

**APPENDIX N**  
**COST ESTIMATE**

## **APPENDIX N COST ESTIMATE**

As stated in Chapter 8, base unit cost and detailed data are shown here. The contents are as follows;

### **TABLE OF CONTENTS**

<b>1</b>	<b>MATERIAL COSTS.....</b>	<b>N-1</b>
<b>2</b>	<b>WORK AND LABOUR COST .....</b>	<b>N-2</b>
<b>3</b>	<b>REHABILITATION OF AGED PIPE BY TOWNSHIP.....</b>	<b>N-3</b>
<b>4</b>	<b>YEARLY INSTALLATION WORK OF PRIMARY MAINS .....</b>	<b>N-5</b>
<b>5</b>	<b>YEARLY INSTALLATION WORK OF SECONDARY MAINS.....</b>	<b>N-7</b>

# 1 MATERIALS COST

## Ductile Iron Pipe

Diameter (mm)	Material Origin		Installation Cost (US\$/m)	Remarks
	Domestic	Imported		
250		○	96.76	Material cost + installation cost
300		○	122.37	
350		○	145.50	
400		○	175.68	
450		○	208.59	
500		○	242.90	
600		○	320.26	
700		○	413.30	
800		○	508.89	
900		○	624.32	
1,000		○	744.90	
1,100		○	882.86	
1,200		○	1,029.05	
1,350		○	1,262.48	
1,400		○	1,348.18	
1,500		○	1,519.60	
1,650		○	1,807.20	
1,800		○	2,103.33	
2,000		○	2,585.87	

## Ductile Iron Pipe

Diameter (mm)	Material Origin		Installation Cost (US\$/m)	Remarks
	Domestic	Imported		
2,100		○	1,982.04	
2,200		○	2,183.20	
2,400		○	2,568.33	
2,500		○	2,794.33	
2,600		○	3,020.32	
2,700		○	4,480.69	

## PVC Pipe

Diameter (mm)	Material Origin		Installation Cost (US\$/m)	Remarks
	Domestic	Imported		
50	○		2.60	Material cost + installation cost
75	○		6.50	
100	○		9.10	
125	○		15.60	
150	○		20.80	
200	○		40.30	
225	○		49.40	
250	○		58.50	
300	○		81.90	

## 2 WORK AND LABOUR COST

### Work Cost

Item	Unit	Rate (US\$)	Remarks
Ready mixed concrete	m <sup>3</sup>	70.00	
Re-bar work	ton	500.00	
Shuttering form work	m <sup>2</sup>	15.00	Jungle wood
Scaffolding work	m <sup>3</sup>	6.00	
Earth work			
- Ordinary Soil (in trench 5' depth)	m <sup>3</sup>	4.20	
(increase 1' depth)	m <sup>3</sup>	0.09	
- Hard Soil (trench 5' depth)	m <sup>3</sup>	6.70	
(increase 1' depth)	m <sup>3</sup>	0.27	
- Medium Soil (in trench 5' depth)	m <sup>3</sup>	5.00	
(increase 1' depth)	m <sup>3</sup>	0.18	
Refill	m <sup>3</sup>	7.00	
Disposal of surplus soil	m <sup>3</sup>	3.00	

### Labour Cost

Item	Unit	Rate (Ks)	Remarks
Foreman	day	2,500	
Skilled labour	day	1,500	
Un-skilled labour	day	1,500	
Electrician	day	1,500	
Mechanic	day	1,500	
Plasterer, Mason	day	1,500	
Carpenter	day	1,500	
Construction machinery operator	day	1,500	

