monthly
Floating particulars	mg/l	24 hr. composite	daily	monthly
Grease & oil	mg/l	grab	daily	monthly
Total Susp. Solids	mg/l	24 hr. composite	daily	monthly
Settable solids	ml/l	grab	daily	monthly
Turbidity	NTU	24 hr. composite	daily	monthly
PH	units	grab	daily	monthly
Dissolved Oxygen	Mg/l	grab sample	weekly	monthly
Total Coliforms	MPH/100 ml	24 hr. composite	weekly	monthly
Ammonia (as N)	Mg/l	24 hr. composite	weekly	monthly

Chapter 17

Appendix 17.1 NWSDB Financial Data

**Appendix 17.2 Water Supply Project
- Financial Analysis Calculation**

**Appendix 17.3 Sewerage Project
- Financial Analysis Calculation**

Appendix 17.1

NWSDB Financial Data

- Appendix 17.1.1** NWS&DB Balance Sheet (as of 31 December 1996)
- Appendix 17.1.2** NWS&DB Balance Sheet (as of 31 December 1995)
- Appendix 17.1.3** NWS&DB Income & Expenditure Account (for the year ended 31 December 1996)
- Appendix 17.1.4** NWS&DB Income & Expenditure Account (for the year ended 31 December 1995)
- Appendix 17.1.5** NWS&DB Trend of Income Statement (1989 - 1996)
- Appendix 17.1.6** NWS&DB Trend of Balance Sheet (1989 - 1996)
- Appendix 17.1.7** NWS&DB Cash Requirement Projection (1997 - 2015)
- Appendix 17.1.8** NWS&DB Revenue Projection (1997 - 2015, Case A)
- Appendix 17.1.9** NWS&DB Debt Outstanding & Repayment Schedule
- Appendix 17.1.10** Comparison of Water Costs and Price by Scheme (1998 price)



Table A17.1.1

NATIONAL WATER SUPPLY & DRAINAGE BOARD
BALANCE SHEET
as at 31st December 1996

	MRS.		MRS.		MRS.
Current Assets	4,402	Current Liabilities		MRS.	347
Bank and Cash Balance	112	Creditors			10
Short Term Investment	1,294	Loan Installments within one y.			80
Deposits & Advances	610	Loan interest payable			170
Debtors	836	Provisions and Accrued Exp.			44
Other Receivables	243	Other Current Dues			43
Stocks & Goods in Transit	1,306				
Inter Regional Current Accounts	1	Long Term Liabilities			8,267
		Creditors due after one year			7,863
Fixed Assets	21,055	Provisions for Liabilities and Charges			404
Property, Plant & equipment	12,741				
Capital Work in Progress	8,249	Capital and Reserves			17,028
Long Term investment	65	Assets from Government			185
		Capital Grants			17,907
Deferred Expenditure	185	Revaluation Reserve			310
		Retained Income			-1,481
		Suspense Balance			107
Total Assets	25,642	Total Liabilities and Equity			25,642

Table A17.1.2

**NATIONAL WATER SUPPLY & DRAINAGE BOARD
BALANCE SHEET**

as at 31st December 1995

	MRS.	MRS.		MRS.
Current Assets		4,363	Current Liabilities	1,543
Bank and Cash Balance		113	Creditors	7
Short Term Investment		1,568	Loan Installments within one y.	649
Deposits & Advances		561	Loan interest payable	743
Debtors		659	Provisions and Accrued Exp.	97
Other Receivables		318	Other Current Dues	47
Stocks & Goods in Transit		1,130		
Inter Regional Current Accounts		14	Long Term Liabilities	6,120
			Creditors due after one year	5,996
			Provisions for Liabilities and Charges	124
Fixed Assets		20,014		
Property, Plant & equipment		4,083	Capital and Reserves	16,909
Capital Work in Progress		15,866	Assets from Government	185
Long Term investment		65	Capital Grants	17,393
			Revaluation Reserve	324
Deferred Expenditure		196	Retained Income	-993
			Suspense Balance	0
Total Assets		24,573	Total Liabilities and Equity	24,572

Table A17.1.3

**NATIONAL WATER SUPPLY & DRAINAGE BOARD
INCOME & EXPENDITURE ACCOUNT
for the year ended 31st December 1996**

	(1000 Rs.)	
Total Revenue	2,003,826	100.0%
Sale of Water	1,525,829	
Other	477,997	
Direct Operating Expenses	1,183,708	59.1%
Personnel Cost	427,431	
Pumping Cost	508,425	
Chemicals	72,558	
Repairs & Maint.	71,992	
Establishment	50,198	
Security & Other	37,600	
Rents, Rates, Taxes	15,504	
Other Scheme Costs	445,585	22.2%
Admin. Overhead	317,648	
Bad Debts	230	
Retiring Gratuity	127,707	
<u>Income before Depr. & Interest</u>	374,533	18.7%
Depreciation	309,681	
Deferred Cost W/Off	20,694	
Loan Interest	356,420	
Sub-total	686,795	34.3%
Income for the Year	-312,262	-15.6%
Debt Service	427,574	
interest	356,420	
capital	71,154	
Debt Service ratio	88%	

Table A17.1.4

**NATIONAL WATER SUPPLY & DRAINAGE BOARD
INCOME & EXPENDITURE ACCOUNT
for the year ended 31st December 1995**

	(1000 Rs.)	
Total Revenue	1,943,197	100.0%
Sale of Water	1,498,904	
Other	444,293	
Direct Operating Expenses	948,565	48.8%
Personnel Cost	367,107	
Pumping Cost	399,423	
Chemicals	62,565	
Repairs & Maint.	45,384	
Establishment	39,806	
Security & Other	22,683	
Rents, Rates, Taxes	11,597	
Other Scheme Costs	246,206	12.7%
Admin. Overhead	227,748	
Bad Debts	5,501	
Retiring Gratuity	12,957	
<u>Income before Depr. & Interest</u>	748,426	38.5%
Depreciation	219,199	
Deferred Cost W/Off	57,529	
Loan Interest	285,875	
Sub-total	562,603	29.0%
Income for the Year	185,823	9.6%
Debt Service	332,292	
interest	285,875	
capital	46,417	
Debt Service ratio	225%	

Table A17.1.5

**NATIONAL WATER SUPPLY & DRAINAGE BOARD
TREND OF INCOME STATEMENT (1989 - 1996) (MRs.)**

Year	1989	1990	1991	1992	1993	1994	1995	1996
Revenue								
Customer Billing	292,725	478,203	923,708	964,842	1,128,899	1,299,416	1,498,904	1,525,829
Other	64,019	77,430	176,784	248,881	360,026	408,290	444,293	477,997
Total Revenue	356,744	555,633	1,100,492	1,213,723	1,488,925	1,707,706	1,943,197	2,003,826
Operating Costs								
Chemicals	21,460	29,511	39,742	54,463	52,742	57,642	62,563	72,558
Pumping (Electricity)	128,889	143,559	151,201	168,549	230,909	312,089	399,423	508,424
Pumping (Fuel)	1,327	2,086	1,098	1,503	1,065	1,058	0	0
Repairs & Maintenance	19,031	12,559	75,630	79,614	51,947	53,121	45,384	71,992
Personnel Cost	123,951	146,187	195,755	224,446	279,003	356,331	367,107	427,430
Direct Operating Exp.	294,658	333,902	463,426	528,575	615,666	780,241	874,477	1,080,404
Establishment	9,325	13,229	15,458	20,749	25,689	26,357	39,806	50,198
Security & Other	6,407	6,655	7,608	11,515	42,803	33,977	22,683	37,600
Rent, Rates, Taxes, Other	3,048	3,910	4,839	3,952	4,042	3,705	11,597	15,504
Other Scheme Costs	18,780	23,794	27,905	36,216	72,534	64,039	74,086	103,302
Total Operating Costs	313,438	357,696	491,331	564,791	688,200	844,280	948,563	1,183,706
Surplus from Operation	43,306	197,937	609,161	648,932	800,725	863,426	994,634	820,120
Administration Overhead	60,856	67,274	82,896	107,017	126,292	157,182	227,748	317,648
Other Recoveries	5,286	3,351	0	0	-9,673	0	0	0
Bad debt W/Off						2,919	5,501	230
Retiring Gratuity						13,169	12,957	127,707
Surplus before Depr. & Interest	-12,264	134,014	526,265	541,915	664,760	690,156	748,428	374,535
Depreciation	214,571	205,656	193,169	199,159	228,232	226,920	219,199	309,681
Deferred Cost W/off	36,420	42,575	48,926	52,180	54,706	56,805	57,529	20,694
Loan Interest	129,257	73,994	74,867	101,215	201,891	224,146	285,875	356,420
Government Levy								40,000
Sub-total	380,248	322,225	316,962	352,554	484,829	507,871	562,603	726,795
Surplus for the Year	-392,512	-188,211	209,303	189,361	179,931	182,285	185,825	-352,260
Balance B/F	-1,324,926	-1,719,806	-1,864,171	-1,664,219	-1,480,055	-1,328,475	-1,153,742	-993,360
Prior year adjustment	-2,368	43,846	-9,351	-5,197	-28,351	-7,552	-25,443	-135,614
BALANCE C/F	-1,719,806	-1,864,171	-1,664,219	-1,480,055	-1,328,475	-1,153,742	-993,360	-1,481,234
The Du Pont Chart (Profit Margin * Assets Turnover = Return on Assets (ROA))								
Profit Margin	-110.0%	-33.9%	19.0%	15.6%	12.1%	10.7%	9.6%	-17.6%
Asset Turnover	3.58%	4.99%	8.63%	7.75%	8.18%	7.91%	7.91%	7.81%
Return on Total Assets (ROA)	-3.94%	-1.69%	1.64%	1.21%	0.99%	0.84%	0.76%	-1.37%

Table A17.1.6

**NATIONAL WATER SUPPLY & DRAINAGE BOARD
TREND OF BALANCE SHEET (1989 - 1996) (M Rs.)**

	1989	1990	1991	1992	1993	1994	1995	1996
Current Assets								
Cash & Bank Balances	1,432	1,766	2,535	2,825	3,415	3,950	4,364	4,403
Deposits & Advance To Contractors	93	266	160	169	177	187		
Investments	527	434	601	489	456	651		
Other Receivables	0	0	361	706	1,114	1,156		
Debtors (Water Supply) Less Prov. For Bad Debts	38	50	115	105	191	229		
Stocks & Goods In Transit	258	350	568	586	651	733		
	476	666	770	770	826	994		
Total Fixed Assets								
Fixed Assets	8,227	9,054	9,888	12,510	14,473	17,333	20,015	21,055
Revalued/Cost as at 01.01.93	4,070	3,964	3,796	3,777	4,431	4,256	4,149	12,306
Addition Less Disposals	4,789	4,890	4,987	5,015	5,199	6,081		
(Less Accumulated Depreciation)	101	98	28	184	881	51		
Written Down Value as at 31.12.93	-820	-1,024	-1,219	-1,422	-1,649	-1,876		
Construction Work in Progress								
Water Piped	4,157	5,090	6,092	8,733	10,042	13,077	15,866	8,249
Water non Piped	2,319	3,262	4,106	6,709	7,838	10,680		
Sewerage	212	262	318	354	399	432		
Others	1,440	1,440	1,502	1,507	1,529	1,537		
	5	31	48	108	191	321		
Rechargeable Works less Customer Advance	181	95	118	55	85	107		
Deferred Cost								
	298	314	337	323	313	303	196	185
Total Assets								
	9,957	11,134	12,760	15,658	18,201	21,586	24,575	25,643
Current Liabilities								
Creditors for Supplies	1,214	1,347	1,126	1,095	1,317	1,450	1,545	347
Central Bank-Imprest Acct	19	20	19	20	3	3		
Provisions and Accrued Expenses	102	84	89	90	58	3		
Loan Interest Payable	180	251	242	72	84	91		
Loan Capital Payable	440	514	354	459	579	698		
Other Current Liabilities	397	446	388	417	512	581		
	76	32	34	38	81	74		
Long Term Liabilities								
Foreign Loans Through Treasury	2,057	2,446	2,511	3,534	3,761	5,022	6,120	8,267
Local Loans	2,022	2,268	2,331	3,348	3,564	4,809	5,996	7,853
Security Deposit	17	130	126	125	124	114	0	0
Retiring Contingency Provision	18	48	54	61	73	86	124	404
	0	0	0	0	0	13	0	0
Shareholders' Equity								
Financed by	6,689	7,341	9,122	11,029	13,123	15,114	16,910	17,029
Assets Taken Over From Government	8,409	9,205	10,786	12,511	14,453	16,270	17,903	18,510
Capital Grant - Central Government	185	185	185	185	185	185		
Capital Grant - Local Government	5,851	6,383	7,701	9,101	9,894	10,938		
Capital Grant - Foreign Agency	402	402	402	402	402	402		
Capital Reserve on Re-Valuation of Assets	1,661	1,925	2,183	2,504	3,711	4,423		
Retained Earnings / (Deficit)								
	-1,720	-1,864	-1,664	-1,482	-1,330	-1,156	-993	-1,481
Total Liabilities and Shareholders' Equity								
	9,960	11,134	12,759	15,659	18,201	21,586	24,575	25,643

Table A17.1.7

NWSDB CASH REQUIREMENT PROJECTION (1997 - 2015) (M.Rs.)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Direct O&M Costs																				
Personnel Cost	1,029,600	1,168,860	1,317,254	1,453,679	1,561,577	1,668,369	1,837,456	2,023,679	2,228,775	2,454,658	2,703,434	2,977,423	3,279,180	3,611,519	3,977,541	4,380,658	4,824,631	5,313,599	5,832,124	
Electricity/Power	548,969	594,908	666,750	758,052	821,151	886,612	976,087	1,074,349	1,182,503	1,301,544	1,432,570	1,576,783	1,735,519	1,910,252	2,102,534	2,314,194	2,547,162	2,805,582	3,085,817	
Chemicals	84,600	94,430	105,830	120,325	130,339	140,764	155,853	172,560	191,058	211,538	234,214	259,321	287,119	317,897	351,974	389,704	431,478	477,731	528,942	
Repairs & Maint.	76,140	84,987	95,247	108,293	117,904	126,687	140,267	155,303	171,951	190,383	210,791	233,386	258,404	286,104	316,772	350,728	388,325	429,951	476,039	
Establishment Cost	149,460	165,826	186,967	212,575	230,264	248,683	275,341	304,856	337,535	373,717	413,778	458,138	507,243	561,617	621,820	688,476	762,278	843,991	934,463	
Direct O & M Total	1,888,769	2,110,011	2,372,028	2,652,924	2,860,614	3,071,516	3,385,064	3,750,747	4,111,822	4,531,941	4,994,787	5,505,049	6,067,465	6,687,549	7,370,641	8,123,761	8,953,874	9,868,854	10,877,584	
Capital Expenses																				
Rehabilitation Exp.	151,102	168,801	189,762	212,234	228,849	245,706	270,797	298,451	328,929	362,520	398,540	440,341	485,309	534,869	589,490	649,689	716,036	789,157	869,746	
Board Funds Schemes	125,000	75,000	75,000	102,000	102,000	127,500	128,066	128,514	129,024	128,556	130,060	130,566	131,064	131,604	132,127	132,651	133,177	133,706	134,237	
Board Capital Expenses	30,000	40,000	50,000	61,200	71,400	81,600	99,679	121,764	148,741	181,696	221,952	271,127	331,197	404,576	494,213	603,709	737,466	900,856	1,100,447	
Staff Loan	10,296	11,689	13,173	14,537	15,616	16,684	18,375	20,238	22,289	24,548	27,036	29,776	32,794	36,118	39,778	43,810	48,250	53,141	58,527	
Capital Expenses Total	316,398	295,490	327,935	389,972	417,865	471,490	518,857	568,966	628,983	698,299	778,578	871,810	980,384	1,107,168	1,255,608	1,423,860	1,634,929	1,876,860	2,162,957	
Less Capitalized O&M Costs	-251,040	-284,135	-319,894	-354,909	-381,829	-408,748	-450,607	-494,753	-547,624	-603,706	-665,530	-733,686	-808,821	-891,651	-982,964	-1,083,627	-1,194,600	-1,316,937	-1,451,802	
Debt Service																				
Interest on Loans	528,000	496,667	469,167	556,750	670,650	753,950	809,626	869,413	933,615	1,002,559	1,076,593	1,156,094	1,241,467	1,333,143	1,431,590	1,537,306	1,650,829	1,772,735	1,903,644	
Capital Repayments	130,000	130,000	160,000	200,940	281,520	381,520	528,566	747,474	1,047,557	1,447,557	2,009,642	2,711,522	3,604,427	4,830,427	6,494,213	8,611,170	11,320,204	15,408,828	20,988,846	
Debt Service Total	658,000	626,667	629,167	757,690	952,170	1,135,470	1,338,192	1,616,887	2,081,173	2,750,116	3,784,241	5,163,646	7,245,894	10,163,570	14,925,803	20,948,476	28,939,033	39,517,563	52,497,490	70,977,490
Gross Cash Requirement	2,612,127	2,748,633	3,009,236	3,445,676	3,848,821	4,169,528	4,589,447	5,055,848	5,574,354	6,151,344	6,794,070	7,510,790	8,310,922	9,206,232	10,206,045	11,327,503	12,585,860	13,999,835	15,591,029	

Table A17.1.8

NWSDB REVENUE PROJECTION (1997 - 2015)
Case A (1.2% annual tariff increase in real term)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Projected Average Water Price																			
Domestic	7.64	7.55	8.32	9.28	10.60	11.70	13.10	14.67	16.44	18.41	20.62	23.09	25.86	28.97	32.44	36.33	40.69	45.58	51.05
Standposts	3.82	3.78	4.16	4.64	5.30	5.85	6.55	7.34	8.22	9.20	10.31	11.55	12.93	14.48	16.22	18.17	20.35	22.79	25.52
Bulk	8.92	8.81	9.70	10.89	12.36	13.65	15.29	17.13	19.18	21.48	24.06	26.95	30.18	33.80	37.86	42.40	47.49	53.19	59.57
Rel/Schools	2.55	2.52	2.78	3.09	3.53	3.90	4.36	4.89	5.47	6.13	6.87	7.69	8.61	9.65	10.80	12.10	13.55	15.18	17.00
Commercial	22.69	22.42	24.69	27.55	31.46	34.73	38.90	43.57	48.80	54.65	61.21	68.56	76.78	85.00	96.32	107.88	120.82	135.32	151.56
Shipping	63.69	62.94	69.31	77.32	88.41	97.52	109.22	122.33	137.01	153.45	171.86	192.49	215.58	241.45	270.45	302.88	339.23	379.93	425.53
Projected Demand by Customer Categories																			
Domestic	7,614,000	7,854,840	8,234,680	8,688,760	9,125,669	9,591,000	9,294,949	9,609,174	9,954,021	10,269,850	10,617,032	10,975,951	11,347,003	11,730,599	12,127,163	12,537,133	12,960,963	13,399,121	13,852,091
Standposts	282,000	290,920	306,840	327,880	347,880	333,000	344,257	355,895	367,927	380,365	393,223	406,517	420,259	434,467	449,154	464,338	480,036	496,264	513,040
Bulk	1,269,000	1,309,140	1,380,780	1,475,480	1,475,480	1,498,500	1,549,138	1,601,529	1,655,670	1,711,642	1,769,505	1,829,325	1,891,167	1,955,100	2,021,194	2,089,522	2,160,161	2,233,187	2,308,682
Rel/Schools	282,000	290,920	306,840	327,880	347,880	333,000	344,257	355,895	367,927	380,365	393,223	406,517	420,259	434,467	449,154	464,338	480,036	496,264	513,040
Commercial	4,638,900	4,785,634	5,047,518	5,395,626	5,697,826	5,477,850	5,663,034	5,854,478	6,052,394	6,257,001	6,468,525	6,687,200	6,913,257	7,146,976	7,388,586	7,638,365	7,896,587	8,163,538	8,439,514
Shipping	14,100	14,546	15,342	16,394	16,984	16,650	17,213	17,795	18,396	19,018	19,661	20,326	21,013	21,723	22,458	23,217	24,002	24,813	25,652
Total Demand	14,100,000	14,546,000	15,342,000	16,230,000	16,994,000	16,650,000	17,212,869	17,794,766	18,396,335	19,018,241	19,661,170	20,325,635	21,012,969	21,723,332	22,457,710	23,216,914	24,001,785	24,813,186	25,652,020
Water Sales by Customer Categories																			
Domestic	698,052	711,649	827,142	967,594	1,125,669	1,262,184	1,461,435	1,692,142	1,959,268	2,268,563	2,626,684	3,041,339	3,521,453	4,077,359	4,721,022	5,465,295	6,329,219	7,328,566	8,485,282
Standposts	12,927	13,196	15,317	18,257	20,846	23,374	27,064	31,336	36,283	42,013	48,642	56,321	65,212	75,507	87,426	101,228	117,208	135,710	157,154
Bulk	135,834	136,402	160,776	191,684	218,680	245,695	284,249	329,122	381,078	441,235	510,890	591,541	684,923	793,046	918,239	1,063,194	1,231,053	1,425,567	1,650,380
Rel/Schools	8,628	8,797	10,224	12,171	13,697	15,267	18,024	20,870	24,164	27,978	32,396	37,510	43,431	50,287	58,226	67,418	78,060	90,383	104,651
Commercial	1,263,060	1,287,527	1,495,454	1,785,026	2,096,360	2,283,153	2,643,577	3,060,899	3,544,101	4,103,582	4,751,384	5,501,451	6,369,924	7,375,497	8,539,813	9,887,931	11,448,866	13,256,214	15,348,875
Shipping	10,776	10,986	12,759	15,212	17,394	19,484	22,560	26,132	30,245	35,020	40,348	46,949	54,561	62,942	72,879	84,383	97,704	113,128	130,987
Total Collection	2,129,297	2,170,558	2,521,674	2,987,954	3,433,045	3,849,258	4,456,910	5,160,490	5,975,138	6,918,390	8,010,545	9,275,111	10,739,304	12,454,640	14,397,605	16,670,449	19,302,090	22,349,170	25,877,289
Collection at 94%	2,001,540	2,040,324	2,370,374	2,808,676	3,227,063	3,618,301	4,189,495	4,850,860	5,616,630	6,503,286	7,529,912	8,718,604	10,094,946	11,688,561	13,533,749	15,670,222	18,143,965	21,008,219	24,324,633
Service Charge etc.	368,800	453,870	448,992	500,357	555,698	615,101	667,384	724,112	785,661	852,443	924,900	994,268	1,068,838	1,149,001	1,235,176	1,327,815	1,427,401	1,534,456	1,649,540
Government Subsidy	88,000	96,800	106,480	117,128	128,941	141,725	153,771	166,942	181,023	196,410	213,057	229,089	246,270	264,741	284,596	305,941	328,886	353,553	380,069
Total Revenue	2,458,340	2,590,954	2,925,846	3,424,161	3,911,402	4,375,127	5,010,652	5,741,815	6,583,316	7,552,140	8,667,919	9,941,961	11,410,065	13,102,363	15,033,521	17,306,978	19,900,252	22,896,228	26,354,242
Gross Cash Requirement	1,632,117	1,748,033	3,099,236	3,445,676	3,848,821	4,169,528	4,589,447	5,055,348	5,574,354	6,151,344	6,794,070	7,510,790	8,310,922	9,285,232	10,306,045	11,327,503	12,385,860	13,999,835	15,591,029
Cash needed / Total Revenue	106.26%	106.06%	102.85%	100.57%	98.40%	95.30%	91.39%	88.05%	84.67%	81.45%	78.38%	75.55%	72.84%	70.26%	67.80%	65.46%	63.24%	61.14%	59.16%
Cash Surplus	-153,787	-157,039	-43,390	-15,515	62,781	265,598	421,205	685,967	1,068,962	1,400,796	1,870,848	2,431,171	3,099,133	3,897,072	4,847,476	5,976,474	7,314,392	8,896,393	10,763,213
Retained Income	-1,451,234	-1,792,060	-1,875,451	-1,894,946	-1,832,135	-1,626,586	-1,265,381	-819,414	-489,548	1,900,344	3,764,132	6,195,363	9,294,496	13,191,563	18,039,044	24,015,518	31,329,910	40,226,303	50,889,516
Average Water Tariff	14.84																		
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015

Table A17.1.9

**NATIONAL WATER SUPPLY & DRAINAGE BOARD
DEBT OUTSTANDING & REPAYMENT SCHEDULE**

No.	Project - Donor	Loan Balance As at 31.12.97	1997		1998		1999		2000		1000 Rs.
			Interest	Repayment	Interest	Repayment	Interest	Repayment	Interest	Repayment	
1	IDA - 1700	793,886	88,712	0	95,266	0	95,266	36,086	90,936	36,086	
2	ADB 817	1,028,667	33,088	0	123,440	0	123,440	46,758	117,829	46,758	
3	ODA	65,323	6,270	3,609	7,406	3,609	6,973	3,609	6,540	3,609	
4	OEFC (Towns East of Colombo)	420,578	48,140	0	50,469	0	50,469	0	50,469	0	
5	IDA - 1041	226,574	11,081	17,429	25,097	17,429	23,006	17,429	20,915	17,429	
6	USAID	56,447	1,399	3,497	6,354	3,497	5,934	3,497	5,515	3,497	
7	French - Trincomalee	133,744	8,642	10,288	14,815	10,288	13,580	10,288	12,346	10,288	
8	French - Negombo (1)	32,776	3,883	2,521	3,631	2,521	3,328	2,521	3,025	2,521	
9	French - Negombo (11)	32,833	3,852	2,189	3,677	2,189	3,415	2,189	3,152	2,189	
10	French - Kurunegala	31,063	3,914	1,553	3,541	1,553	3,355	1,553	3,168	1,553	
11	French - Badulla	38,837	4,906	2,044	4,415	2,044	4,170	2,044	3,925	2,044	
12	French - Ambatale	519,580	65,319	24,742	59,381	24,742	56,412	24,742	53,442	24,742	
13	ADB - 1235	503,254	44,806	0	60,391	0	60,391	0	60,391	0	
14	OEFC (Towns South of Colombo)	145,493	8,152	0	17,459	0	17,459	0	17,459	0	
15	Karumunia - EFIC	91,260	9,079	0	10,951	0	10,951	0	10,951	0	
16	Matara/Nilambe - ODA	544,858	63,445	0	65,383	0	65,383	0	65,383	0	
17	Ambatale - Remote Supervision French	189,000	22,680	0	22,680	0	22,680	0	22,680	0	
18	Ambatale - Refur. & Impr. French	120,000	9,360	0	14,400	0	14,400	0	14,400	0	
	Total	4,974,173	436,728	67,872	588,756	67,872	580,612	150,716	562,526	150,716	

Table A17.1.10

**The Comparison of Water Costs and Price by the schemes (1998 Price)
The Greater Kandy Water Supply**

	Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
1. KMC Water Supply										
Total Expenses (1) (note)	Rs.	72,298,503								
Total Expenses (2) (note)	Rs.	70,499,076								
Total Billing	cum	6,692,457								
Average Cost (1)	Rs./cum	10.80								
Average Cost (2)	Rs./cum	10.53								
Total Revenue (1)	Rs.	64,168,639								
Average Price	Rs./cum	9.01								
2. Kundasale Water Supply										
Water from NWSDB Cost (Over All)	Rs./cum		14.16							
Kundasale Water Cost	Rs./cum		8.70							
Effective Water Price	Rs./cum		10.94							
3. NWSDB Price (whole country average)										
	Rs./cum	0.0%	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84
	Rs./cum	0.5%	14.84	14.91	14.99	15.06	15.14	15.21	15.29	15.37
	Rs./cum	1.0%	14.84	14.99	15.14	15.29	15.44	15.60	15.75	15.91
	Rs./cum	1.5%	14.84	15.06	15.29	15.52	15.75	15.99	16.23	16.47
	Rs./cum	2.0%	14.84	15.14	15.44	15.75	16.06	16.38	16.71	17.05
	Rs./cum	2.5%	14.84	15.21	15.59	15.98	16.38	16.79	17.21	17.64
	Rs./cum	3.0%	14.84	15.29	15.74	16.22	16.70	17.20	17.72	18.25

note: (1) from KMC accountant. (2) from operational side of KMC water supply division.

Appendix 17.2 Water Supply Project - Financial Analysis Calculation

- Appendix 17.2.1 Pro-forma Financial Statements**
 - Greater Kandy Water Supply Project (Master Plan)**

- Appendix 17.2.2 Calculation of FIRR**
 - Greater Kandy Water Supply Project (Master Plan)**

- Appendix 17.2.3 Pro-forma Financial Statements**
 - Greater Kandy Water Supply Project (Feasibility Study)**

- Appendix 17.2.4 Calculation of FIRR**
 - Greater Kandy Water Supply Project (Feasibility Study)**

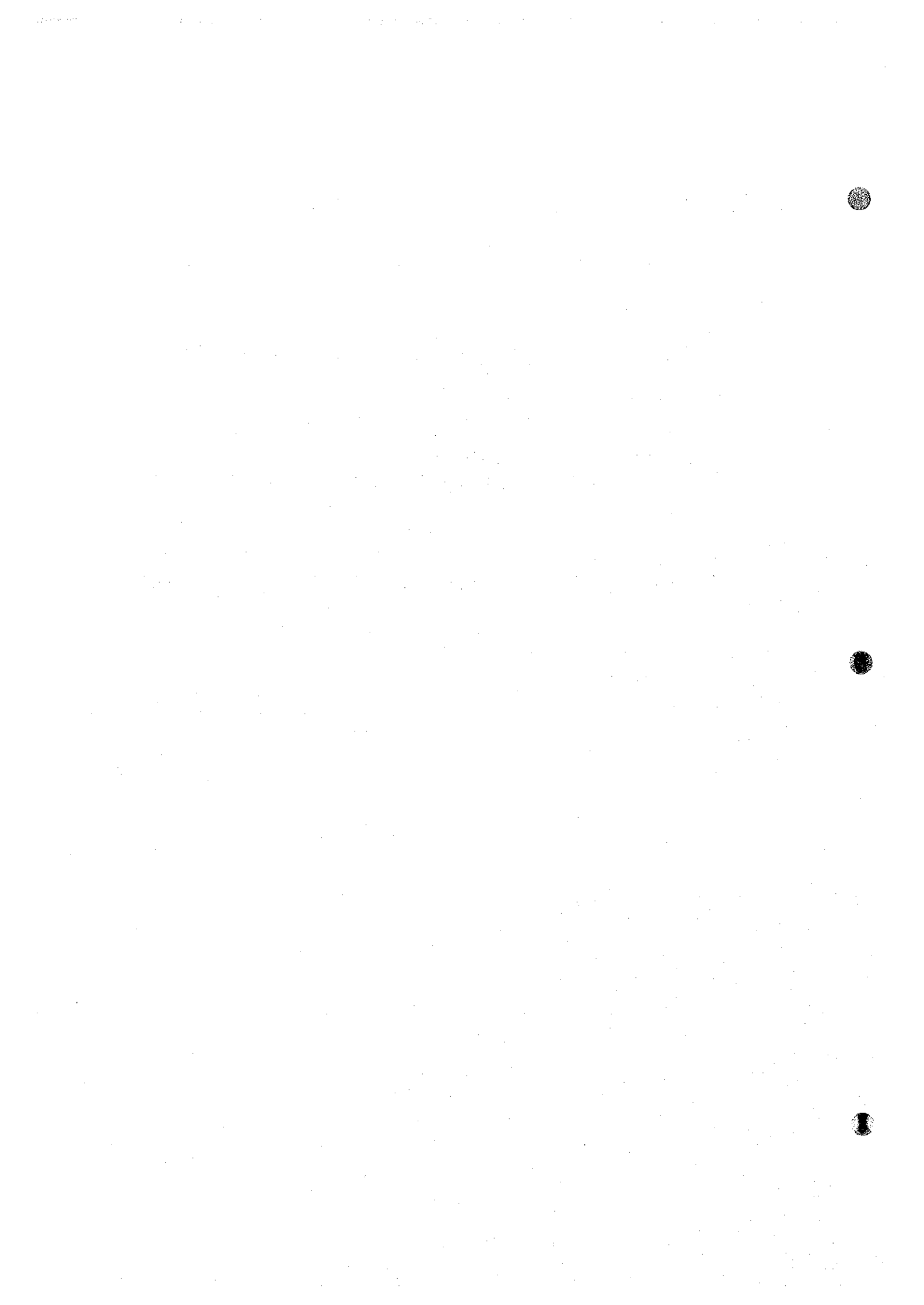


Table A17.2.1

Pro Forma Financial Statements (M.Rs.)
Greater Kandy Water Supply Project (Master Plan) 1.0 % tariff increase in real terms

Year	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Fund Flow Table																												
Annual Sales	0.0	0.0	0.0	0.0	0.0	199.1	223.5	257.7	290.6	328.5	357.7	405.6	485.5	570.0	670.7	799.7	944.9	1,024.0	1,116.2	1,215.6	1,322.6	1,437.4	1,560.0	1,694.3	1,840.5	1,998.7	2,169.2	
Subsidy from GSL	0.0	208.3	824.3	1,240.1	1,630.7	124.7	711.7	1,046.9	1,425.3	0.0	293.4	1,303.5	2,210.1	3,013.9	0.0	0.0	0.0	0.0	0.0	0.0	100.9	2,804.7	0.0	0.0	3,228.7	0.0	0.0	
Loan (10% Interest)	0.0	208.3	824.3	1,240.1	1,630.7	124.7	711.7	1,046.9	1,425.3	0.0	293.4	1,303.5	2,210.1	3,013.9	0.0	0.0	0.0	0.0	0.0	0.0	100.9	2,804.7	0.0	0.0	3,228.7	0.0	0.0	
Capital Investment	0.0	416.6	1,648.6	2,480.2	3,361.4	2,494.4	1,423.3	2,093.9	2,850.5	0.0	586.9	3,006.9	4,420.3	6,027.8	0.0	0.0	0.0	0.0	0.0	0.0	201.8	5,699.4	0.0	0.0	6,457.5	0.0	0.0	
Interest Payment (10%)	0.0	208.3	824.3	1,240.1	1,630.7	124.7	711.7	1,046.9	1,425.3	0.0	293.4	1,303.5	2,210.1	3,013.9	0.0	0.0	0.0	0.0	0.0	0.0	100.9	2,804.7	0.0	0.0	3,228.7	0.0	0.0	
Annual Loan Repayment	0.0	0.0	0.0	0.0	0.0	9.5	46.9	103.3	177.4	183.1	215.4	263.0	327.8	341.2	409.5	510.0	647.0	847.0	1,103.2	1,408.2	1,769.0	2,197.3	2,697.9	3,274.4	3,928.7	4,665.9	5,491.7	
O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cash Inflow	0.0	(208.3)	(103.3)	(235.8)	(315.6)	(469.6)	(588.6)	(723.2)	(815.3)	(755.9)	(762.2)	(845.2)	(1,066.3)	(1,289.5)	(1,152.7)	(1,090.0)	(922.8)	(745.3)	(602.1)	(487.8)	(396.1)	(308.1)	(217.8)	(147.8)	(201.2)	92.2	288.7	
Working Capital Burden																												
Cumulative Cash Deficit	(208.3)	(416.6)	(840.9)	(1,265.2)	(1,690.4)	(2,115.6)	(2,540.8)	(2,966.0)	(3,391.2)	(3,816.4)	(4,241.6)	(4,666.8)	(5,092.0)	(5,517.2)	(5,942.4)	(6,367.6)	(6,792.8)	(7,218.0)	(7,643.2)	(8,068.4)	(8,493.6)	(8,918.8)	(9,344.0)	(9,769.2)	(10,194.4)	(10,619.6)	(11,044.8)	
10% Interest on above	(21.1)	(12.4)	(36.0)	(79.2)	(128.1)	(185.0)	(252.2)	(333.8)	(429.4)	(485.5)	(570.0)	(670.7)	(799.7)	(944.9)	(1,024.0)	(1,116.2)	(1,215.6)	(1,322.6)	(1,437.4)	(1,560.0)	(1,694.3)	(1,840.5)	(1,998.7)	(2,169.2)	(2,352.7)	(2,548.9)	(2,757.8)	
Cum. Interest Payment	(2.1)	(14.5)	(50.5)	(129.6)	(255.7)	(440.7)	(693.0)	(1,026.7)	(1,436.1)	(1,921.7)	(2,491.8)	(3,162.5)	(3,962.2)	(4,877.1)	(5,901.1)	(7,017.5)	(8,209.9)	(9,482.8)	(10,785.2)	(12,157.5)	(13,572.6)	(15,032.4)	(16,540.9)	(18,098.3)	(19,706.6)	(21,368.9)	(23,088.1)	
Income Statement																												
Annual Sales	0.0	0.0	0.0	0.0	0.0	199.1	223.5	257.7	290.6	328.5	357.7	405.6	485.5	570.0	670.7	799.7	944.9	1,024.0	1,116.2	1,215.6	1,322.6	1,437.4	1,560.0	1,694.3	1,840.5	1,998.7	2,169.2	
O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Annual Depreciation	0.0	3.0	19.5	45.3	105.9	108.1	123.3	143.3	204.0	208.8	238.8	283.0	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	395.7	
Interest Payment (10%)	0.0	208.3	824.3	1,240.1	1,630.7	124.7	711.7	1,046.9	1,425.3	0.0	293.4	1,303.5	2,210.1	3,013.9	0.0	0.0	0.0	0.0	0.0	0.0	100.9	2,804.7	0.0	0.0	3,228.7	0.0	0.0	
Net Income	0.0	(23.9)	(122.8)	(271.6)	(490.6)	(674.4)	(833.8)	(982.5)	(1,124.0)	(1,265.6)	(1,411.1)	(1,561.1)	(1,715.6)	(1,875.1)	(2,039.6)	(2,209.1)	(2,383.6)	(2,563.1)	(2,747.6)	(2,937.1)	(3,131.6)	(3,331.1)	(3,535.6)	(3,745.1)	(3,959.6)	(4,179.1)	(4,403.6)	
Balance Sheet																												
Cash	(208.3)	(416.6)	(840.9)	(1,265.2)	(1,690.4)	(2,115.6)	(2,540.8)	(2,966.0)	(3,391.2)	(3,816.4)	(4,241.6)	(4,666.8)	(5,092.0)	(5,517.2)	(5,942.4)	(6,367.6)	(6,792.8)	(7,218.0)	(7,643.2)	(8,068.4)	(8,493.6)	(8,918.8)	(9,344.0)	(9,769.2)	(10,194.4)	(10,619.6)	(11,044.8)	
Capital Investment	302.1	1,980.7	4,630.9	7,892.5	11,254.1	14,615.7	17,977.3	21,338.9	24,700.5	28,062.1	31,423.7	34,785.3	38,146.9	41,508.5	44,870.1	48,231.7	51,593.3	54,954.9	58,316.5	61,678.1	65,039.7	68,401.3	71,762.9	75,124.5	78,486.1	81,847.7	85,209.3	
Less Annual Depreciation	0.0	22.5	67.8	137.1	206.4	275.7	345.0	414.3	483.6	552.9	622.2	691.5	760.8	830.1	900.0	969.3	1,038.6	1,107.9	1,177.2	1,246.5	1,315.8	1,385.1	1,454.4	1,523.7	1,593.0	1,662.3	1,731.6	
Land	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	
Total Assets	392.3	1,918.6	4,117.7	6,841.6	9,565.3	12,319.2	15,073.9	17,828.6	20,583.3	23,338.0	26,092.7	28,847.4	31,602.1	34,356.8	37,111.5	39,866.2	42,620.9	45,375.6	48,130.3	50,885.0	53,639.7	56,394.4	59,149.1	61,903.8	64,658.5	67,413.2	70,167.9	
Loan Balance	208.3	1,032.6	2,265.2	3,497.8	4,730.4	5,963.0	7,195.6	8,428.2	9,660.8	10,893.4	12,126.0	13,358.6	14,591.2	15,823.8	17,056.4	18,289.0	19,521.6	20,754.2	21,986.8	23,219.4	24,452.0	25,684.6	26,917.2	28,149.8	29,382.4	30,615.0	31,847.6	
Grant from GSL	(21.9)	(146.6)	(418.2)	(908.8)	(1,517.0)	(2,125.2)	(2,733.4)	(3,341.6)	(3,949.8)	(4,558.0)	(5,166.2)	(5,774.4)	(6,382.6)	(6,990.8)	(7,599.0)	(8,207.2)	(8,815.4)	(9,423.6)	(10,031.8)	(10,640.0)	(11,248.2)	(11,856.4)	(12,464.6)	(13,072.8)	(13,681.0)	(14,289.2)	(14,897.4)	
Reserved Fund	392.8	1,918.6	4,117.7	6,841.6	9,565.3	12,319.2	15,073.9	17,828.6	20,583.3	23,338.0	26,092.7	28,847.4	31,602.1	34,356.8	37,111.5	39,866.2	42,620.9	45,375.6	48,130.3	50,885.0	53,639.7	56,394.4	59,149.1	61,903.8	64,658.5	67,413.2	70,167.9	
Total Liab. & Capital																												

Table A17.2.1

Pro Forma Financial Statements (M.Rs.)
Greater Kandy Water Supply Project (Master Plan)