### 3 REHABILITATION OF AGED PIPE BY TOWNSHIP (Phase-1)

Township	Zone no	Nominal dia (mm)	Pipe Diameter (mm)												Total Cost (US\$)		
			75	100	125	150	200	225	250	300	350	400	450	L/C	F/C	total	
1 Ahtone	1	0	2,277	0	15,376	0	0	0	457	0	1,410	0	0	0	0	0	18,520
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	0	96.76	122.37	145.50	175.68	208.59				
Cost		0	20,721	0	319,821	0	0	0	55,923	0	0	294,112	0	0	0	359,043	690,576
2 Bahan	1	5,243	11,034	0	32,339	1,372	0	2,804	8,077	0	0	0	0	0	0	0	60,869
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		34,080	100,409	0	672,651	55,292	0	271,315	988,382	0	0	0	0	0	0	925,417	2,122,129
3 Botataung	1	0	866	0	17,678	366	0	448	11,275	0	0	0	0	0	0	0	31,209
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		0	7,881	0	367,702	14,750	0	43,348	1,379,722	0	0	0	0	0	0	467,494	1,466,057
4 Dagon	1	1,719	5,257	0	10,201	0	0	5,637	2,577	279	0	0	0	0	0	0	25,670
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		11,174	47,839	0	212,181	0	0	545,436	315,347	40,595	0	0	0	0	0	916,262	1,172,571
15 Kyauktada	1	2,611	0	0	11,736	262	0	876	4,915	0	0	0	0	0	0	0	20,200
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		16,972	0	0	244,109	10,559	0	85,410	601,449	0	0	0	0	0	0	304,882	938,497
16 Kyeemyindaing	1	0	6,104	0	15,820	0	0	1,448	0	0	0	0	0	0	0	0	23,472
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		0	55,546	0	331,136	0	0	140,108	0	0	0	0	0	0	0	393,688	526,791
17 Lanmadaw	1	1,153	958	0	8,357	0	0	4,730	2,948	0	0	0	0	0	0	0	18,146
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		7,495	8,718	0	173,826	0	0	457,675	360,747	0	0	0	0	0	0	230,959	1,009,459
18 Latha	1	959	0	0	8,706	0	0	1,885	2,597	0	0	0	0	0	0	0	12,127
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		6,234	0	0	139,485	0	0	180,457	317,795	0	0	0	0	0	0	170,631	643,971
21 Mingalartaungnyunt	1	0	1,931	0	12,924	0	0	701	7,126	0	0	0	0	0	0	0	23,627
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		0	17,572	0	268,819	0	0	67,829	872,009	0	0	0	0	0	0	343,239	1,423,346
23 Pabedan	1	0	0	0	9,022	0	0	991	6,126	0	0	0	0	0	0	0	16,139
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		0	0	0	187,658	0	0	95,889	749,639	0	0	0	0	0	0	228,834	1,033,185
24 Pazundaung	1	198	2,103	0	14,105	0	0	914	3,566	0	0	0	0	0	0	0	21,648
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		1,287	19,137	0	283,384	0	0	88,439	436,371	0	0	0	0	0	0	347,996	997,564
25 Sarschaung	1	0	5,161	0	21,744	0	0	4,372	0	0	0	0	0	0	0	0	31,675
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		0	46,965	0	452,275	0	0	423,035	0	0	0	0	0	0	0	523,888	992,196
30 Tamwe	1	960	7,632	0	18,596	0	0	2,019	0	0	0	0	0	0	0	0	30,198
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		6,240	69,451	0	386,797	0	0	195,358	0	0	0	0	0	0	0	206,713	864,559
33 Yanlin	1	1,415	7,362	0	2,465	292	0	1,040	1,720	0	0	0	0	0	0	0	14,294
Unit Cost		6.50	9.10	15.60	20.80	40.30	0	96.76	122.37	145.50	175.68	208.59					
Cost		9,198	66,994	0	51,272	11,768	0	100,630	210,476	0	0	0	0	0	0	154,787	450,338
													Total	5,249,910	9,547,824	14,797,734	
													Pipe Length			348,794	