1.0 % tariff increase in real terms

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Fund Flow Table																										
Annual Sales	6,388.4	7,097.5	7,895.4	8,760.6	9,733.1	10,813.4	12,013.7	13,347.3	14,828.8	16,474.8	18,303.5	20,335.2	22,592.4	25,100.1	27,886.3	30,981.6	34,420.6	38,241.3	42,486.1	47,202.0	52,441.5	58,262.5	64,729.6	71,914.6	79,897.1	
Subsidy from CSL	0.0	0.0	5,243.5	0.0	0.0	0.0	0.0	421.5	11,715.9	0.0	0.0	0.0	13,487.3	0.0	0.0	0.0	0.0	21,903.6	0.0	0.0	0.0	0.0	1,760.9	48,940.2	0.0	
Loan (10% Interest)	0.0	0.0	5,243.5	0.0	0.0	0.0	0.0	421.5	11,715.9	0.0	0.0	0.0	13,487.3	0.0	0.0	0.0	0.0	21,903.6	0.0	0.0	0.0	0.0	1,760.9	48,940.2	0.0	
Capital Investment	0.0	0.0	10,487.1	0.0	0.0	0.0	0.0	843.1	23,431.8	0.0	0.0	0.0	26,974.5	0.0	0.0	0.0	0.0	43,807.2	0.0	0.0	0.0	0.0	3,511.7	97,880.5	0.0	
Interest Payment (10%)	868.7	786.9	1,236.9	1,621.1	1,983.7	2,369.0	2,786.5	3,241.8	3,733.0	4,260.4	4,824.9	5,417.4	6,037.9	6,696.4	7,395.9	8,139.4	8,980.9	9,814.5	10,747.1	11,784.7	12,933.2	14,200.7	15,594.2	17,121.7	18,797.2	
Annual Loan Repayment	874.3	817.9	1,243.8	1,632.2	1,987.4	2,378.0	2,795.5	3,250.3	3,741.8	4,269.4	4,834.3	5,431.8	6,061.3	6,724.3	7,422.8	8,158.3	8,934.8	9,758.3	10,725.8	11,744.3	12,812.8	13,940.3	15,136.8	16,403.3	17,750.8	
O & M	3,520.4	3,625.2	4,017.7	4,419.5	4,861.4	5,347.6	5,882.4	6,470.6	7,117.6	7,829.4	8,612.4	9,473.6	10,420.9	11,463.0	12,609.3	13,870.3	15,257.3	16,783.0	18,457.3	20,289.2	22,281.7	24,441.5	26,784.5	30,420.6	34,420.6	
Overhead (10% of Sales)	638.8	709.8	786.9	876.1	973.3	1,081.3	1,201.4	1,334.7	1,482.9	1,647.5	1,830.3	2,035.2	2,259.2	2,510.0	2,788.6	3,098.2	3,442.1	3,824.1	4,246.6	4,720.2	5,244.1	5,826.2	6,473.0	7,191.5	7,989.7	
Net Cash Inflow	666.2	1,150.5	1,098.5	1,563.9	1,863.6	2,269.0	2,692.5	3,134.7	3,618.9	4,147.5	4,724.3	5,351.8	6,031.3	6,766.8	7,562.4	8,425.9	9,364.3	10,383.3	11,490.8	12,694.8	13,993.8	15,395.8	16,909.8	18,546.8	20,316.8	
Working Capital Burden																										
Cumulative Cash Deficit	(13,401.6)	(12,271.1)	(11,172.6)	(9,608.7)	(7,725.1)	(5,214.1)	(2,011.7)	1,843.7	5,309.0	9,687.3	14,614.7	20,750.8	26,726.8	34,022.2	42,231.6	52,131.8	63,905.7	75,662.8	89,754.9	105,482.3	124,147.0	146,201.5	171,681.2	196,268.3	225,304.4	
10% Interest on above	(1,340.2)	(1,227.1)	(1,117.3)	(960.9)	(772.3)	(521.4)	(201.2)	184.4	530.9	968.7	1,461.5	2,075.1	2,822.2	3,742.2	4,853.2	6,180.6	7,748.3	9,580.9	11,718.8	14,202.2	17,081.2	19,418.1	22,271.5	25,704.4		
Cum. Interest Payment	(20,629.7)	(21,856.8)	(22,974.1)	(23,594.9)	(24,707.3)	(25,228.7)	(25,429.8)	(25,245.5)	(24,714.6)	(23,745.8)	(22,284.3)	(20,209.3)	(17,536.6)	(14,134.4)	(9,911.2)	(4,698.0)	1,692.5	9,266.8	18,236.3	28,784.5	41,199.2	55,819.4	72,987.5	92,614.3	115,144.8	
Income Statement																										
Annual Sales	6,388.4	7,097.5	7,895.4	8,760.6	9,733.1	10,813.4	12,013.7	13,347.3	14,828.8	16,474.8	18,303.5	20,335.2	22,592.4	25,100.1	27,886.3	30,981.6	34,420.6	38,241.3	42,486.1	47,202.0	52,441.5	58,262.5	64,729.6	71,914.6	79,897.1	
O & M	3,520.4	3,625.2	4,017.7	4,419.5	4,861.4	5,347.6	5,882.4	6,470.6	7,117.6	7,829.4	8,612.4	9,473.6	10,420.9	11,463.0	12,609.3	13,870.3	15,257.3	16,783.0	18,457.3	20,289.2	22,281.7	24,441.5	26,784.5	30,420.6	34,420.6	
Overhead (10% of Sales)	638.8	709.8	786.9	876.1	973.3	1,081.3	1,201.4	1,334.7	1,482.9	1,647.5	1,830.3	2,035.2	2,259.2	2,510.0	2,788.6	3,098.2	3,442.1	3,824.1	4,246.6	4,720.2	5,244.1	5,826.2	6,473.0	7,191.5	7,989.7	
Annual Depreciation	626.3	626.3	822.2	822.2	822.2	822.2	822.2	843.5	1,318.8	1,318.8	1,318.8	1,865.9	1,865.9	1,865.9	1,865.9	1,865.9	2,754.5	2,754.5	2,754.5	2,754.5	2,754.5	3,460.1	3,460.1	4,829.0	4,829.0	
Interest Payment (10%)	868.7	786.9	1,236.9	1,621.1	1,983.7	2,369.0	2,786.5	3,241.8	3,733.0	4,260.4	4,824.9	5,417.4	6,037.9	6,696.4	7,395.9	8,139.4	8,980.9	9,814.5	10,747.1	11,784.7	12,933.2	14,200.7	15,594.2	17,121.7		
Net Income	934.2	1,322.1	1,020.1	1,479.8	2,007.5	2,583.3	3,212.0	3,843.6	4,584.9	5,447.5	6,437.3	7,566.8	8,842.4	10,264.1	11,842.4	13,581.6	15,490.9	17,580.3	19,850.8	22,312.8	24,987.3	27,886.3	31,029.8	34,536.6	38,420.6	
Balance Sheet																										
Capital Investment	40,491.0	40,491.0	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	50,968.1	
Less Accum. Depreciation	8,592.7	9,219.0	10,041.2	10,863.3	11,685.5	12,507.7	13,329.8	14,152.0	15,074.2	16,096.4	17,218.6	18,440.8	19,763.0	21,185.2	22,707.4	24,329.6	26,051.8	27,874.0	29,796.2	31,818.4	33,940.6	36,162.8	38,585.0	41,307.2	44,329.4	
Land	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	253.5	
Total Assets	18,740.2	19,244.5	30,007.8	30,749.6	31,813.0	33,499.8	35,880.1	38,975.1	42,813.4	47,417.5	52,811.4	58,976.8	65,912.4	73,627.4	82,139.6	91,467.2	101,614.6	112,600.6	124,456.6	137,202.6	150,869.6	165,487.6	181,187.6	198,007.6	216,007.6	
Loan Balance	8,686.9	7,869.0	12,368.8	11,630.7	10,686.6	9,796.0	8,958.3	8,268.1	7,729.3	7,343.3	7,009.3	6,726.3	6,494.3	6,312.3	6,180.3	6,098.3	6,056.3	6,054.3	6,052.3	6,050.3	6,048.3	6,046.3	6,044.3	6,042.3	6,040.3	
Grant from CSL	20,367.3	20,367.3	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	25,610.8	
Reserve Fund	(10,313.9)	(8,991.6)	(7,971.7)	(6,491.9)	(4,484.4)	(1,811.0)	1,311.0	5,154.6	11,929.0	16,719.7	22,582.1	29,524.5	37,546.9	46,659.3	56,871.7	68,184.1	80,696.5	94,418.9	109,351.3	125,503.7	142,876.1	161,478.5	181,320.9	202,423.3	224,775.7	
Total Liab. & Capital	18,740.2	19,244.5	30,007.8	30,749.6	31,813.0	33,499.8	35,880.1	38,975.1	42,813.4	47,417.5	52,811.4	58,976.8	65,912.4	73,627.4	82,139.6	91,467.2	101,614.6	112,600.6	124,456.6	137,202.6	150,869.6	165,487.6	181,187.6	198,007.6	216,007.6	

Table A17.2.2
Calculation of FIRR
Greater Kandy Water Supply Project (Master Plan)

(1998 Price)

Year	Water cum/d	Tariff Rs./cum	Revenue M Rs./y	Investment M Rs.	50% of Inv. M Rs.	O&M M Rs.	OII15% M Rs.	Cash Outflow M Rs.	Net Inflow M Rs.	FIRR
2001				313.00	156.50		0.00	156.50	(156.50)	
2002				1,126.00	563.00		0.00	563.00	(563.00)	
2003				1,540.00	770.00		0.00	770.00	(770.00)	
2004				1,841.00	920.50		0.00	920.50	(920.50)	
2005	19,547	14.32	102.16	128.00	64.00	81.39	15.32	160.71	(58.55)	
2006	20,196	14.46	106.61	664.00	332.00	82.49	15.99	430.48	(323.87)	
2007	20,502	14.61	109.31	888.00	444.00	82.49	16.40	542.89	(433.58)	
2008	20,808	14.75	112.05	1,099.00	549.50	82.49	16.81	648.80	(536.75)	
2009	38,478	14.90	209.27	0.00	0.00	143.34	31.39	174.73	34.54	
2010	43,446	15.05	238.66	187.00	93.50	156.31	35.80	285.61	(46.95)	
2011	43,956	15.20	243.87	871.00	435.50	156.31	36.58	628.39	(384.52)	
2012	44,425	15.35	248.94	1,164.00	582.00	156.31	37.34	775.65	(526.71)	
2013	44,915	15.51	254.20	1,443.00	721.50	156.31	38.13	915.94	(661.74)	
2014	62,316	15.66	356.21	0.00	0.00	214.16	53.43	267.59	88.62	
2015	67,262	15.82	388.33	0.00	0.00	226.04	58.25	284.29	104.04	
2016	68,775	15.98	401.04	0.00	0.00	230.25	60.16	290.41	110.63	
2017	68,775	16.14	405.05	0.00	0.00	230.25	60.76	291.01	114.04	
2018	68,775	16.30	409.10	30.00	15.00	230.25	61.36	306.61	102.48	
2019	68,775	16.46	413.19	758.00	379.00	230.25	61.98	671.23	(258.04)	
2020	68,775	16.62	417.32		0.00	230.25	62.60	292.85	124.47	
2021	68,775	16.79	421.49		0.00	230.25	63.22	293.47	128.02	
2022	68,775	16.96	425.71		0.00	230.25	63.86	294.11	131.60	
2023	68,775	17.13	429.97	596.00	298.00	230.25	64.49	592.74	(162.78)	
2024	68,775	17.30	434.27		0.00	230.25	65.14	295.39	138.88	
2025	68,775	17.47	438.61		0.00	230.25	65.79	296.04	142.57	
2026	68,775	17.65	442.99		0.00	230.25	66.45	296.70	146.30	
2027	68,775	17.82	447.42		0.00	230.25	67.11	297.36	150.06	
2028	68,775	18.00	451.90	601.00	300.50	230.25	67.78	598.53	(146.64)	
2029	68,775	18.18	456.42		0.00	230.25	68.46	298.71	157.71	
2030	68,775	18.36	460.98		0.00	230.25	69.15	299.40	161.58	
2031	68,775	18.55	465.59		0.00	230.25	69.84	300.09	165.50	
2032	68,775	18.73	470.25		0.00	230.25	70.54	300.79	169.46	
2033	68,775	18.92	474.95	30.00	15.00	230.25	71.24	316.49	158.46	
2034	68,775	19.11	479.70	758.00	379.00	230.25	71.95	681.20	(201.51)	
2035	68,775	19.30	484.50		0.00	230.25	72.67	302.92	181.57	
2036	68,775	19.49	489.34		0.00	230.25	73.40	303.65	185.69	
2037	68,775	19.69	494.23		0.00	230.25	74.14	304.39	189.85	
2038	68,775	19.89	499.18	596.00	298.00	230.25	74.88	603.13	(103.95)	
2039	68,775	20.08	504.17		0.00	230.25	75.63	305.88	198.29	
2040	68,775	20.28	509.21		0.00	230.25	76.38	306.63	202.58	
2041	68,775	20.49	514.30		0.00	230.25	77.15	307.40	206.91	
2042	68,775	20.69	519.45		0.00	230.25	77.92	308.17	211.28	
2043	68,775	20.90	524.64	601.00	300.50	230.25	78.70	609.45	(84.81)	
2044	68,775	21.11	529.89		0.00	230.25	79.48	309.73	220.15	
2045	68,775	21.32	535.19		0.00	230.25	80.28	310.53	224.66	
2046	68,775	21.53	540.54		0.00	230.25	81.08	311.33	229.21	
2047	68,775	21.75	545.94		0.00	230.25	81.89	312.14	233.80	
2048	68,775	21.97	551.40	30.00	15.00	230.25	82.71	327.96	223.44	
2049	68,775	22.19	556.92	758.00	379.00	230.25	83.54	692.79	(135.87)	
2050	68,775	22.41	562.49	(1,670.00)	(835.00)	230.25	84.37	(520.38)	1,082.86	5.04%

Note: 1.0% annual tariff increase in real terms is assumed.

Investment Costs in 2050 are assumed salvage value.

Table A17.2.3

Pro Forma Financial Statements (M Rs.)
Greater Kandy Water Supply Project (Feasibility Study) 3.0 % tariff increase in real terms

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Fixed Flow Table																												
Annual Sales	0.0	0.0	0.0	0.0	228.4	267.3	307.5	353.6	400.6	453.9	514.3	582.7	660.2	748.0	847.4	960.1	1,087.8	1,232.5	1,396.5	1,582.2	1,792.6	2,031.0	2,301.2	2,607.2	2,954.0	3,346.9		
Subsidy from GSL	0.0	208.3	824.3	1,240.1	1,630.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.9	2,884.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (20% Interest)	0.0	208.3	824.3	1,240.1	1,630.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.9	2,884.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	416.6	1,648.6	2,480.2	3,261.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	201.8	5,699.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	20.8	103.3	226.3	384.7	574.4	856.6	1,211.4	1,630.7	2,115.4	2,679.9	3,346.9	4,128.8	5,027.2	6,050.0	7,204.1	8,488.8	9,904.5	11,461.6	13,171.4	15,036.6	17,057.2	19,334.8	21,869.6	24,669.6	27,725.1		
Annual Loan Repayment	0.0	0.0	0.0	0.0	9.5	46.9	103.3	177.4	285.7	454.4	703.3	1,033.3	1,533.3	2,216.7	3,183.3	4,444.4	6,000.0	7,866.7	10,044.4	12,644.4	15,666.7	19,200.0	23,333.3	28,066.7	33,500.0	39,733.3		
O & M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net Cash Inflow	0.0	(20.8)	(103.3)	(235.8)	(431.6)	(430.7)	(470.3)	(534.3)	(622.5)	(738.5)	(885.9)	(1,058.2)	(1,260.0)	(1,494.2)	(1,760.8)	(2,060.7)	(2,394.9)	(2,773.4)	(3,197.9)	(3,668.4)	(4,185.0)	(4,747.7)	(5,356.5)	(6,012.5)	(6,716.5)	(7,468.5)		
Working Capital Burden																												
Cumulative Cash Deficit	(20.8)	(124.1)	(359.9)	(791.5)	(1,222.3)	(1,692.5)	(2,126.6)	(2,520.9)	(2,876.5)	(3,190.0)	(3,457.3)	(3,673.7)	(3,834.0)	(3,932.0)	(3,960.6)	(3,911.7)	(3,776.1)	(3,551.0)	(3,234.3)	(2,824.4)	(2,320.4)	(1,722.6)	(1,031.1)	(250.1)	(405.4)	(569.0)	974.1	
20% Interest on above	(2.1)	(12.4)	(36.0)	(79.2)	(122.3)	(169.3)	(232.7)	(321.2)	(435.7)	(578.7)	(754.9)	(967.9)	(1,220.9)	(1,618.2)	(2,060.6)	(2,548.2)	(3,081.9)	(3,662.6)	(4,291.3)	(4,969.0)	(5,695.7)	(6,471.4)	(7,296.1)	(8,169.8)	(9,092.5)	(10,065.2)	(11,087.9)	
Loan Interest Payment	(2.1)	(12.4)	(36.0)	(79.2)	(122.3)	(169.3)	(232.7)	(321.2)	(435.7)	(578.7)	(754.9)	(967.9)	(1,220.9)	(1,618.2)	(2,060.6)	(2,548.2)	(3,081.9)	(3,662.6)	(4,291.3)	(4,969.0)	(5,695.7)	(6,471.4)	(7,296.1)	(8,169.8)	(9,092.5)	(10,065.2)	(11,087.9)	
Income Statement																												
Annual Sales	0.0	0.0	0.0	0.0	228.4	267.3	307.5	353.6	400.6	453.9	514.3	582.7	660.2	748.0	847.4	960.1	1,087.8	1,232.5	1,396.5	1,582.2	1,792.6	2,031.0	2,301.2	2,607.2	2,954.0	3,346.9		
O & M	0.0	0.0	0.0	0.0	158.6	176.8	194.5	214.0	235.4	258.9	284.8	313.3	344.6	379.0	416.9	458.6	504.5	555.0	610.4	671.5	738.6	812.5	893.8	983.1	1,081.4	1,189.6		
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	22.8	26.7	30.7	35.4	40.1	45.4	51.4	58.3	66.0	74.8	84.7	96.0	108.8	123.3	139.6	158.2	179.3	203.1	230.1	260.7	295.4	334.7		
Annual Depreciation	0.0	3.0	15.5	45.3	105.9	184.7	279.6	385.6	503.4	634.4	778.7	937.3	1,110.3	1,298.3	1,491.4	1,689.6	1,892.9	2,101.4	2,315.1	2,534.0	2,758.1	3,087.2	3,421.3	3,760.4	4,104.5	4,453.6		
Interest Payment (10%)	0.0	20.8	103.3	226.3	384.7	574.4	856.6	1,211.4	1,630.7	2,115.4	2,679.9	3,346.9	4,128.8	5,027.2	6,050.0	7,204.1	8,488.8	9,904.5	11,461.6	13,171.4	15,036.6	17,057.2	19,334.8	21,869.6	24,669.6	27,725.1		
Net Income	0.0	(23.9)	(122.8)	(271.6)	(490.6)	(433.3)	(398.7)	(342.6)	(284.1)	(241.9)	(195.8)	(144.9)	(88.8)	(25.5)	42.9	120.4	207.2	289.5	368.1	443.3	516.1	586.5	654.1	720.7	786.4	851.1	914.8	
Balance Sheet																												
Cash	302.1	1,901.7	4,430.9	7,692.3	10,623.3	13,144.4	15,258.0	16,966.3	18,270.2	19,170.3	19,670.4	19,770.5	19,470.6	18,770.7	17,670.8	16,170.9	14,271.0	12,071.1	9,571.2	6,871.3	4,071.4	1,271.5	(1,528.4)	(3,328.5)	(5,128.6)	(6,928.7)	(8,728.8)	
Capital Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Less: Accum. Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	
Total Assets	392.8	1,918.6	4,117.7	6,841.6	9,504.9	11,770.7	13,588.8	14,988.6	15,988.6	16,588.6	16,888.6	16,988.6	16,888.6	16,488.6	15,788.6	14,688.6	13,188.6	11,288.6	9,088.6	6,888.6	4,688.6	2,488.6	(328.6)	(1,128.6)	(2,328.6)	(3,528.6)	(4,728.6)	
Loan Balance	208.3	1,032.6	2,263.2	3,847.0	5,430.8	6,914.6	8,298.4	9,482.2	10,466.0	11,250.0	11,934.0	12,518.0	12,902.0	13,186.0	13,370.0	13,454.0	13,438.0	13,322.0	13,106.0	12,790.0	12,374.0	11,858.0	11,242.0	10,526.0	9,710.0	8,794.0	7,778.0	
Grant from GSL	208.3	1,032.6	2,263.2	3,847.0	5,430.8	6,914.6	8,298.4	9,482.2	10,466.0	11,250.0	11,934.0	12,518.0	12,902.0	13,186.0	13,370.0	13,454.0	13,438.0	13,322.0	13,106.0	12,790.0	12,374.0	11,858.0	11,242.0	10,526.0	9,710.0	8,794.0	7,778.0	
Reserved Fund	(23.9)	(146.6)	(418.2)	(806.8)	(1,195.4)	(1,584.0)	(1,972.6)	(2,361.2)	(2,750.0)	(3,138.8)	(3,527.4)	(3,916.0)	(4,304.6)	(4,693.2)	(5,081.8)	(5,470.4)	(5,859.0)	(6,247.6)	(6,636.2)	(7,024.8)	(7,413.4)	(7,802.0)	(8,190.6)	(8,579.2)	(8,967.8)	(9,356.4)	(9,745.0)	
Total Liab. & Capital	392.8	1,918.6	4,117.7	6,841.6	9,504.9	11,770.7	13,588.6	14,988.6	15,988.6	16,588.6	16,888.6	16,988.6	16,888.6	16,488.6	15,788.6	14,688.6	13,188.6	11,288.6	9,088.6	6,888.6	4,688.6	2,488.6	(328.6)	(1,128.6)	(2,328.6)	(3,528.6)	(4,728.6)	

Table A17.2.3

Pro Forma Financial Statements (M Rs.)
Greater Kandy Water Supply Project (Feasibility Study) 3.0 % tariff increase in real terms

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Fixed Price Table																									
Annual Sales	3,792.0	4,286.3	4,867.7	5,515.1	6,248.7	7,079.7	8,021.3	9,088.2	10,296.9	11,666.4	13,218.0	14,976.0	16,967.8	19,224.5	21,781.4	24,678.3	27,960.5	31,679.3	35,892.6	40,666.4	46,075.0	52,203.0	59,146.0	67,012.4	
Subsidy from G.S.L.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (10% Interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	0.0	0.0	0.0	0.0	843.1	23,431.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,521.7	97,980.5	0.0	
Interest Payment (10%)	201.3	186.6	175.8	163.1	150.3	137.6	125.8	113.1	100.4	88.1	76.4	65.1	54.2	43.7	33.6	24.1	15.2	7.1	2.8	0.0	0.0	584.3	707.6	5,983.4	
Annual Loan Repayment	201.3	186.6	175.8	163.1	150.3	137.6	125.8	113.1	100.4	88.1	76.4	65.1	54.2	43.7	33.6	24.1	15.2	7.1	2.8	0.0	0.0	584.3	707.6	5,983.4	
O & M	1,308.5	1,439.4	1,583.3	1,741.7	1,915.8	2,107.4	2,318.2	2,550.0	2,803.6	3,085.5	3,394.0	3,733.4	4,103.8	4,517.5	4,980.2	5,496.1	6,070.5	6,719.7	7,451.9	8,275.4	9,202.6	10,246.6	11,421.9	12,745.9	
Overhead (10% of Sales)	379.2	428.6	486.8	551.5	624.9	708.0	802.1	908.8	1,029.7	1,166.6	1,321.8	1,497.6	1,696.8	1,922.5	2,178.1	2,467.8	2,796.1	3,167.9	3,589.3	4,066.6	4,607.5	5,220.3	5,914.6	6,701.2	
Net Cash Inflow	1,701.3	2,111.2	2,494.3	2,931.4	3,430.1	3,999.3	4,606.6	5,257.2	5,957.2	6,706.1	7,554.2	8,502.4	9,550.6	10,700.0	11,951.5	13,305.2	14,762.1	16,322.4	17,987.2	19,756.6	21,641.0	23,655.9	25,811.5	28,118.6	
Working Capital Burden																									
Cumulative Cash Deficit	2,675.4	4,786.7	7,281.0	10,212.4	13,642.5	17,641.8	22,248.3	26,424.4	31,446.0	36,952.2	43,014.3	49,684.2	56,923.8	64,700.9	73,081.1	82,027.1	91,502.5	101,582.3	112,241.6	123,566.4	135,541.0	148,160.0	161,428.7	175,351.8	
10% Interest on above	267.5	478.7	728.1	1,021.2	1,364.3	1,764.2	2,248.8	2,842.4	3,546.6	4,361.4	5,288.0	6,337.6	7,510.4	8,807.5	10,229.1	11,776.1	13,451.8	15,258.6	17,199.7	19,279.6	21,500.6	23,875.9	27,410.4	31,114.4	
Cum. Interest Payment	(5,802.9)	(5,324.2)	(4,596.1)	(3,574.9)	(2,310.7)	(946.5)	1,778.4	4,220.8	7,565.4	11,260.7	15,622.1	20,780.6	26,884.5	34,102.6	42,626.4	52,673.5	64,502.7	78,394.0	94,665.7	113,680.0	135,649.0	161,623.9	191,048.6	224,736.0	
Income Statement																									
Annual Sales	3,792.0	4,286.3	4,867.7	5,515.1	6,248.7	7,079.7	8,021.3	9,088.2	10,296.9	11,666.4	13,218.0	14,976.0	16,967.8	19,224.5	21,781.4	24,678.3	27,960.5	31,679.3	35,892.6	40,666.4	46,075.0	52,203.0	59,146.0	67,012.4	
O & M	1,308.5	1,439.4	1,583.3	1,741.7	1,915.8	2,107.4	2,318.2	2,550.0	2,803.6	3,085.5	3,394.0	3,733.4	4,103.8	4,517.5	4,980.2	5,496.1	6,070.5	6,719.7	7,451.9	8,275.4	9,202.6	10,246.6	11,421.9	12,745.9	
Overhead (10% of Sales)	379.2	428.6	486.8	551.5	624.9	708.0	802.1	908.8	1,029.7	1,166.6	1,321.8	1,497.6	1,696.8	1,922.5	2,178.1	2,467.8	2,796.1	3,167.9	3,589.3	4,066.6	4,607.5	5,220.3	5,914.6	6,701.2	
Annual Depreciation	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	215.8	
Interest Payment (10%)	201.3	186.6	175.8	163.1	150.3	137.6	125.8	113.1	100.4	88.1	76.4	65.1	54.2	43.7	33.6	24.1	15.2	7.1	2.8	0.0	0.0	584.3	707.6	5,983.4	
Net Income	1,667.1	2,022.9	2,406.0	2,843.0	3,341.8	3,910.9	4,496.8	5,191.1	5,931.6	6,720.6	7,654.2	8,732.6	9,956.0	11,326.3	12,843.7	14,506.0	16,324.2	18,298.3	20,439.3	22,748.3	25,226.5	27,875.7	30,707.6	33,731.6	
Balance Sheet																									
Cash	2,675.4	4,786.7	7,281.0	10,212.4	13,642.5	17,641.8	22,248.3	26,424.4	31,446.0	36,952.2	43,014.3	49,684.2	56,923.8	64,700.9	73,081.1	82,027.1	91,502.5	101,582.3	112,241.6	123,566.4	135,541.0	148,160.0	161,428.7	175,351.8	
Capital Investment	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	13,503.6	
Less Accum. Depreciation	3,604.2	3,820.0	4,035.9	4,251.7	4,467.6	4,683.4	4,920.6	5,131.1	5,345.6	5,553.1	5,763.6	5,977.0	6,193.3	6,412.5	6,634.6	6,859.6	7,087.5	7,318.3	7,552.0	7,788.6	8,028.1	8,270.4	8,515.5	8,763.4	
Land	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	114.5	
Total Assets	12,689.3	14,584.7	16,863.1	19,578.7	22,793.0	26,576.4	31,388.2	36,993.4	43,449.6	50,809.8	59,088.0	68,394.0	78,736.6	89,121.0	100,550.2	113,024.2	126,543.0	141,207.6	157,027.9	174,002.6	192,232.5	211,726.5	232,491.3	254,535.3	
Loan Balance	2,013.2	1,886.7	1,758.2	1,630.7	1,503.2	1,375.8	1,258.2	1,140.8	1,023.4	906.0	788.6	671.2	553.8	436.4	319.0	201.6	84.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Grant from G.S.L.	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	6,809.0	
Reserve Fund	3,867.1	5,889.0	8,295.9	11,138.9	14,480.7	18,319.6	22,658.4	27,497.2	32,836.0	38,674.8	45,013.6	51,852.4	59,191.2	67,030.0	75,468.8	84,507.6	94,146.4	104,385.2	115,224.0	126,762.8	138,901.6	151,640.4	164,979.2	178,918.0	
Total Liab. & Capital	12,689.3	14,584.7	16,863.1	19,578.7	22,793.0	26,576.4	31,388.2	36,993.4	43,449.6	50,809.8	59,088.0	68,394.0	78,736.6	89,121.0	100,550.2	113,024.2	126,543.0	141,207.6	157,027.9	174,002.6	192,232.5	211,726.5	232,491.3	254,535.3	

Table A17.2.4
Calculation of FIRR
Greater Kandy Water Supply Project (F/S)

(1998 Price)

Year	Water cum/d	Tariff Rs./cum	Revenue M Rs./y	Investment M Rs.	50% of Inv.		O&M		Cash Outflow M Rs.	Net Inflow M Rs.	FIRR
					M Rs.	M Rs.	M Rs.	M Rs.			
2001				313.00	156.50			0.00	156.50	(156.50)	
2002				1,126.00	563.00			0.00	563.00	(563.00)	
2003				1,540.00	770.00			0.00	770.00	(770.00)	
2004				1,841.00	920.50			0.00	920.50	(920.50)	
2005	19,547	16.43	117.20		0.00	81.39	17.58	98.97	98.97	18.23	
2006	20,196	16.92	124.72		0.00	82.49	18.71	101.20	101.20	23.52	
2007	20,502	17.43	130.41		0.00	82.49	19.56	102.05	102.05	28.36	
2008	20,808	17.95	136.32		0.00	82.49	20.45	102.94	102.94	33.39	
2009	20,808	18.49	140.41		0.00	82.49	21.06	103.55	103.55	36.86	
2010	20,808	19.04	144.63		0.00	82.49	21.69	104.18	104.18	40.44	
2011	20,808	19.61	148.96		0.00	82.49	22.34	104.83	104.83	44.13	
2012	20,808	20.20	153.43		0.00	82.49	23.02	105.51	105.51	47.93	
2013	20,808	20.81	158.04		0.00	82.49	23.71	106.20	106.20	51.84	
2014	20,808	21.43	162.78		0.00	82.49	24.42	106.91	106.91	55.87	
2015	20,808	22.08	167.66		0.00	82.49	25.15	107.64	107.64	60.02	
2016	20,808	22.74	172.69		0.00	82.49	25.90	108.39	108.39	64.30	
2017	20,808	23.42	177.87		0.00	82.49	26.68	109.17	109.17	68.70	
2018	20,808	24.12	183.21	30.00	15.00	82.49	27.48	124.97	124.97	58.24	
2019	20,808	24.85	188.70	758.00	379.00	82.49	28.31	489.80	489.80	(301.09)	
2020	20,808	25.59	194.37		0.00	82.49	29.15	111.64	111.64	82.72	
2021	20,808	26.36	200.20		0.00	82.49	30.03	112.52	112.52	87.68	
2022	20,808	27.15	206.20		0.00	82.49	30.93	113.42	113.42	92.78	
2023	20,808	27.96	212.39		0.00	82.49	31.86	114.35	114.35	98.04	
2024	20,808	28.80	218.76		0.00	82.49	32.81	115.30	115.30	103.46	
2025	20,808	29.67	225.32		0.00	82.49	33.80	116.29	116.29	109.03	
2026	20,808	30.56	232.08		0.00	82.49	34.81	117.30	117.30	114.78	
2027	20,808	31.47	239.04		0.00	82.49	35.86	118.35	118.35	120.70	
2028	20,808	32.42	246.22		0.00	82.49	36.93	119.42	119.42	126.79	
2029	20,808	33.39	253.60		0.00	82.49	38.04	120.53	120.53	133.07	
2030	20,808	34.39	261.21		0.00	82.49	39.18	121.67	121.67	139.54	
2031	20,808	35.42	269.05		0.00	82.49	40.36	122.85	122.85	146.20	
2032	20,808	36.49	277.12		0.00	82.49	41.57	124.06	124.06	153.06	
2033	20,808	37.58	285.43	30.00	15.00	82.49	42.81	140.30	140.30	145.13	
2034	20,808	38.71	293.99	758.00	379.00	82.49	44.10	505.59	505.59	(211.59)	
2035	20,808	39.87	302.81		0.00	82.49	45.42	127.91	127.91	174.90	
2036	20,808	41.07	311.90		0.00	82.49	46.78	129.27	129.27	182.62	
2037	20,808	42.30	321.26		0.00	82.49	48.19	130.68	130.68	190.58	
2038	20,808	43.57	330.89		0.00	82.49	49.63	132.12	132.12	198.77	
2039	20,808	44.87	340.82		0.00	82.49	51.12	133.61	133.61	207.21	
2040	20,808	46.22	351.05		0.00	82.49	52.66	135.15	135.15	215.90	
2041	20,808	47.61	361.58		0.00	82.49	54.24	136.73	136.73	224.85	
2042	20,808	49.04	372.42		0.00	82.49	55.86	138.35	138.35	234.07	
2043	20,808	50.51	383.60		0.00	82.49	57.54	140.03	140.03	243.57	
2044	20,808	52.02	395.10		0.00	82.49	59.27	141.76	141.76	253.35	
2045	20,808	53.58	406.96		0.00	82.49	61.04	143.53	143.53	263.42	
2046	20,808	55.19	419.17		0.00	82.49	62.87	145.36	145.36	273.80	
2047	20,808	56.85	431.74		0.00	82.49	64.76	147.25	147.25	284.49	
2048	20,808	58.55	444.69	30.00	15.00	82.49	66.70	164.19	164.19	280.50	
2049	20,808	60.31	458.03	758.00	379.00	82.49	68.71	530.20	530.20	(72.16)	
2050	20,808	62.12	471.78	(931.00)	(465.50)	82.49	70.77	(312.24)	(312.24)	784.02	2.71%

Note: 3.0% annual tariff increase in real terms is assumed.

Investment Costs in 2050 are assumed salvage value.

Appendix 17.3 Sewerage Project - Financial Analysis Calculation

- Appendix 17.3.1 Pro-forma Financial Statements**
- Kandy Sewerage Project (Master Plan, Case A-1)
- Appendix 17.3.2 Calculation of FIRR**
- Kandy Sewerage Project (Master Plan, Case A-1)
- Appendix 17.3.3 Pro-forma Financial Statements**
- Kandy Sewerage Project (Master Plan, Case A-2)
- Appendix 17.3.4 Calculation of FIRR**
- Kandy Sewerage Project (Master Plan, Case A-2)
- Appendix 17.3.5 Pro-forma Financial Statements**
- Kandy Sewerage Project (Feasibility Study, Case A-1)
- Appendix 17.3.6 Calculation of FIRR**
- Kandy Sewerage Project (Feasibility Study, Case A-1)
- Appendix 17.3.7 Pro-forma Financial Statements**
- Kandy Sewerage Project (Feasibility Study, Case A-2)
- Appendix 17.3.8 Calculation of FIRR**
- Kandy Sewerage Project (Feasibility Study, Case A-2)

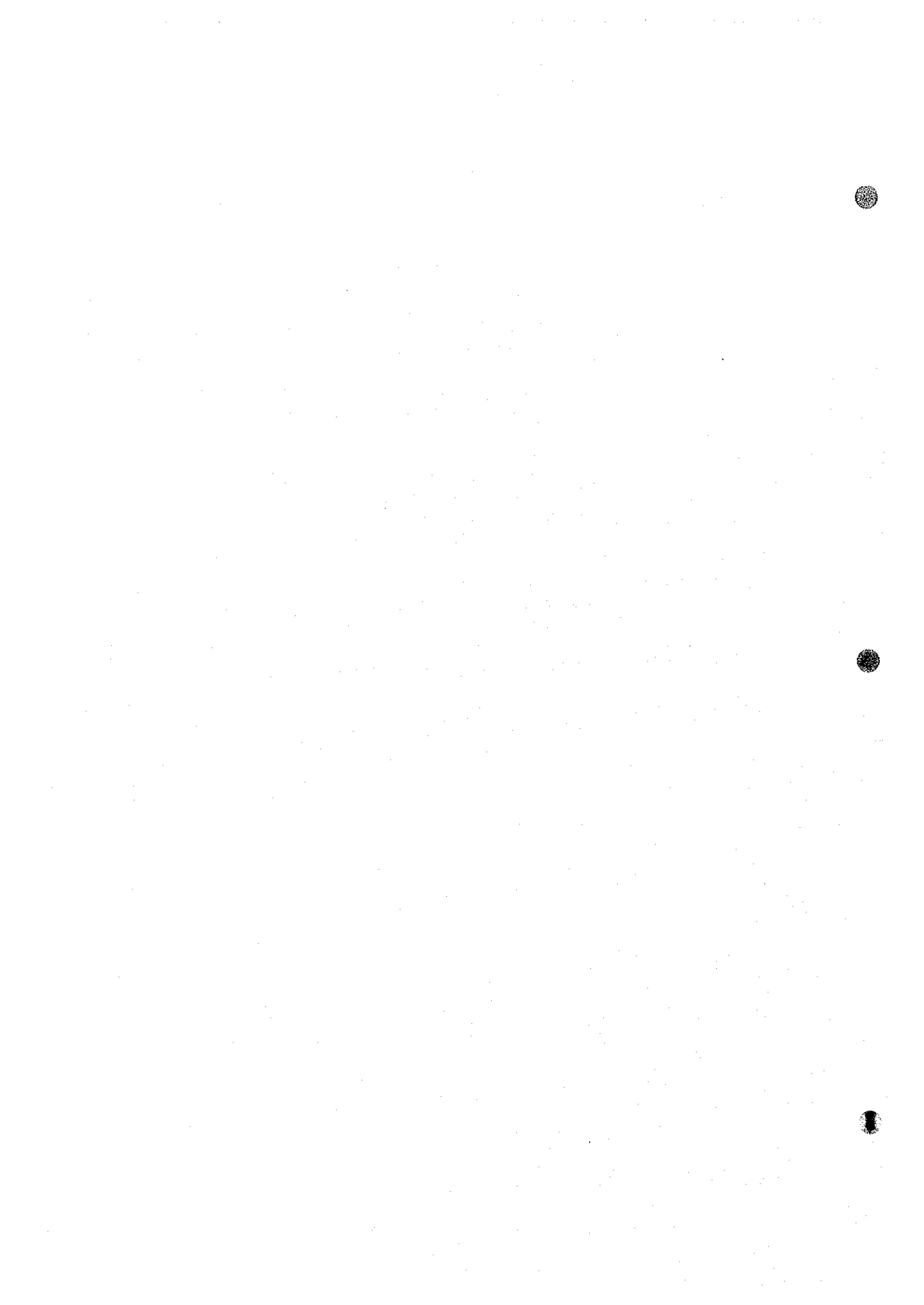


Table A17.3.1

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (M/P)

Case A-1 100 % subsidy
1.0 % tariff increase in real terms

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Fund Flow Table																												
Annual Sales	0.0	0.0	0.0	4.8	10.9	18.6	28.3	32.2	36.6	41.6	47.3	53.7	61.0	79.9	99.4	121.9	148.2	167.9	190.3	215.6	246.7	276.9	313.8	355.6	396.7	440.7		
Subsidy from GSL	0.0	356.7	689.6	1,563.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	262.4	1,488.2	3,383.6	0.0	0.0	0.0	1,924.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (10% Interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	356.7	689.6	1,563.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	262.4	1,488.2	3,383.6	0.0	0.0	0.0	1,924.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Annual Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
O & M	0.0	0.0	0.0	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	86.6	108.4	131.3	157.7	178.5	190.9	209.9	230.9	254.0	279.4	307.4	338.1	371.9		
Overhead (10 % of Sales)	0.0	0.0	0.0	0.5	1.1	1.9	2.8	3.2	3.7	4.2	4.7	5.4	6.1	8.0	9.9	12.2	14.8	16.8	19.0	21.6	24.7	27.7	31.4	35.6	39.7	44.1		
Net Cash Inflow	0.0	0.0	0.0	(7.5)	(6.9)	(6.1)	(4.6)	(4.1)	(3.4)	(2.5)	(1.4)	(0.0)	1.7	(16.8)	(19.0)	(21.6)	(24.4)	(22.4)	(19.6)	(15.9)	(8.9)	(4.8)	3.0	12.7	18.9	24.7		
Working Capital Burden																												
Cumulative cash deficit	0.0	0.0	0.0	(7.5)	(14.2)	(20.3)	(24.9)	(29.0)	(32.9)	(34.8)	(36.2)	(36.2)	(34.5)	(51.3)	(70.3)	(91.9)	(116.5)	(138.7)	(158.2)	(174.1)	(183.0)	(187.8)	(187.8)	(184.8)	(172.2)	(153.2)	(128.5)	
10% interest on above	0.0	0.0	0.0	(0.7)	(1.4)	(2.0)	(2.5)	(2.9)	(3.2)	(3.5)	(3.6)	(3.6)	(3.5)	(5.1)	(7.0)	(9.2)	(11.5)	(13.9)	(15.8)	(17.4)	(18.3)	(18.8)	(18.8)	(18.5)	(17.2)	(15.3)	(12.8)	
Cum. Interest Payment	0.0	0.0	0.0	(0.7)	(2.2)	(4.2)	(6.7)	(9.6)	(12.8)	(16.5)	(19.9)	(23.5)	(27.0)	(32.1)	(39.2)	(48.3)	(59.0)	(73.8)	(89.7)	(107.1)	(125.4)	(144.2)	(162.6)	(179.9)	(195.2)	(208.0)		
Income Statement																												
Annual Sales	0.0	0.0	0.0	4.8	10.9	18.6	28.3	32.2	36.6	41.6	47.3	53.7	61.0	79.9	99.4	121.9	148.2	167.9	190.3	215.6	246.7	276.9	313.8	355.6	396.7	440.7		
O & M	0.0	0.0	0.0	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	86.6	108.4	131.3	157.7	178.5	190.9	209.9	230.9	254.0	279.4	307.4	338.1	371.9		
Overhead (10 % of Sales)	0.0	0.0	0.0	0.5	1.1	1.9	2.8	3.2	3.7	4.2	4.7	5.4	6.1	8.0	9.9	12.2	14.8	16.8	19.0	21.6	24.7	27.7	31.4	35.6	39.7	44.1		
Annual Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net Income	0.0	0.0	0.0	(7.5)	(6.9)	(6.1)	(4.6)	(4.1)	(3.4)	(2.5)	(1.4)	(0.0)	1.7	(16.8)	(19.0)	(21.6)	(24.4)	(22.4)	(19.6)	(15.9)	(8.9)	(4.8)	3.0	12.7	18.9	24.7		
Balance Sheet																												
Cash	0.0	0.0	0.0	(7.5)	(14.2)	(20.3)	(24.9)	(29.0)	(32.9)	(34.8)	(36.2)	(36.2)	(34.5)	(51.3)	(70.3)	(91.9)	(116.5)	(138.7)	(158.2)	(174.1)	(183.0)	(187.8)	(187.8)	(184.8)	(172.2)	(153.2)	(128.5)	
Capital Investment	145.7	833.3	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,590.5	4,048.7	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	9,356.3	9,356.3	9,356.3	9,356.3	9,356.3	9,356.3	9,356.3	9,356.3	9,356.3	
Less Accum. Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Land	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	
Total Assets	356.7	1,046.3	2,610.1	2,602.8	2,599.9	2,589.8	2,585.2	2,581.1	2,577.8	2,575.3	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	
Loan Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Grant from GSL	356.7	1,046.3	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	
Reserved Fund	0.0	0.0	0.0	(7.5)	(14.2)	(20.3)	(24.9)	(29.0)	(32.9)	(34.8)	(36.2)	(36.2)	(34.5)	(51.3)	(70.3)	(91.9)	(116.5)	(138.7)	(158.2)	(174.1)	(183.0)	(187.8)	(187.8)	(184.8)	(172.2)	(153.2)	(128.5)	
Total Liab. & Capital	356.7	1,046.3	2,610.1	2,602.8	2,599.9	2,589.8	2,585.2	2,581.1	2,577.8	2,575.3	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	2,573.5	

Table A17.3.1

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (M/P)

Case A-1 100 % subsidy
1.0 % tariff increase in real terms

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Fund Flow Table																								
Annual Sales	489.7	544.0	604.4	671.5	746.0	828.8	920.8	1,023.0	1,136.6	1,262.8	1,402.9	1,558.6	1,731.7	1,923.9	2,137.4	2,374.7	2,638.3	2,931.1	3,256.5	3,617.9	4,019.5	4,465.7	4,961.4	5,512.1
Subsidy from CSL	0.0	5,008.0	0.0	0.0	0.0	0.0	8,037.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20,919.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loan (10% Interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital Investment	0.0	5,008.0	0.0	0.0	0.0	0.0	8,037.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20,919.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Annual Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O & M	409.1	450.0	495.0	544.5	599.0	658.9	724.8	797.2	877.0	964.7	1,061.1	1,167.2	1,284.0	1,412.4	1,553.6	1,709.0	1,879.8	2,067.8	2,274.6	2,502.1	2,752.3	3,027.5	3,330.3	3,663.3
Overhead (10% of Sales)	49.0	54.4	60.4	67.1	74.6	82.9	92.1	102.3	113.7	126.5	140.3	155.9	173.2	192.4	213.7	237.5	263.8	293.1	325.6	361.8	402.0	446.6	491.1	541.2
Net Cash Inflow	31.6	39.6	48.9	59.8	72.4	87.1	104.0	123.5	146.0	171.8	201.5	235.5	274.5	319.1	370.1	428.3	494.6	570.2	656.2	754.1	865.3	991.6	1,135.0	1,297.6
Working Capital Burden																								
Cumulative cash deficit	(96.9)	(57.3)	(8.4)	51.4	123.9	210.9	314.9	438.4	584.4	756.2	957.7	1,193.3	1,467.8	1,786.9	2,157.0	2,585.3	3,079.9	3,650.1	4,306.3	5,052.6	5,925.6	6,917.2	8,052.2	9,349.8
10% Interest on above	(8.7)	(5.7)	(0.8)	5.1	12.4	21.1	31.5	43.8	58.4	75.6	95.8	119.3	146.8	178.7	215.7	258.5	308.0	365.0	430.6	506.0	592.6	691.7	805.2	935.0
Cum. Interest Payment	(217.7)	(223.5)	(224.5)	(213.1)	(206.8)	(185.7)	(154.2)	(110.3)	(51.9)	23.7	119.5	238.8	385.6	564.3	780.0	1,038.5	1,346.5	1,711.5	2,142.2	2,648.2	3,240.8	3,932.5	4,737.7	5,674.7
Income Statement																								
Annual Sales	489.7	544.0	604.4	671.5	746.0	828.8	920.8	1,023.0	1,136.6	1,262.8	1,402.9	1,558.6	1,731.7	1,923.9	2,137.4	2,374.7	2,638.3	2,931.1	3,256.5	3,617.9	4,019.5	4,465.7	4,961.4	5,512.1
O & M	409.1	450.0	495.0	544.5	599.0	658.9	724.8	797.2	877.0	964.7	1,061.1	1,167.2	1,284.0	1,412.4	1,553.6	1,709.0	1,879.8	2,067.8	2,274.6	2,502.1	2,752.3	3,027.5	3,330.3	3,663.3
Overhead (10% of Sales)	49.0	54.4	60.4	67.1	74.6	82.9	92.1	102.3	113.7	126.5	140.3	155.9	173.2	192.4	213.7	237.5	263.8	293.1	325.6	361.8	402.0	446.6	491.1	541.2
Annual Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Income	31.6	39.6	48.9	59.8	72.4	87.1	104.0	123.5	146.0	171.8	201.5	235.5	274.5	319.1	370.1	428.3	494.6	570.2	656.2	754.1	865.3	991.6	1,135.0	1,297.6
Balance Sheet																								
Cash	(96.9)	(57.3)	(8.4)	51.4	123.9	210.9	314.9	438.4	584.4	756.2	957.7	1,193.3	1,467.8	1,786.9	2,157.0	2,585.3	3,079.9	3,650.1	4,306.3	5,052.6	5,925.6	6,917.2	8,052.2	9,349.8
Capital Investment	9,565.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3	14,564.3
Less Accum. Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0
Total Assets	9,541.5	14,589.0	14,698.0	14,697.8	14,702.0	14,857.3	15,098.6	15,322.1	15,660.0	16,111.4	16,776.9	17,586.9	18,551.4	19,686.9	20,917.0	22,747.6	25,206.9	28,385.1	32,348.5	37,206.5	43,052.6	49,994.2	58,129.2	67,526.8
Loan Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grant from CSL	9,638.4	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3	14,646.3
Reserve Fund	(96.9)	(57.3)	(8.4)	51.4	123.9	210.9	314.9	438.4	584.4	756.2	957.7	1,193.3	1,467.8	1,786.9	2,157.0	2,585.3	3,079.9	3,650.1	4,306.3	5,052.6	5,925.6	6,917.2	8,052.2	9,349.8
Total Lib. & Capital	9,541.5	14,589.0	14,698.0	14,697.8	14,702.0	14,857.3	15,098.6	15,322.1	15,660.0	16,111.4	16,776.9	17,586.9	18,551.4	19,686.9	20,917.0	22,747.6	25,206.9	28,385.1	32,348.5	37,206.5	43,052.6	49,994.2	58,129.2	67,526.8

Table A17.3.2
Calculation of FIRR
Kandy Sewerage Project (M/P)
Case A-1

(1998 Price)

Year	Volume		Tariff		Revenue			Investment	O&M	OH10%	Net Inflow	FIRR
	Dom cum/d	Non-Dom cum/d	Dom Rs./cum	Non-Dom Rs./cum	Dom M Rs./Y	Non-Dom M Rs./Y	Total M Rs./Y					
2000												
2001								268.0			0.00	
2002								471.0			0.00	
2003								971.0			0.00	
2004	404	1,102	2.0	6.0	0.3	2.4	2.7		6.56	0.27	(4.12)	
2005	829	2,259	2.0	6.1	0.6	5.0	5.6		8.61	0.56	(3.56)	
2006	1,273	3,469	2.0	6.1	0.9	7.7	8.7		10.67	0.87	(2.84)	
2007	1,737	4,736	2.1	6.2	1.3	10.7	12.0		12.73	1.20	(1.94)	
2008	1,779	4,850	2.1	6.2	1.4	11.1	12.4		12.73	1.24	(1.57)	
2009	1,822	4,966	2.1	6.3	1.4	11.4	12.8		12.73	1.28	(1.18)	
2010	1,866	5,086	2.1	6.4	1.4	11.8	13.3		12.73	1.33	(0.79)	
2011	1,907	5,198	2.1	6.4	1.5	12.2	13.7	76.0	12.73	1.37	(0.40)	
2012	1,949	5,312	2.2	6.5	1.5	12.6	14.1	384.0	12.73	1.41	(0.01)	
2013	1,991	5,429	2.2	6.6	1.6	13.0	14.6	810.0	12.73	1.46	0.40	
2014	2,941	6,204	2.2	6.6	2.4	15.0	17.4		19.29	1.74	(3.65)	
2015	3,828	6,770	2.2	6.7	3.1	16.5	19.7		21.45	1.97	(3.76)	
2016	4,679	7,326	2.3	6.8	3.8	18.1	21.9		23.62	2.19	(3.89)	
2017	5,549	7,871	2.3	6.8	4.6	19.6	24.2		25.79	2.42	(3.98)	
2018	5,660	8,028	2.3	6.9	4.7	20.2	25.0	286.0	25.79	2.50	(3.33)	
2019	5,774	8,189	2.3	7.0	4.9	20.8	25.7		25.79	2.57	(2.65)	
2020	5,889	8,352	2.3	7.0	5.0	21.4	26.5		25.79	2.65	(1.95)	
2021	6,007	8,619	2.4	7.1	5.2	22.4	27.5		25.79	2.75	(1.00)	
2022	6,127	8,690	2.4	7.2	5.4	22.8	28.1		25.79	2.81	(0.49)	
2023	6,250	8,864	2.4	7.2	5.5	23.5	29.0		25.79	2.90	0.28	
2024	6,375	9,041	2.4	7.3	5.7	24.2	29.8		25.79	2.98	1.06	
2025	6,401	9,078	2.5	7.4	5.8	24.5	30.3		25.79	3.03	1.44	
2026	6,401	9,078	2.5	7.5	5.8	24.7	30.6		25.79	3.06	1.72	
2027	6,401	9,078	2.5	7.5	5.9	25.0	30.9		25.79	3.09	1.99	
2028	6,401	9,078	2.5	7.6	5.9	25.2	31.2	287.0	25.79	3.12	2.27	
2029	6,401	9,078	2.6	7.7	6.0	25.5	31.5		25.79	3.15	2.55	
2030	6,401	9,078	2.6	7.8	6.1	25.8	31.8		25.79	3.18	2.83	
2031	6,401	9,078	2.6	7.8	6.1	26.0	32.1		25.79	3.21	3.12	
2032	6,401	9,078	2.6	7.9	6.2	26.3	32.4		25.79	3.24	3.41	
2033	6,401	9,078	2.7	8.0	6.2	26.5	32.8	286.0	25.79	3.28	3.70	
2034	6,401	9,078	2.7	8.1	6.3	26.8	33.1		25.79	3.31	4.00	
2035	6,401	9,078	2.7	8.2	6.4	27.1	33.4		25.79	3.34	4.29	
2036	6,401	9,078	2.7	8.2	6.4	27.3	33.8		25.79	3.38	4.59	
2037	6,401	9,078	2.8	8.3	6.5	27.6	34.1		25.79	3.41	4.90	
2038	6,401	9,078	2.8	8.4	6.6	27.9	34.4		25.79	3.44	5.20	
2039	6,401	9,078	2.8	8.5	6.6	28.2	34.8		25.79	3.48	5.51	
2040	6,401	9,078	2.9	8.6	6.7	28.4	35.1		25.79	3.51	5.83	
2041	6,401	9,078	2.9	8.7	6.8	28.7	35.5		25.79	3.55	6.14	
2042	6,401	9,078	2.9	8.8	6.8	29.0	35.8		25.79	3.58	6.46	
2043	6,401	9,078	2.9	8.8	6.9	29.3	36.2	287.0	25.79	3.62	6.79	
2044	6,401	9,078	3.0	8.9	7.0	29.6	36.6		25.79	3.66	7.11	
2045	6,401	9,078	3.0	9.0	7.0	29.9	36.9		25.79	3.69	7.44	
2046	6,401	9,078	3.0	9.1	7.1	30.2	37.3		25.79	3.73	7.77	
2047	6,401	9,078	3.1	9.2	7.2	30.5	37.7		25.79	3.77	8.11	
2048	6,401	9,078	3.1	9.3	7.2	30.8	38.0	286.0	25.79	3.80	8.45	
2049	6,401	9,078	3.1	9.4	7.3	31.1	38.4		25.79	3.84	8.79	
2050	6,401	9,078	3.2	9.5	7.4	31.4	38.8	(406.0)	25.79	3.88	9.14	4.42%

- Note: 1. 1 % annual tariff increase in real terms.
2. Unit tariff of Non Domestic User is 3 times of Domestic User.
3. 100 % subsidy for capital investment.
4. Overhead is assumed to be 10% of Revenue.
5. Investment Cost in 2050 is assumed salvage value.

Table A17.3.3

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (M/P)

Case A-2.90 % subsidy
1.0 % tariff increase in real terms

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Fund Flow Table																												
Annual Sales	0.0	0.0	0.0	0.0	7.6	17.4	29.7	45.1	51.3	58.3	66.4	75.4	85.6	97.2	125.8	155.1	188.9	228.2	258.5	293.0	332.0	380.1	426.4	483.2	547.6	610.8	678.6	
Subsidy from CSL	0.0	32.0	620.6	1,407.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	236.1	1,312.4	3,046.2	0.0	0.0	0.0	0.0	1,731.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (10% Interest)	0.0	35.7	69.0	156.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.2	145.8	338.4	0.0	0.0	0.0	0.0	192.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital Investment	0.0	356.7	689.6	1,563.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	262.4	1,458.2	3,343.6	0.0	0.0	0.0	0.0	1,924.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Payment (10%)	0.0	3.6	10.5	25.9	25.5	24.3	23.1	21.9	20.7	19.5	18.3	19.8	33.2	65.7	63.7	60.2	56.7	53.2	68.0	65.4	61.1	56.7	52.3	47.9	43.5	39.3	35.4	
Annual Loan Repayment	0.0	0.0	0.0	0.0	1.6	4.8	11.9	11.9	11.9	11.9	11.9	11.9	11.9	13.1	19.7	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	43.8	43.8	42.2	39.1	
O & M	0.0	0.0	0.0	0.0	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	58.6	108.4	131.3	157.7	173.5	190.9	209.9	230.9	254.0	279.4	307.4	338.1	371.9	
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	0.8	1.7	3.0	4.5	5.1	5.8	6.6	7.5	8.6	9.7	12.6	15.5	18.9	22.6	25.9	29.3	33.2	38.0	42.6	48.3	54.8	61.1	67.9	
Net Cash Inflow	0.0	(3.6)	(10.5)	(27.6)	(34.2)	(35.5)	(28.1)	(18.7)	(14.5)	(9.4)	(3.8)	(0.2)	(7.8)	(34.6)	(46.2)	(48.6)	(34.2)	(17.9)	(19.0)	1.6	17.2	48.7	76.3	112.1	152.8	191.2	232.3	
Working Capital Burden																												
Cumulative cash deficit	(3.6)	(14.0)	(41.6)	(75.8)	(111.3)	(139.4)	(158.1)	(158.1)	(172.4)	(181.6)	(185.6)	(185.6)	(195.6)	(228.4)	(274.6)	(323.2)	(357.4)	(375.2)	(394.2)	(392.6)	(375.4)	(328.7)	(250.4)	(138.4)	14.5	205.7	438.0	
10% interest on above	(0.4)	(1.4)	(4.2)	(7.6)	(11.1)	(13.9)	(15.9)	(17.2)	(18.6)	(19.4)	(19.6)	(19.6)	(20.6)	(22.6)	(27.5)	(32.3)	(35.7)	(37.5)	(39.4)	(39.3)	(37.5)	(32.7)	(25.0)	(13.8)	1.4	20.6	45.8	
Cum. Interest Payment	0.4	1.0	3.1	(4.5)	(15.6)	(29.5)	(45.5)	(62.6)	(80.6)	(98.5)	(117.5)	(137.5)	(157.5)	(180.1)	(216.6)	(255.6)	(295.6)	(333.1)	(362.0)	(371.8)	(408.3)	(442.0)	(467.1)	(480.9)	(479.4)	(458.9)	(415.1)	
Income Statement																												
Annual Sales	0.0	0.0	0.0	0.0	7.6	17.4	29.7	45.1	51.3	58.3	66.4	75.4	85.6	97.2	125.8	155.1	188.9	228.2	258.5	293.0	332.0	380.1	426.4	483.2	547.6	610.8	678.6	
O & M	0.0	0.0	0.0	0.0	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	58.6	108.4	131.3	157.7	173.5	190.9	209.9	230.9	254.0	279.4	307.4	338.1	371.9	
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	0.8	1.7	3.0	4.5	5.1	5.8	6.6	7.5	8.6	9.7	12.6	15.5	18.9	22.6	25.9	29.3	33.2	38.0	42.6	48.3	54.8	61.1	67.9	
Annual Depreciation	0.0	0.3	1.7	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	7.0	9.9	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	
Interest Payment (10%)	0.0	3.6	10.5	25.9	25.5	24.3	23.1	21.9	20.7	19.5	18.3	19.8	33.2	65.7	63.7	60.2	56.7	53.2	68.0	65.4	61.1	56.7	52.3	47.9	43.5	39.3	35.4	
Net Income	0.0	(3.9)	(12.1)	(32.5)	(36.6)	(32.0)	(25.8)	(17.5)	(14.2)	(9.9)	(5.1)	(2.9)	(14.4)	(53.1)	(60.6)	(50.7)	(39.7)	(27.9)	(41.4)	(24.2)	(3.8)	22.9	45.8	75.9	110.3	140.7	171.8	
Balance Sheet																												
Cash	(3.6)	(14.0)	(41.6)	(75.8)	(111.3)	(139.4)	(158.1)	(158.1)	(172.4)	(181.6)	(185.6)	(185.6)	(195.6)	(228.4)	(274.6)	(323.2)	(357.4)	(375.2)	(394.2)	(392.6)	(375.4)	(328.7)	(250.4)	(138.4)	14.5	205.7	438.0	
Capital Investment	143.7	833.3	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,397.1	2,590.5	4,048.7	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3	7,432.3
Less Accum. Depreciation	0.3	2.0	8.5	15.1	21.7	28.3	34.8	41.4	48.0	54.6	61.2	71.4	93.1	114.7	136.4	158.0	180.0	202.0	224.0	246.0	268.0	290.0	312.0	334.0	356.0	378.0	400.0	
Land	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0
Total Assets	352.9	1,030.3	2,560.0	2,519.2	2,477.1	2,442.4	2,417.2	2,396.3	2,380.3	2,370.0	2,362.2	2,354.2	2,346.2	2,338.2	2,330.2	2,322.2	2,314.2	2,306.2	2,298.2	2,290.2	2,282.2	2,274.2	2,266.2	2,258.2	2,250.2	2,242.2	2,234.2	
Loan Balance	35.7	104.6	259.4	546.6	941.7	1,349.1	1,749.1	2,149.1	2,549.1	2,949.1	3,349.1	3,749.1	4,149.1	4,549.1	4,949.1	5,349.1	5,749.1	6,149.1	6,549.1	6,949.1	7,349.1	7,749.1	8,149.1	8,549.1	8,949.1	9,349.1	9,749.1	
Grant from CSL	33.0	94.7	234.9	484.5	734.1	983.7	1,233.3	1,482.9	1,732.5	1,982.1	2,231.7	2,481.3	2,730.9	3,020.5	3,310.1	3,600.0	3,890.0	4,180.0	4,470.0	4,760.0	5,050.0	5,340.0	5,630.0	5,920.0	6,210.0	6,500.0	6,790.0	
Reserve Fund	(3.9)	(16.0)	(48.5)	(84.5)	(114.7)	(137.6)	(161.1)	(185.2)	(209.8)	(234.9)	(260.5)	(286.6)	(313.2)	(340.4)	(368.1)	(396.4)	(425.2)	(454.5)	(484.3)	(514.6)	(545.4)	(576.7)	(608.5)	(640.8)	(673.6)	(706.9)	(740.7)	
Total Lib. & Capital	352.9	1,030.3	2,560.0	2,519.2	2,477.1	2,442.4	2,417.2	2,396.3	2,380.3	2,370.0	2,362.2	2,354.2	2,346.2	2,338.2	2,330.2	2,322.2	2,314.2	2,306.2	2,298.2	2,290.2	2,282.2	2,274.2	2,266.2	2,258.2	2,250.2	2,242.2	2,234.2	

Table A17.3.3

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (M/P)

Case A-2 90 % subsidy
1.0 % tariff increase in real terms

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Fund Flow Table																									
Annual Sales	754.0	837.7	990.6	1,039.9	1,148.7	1,276.2	1,417.9	1,575.3	1,750.1	1,944.4	2,160.2	2,400.0	2,666.4	2,962.4	3,291.2	3,656.5	4,062.4	4,513.3	5,014.3	5,570.9	6,189.2	6,876.3	7,639.5	8,487.5	
Subsidy from CSL	0.0	4,507.2	0.0	0.0	0.0	0.0	7,233.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18,827.6	0.0	0.0	0.0	0.0	30,216.4	0.0	0.0	
Loan (10% Interest)	0.0	500.8	0.0	0.0	0.0	0.0	803.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,092.0	0.0	0.0	0.0	0.0	3,357.4	0.0	0.0	
Capital Investment	0.0	5,008.0	0.0	0.0	0.0	0.0	8,037.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20,919.6	0.0	0.0	0.0	0.0	35,573.8	0.0	0.0	
Interest Payment (10%)	32.2	79.1	75.9	70.4	65.0	59.5	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	
Annual Loan Repayment	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	
O & M	489.1	450.0	495.0	543.5	598.0	658.9	724.8	797.2	877.0	964.7	1,061.1	1,167.2	1,284.0	1,412.4	1,553.6	1,709.0	1,879.8	2,067.8	2,274.6	2,502.1	2,752.3	3,027.5	3,330.3	3,663.3	
Overhead (10% of Sales)	75.4	83.8	93.1	103.4	114.9	127.6	141.8	157.5	175.0	194.4	216.0	240.0	266.6	296.2	329.1	365.7	406.2	451.3	501.4	557.1	618.9	687.6	764.0	848.8	
Net Cash Inflow	280.7	276.6	327.8	364.3	430.1	503.1	594.4	693.2	784.7	863.2	926.3	1,066.7	1,223.2	1,397.6	1,592.0	1,816.6	2,068.3	2,341.2	2,631.8	2,949.9	3,298.8	3,681.5	4,094.4	4,539.4	
Working Capital Burden																									
Cumulative cash deficit	718.7	995.2	1,323.0	1,687.5	2,117.3	2,620.5	3,124.5	3,718.9	4,382.1	5,166.8	6,093.1	7,159.8	8,383.0	9,780.6	11,372.6	13,189.3	15,087.6	17,154.8	19,486.6	22,162.9	25,222.8	28,674.2	32,001.6	36,022.0	
10% interest on above	71.9	89.5	132.3	168.7	211.7	262.0	312.4	371.9	438.2	516.7	609.5	716.0	838.3	978.1	1,137.3	1,318.9	1,509.8	1,715.5	1,948.7	2,216.3	2,522.5	2,877.4	3,200.2	3,602.2	
Cash Interest Payment	(345.2)	(245.7)	(111.4)	57.3	260.1	531.1	843.6	1,215.5	1,653.7	2,170.3	2,779.6	3,495.6	4,333.9	5,312.0	6,449.2	7,788.2	9,271.9	10,987.4	12,936.1	15,152.4	17,674.7	20,512.1	23,712.2	27,314.4	
Income Statement																									
Annual Sales	754.0	837.7	990.6	1,039.9	1,148.7	1,276.2	1,417.9	1,575.3	1,750.1	1,944.4	2,160.2	2,400.0	2,666.4	2,962.4	3,291.2	3,656.5	4,062.4	4,513.3	5,014.3	5,570.9	6,189.2	6,876.3	7,639.5	8,487.5	
O & M	409.1	450.0	495.0	544.5	599.0	658.9	724.8	797.2	877.0	964.7	1,061.1	1,167.2	1,284.0	1,412.4	1,553.6	1,709.0	1,879.8	2,067.8	2,274.6	2,502.1	2,752.3	3,027.5	3,330.3	3,663.3	
Overhead (10% of Sales)	75.4	83.8	93.1	103.4	114.9	127.6	141.8	157.5	175.0	194.4	216.0	240.0	266.6	296.2	329.1	365.7	406.2	451.3	501.4	557.1	618.9	687.6	764.0	848.8	
Annual Depreciation	31.6	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	
Interest Payment (10%)	32.2	79.1	75.9	70.4	65.0	59.5	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	54.7	
Net Income	205.6	167.8	209.6	258.6	312.9	373.2	439.2	505.8	580.5	663.2	756.3	866.3	994.7	1,141.4	1,308.6	1,498.8	1,716.9	1,968.3	2,257.3	2,587.8	2,961.9	3,374.1	3,828.7	4,329.9	
Balance Sheet																									
Cash	718.7	995.2	1,323.0	1,687.5	2,117.3	2,620.5	3,124.5	3,718.9	4,382.1	5,166.8	6,093.1	7,159.8	8,383.0	9,780.6	11,372.6	13,189.3	15,087.6	17,154.8	19,486.6	22,162.9	25,222.8	28,674.2	32,001.6	36,022.0	
Capital Investment	9,356.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	14,364.3	
Less Accum. Depreciation	489.9	552.9	698.9	866.9	1,066.9	1,298.9	1,566.9	1,872.9	2,218.9	2,606.9	3,036.9	3,508.9	4,022.9	4,578.9	5,176.9	5,816.9	6,500.9	7,222.9	7,984.9	8,788.9	9,636.9	10,522.9	11,448.9	12,416.9	
Land	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	282.0	
Total Assets	9,861.1	15,088.7	15,359.4	15,666.7	16,039.7	16,485.9	16,929.4	17,452.0	17,955.1	18,530.9	19,180.9	19,906.9	20,718.9	21,618.9	22,608.9	23,689.9	24,864.9	26,136.9	27,508.9	28,984.9	30,569.9	32,268.9	34,086.9	36,032.0	
Loan Balance	322.2	791.1	759.1	704.4	649.7	595.0	540.4	485.7	431.0	376.3	321.6	266.9	212.2	157.5	102.8	48.1	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Grant from CSL	8,674.5	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	13,181.7	
Reserved Fund	864.3	1,115.9	1,418.6	1,780.6	2,208.3	2,709.2	3,170.1	3,721.5	4,376.9	5,147.3	6,049.9	7,089.9	8,274.4	9,623.9	11,148.6	12,982.7	15,166.5	17,746.8	20,780.9	24,329.4	28,452.9	33,148.4	38,581.2	44,871.5	
Total Liab. & Capital	9,861.1	15,088.7	15,359.4	15,666.7	16,039.7	16,485.9	16,929.4	17,452.0	17,955.1	18,530.9	19,180.9	19,906.9	20,718.9	21,618.9	22,608.9	23,689.9	24,864.9	26,136.9	27,508.9	28,984.9	30,569.9	32,268.9	34,086.9	36,032.0	

Table A17.3.4
Calculation of FIRR
Kandy Sewcrage Project (M/P)
Case A-2

(1998 Price)

Year	Volume		Tariff		Revenue			Investment	10% of Inv.	O&M	OII 10%	Net Inflow	FIRR
	Dom	Non-Dom	Dom	Non-Dom	Dom	Non-Dom	Total						
	cum/d	cum/d	Rs./cum	Rs./cum	M Rs./Y	M Rs./Y	M Rs./Y	M Rs	M Rs	M Rs	M Rs	M Rs	
2000													
2001								268.0	26.8			(26.8)	
2002								471.0	47.1			(47.1)	
2003								971.0	97.1			(97.1)	
2004	404	1,102	2.0	10.0	0.3	4.0	4.3		0.0	6.56	0.43	(2.7)	
2005	829	2,259	2.0	10.1	0.6	8.3	8.9		0.0	8.61	0.89	(0.6)	
2006	1,273	3,469	2.0	10.2	0.9	12.9	13.9		0.0	10.67	1.39	1.8	
2007	1,737	4,736	2.1	10.3	1.3	17.8	19.1		0.0	12.73	1.91	4.5	
2008	1,779	4,850	2.1	10.4	1.4	18.4	19.8		0.0	12.73	1.98	5.1	
2009	1,822	4,966	2.1	10.5	1.4	19.1	20.4		0.0	12.73	2.04	5.7	
2010	1,866	5,086	2.1	10.6	1.4	19.7	21.2		0.0	12.73	2.12	6.3	
2011	1,907	5,198	2.1	10.7	1.5	20.3	21.8	76.0	7.6	12.73	2.18	(0.7)	
2012	1,949	5,312	2.2	10.8	1.5	21.0	22.5	384.0	38.4	12.73	2.25	(30.8)	
2013	1,991	5,429	2.2	10.9	1.6	21.7	23.3	810.0	81.0	12.73	2.33	(72.8)	
2014	2,941	6,204	2.2	11.0	2.4	25.0	27.4		0.0	19.29	2.74	5.4	
2015	3,828	6,770	2.2	11.2	3.1	27.6	30.7		0.0	21.45	3.07	6.2	
2016	4,679	7,326	2.3	11.3	3.8	30.1	34.0		0.0	23.62	3.40	7.0	
2017	5,549	7,871	2.3	11.4	4.6	32.7	37.3		0.0	25.79	3.73	7.8	
2018	5,660	8,028	2.3	11.5	4.7	33.7	38.4	286.0	28.6	25.79	3.84	(19.8)	
2019	5,774	8,189	2.3	11.6	4.9	34.7	39.6		0.0	25.79	3.96	9.8	
2020	5,889	8,352	2.3	11.7	5.0	35.7	40.8		0.0	25.79	4.08	10.9	
2021	6,007	8,619	2.4	11.8	5.2	37.3	42.5		0.0	25.79	4.25	12.4	
2022	6,127	8,690	2.4	12.0	5.4	37.9	43.3		0.0	25.79	4.33	13.2	
2023	6,250	8,864	2.4	12.1	5.5	39.1	44.6		0.0	25.79	4.46	14.3	
2024	6,375	9,041	2.4	12.2	5.7	40.3	45.9		0.0	25.79	4.59	15.6	
2025	6,401	9,078	2.5	12.3	5.8	40.8	46.6		0.0	25.79	4.66	16.1	
2026	6,401	9,078	2.5	12.4	5.8	41.2	47.1		0.0	25.79	4.71	16.6	
2027	6,401	9,078	2.5	12.6	5.9	41.7	47.5		0.0	25.79	4.75	17.0	
2028	6,401	9,078	2.5	12.7	5.9	42.1	48.0	287.0	28.7	25.79	4.80	(11.3)	
2029	6,401	9,078	2.6	12.8	6.0	42.5	48.5		0.0	25.79	4.85	17.8	
2030	6,401	9,078	2.6	13.0	6.1	42.9	49.0		0.0	25.79	4.90	18.3	
2031	6,401	9,078	2.6	13.1	6.1	43.3	49.5		0.0	25.79	4.95	18.7	
2032	6,401	9,078	2.6	13.2	6.2	43.8	50.0		0.0	25.79	5.00	19.2	
2033	6,401	9,078	2.7	13.3	6.2	44.2	50.5	286.0	28.6	25.79	5.05	(9.0)	
2034	6,401	9,078	2.7	13.5	6.3	44.7	51.0		0.0	25.79	5.10	20.1	
2035	6,401	9,078	2.7	13.6	6.4	45.1	51.5		0.0	25.79	5.15	20.5	
2036	6,401	9,078	2.7	13.7	6.4	45.6	52.0		0.0	25.79	5.20	21.0	
2037	6,401	9,078	2.8	13.9	6.5	46.0	52.5		0.0	25.79	5.25	21.5	
2038	6,401	9,078	2.8	14.0	6.6	46.5	53.0		0.0	25.79	5.30	21.9	
2039	6,401	9,078	2.8	14.2	6.6	46.9	53.6		0.0	25.79	5.36	22.4	
2040	6,401	9,078	2.9	14.3	6.7	47.4	54.1		0.0	25.79	5.41	22.9	
2041	6,401	9,078	2.9	14.5	6.8	47.9	54.6		0.0	25.79	5.46	23.4	
2042	6,401	9,078	2.9	14.6	6.8	48.4	55.2		0.0	25.79	5.52	23.9	
2043	6,401	9,078	2.9	14.7	6.9	48.8	55.7	287.0	28.7	25.79	5.57	(4.3)	
2044	6,401	9,078	3.0	14.9	7.0	49.3	56.3		0.0	25.79	5.63	24.9	
2045	6,401	9,078	3.0	15.0	7.0	49.8	56.9		0.0	25.79	5.69	25.4	
2046	6,401	9,078	3.0	15.2	7.1	50.3	57.4		0.0	25.79	5.74	25.9	
2047	6,401	9,078	3.1	15.3	7.2	50.8	58.0		0.0	25.79	5.80	26.4	
2048	6,401	9,078	3.1	15.5	7.2	51.3	58.6	286.0	28.6	25.79	5.86	(1.7)	
2049	6,401	9,078	3.1	15.6	7.3	51.8	59.2		0.0	25.79	5.92	27.5	
2050	6,401	9,078	3.2	15.8	7.4	52.4	59.8	(406.0)	(40.6)	25.79	5.98	68.6	2.75%

- Note: 1. 1 % annual tariff increase in real terms.
2. Unit tariff of Non Domestic User is 5 times of Domestic User.
3. 90 % subsidy for capital investment.
4. Overhead is assumed to be 10% of Revenue.
5. Investment Cost in 2050 is assumed salvage value.

Table A17.3.5

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (R/S)

Case A-1 100 % subsidy
1.0 % tariff increase in real terms

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Fund Flow Table																												
Annual Sales	0.0	0.0	0.0	4.8	10.9	18.6	28.3	32.2	36.6	41.6	47.3	53.7	60.9	67.6	75.1	83.5	92.7	103.0	114.4	127.2	141.3	156.9	174.4	193.7	215.2	239.1	268.6	
Subsidy from CSL	0.0	366.7	689.6	1,563.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,924.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (10% interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	356.7	689.6	1,563.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,924.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Annual Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
O & M	0.0	0.0	0.0	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	58.5	64.3	70.8	77.9	85.6	94.2	103.6	114.0	125.4	137.9	151.7	166.9	183.6		
Overhead (10% of Sales)	0.0	0.0	0.0	0.5	1.1	1.9	2.6	3.2	3.7	4.2	4.7	5.4	6.1	6.8	7.5	8.3	9.3	10.3	11.4	12.7	14.1	15.7	17.4	19.4	21.5	23.9		
Net Cash Inflow	0.0	0.0	0.0	(7.5)	(6.9)	(6.1)	(4.6)	(4.1)	(3.4)	(2.5)	(1.4)	(0.0)	1.6	2.4	3.3	4.3	5.6	7.1	8.8	10.8	13.1	15.9	19.0	22.6	26.8	31.6		
Working Capital Burden																												
Cumulative cash deficit	0.0	0.0	0.0	(7.5)	(14.2)	(20.9)	(24.9)	(29.0)	(32.5)	(34.8)	(36.2)	(36.2)	(34.6)	(32.5)	(29.0)	(24.7)	(19.1)	(12.0)	(3.2)	7.6	20.7	36.6	55.6	78.2	105.0	136.7		
10% interest on above	0.0	0.0	0.0	(0.7)	(1.4)	(2.0)	(2.5)	(2.9)	(3.2)	(3.5)	(3.6)	(3.6)	(3.5)	(3.2)	(2.8)	(2.5)	(2.1)	(1.2)	(0.3)	0.8	2.1	3.7	5.6	7.8	10.5	13.7		
Cum. Interest Payment	0.0	0.0	0.0	(0.7)	(2.2)	(4.2)	(6.7)	(9.6)	(12.8)	(16.3)	(19.9)	(23.5)	(27.0)	(30.2)	(33.1)	(35.6)	(37.5)	(38.7)	(39.0)	(38.5)	(36.2)	(32.5)	(27.0)	(19.1)	(8.6)	5.0		
Income Statement																												
Annual Sales	4.8	10.9	18.6	28.3	32.2	36.6	41.6	47.3	53.7	60.9	67.6	75.1	83.5	92.7	103.0	114.4	127.2	141.3	156.9	174.4	193.7	215.2	239.1	268.6				
O & M	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	58.5	64.3	70.8	77.9	85.6	94.2	103.6	114.0	125.4	137.9	151.7	166.9	183.6					
Overhead (10% of Sales)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Annual Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Net Income	0.0	0.0	0.0	(6.8)	(5.9)	(4.2)	(1.7)	(0.8)	0.3	1.7	(1.4)	(0.0)	1.6	2.4	3.3	4.3	5.6	7.1	8.8	10.8	13.1	15.9	19.0	22.6	26.8	31.6		
Balance Sheet																												
Cash	0.0	0.0	0.0	(7.5)	(14.2)	(20.9)	(24.9)	(29.0)	(32.5)	(34.8)	(36.2)	(36.2)	(34.6)	(32.5)	(29.0)	(24.7)	(19.1)	(12.0)	(3.2)	7.6	20.7	36.6	55.6	78.2	105.0	136.7		
Capital Investment	366.7	1,046.3	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	
Less Accum. Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Land	0.0	0.0	0.0	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	
Total Assets	366.7	1,046.3	2,610.1	2,602.8	2,595.9	2,588.8	2,581.2	2,573.9	2,566.2	2,558.5	2,550.8	2,543.1	2,535.4	2,527.8	2,520.1	2,512.4	2,504.8	2,497.1	2,489.5	2,481.8	2,474.2	2,466.5	2,458.9	2,451.2	2,443.6	2,435.9	2,428.3	
Loan Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Grant from CSL	366.7	1,046.3	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	2,610.1	
Reserved Fund	0.0	0.0	0.0	(7.5)	(14.2)	(20.9)	(24.9)	(29.0)	(32.5)	(34.8)	(36.2)	(36.2)	(34.6)	(32.5)	(29.0)	(24.7)	(19.1)	(12.0)	(3.2)	7.6	20.7	36.6	55.6	78.2	105.0	136.7		
Total Liab. & Capital	366.7	1,046.3	2,610.1	2,602.8	2,595.9	2,588.8	2,581.2	2,573.9	2,566.2	2,558.5	2,550.8	2,543.1	2,535.4	2,527.8	2,520.1	2,512.4	2,504.8	2,497.1	2,489.5	2,481.8	2,474.2	2,466.5	2,458.9	2,451.2	2,443.6	2,435.9	2,428.3	

Table A17.3.5

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (F/S)

Case A-1 100 % subsidy
1.0 % tariff increase in real terms

Year	2017	2018	2019	2020	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Fund Flow Table																									
Annual Sales	265.7	295.1	327.9	364.5	404.7	449.7	499.6	555.0	616.6	685.1	761.1	845.6	939.5	1,043.8	1,159.6	1,288.3	1,431.3	1,590.2	1,766.7	1,962.8	2,180.7	2,422.8	2,691.7	2,990.5	
Subsidy from CSL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (10% interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Annual Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
O & M	201.9	222.1	244.3	268.8	295.7	325.2	357.7	393.5	432.9	476.2	523.8	576.2	633.8	697.1	766.9	843.5	927.9	1,020.7	1,122.8	1,235.0	1,358.5	1,494.4	1,645.8	1,808.2	
Overhead (10 % of Sales)	26.6	29.5	32.8	36.4	40.5	45.0	50.0	55.5	61.7	68.5	76.1	84.6	93.9	104.4	116.0	128.8	143.1	159.0	176.7	196.3	218.1	242.3	269.2	299.0	
Net Cash Inflow	37.2	43.5	50.8	59.1	68.6	79.5	91.9	106.0	122.1	140.4	161.2	184.9	211.8	242.2	276.8	316.0	360.3	410.5	467.3	531.5	604.1	686.1	778.7	883.2	
Working Capital Burden																									
Cumulative cash deficit	173.8	217.3	268.1	327.2	395.8	475.3	567.1	673.1	795.3	935.7	1,096.9	1,281.8	1,495.6	1,735.8	2,012.6	2,328.6	2,688.9	3,099.4	3,566.7	4,098.2	4,702.3	5,388.5	6,167.2	7,050.4	
10% interest on above	17.4	21.7	26.8	32.7	39.6	47.5	56.7	67.3	79.5	93.6	109.7	128.2	149.4	173.6	201.3	232.9	268.9	309.9	367.7	432.8	506.8	590.6	616.7	705.0	
Cum. Interest Payment	22.4	44.1	70.9	103.7	143.2	190.8	247.5	314.8	394.3	487.9	597.6	725.8	875.1	1,048.7	1,250.0	1,482.8	1,751.7	2,061.7	2,418.3	2,828.1	3,296.4	3,837.2	4,453.9	5,159.0	
Income Statement																									
Annual Sales	265.7	295.1	327.9	364.5	404.7	449.7	499.6	555.0	616.6	685.1	761.1	845.6	939.5	1,043.8	1,159.6	1,288.3	1,431.3	1,590.2	1,766.7	1,962.8	2,180.7	2,422.8	2,691.7	2,990.5	
O & M	201.9	222.1	244.3	268.8	295.7	325.2	357.7	393.5	432.9	476.2	523.8	576.2	633.8	697.1	766.9	843.5	927.9	1,020.7	1,122.8	1,235.0	1,358.5	1,494.4	1,645.8	1,808.2	
Overhead (10 % of Sales)	26.6	29.5	32.8	36.4	40.5	45.0	50.0	55.5	61.7	68.5	76.1	84.6	93.9	104.4	116.0	128.8	143.1	159.0	176.7	196.3	218.1	242.3	269.2	299.0	
Annual Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net Income	37.2	43.5	50.8	59.1	68.6	79.5	91.9	106.0	122.1	140.4	161.2	184.9	211.8	242.2	276.8	316.0	360.3	410.5	467.3	531.5	604.1	686.1	778.7	883.2	
Balance Sheet																									
Cash	173.8	217.3	268.1	327.2	395.8	475.3	567.1	673.1	795.3	935.7	1,096.9	1,281.8	1,495.6	1,735.8	2,012.6	2,328.6	2,688.9	3,099.4	3,566.7	4,098.2	4,702.3	5,388.5	6,167.2	7,050.4	
Capital Investment	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	
Less Accum. Depreciation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Land	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	
Total Assets	4,708.0	4,751.5	4,802.3	4,861.4	4,930.0	5,009.4	5,098.4	5,204.6	5,326.7	5,465.9	5,622.6	5,797.2	6,000.0	6,232.0	6,494.8	6,788.8	7,115.2	7,478.1	7,880.4	8,328.2	8,818.5	9,357.2	9,942.1	10,570.6	
Loan Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Grant from CSL	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	4,594.2	
Reserve Fund	173.8	217.3	268.1	327.2	395.8	475.3	567.1	673.1	795.3	935.7	1,096.9	1,281.8	1,495.6	1,735.8	2,012.6	2,328.6	2,688.9	3,099.4	3,566.7	4,098.2	4,702.3	5,388.5	6,167.2	7,050.4	
Total Liab. & Capital	4,708.0	4,751.5	4,802.3	4,861.4	4,930.0	5,009.4	5,098.4	5,204.6	5,326.7	5,465.9	5,622.6	5,797.2	6,000.0	6,232.0	6,494.8	6,788.8	7,115.2	7,478.1	7,880.4	8,328.2	8,818.5	9,357.2	9,942.1	10,570.6	

Table A17.3.6
Calculation of FIRR
Kandy Sewerage Project (F/S)
Case A-1

(1998 price)

Year	Volume		Tariff		Revenue			Investment	O&M	OH10%	Net Inflow	FIRR
	Dom cum/d	Non-Dom cum/d	Dom Rs./cum	Non-Dom Rs./cum	Dom M Rs./Y	Non-Dom M Rs./Y	Total M Rs./Y					
2000												
2001								268.0			0.00	
2002								471.0			0.00	
2003								971.0			0.00	
2004	404	1102	2.0	6.0	0.3	2.4	2.7		6.56	0.27	(4.12)	
2005	829	2259	2.0	6.1	0.6	5.0	5.6		8.61	0.56	(3.56)	
2006	1273	3469	2.0	6.1	0.9	7.7	8.7		10.67	0.87	(2.84)	
2007	1737	4736	2.1	6.2	1.3	10.7	12.0		12.73	1.20	(1.94)	
2008	1779	4850	2.1	6.2	1.4	11.1	12.4		12.73	1.24	(1.57)	
2009	1822	4966	2.1	6.3	1.4	11.4	12.8		12.73	1.28	(1.18)	
2010	1866	5086	2.1	6.4	1.4	11.8	13.3		12.73	1.33	(0.79)	
2011	1907	5198	2.1	6.4	1.5	12.2	13.7		12.73	1.37	(0.40)	
2012	1949	5312	2.2	6.5	1.5	12.6	14.1		12.73	1.41	(0.01)	
2013	1988	5420	2.2	6.6	1.6	13.0	14.6		12.73	1.46	0.38	
2014	1988	5420	2.2	6.6	1.6	13.1	14.7		12.73	1.47	0.51	
2015	1988	5420	2.2	6.7	1.6	13.2	14.9		12.73	1.49	0.65	
2016	1988	5420	2.3	6.8	1.6	13.4	15.0		12.73	1.50	0.78	
2017	1988	5420	2.3	6.8	1.7	13.5	15.2		12.73	1.52	0.91	
2018	1988	5420	2.3	6.9	1.7	13.6	15.3	286.0	12.73	1.53	1.05	
2019	1988	5420	2.3	7.0	1.7	13.8	15.5		12.73	1.55	1.19	
2020	1988	5420	2.3	7.0	1.7	13.9	15.6		12.73	1.56	1.33	
2021	1988	5420	2.4	7.1	1.7	14.1	15.8		12.73	1.58	1.47	
2022	1988	5420	2.4	7.2	1.7	14.2	15.9		12.73	1.59	1.61	
2023	1988	5420	2.4	7.2	1.8	14.3	16.1		12.73	1.61	1.75	
2024	1988	5420	2.4	7.3	1.8	14.5	16.3		12.73	1.63	1.90	
2025	1988	5420	2.5	7.4	1.8	14.6	16.4		12.73	1.64	2.05	
2026	1988	5420	2.5	7.5	1.8	14.8	16.6		12.73	1.66	2.19	
2027	1988	5420	2.5	7.5	1.8	14.9	16.7		12.73	1.67	2.34	
2028	1988	5420	2.5	7.6	1.8	15.1	16.9		12.73	1.69	2.49	
2029	1988	5420	2.6	7.7	1.9	15.2	17.1		12.73	1.71	2.64	
2030	1988	5420	2.6	7.8	1.9	15.4	17.3		12.73	1.73	2.80	
2031	1988	5420	2.6	7.8	1.9	15.5	17.4		12.73	1.74	2.95	
2032	1988	5420	2.6	7.9	1.9	15.7	17.6		12.73	1.76	3.11	
2033	1988	5420	2.7	8.0	1.9	15.8	17.8	286.0	12.73	1.78	3.27	
2034	1988	5420	2.7	8.1	2.0	16.0	18.0		12.73	1.80	3.43	
2035	1988	5420	2.7	8.2	2.0	16.2	18.1		12.73	1.81	3.59	
2036	1988	5420	2.7	8.2	2.0	16.3	18.3		12.73	1.83	3.75	
2037	1988	5420	2.8	8.3	2.0	16.5	18.5		12.73	1.85	3.92	
2038	1988	5420	2.8	8.4	2.0	16.6	18.7		12.73	1.87	4.09	
2039	1988	5420	2.8	8.5	2.1	16.8	18.9		12.73	1.89	4.25	
2040	1988	5420	2.9	8.6	2.1	17.0	19.1		12.73	1.91	4.42	
2041	1988	5420	2.9	8.7	2.1	17.2	19.2		12.73	1.92	4.59	
2042	1988	5420	2.9	8.8	2.1	17.3	19.4		12.73	1.94	4.77	
2043	1988	5420	2.9	8.8	2.1	17.5	19.6		12.73	1.96	4.94	
2044	1988	5420	3.0	8.9	2.2	17.7	19.8		12.73	1.98	5.12	
2045	1988	5420	3.0	9.0	2.2	17.8	20.0		12.73	2.00	5.30	
2046	1988	5420	3.0	9.1	2.2	18.0	20.2		12.73	2.02	5.48	
2047	1988	5420	3.1	9.2	2.2	18.2	20.4		12.73	2.04	5.66	
2048	1988	5420	3.1	9.3	2.2	18.4	20.6	286.0	12.73	2.06	5.84	
2049	1988	5420	3.1	9.4	2.3	18.6	20.8		12.73	2.08	6.03	
2050	1988	5420	3.2	9.5	2.3	18.8	21.1	(209.0)	12.73	2.11	6.22	7.26%

- Note: 1. 1 % annual tariff increase in real terms.
2. Unit tariff of Non Domestic User is 3 times of Domestic User.
3. 100 % subsidy for capital investment.
4. Overhead is assumed to be 10% of Revenue.
5. Investment Cost in 2050 is assumed salvage value.

Table A17.3.7

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (F/S)

Case A-2 90 % subsidy
1.0 % tariff increase in real terms

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Fund Flow Table																												
Annual Sales	0.0	0.0	0.0	4.8	10.9	18.6	28.3	32.2	36.6	41.6	47.3	53.7	60.9	67.6	75.1	83.5	92.7	103.0	114.4	127.2	141.3	156.9	174.4	193.7	215.2	239.1		
Subsidy from GSL	0.0	321.0	620.6	1,407.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,731.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Loan (10% Interest)	0.0	35.7	69.0	156.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	192.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	356.7	689.6	1,563.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,924.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (10%)	0.0	3.6	10.5	25.9	25.5	24.3	23.1	21.9	20.7	19.5	18.3	17.2	16.0	14.8	13.6	12.4	11.2	10.0	28.1	26.9	24.8	22.8	20.7	18.7	16.6	14.7	13.1	
Annual Loan Repayment	0.0	0.0	0.0	1.6	4.8	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	11.9	20.6	20.6	20.6	20.6	20.6	19.0	15.9	
O & M	0.0	0.0	0.0	0.0	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	58.5	64.3	70.8	77.9	85.6	94.2	103.6	114.0	125.4	137.9	151.7	166.9	183.6	
Overhead (10 % of Sales)	(3.6)	(10.5)	(27.6)	(37.0)	(42.0)	(49.2)	(58.2)	(65.5)	(73.4)	(81.1)	(88.5)	(95.7)	(102.5)	(109.0)	(116.3)	(123.5)	(130.4)	(137.0)	(143.5)	(150.0)	(156.1)	(161.1)	(166.1)	(171.1)	(176.1)	(181.1)	(186.1)	
Net Cash Inflow																												
Working Capital Burden																												
Cumulative cash deficit	(3.6)	(14.0)	(41.6)	(78.6)	(120.6)	(159.8)	(195.3)	(228.7)	(259.9)	(288.4)	(314.1)	(336.5)	(355.5)	(371.9)	(385.4)	(395.8)	(402.8)	(407.8)	(411.8)	(414.8)	(416.9)	(418.0)	(418.2)	(417.5)	(415.9)	(413.5)	(409.6)	
10% interest on above	(0.4)	(1.4)	(4.2)	(7.9)	(12.1)	(16.0)	(19.5)	(22.9)	(26.0)	(28.8)	(31.4)	(33.7)	(35.6)	(37.2)	(38.5)	(39.6)	(40.3)	(40.8)	(41.2)	(41.5)	(41.7)	(41.8)	(41.8)	(41.7)	(41.5)	(41.2)	(40.7)	
Cum. Interest Payment	0.4	1.0	3.1	(4.8)	(16.6)	(32.6)	(47.5)	(61.2)	(73.2)	(83.5)	(91.4)	(96.9)	(101.1)	(104.1)	(105.9)	(106.7)	(107.4)	(108.0)	(108.5)	(109.0)	(109.5)	(110.0)	(110.5)	(111.0)	(111.5)	(112.0)	(112.5)	
Income Statement																												
Annual Sales	4.8	10.9	18.6	28.3	32.2	36.6	41.6	47.3	53.7	60.9	67.6	75.1	83.5	92.7	103.0	114.4	127.2	141.3	156.9	174.4	193.7	215.2	239.1	265.5	293.1			
O & M	11.6	16.8	22.9	30.0	33.0	36.3	40.0	43.9	48.3	53.2	58.5	64.3	70.8	77.9	85.6	94.2	103.6	114.0	125.4	137.9	151.7	166.9	183.6	201.5	220.6	240.9		
Overhead (10 % of Sales)	0.5	1.8	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	
Annual Depreciation	3.6	10.5	25.9	25.5	24.3	23.1	21.9	20.7	19.5	18.3	17.2	16.0	14.8	13.6	12.4	11.2	10.0	28.1	26.9	24.8	22.8	20.7	18.7	16.6	14.7	13.1		
Interest Payment (10%)	(3.6)	(12.3)	(32.9)	(39.2)	(42.0)	(49.2)	(58.2)	(65.5)	(73.4)	(81.1)	(88.5)	(95.7)	(102.5)	(109.0)	(116.3)	(123.5)	(130.4)	(137.0)	(143.5)	(150.0)	(156.1)	(161.1)	(166.1)	(171.1)	(176.1)	(181.1)	(186.1)	
Net Income																												
Balance Sheet																												
Cash	(3.6)	(14.0)	(41.6)	(78.6)	(120.6)	(159.8)	(195.3)	(228.7)	(259.9)	(288.4)	(314.1)	(336.5)	(355.5)	(371.9)	(385.4)	(395.8)	(402.8)	(407.8)	(411.8)	(414.8)	(416.9)	(418.0)	(418.2)	(417.5)	(415.9)	(413.5)	(409.6)	
Capital Investment	356.7	1,046.3	2,352.4	4,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	2,352.4	
Less Accum. Depreciation	0.5	2.1	9.1	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	
Land	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Assets	352.8	1,050.1	2,559.4	4,515.4	2,466.5	2,420.4	2,377.9	2,337.5	2,299.5	2,264.0	2,231.4	2,201.9	2,176.0	2,152.7	2,132.3	2,114.9	2,100.9	3,985.5	3,950.0	3,911.2	3,878.1	3,851.4	3,831.7	3,819.5	3,817.2	3,826.9		
Loan Balance	35.7	104.6	259.4	542.8	250.9	254.6	242.8	230.9	219.0	207.2	195.5	183.4	171.6	159.7	147.8	136.0	124.1	112.3	100.4	280.9	269.1	248.5	227.9	207.2	186.6	166.0	147.0	
Grant from GSL	321.0	941.7	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	2,349.1	
Reserved Fund	(3.6)	(16.2)	(49.1)	(88.5)	(125.4)	(159.6)	(190.2)	(218.8)	(245.0)	(268.6)	(289.5)	(309.5)	(328.4)	(346.0)	(362.5)	(378.0)	(392.5)	(406.0)	(418.5)	(430.0)	(440.5)	(450.0)	(458.5)	(466.0)	(472.5)	(478.0)	(482.5)	
Total Liab. & Capital	352.8	1,050.1	2,559.4	4,515.4	2,466.5	2,420.4	2,377.9	2,337.5	2,299.5	2,264.0	2,231.4	2,201.9	2,176.0	2,152.7	2,132.3	2,114.9	2,100.9	3,985.5	3,950.0	3,911.2	3,878.1	3,851.4	3,831.7	3,819.5	3,817.2	3,826.9		

Table A17.3.7

Pro Forma Financial Statements (M Rs.)
Kandy Sewerage Project (F/S)

Case A-2 90 % subsidy
1.0 % tariff increase in real terms

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Fund Flow Table																									
Annual Sales	265.7	295.1	327.9	364.3	404.7	449.7	499.6	555.0	616.6	685.1	761.1	845.6	939.5	1,043.8	1,159.6	1,288.3	1,431.3	1,590.2	1,766.7	1,962.8	2,180.7	2,422.8	2,691.7	2,990.5	
Subsidy from GSL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30,216.4	0.0	0.0	
Loan (10% interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Capital Investment	0.0	0.0	0.0	0.0	0.0	0.0	8,037.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33,573.8	0.0	0.0	
Interest Payment (10%)	12.2	11.4	10.5	9.6	8.7	7.9	87.4	86.5	82.0	77.4	72.9	68.4	63.9	59.3	54.8	51.1	47.5	43.8	40.2	36.5	32.9	36.0	36.3	34.2	
Annual Loan Repayment	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	
O & M	201.9	222.1	244.3	268.8	295.7	325.2	357.7	393.5	432.9	476.2	523.8	576.2	633.8	697.1	766.9	843.5	927.9	1,026.7	1,122.8	1,235.0	1,358.5	1,494.4	1,643.8	1,808.2	
Overhead (10 % of Sales)																									
Net Cash Inflow	42.7	52.9	64.3	77.2	91.6	107.8	45.7	66.3	56.5	86.2	119.2	155.8	196.6	242.0	292.7	357.1	419.4	489.2	567.3	654.7	752.8	856.9	969.0	650.7	
Working Capital Burden																									
Cumulative cash deficit	(405.9)	(359.6)	(288.7)	(211.5)	(119.9)	(12.1)	33.6	99.9	156.4	242.6	361.8	517.6	714.2	956.2	1,248.9	1,606.0	2,025.4	2,514.6	3,081.8	3,736.6	4,489.3	5,016.2	5,666.3	6,317.0	
10% interest on above	(40.6)	(35.3)	(28.9)	(21.1)	(12.6)	(1.2)	3.4	10.0	15.6	24.3	36.2	51.8	71.4	95.6	124.9	160.6	202.5	251.5	308.2	373.7	448.9	501.6	566.6	631.7	
Cum. Interest Payment	(848.5)	(883.8)	(912.7)	(933.8)	(945.8)	(947.0)	(943.6)	(935.7)	(918.0)	(893.7)	(857.6)	(805.8)	(734.4)	(638.8)	(513.9)	(353.3)	(150.7)	100.7	408.9	782.6	1,231.5	1,733.1	2,299.7	2,931.4	
Income Statement																									
Annual Sales	265.7	295.1	327.9	364.3	404.7	449.7	499.6	555.0	616.6	685.1	761.1	845.6	939.5	1,043.8	1,159.6	1,288.3	1,431.3	1,590.2	1,766.7	1,962.8	2,180.7	2,422.8	2,691.7	2,990.5	
O & M	201.9	222.1	244.3	268.8	295.7	325.2	357.7	393.5	432.9	476.2	523.8	576.2	633.8	697.1	766.9	843.5	927.9	1,026.7	1,122.8	1,235.0	1,358.5	1,494.4	1,643.8	1,808.2	
Overhead (10 % of Sales)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Annual Depreciation	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	
Interest Payment (10%)	12.2	11.4	10.5	9.6	8.7	7.9	87.4	86.5	82.0	77.4	72.9	68.4	63.9	59.3	54.8	51.1	47.5	43.8	40.2	36.5	32.9	36.0	36.3	34.2	
Net Income	34.5	44.7	56.1	69.0	83.4	99.6	(3.2)	17.3	44.1	73.8	106.8	143.4	184.2	229.6	280.3	336.0	398.3	468.0	546.1	633.6	731.6	835.5	948.6	612.0	
Balance Sheet																									
Cash	(405.9)	(353.0)	(288.7)	(211.5)	(119.9)	(12.1)	33.6	99.9	156.4	242.6	361.8	517.6	714.2	956.2	1,248.9	1,606.0	2,025.4	2,514.6	3,081.8	3,736.6	4,489.3	5,016.2	5,666.3	6,317.0	
Capital Investment	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	4,276.5	
Less Accum. Depreciation	275.6	292.6	308.5	326.4	345.3	366.3	389.3	417.9	453.6	498.0	551.0	613.4	686.4	770.0	865.3	973.8	1,097.4	1,238.1	1,396.8	1,574.5	1,772.2	1,990.9	2,240.6	2,521.6	
Land	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	257.7	
Total Assets	3,852.7	3,888.6	3,956.0	3,996.3	4,070.9	4,161.8	4,276.5	4,418.2	4,595.5	4,818.4	5,098.4	5,435.8	5,839.6	6,319.8	6,889.1	7,564.3	8,357.4	9,280.5	10,364.6	11,620.3	13,069.8	14,825.5	16,913.2	19,374.5	
Loan Balance	1,224	1,137	1,049	962	875	787	875	864.9	819.7	774.4	729.1	683.8	638.6	593.3	548.0	511.5	474.9	438.4	401.9	365.3	328.8	292.3	255.8	219.3	
Grant from GSL	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	4,080.8	
Reserved Fund	(350.5)	(305.8)	(249.7)	(180.7)	(97.3)	2.4	(0.8)	16.5	60.6	134.4	241.2	384.6	568.8	798.4	1,078.7	1,414.6	1,812.9	2,280.9	2,827.0	3,460.6	4,192.2	4,927.7	5,768.4	6,719.3	
Total Liab. & Capital	3,852.7	3,888.6	3,956.0	3,996.3	4,070.9	4,161.8	4,276.5	4,418.2	4,595.5	4,818.4	5,098.4	5,435.8	5,839.6	6,319.8	6,889.1	7,564.3	8,357.4	9,280.5	10,364.6	11,620.3	13,069.8	14,825.5	16,913.2	19,374.5	

Table 17.3.8

Calculation of FIRR
Kandy Sewerage Project (F/S)
Case A-2

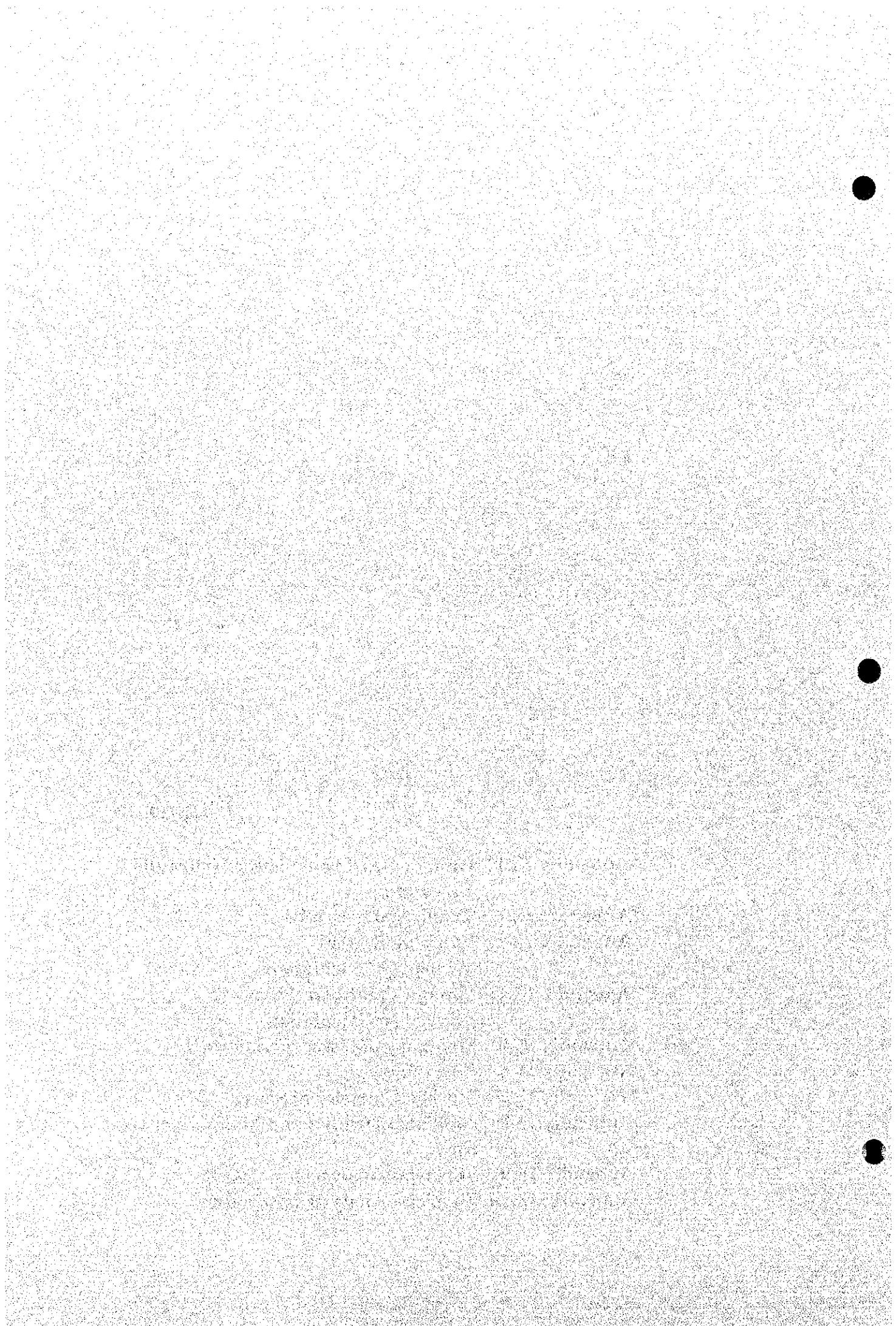
(1998 Price)

Year	Volume		Tariff		Revenue			Investment	10% of Inv.	O&M	OH10%	Net Inflow	FIRR
	Dom cum/d	Non-Dom cum/d	Dom Rs./cum	Non-Dom Rs./cum	Dom M Rs./Y	Non-Dom M Rs./Y	Total M Rs./Y						
2000													
2001								268.0	26.8			(26.80)	
2002								471.0	47.1			(47.10)	
2003								971.0	97.1			(97.10)	
2004	404	1102	2.00	10.00	0.3	4.0	4.3		0.0	6.56	0.43	(2.67)	
2005	829	2259	2.02	10.10	0.6	8.3	8.9		0.0	8.61	0.89	(0.56)	
2006	1273	3469	2.04	10.20	0.9	12.9	13.9		0.0	10.67	1.39	1.81	
2007	1737	4736	2.06	10.30	1.3	17.8	19.1		0.0	12.73	1.91	4.47	
2008	1779	4850	2.08	10.41	1.4	18.4	19.8		0.0	12.73	1.98	5.07	
2009	1822	4966	2.10	10.51	1.4	19.1	20.4		0.0	12.73	2.04	5.67	
2010	1866	5086	2.12	10.62	1.4	19.7	21.2		0.0	12.73	2.12	6.31	
2011	1907	5198	2.14	10.72	1.5	20.3	21.8		0.0	12.73	2.18	6.92	
2012	1949	5312	2.17	10.83	1.5	21.0	22.5		0.0	12.73	2.25	7.55	
2013	1988	5420	2.19	10.94	1.6	21.6	23.2		0.0	12.73	2.32	8.17	
2014	1988	5420	2.21	11.05	1.6	21.9	23.5		0.0	12.73	2.35	8.38	
2015	1988	5420	2.23	11.16	1.6	22.1	23.7		0.0	12.73	2.37	8.59	
2016	1988	5420	2.25	11.27	1.6	22.3	23.9		0.0	12.73	2.39	8.80	
2017	1988	5420	2.28	11.38	1.7	22.5	24.2		0.0	12.73	2.42	9.02	
2018	1988	5420	2.30	11.49	1.7	22.7	24.4	286.0	28.6	12.73	2.44	(19.36)	
2019	1988	5420	2.32	11.61	1.7	23.0	24.7		0.0	12.73	2.47	9.46	
2020	1988	5420	2.35	11.73	1.7	23.2	24.9		0.0	12.73	2.49	9.68	
2021	1988	5420	2.37	11.84	1.7	23.4	25.1		0.0	12.73	2.51	9.90	
2022	1988	5420	2.39	11.96	1.7	23.7	25.4		0.0	12.73	2.54	10.13	
2023	1988	5420	2.42	12.08	1.8	23.9	25.7		0.0	12.73	2.57	10.36	
2024	1988	5420	2.44	12.20	1.8	24.1	25.9		0.0	12.73	2.59	10.59	
2025	1988	5420	2.46	12.32	1.8	24.4	26.2		0.0	12.73	2.62	10.82	
2026	1988	5420	2.49	12.45	1.8	24.6	26.4		0.0	12.73	2.64	11.06	
2027	1988	5420	2.51	12.57	1.8	24.9	26.7		0.0	12.73	2.67	11.30	
2028	1988	5420	2.54	12.70	1.8	25.1	27.0		0.0	12.73	2.70	11.54	
2029	1988	5420	2.56	12.82	1.9	25.4	27.2		0.0	12.73	2.72	11.78	
2030	1988	5420	2.59	12.95	1.9	25.6	27.5		0.0	12.73	2.75	12.02	
2031	1988	5420	2.62	13.08	1.9	25.9	27.8		0.0	12.73	2.78	12.27	
2032	1988	5420	2.64	13.21	1.9	26.1	28.1		0.0	12.73	2.81	12.52	
2033	1988	5420	2.67	13.35	1.9	26.4	28.3	286.0	28.6	12.73	2.83	(15.83)	
2034	1988	5420	2.70	13.48	2.0	26.7	28.6		0.0	12.73	2.86	13.03	
2035	1988	5420	2.72	13.61	2.0	26.9	28.9		0.0	12.73	2.89	13.29	
2036	1988	5420	2.75	13.75	2.0	27.2	29.2		0.0	12.73	2.92	13.55	
2037	1988	5420	2.78	13.89	2.0	27.5	29.5		0.0	12.73	2.95	13.81	
2038	1988	5420	2.81	14.03	2.0	27.7	29.8		0.0	12.73	2.98	14.07	
2039	1988	5420	2.83	14.17	2.1	28.0	30.1		0.0	12.73	3.01	14.34	
2040	1988	5420	2.86	14.31	2.1	28.3	30.4		0.0	12.73	3.04	14.61	
2041	1988	5420	2.89	14.45	2.1	28.6	30.7		0.0	12.73	3.07	14.89	
2042	1988	5420	2.92	14.60	2.1	28.9	31.0		0.0	12.73	3.10	15.16	
2043	1988	5420	2.95	14.74	2.1	29.2	31.3		0.0	12.73	3.13	15.44	
2044	1988	5420	2.98	14.89	2.2	29.5	31.6		0.0	12.73	3.16	15.72	
2045	1988	5420	3.01	15.04	2.2	29.7	31.9		0.0	12.73	3.19	16.01	
2046	1988	5420	3.04	15.19	2.2	30.0	32.3		0.0	12.73	3.23	16.30	
2047	1988	5420	3.07	15.34	2.2	30.3	32.6		0.0	12.73	3.26	16.59	
2048	1988	5420	3.10	15.49	2.2	30.7	32.9	286.0	28.6	12.73	3.29	(11.72)	
2049	1988	5420	3.13	15.65	2.3	31.0	33.2		0.0	12.73	3.32	17.17	
2050	1988	5420	3.16	15.80	2.3	31.3	33.6	(209.0)	(20.9)	12.73	3.36	38.37	3.50%

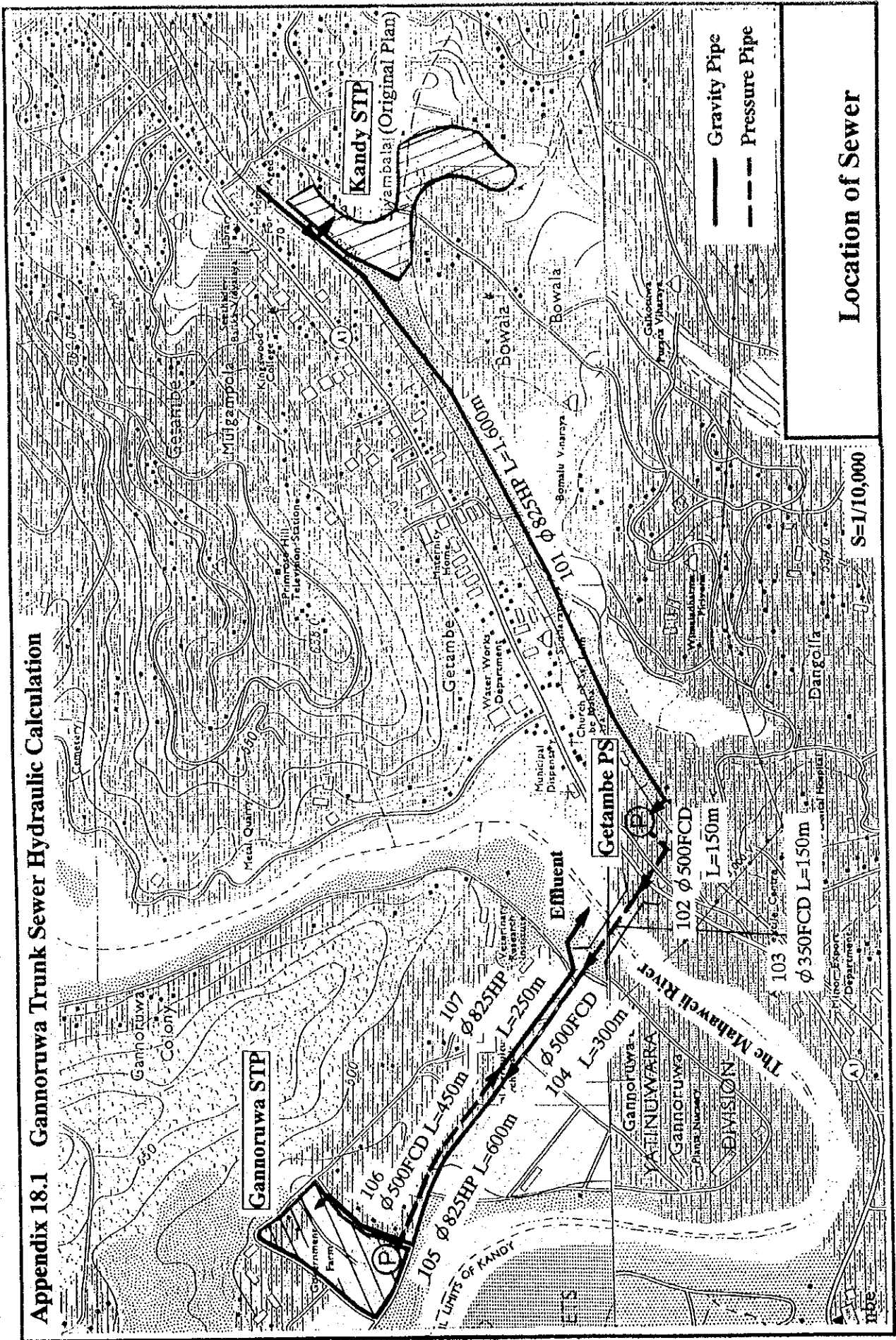
- Note: 1. 1 % annual tariff increase in real terms.
2. Unit tariff of Non Domestic User is 5 times of Domestic User.
3. 90 % subsidy for capital investment.
4. Overhead is assumed to be 10% of Revenue.
5. Investment Cost in 2050 is assumed salvage value.

Chapter 18

- Appendix 18.1 Gannoruwa Trunk Sewer Hydraulic Calculation**
- Appendix 18.2 Trunk Sewer Profile**
- Appendix 18.3 Pumping Station
- Capacity Calculation**
- Appendix 18.4 Sewage Treatment Plant
- Capacity Calculation**
- Appendix 18.5 Summary of Construction Cost**
- Appendix 18.6 Cost of Sewer**
- Appendix 18.7 Storage Capacity of Sewer**
- Appendix 18.8 Annual Operation and Maintenance Cost**
- Appendix 18.9 Financial Analysis for Case B**
- Appendix 18.10 Financial Analysis for Case C**



Appendix 18.1 Gannoruwa Trunk Sewer Hydraulic Calculation



Sewage Flow Calculation Table (Gannoruwa)

※Unit Sewage Flow : 0.324m³/capita·day

Pipe No.	Down stream	Service Area				Length				T				Storm Run-off				Sewage Flow				Other Flow				Design Sewer				Remarks						
		Sec.		Accum.		m		Sec. Accum.		min		C		Service Area		R.O.		Pop/D		Flow		Sec. Accum.		Accum.		Dia.		Slope			Flow		G.L.		Level	
		ha	ha	m	m	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha	m ³ /s	m ³ /s	m ³ /s	m ³ /s	m ³ /s	m ³ /s	m ³ /s	m ³ /s	m ³ /s		m ³ /s	m ³ /s	m ³ /s	m ³ /s	m ³ /s	
52		248	4343	270	3424															2754	23718	00889	010929	01982	01982	φ 675	140	0879	03145	48919	489761	270				
52-1			4343	20	3444																23718	00889	010929	01982	φ 450	220	0941	01337	48977	477761	749		Umekeda Eia			
52-2			4343	210	3654																23718	00889	010929	01982	φ 675	140	0879	03145	48951	481411	337					
53	57	396	4739	1100	4764															5816	29634	01108	010929	02201	φ 750	130	0909	04014	48285	479314	292			42Umekeda Eia		
54		1155	1155	1500	1500																8473	8473	00318	00318	φ 400	240	0812	01020	48777	484894	264			1100mE.L.		
55	57	479	1634	650	2150															2862	11185	00418	00418	φ 400	240	0812	01020	47501	473564	100						
56		412	412	450	450															3054	3054	00115	00115	φ 225	500	0799	00318	47500	473752	100				430Umekeda Eia		
57		6785	6785	50	4804																43723	01640	010929	02733	φ 825	120	0930	04972	47500	465838	818					
101		6785	6785	1600	6404																43723	01640	010929	02733	φ 825	120	0930	04972	46800	463958	315				Pumping Station	
102		6785	6785	150	6554																43723	01640	010929	02733	φ 500	001	0061	00119	46900	469444	100					
103		6785	6785	150	6704																43723	01640	010929	02733	φ 350	001	0048	00046	47000	468640	097					
104		6785	6785	300	7004																43723	01640	010929	02733	φ 500	001	0061	00119	47000	468640	080					
105		6785	6785	800	7604																43723	01640	010929	02733	φ 825	120	0930	04972	47000	468640	100					To Gannoruwa ST
106		6785	6785	450	8054																43723	01640	010929	02733	φ 500	001	0061	00119	47000	468640	100					From PS

NIPPON JOGESUDO SEKKEI CO., LTD.

Sewage Flow Calculation Table (Gannoruwa)

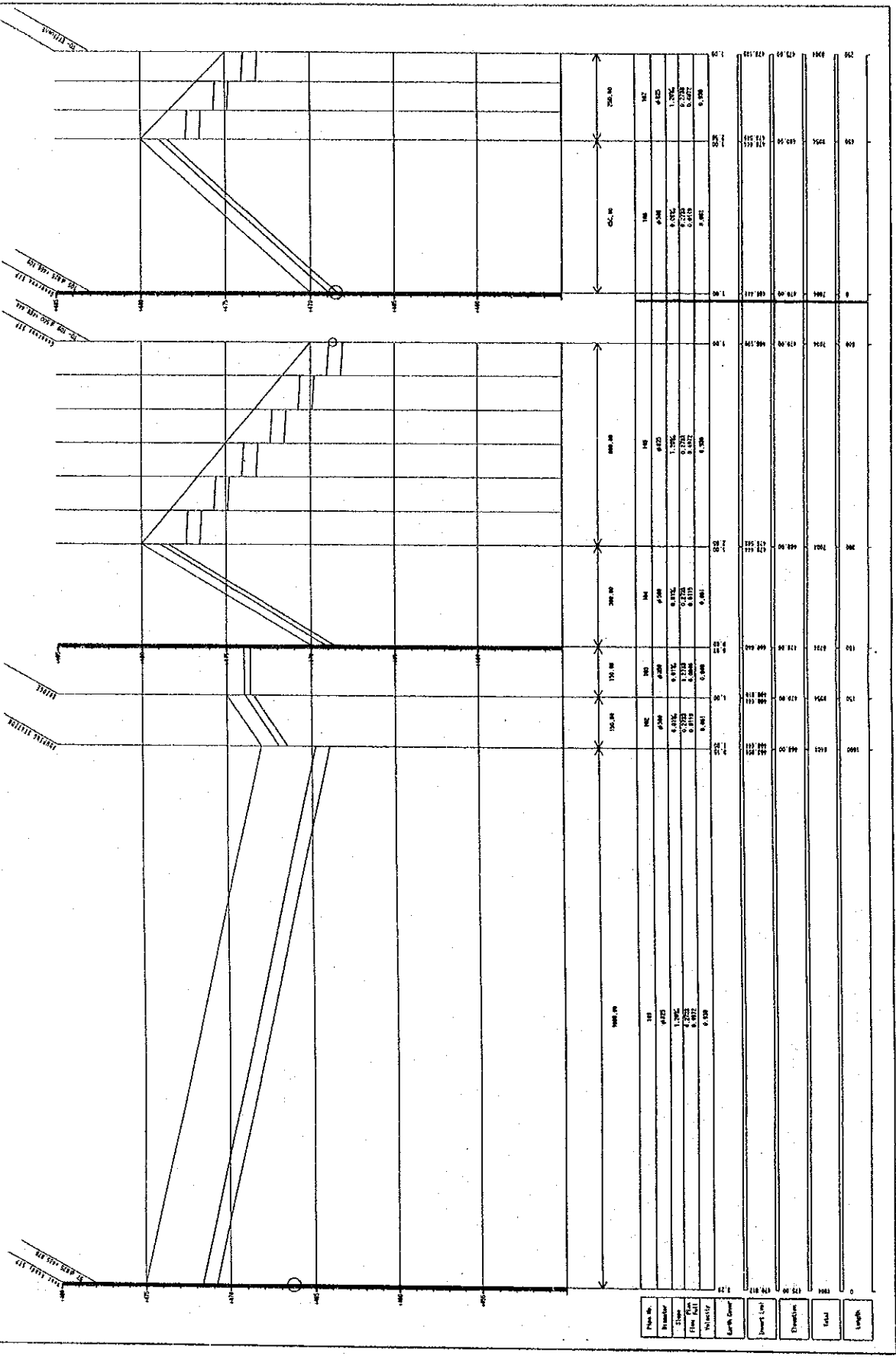
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*Unit Sewage Flow : 0.324m³/capita·day

Pipe No.	Down stream	Service Area			I	Rainfall			Storm Run-off				Sewage Flow				Other Flow				Design Sewer				Remarks						
		ha	Sec.	Accum.		m	m	m	m	C	ha	ha	ha	R.O.	Pop/D	Sec.	P	P	Accum.	Flow	Sec.	Accum.	Accum.	Dia.		Slope	V	FLOW	G.L.	Level	D
107		6765			250	8304									43723	01640	010929	02733					825	120	9530	04972	47500	473109	47549	256	Effluent

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Appendix 18.2 Trunk Sewer Profile



Pipe No.	Material	Size	Length	Start Elev.	End Elev.	Depth	Notes
100	48" Dia	100.00	100.00	100.00	100.00	0.00	
101	48" Dia	100.00	100.00	100.00	100.00	0.00	
102	48" Dia	100.00	100.00	100.00	100.00	0.00	
103	48" Dia	100.00	100.00	100.00	100.00	0.00	
104	48" Dia	100.00	100.00	100.00	100.00	0.00	
105	48" Dia	100.00	100.00	100.00	100.00	0.00	
106	48" Dia	100.00	100.00	100.00	100.00	0.00	
107	48" Dia	100.00	100.00	100.00	100.00	0.00	
108	48" Dia	100.00	100.00	100.00	100.00	0.00	
109	48" Dia	100.00	100.00	100.00	100.00	0.00	
110	48" Dia	100.00	100.00	100.00	100.00	0.00	
111	48" Dia	100.00	100.00	100.00	100.00	0.00	
112	48" Dia	100.00	100.00	100.00	100.00	0.00	
113	48" Dia	100.00	100.00	100.00	100.00	0.00	
114	48" Dia	100.00	100.00	100.00	100.00	0.00	
115	48" Dia	100.00	100.00	100.00	100.00	0.00	
116	48" Dia	100.00	100.00	100.00	100.00	0.00	
117	48" Dia	100.00	100.00	100.00	100.00	0.00	
118	48" Dia	100.00	100.00	100.00	100.00	0.00	
119	48" Dia	100.00	100.00	100.00	100.00	0.00	
120	48" Dia	100.00	100.00	100.00	100.00	0.00	
121	48" Dia	100.00	100.00	100.00	100.00	0.00	
122	48" Dia	100.00	100.00	100.00	100.00	0.00	
123	48" Dia	100.00	100.00	100.00	100.00	0.00	
124	48" Dia	100.00	100.00	100.00	100.00	0.00	
125	48" Dia	100.00	100.00	100.00	100.00	0.00	

Appendix 18.3.1 Pumping Equipment-Capacity Calculation
Kandy - Gannoruwa

1. Pumping Facility

Alternative		Alternative 2			
Area		Kandy			Katugastota
Pump Station		P/S 1	P/S 2	STP	P/S 1
P/S Flow	m3/sec	0.00700	0.27333	0.27333	0.02900
	m3/min	0.420	16.400	16.400	1.740
P/S Type		Circular	Rectangular	Rectangular	Circular
Number (+1)-standby		1 (+ 1)	3 (+ 1)	3 (+ 1)	1 (+ 1)
Capacity	m3/min	0.42	5.47	5.47	1.74
Head	m	14	18.5	13	18
h1 =	m	4.45	12.40	10.00	15.00
h2 =	m	6.51	1.56	2.96	0.87
D =	mm	100	500	350	500
L =	m	650	450	150	250
V =	m/sec	0.891	1.392	2.841	1.392
h3 =	m	1.50	1.50	1.50	1.50
Diameter	mm	60	374	374	122
Diameter	mm	65	126	401	125
Motor Output	kW	1.7	29.2	20.5	9
Motor Output	kW	2.2	30	22	11

2. Pump Pit (Circular)

Alternative		Alternative 2	
Area		Kandy	Katugastota
Pump Station		P/S 1	P/S 1
P/S Flow	m3/sec	0.00700	0.02900
	m3/min	0.420	1.740
P/S Type		Circular	Circular
Number (+1)-standby		1 (+ 1)	1 (+ 1)
Capacity	m3/min	0.42	1.74
Pump Minimum Starting Period	min	8	8
Pump Pit Capacity	cu.m	0.84	3.48
	Therefore	2.00	4.00
Ground Level	m	0.00	0.00
Inlet Pipe Level	m	-4.00	-4.00
Effective Depth	m	1.00	1.00
Top	m	0.50	0.50
Bottom	m	0.50	0.50
Required Area	sq.m	2.00	4.00
Diameter	m	1.60	2.26
	Therefore	3.00	2.50
Dimension (DIA)	m	3.00	2.50
	(D)	6.00	6.00
Retention Time	min	16.83	2.82

3. Pump Pit (Rectangular)

Alternative		Alternative 2	
Area		Kandy	Kandy
Pump Station		PS-2	STP
P/S Flow	m3/sec	0.27333	0.27333
	m3/min	16.400	16.400
P/S Type		Rectangular	Rectangular
Number (+1)-standby		3 (+ 1)	3 (+ 1)
Capacity	m3/min	5.47	5.47
Pump Minimum Starting Period	min	15	15
Pump Pit Capacity	cu.m	20.51	20.51
	Therefore	24.00	24.00
Ground Level	m	468.00	470.00
Inlet Pipe Level	m	464.00	468.50
Effective Depth	m	1.50	1.50
Top	m	0.50	0.50
Bottom	m	0.70	0.70
Required Area	sq.m	16.00	16.00
Width	m	4.00	4.00
Length	m	4.00	4.00
Therefore	m	4.00	4.00
Dimension	(W)	4.00	4.00
	(L)	4.00	4.00
	(D)	6.70	4.20
Retention Time	min	3.90	3.90

Appendix 18.3.2 Pumping Equipment-Capacity Calculation Kandy - Gannoruwa

1. Pumping Station No.1 (Kandy Lake)

Total Capacity 605 m3/day= 0.42 m3/min
 Quantity of pump 1 sets + 1 set for stand-by
 Pump Capacity 605 m3/day
 $Q = 0.420 \text{ m}^3/\text{min}$
 $q = 0.0070 \text{ m}^3/\text{sec}$

Diameter Diameter = $146 \cdot (Q/v)^{1/2}$
 = 77 mm to 55 mm
 = 65 mm
 where, $v = 1.50$ to 3.00

Total Head Total Head $H = h_1 + h_2 + h_3 = 12.3 \text{ m}$
 = 14.0 m
 actual head $h_1 = h_d - h_s = 4.45 \text{ m}$
 suction level $h_s = 508.66 \text{ m}$
 delivery level $h_d = 513.11 \text{ m}$
 friction loss (Hazen Williams) : straight pipe
 $h_2 = 10.666 \cdot c^{-1.85} \cdot D^{-4.87} \cdot q^{1.85} \cdot L$
 = 6.51 m
 where, $c = 130$
 $D = 100 \text{ mm dia} / 1000$
 $L = 650 \text{ m}$
 $(v = 0.892 \text{ m/sec})$

friction loss : fittings

$h_3 = f \cdot (v^2 / 2 \cdot g)$
 = 1.34 m

where, $v = 2.11 \text{ m/sec}$

where,	Q'ty	f/pc	f
check valve	1	1.50	1.50
sluice valve	2	0.10	0.20
increase	0	0.15	0.00
90deg	5	0.18	0.90
tee	2	1.15	2.30
outlet	1	1.00	1.00
		total	5.90

Motor Output Motor Output = $(0.163 \cdot r \cdot Q \cdot H / e) \cdot (1 + a)$
 = 1.8 kW
 = 2.2 kW
 where, $r = 1.00$
 $e = 0.60$
 $a = 0.15$

Specification

Type Submersible Sewage Pump
 Diameter 65 mm
 Capacity 0.42 m3/min
 Head 14.0 m
 Motor Output 2.2 kW
 Quantity 1 sets + 1 set for standby

2. Pumping Station No.2 (Getambe)

Total Capacity 23,613 m³/day= 16.40 m³/min
 Quantity of pump 3 sets + 1 set for stand-by
 Pump Capacity 7,871 m³/day
 Q = 5.466 m³/min
 q = 0.0911 m³/sec

Diameter Diameter = $146 \cdot (Q/v)^{1/2}$
 = 279 mm to 197 mm
 = 250 mm
 where, v = 1.50 to 3.00

Total Head Total Head H=h₁+h₂+h₃= 18.0 m
 = 19.0 m
 actual head h₁ = h_d - h_s = 12.40 m
 suction level h_s= 466.10 m
 delivery level h_d= 478.50 m
 friction loss (Hazen Williams) :straight pipe
 $h_2 = 10.666 \cdot c^{-1.85} \cdot D^{-4.87} \cdot q^{1.85} \cdot L$
 = 1.56 m 2.96 m
 where, c= 130 130
 D = 500 mm dia/100 350 mm dia/1000
 L = 450 m 150 m
 (v = 1.392 m/sec 2.841 m/sec)

friction loss : fittings
 $h_3 = f \cdot (v^2 / 2 \cdot g)$
 = 1.04 m
 where, v = 1.86 m/sec

where,	Q'ty	f/pc	f
check valve	1	1.50	1.50
sluice valve	2	0.10	0.20
increase	0	0.15	0.00
90deg	5	0.18	0.90
tee	2	1.15	2.30
outlet	1	1.00	1.00
		total	5.90

Motor Output Motor Output = $(0.163 \cdot r \cdot Q \cdot H / e) \cdot (1+a)$
 = 29.9 kW
 = 30.0 kW
 where, r = 1.00
 e = 0.65
 a = 0.15

Specification

Type Submersible Sewage Pump
 Diameter 250 mm
 Capacity 5.47 m³/min
 Head 19.0 m
 Motor Output 30 kW
 Quantity 3 sets + 1 set for standby

3. Sewage Treatment Plant (Discharge)

Total Capacity 23,613 m³/day= 16.40 m³/min
 Quantity of pump 3 sets + 1 set for stand-by
 Pump Capacity 7,871 m³/day
 Q = 5.466 m³/min
 q = 0.0911 m³/sec

Diameter Diameter = $146 \cdot (Q/v)^{1/2}$
 = 279 mm to 197 mm
 = 250 mm
 where, v = 1.50 to 3.00

Total Head Total Head $H = h_1 + h_2 + h_3 = 11.9$ m
 = 13.0 m
 actual head $h_1 = h_d - h_s = 10.00$ m
 suction level $h_s = 468.50$ m
 delivery level $h_d = 478.50$ m
 friction loss (Hazen Williams) : straight pipe
 $h_2 = 10.666 \cdot c^{-1.85} \cdot D^{-4.87} \cdot q^{1.85} \cdot L$
 = 0.87 m
 where, c = 130
 D = 500 mm dia /1000
 L = 250 m
 (v = 1.392 m/sec)

friction loss : fittings

$$h_3 = f \cdot (v^2 / 2 \cdot g)$$

$$= 1.04$$

where, v = 1.86 m/sec

where,	Q'ty	f/pc	f
check valve	1	1.50	1.50
sluice valve	2	0.10	0.20
increase	0	0.15	0.00
90deg	5	0.18	0.90
tee	2	1.15	2.30
outlet	1	1.00	1.00
		total	5.90

Motor Output Motor Output = $(0.163 \cdot r \cdot Q \cdot H / e) \cdot (1 + a)$
 = 20.5 kW
 = 22.0 kW
 where, r = 1.00
 e = 0.65
 a = 0.15

Specification

Type Submersible Sewage Pump
 Diameter 250 mm
 Capacity 5.47 m³/min
 Head 13.0 m
 Motor Output 22 kW
 Quantity 3 sets + 1 set for standby

Appendix 18.4 Sewage Treatment Plant - Capacity Calculation

CAPACITY CALCULATION OF FACILITIES

Gannoruwa - Dual Power Aerated Lagoon

1 BASIC CONDITIONS

1-1 BASIC ITEMS

- (1) Name : Gannoruwa Sewage Treatment Plant
- (2) Land Area : Approximately 4 ha
- (3) Elevation : - m
- (4) Inlet Pipe Level : - m
- (5) Pipe Diameter : - m
- (6) Land Use : -
- (7) Collection System : Seperate Type
- (8) Treatment Method : Sewage Treatment : Aerated Lagoon Method
Sludge Treatment : Pond Accumulation
- (9) Effluent Point : Mahaweli Ganga
- (10) Effluent Point Water Level : - m
- (11) Target Year : Year 2005 (Phase 1), Year 2015 (Phase 2)
- (12) Lowest Monthly Average Temperature : 23.6 °C (January)

1-2 Design Population

Design Population : 55,000 Persons

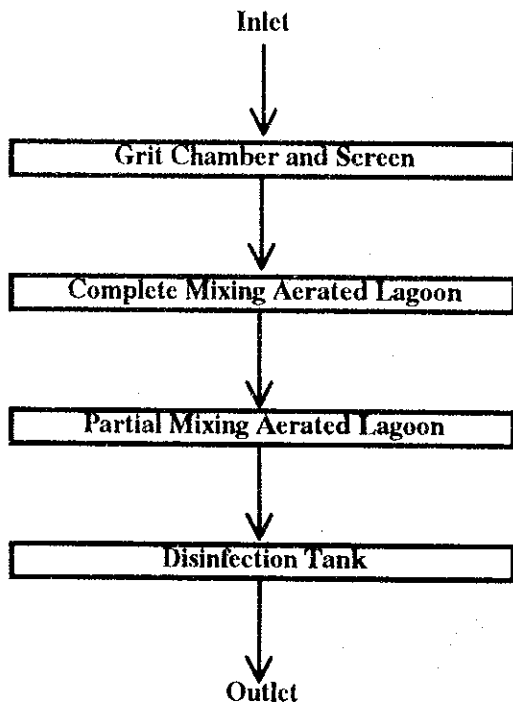
1-3 Design Sewage Flow

ITEM	m ³ /day	m ³ /hr	m ³ /min	m ³ /sec
Daily Average	13,700	570.8	9.51	0.159
Daily Maximum	17,000	708.3	11.81	0.197
Hourly Maximum	23,100	962.5	16.04	0.267

1-4 Design Sewage Quality

ITEM	INFLUENT (mg/L)	EFFLUENT (mg/L)	REMOVAL RATIO (%)	REMARKS
BOD	240	30	88	
SS	250	50	80	

1-5 Flow Chart (Dual Power Aerated Lagoon)



1-6 Design Criteria for Dual Power Aerated Lagoon

ITEMS	UNIT	Formula or Value	Application
1-6-1 Grit Chamber			
(1) Water Surface Load	m ³ /m ² /day	> 1800	1,800
(2) Average Velocity	m/sec	> 0.3	0.3
1-6-2 Complete Mixing Aerated Lagoon			
(1) Retention Time	day	1.5 - 2.5	1.50
(2) Water Depth	m	3.0 - 4.0	3.0
(3) Power Requirement for Mixing	W/m ³	> 6.0	6.0
1-6-3 Partial Mixing Aerated Lagoon			
(1) Retention Time	day	2.0	2.0
(2) Water Depth	m	2.0 - 4.0	3.0
(3) Power Requirement for Mixing	W/m ³	> 1.0	1.0
(4) Number of Cell	Cell/Basin	1 - 3	3
1-6-4 Storm Water Settling Tank			
(1) Water Depth	m	1.5 - 3.0	1.5
(2) Retention Time (Hourly Max. - Rain)	hour	> 0.5	0.5
(3) Water Surface Load (Hourly Max. - Rain)	m ³ /m ² /day	75 - 150	150.0
1-6-5 Disinfection Tank			
(1) Retention Time	min.	> 15	15.0
(2) Dosage	mg/l	2.0 - 4.0	3.0