1.1.1		
L/C	F/C	Total
1,761,995	4,803,232	6,565,227

1.1.2		
L/C	F/C	Total
482,582	381,968	864,559

1.1.3		
L/C	F/C	Total
761,731	465,636	1,217,367

1.2.1		
L/C	F/C	Total
523,888	468,308	992,196

1.2.2		
L/C	F/C	Total
343,239	1,080,107	1,423,346

1.2.3		
L/C	F/C	Total
1,396,465	2,348,573	3,745,038

Total		
L/C	F/C	Total
5,249,910	9,547,824	14,797,734

### 3 REHABILITATION OF AGED PIPE BY TOWNSHIP (Phase-2)

Township	Zone no	Pipe Diameter (mm)											Total Cost (US\$)		
		Nominal dia (mm)											L/C	FFC	total
		75	100	125	150	200	225	250	300	350	400	450			
9. Dala	9	3,902	5,486	0	2,134	0	0	0	146	0	12,070	0			23,799
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		25,753	49,923	0	44,387	0	0	0	16,491	0	1,857,271	0	218,751	1,875,074	2,093,825
10. Dawbon	6	0	213	0	0	0	0	0	0	0	0	0			213
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		0	1,938	0	0	0	0	0	0	0	0	0	1,938	0	1,938
11. Htalng	3	10,668	8,022	5,666	5,441	975	0	0	396	0	305	975			32,448
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		69,342	73,000	88,390	113,173	39,293	0	0	44,728	0	49,459	187,727	397,293	267,818	665,111
13. Insein	3	0	0	1,524	1,433	0	0	1,067	168	0	0	0			4,192
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		0	0	23,774	29,806	0	0	95,304	18,976	0	0	0	59,295	108,566	167,861
14. Kamayut	1	2,207	1,914	0	8,733	1,710	0	704	2,682	0	0	0			17,950
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		14,346	17,417	0	181,646	68,913	0	62,881	302,932	0	0	0	300,613	347,523	648,135
19. Mayangone	3	8,120	11,305	0	12,052	4,560	0	0	3,749	0	0	0			39,788
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		52,780	102,878	0	250,682	183,768	0	0	423,450	0	0	0	611,278	402,277	1,013,555
20. Mingalardon	3	2,758	1,372	61	12	0	0	0	0	0	0	0			4,203
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		17,927	12,485	952	250	0	0	0	0	0	0	0	31,613	0	31,613
22. North Okkalapa	3	1,295	16,383	0	3,719	8,553	0	343	4,801	0	0	0			33,094
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		8,418	149,085	0	77,355	284,086	0	30,637	542,273	0	0	0	527,589	544,264	1,071,854
26. Seikan Port	1	0	0	0	2,661	0	0	0	0	0	0	0			2,661
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		0	0	0	55,349	0	0	0	0	0	0	0	55,349	0	55,349
29. South Okkalapa	2	24,841	2,591	0	14,783	0	0	1,829	9,449	0	0	0			53,493
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		161,467	23,578	0	307,486	0	0	183,366	1,067,265	0	0	0	554,063	1,169,099	1,723,162
31. Thaketa	6	5,273	11,582	0	16,002	3,993	0	1,615	8,382	0	0	0			46,847
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		34,275	105,396	0	332,842	160,918	0	144,252	946,747	0	0	0	687,980	1,036,449	1,724,429
32. Thingangyun	2	1,991	10,698	0	5,883	1,524	0	1,372	5,486	0	0	0			26,944
Unit Cost		6.50	9.10	15.60	20.80	40.30	89.32	112.95	134.31	162.16	192.54	0			
Cost		12,877	97,352	0	122,366	61,417	0	122,547	619,644	0	0	0	331,121	705,081	1,036,203
													3,776,863	6,456,151	10,233,034
													Pipe Length		285,629

4 YEARLY INSTALLATION WORK OF PRIMARY MAINS

Distribution Zone Name		No.	Yearly new primary main installation length and cost																		Total
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Downtown		1	0	3,910	4,410	3,560	3,560	3,560	3,550	0	0	0	0	0	0	0	0	0	0	22,550	
	L/C		0	109,820	123,863	99,989	99,989	99,989	99,709	0	0	0	0	0	0	0	0	0	0	533,360	
	F/C		0	2,096,576	2,353,402	1,899,798	1,899,798	1,899,798	1,894,462	0	0	0	0	0	0	0	0	0	0	12,033,835	
Downtown East		2	0	0	0	2,960	2,960	2,970	2,180	2,180	2,180	2,180	2,180	2,180	2,180	2,180	2,180	2,180	2,180	32,920	
	L/C		0	0	0	84,300	84,300	84,517	47,356	47,356	47,356	47,356	47,356	47,356	47,356	47,356	47,356	47,356	47,356	48,442	
	F/C		0	0	0	1,221,700	1,221,700	1,225,827	899,766	899,766	899,766	899,766	899,766	899,766	899,766	899,766	899,766	899,766	899,766	920,402	
Central West		3	0	0	2,840	3,480	3,480	3,480	3,480	3,630	3,480	3,480	3,480	3,480	3,480	3,480	3,480	3,480	3,480	51,640	
	L/C		0	0	63,667	78,014	78,014	78,014	78,014	81,377	78,014	78,014	78,014	78,014	78,014	78,014	78,014	78,014	78,014	76,445	
	F/C		0	0	1,209,667	1,482,268	1,482,268	1,482,268	1,482,268	1,546,159	1,482,268	1,482,268	1,482,268	1,482,268	1,482,268	1,482,268	1,482,268	1,482,268	1,482,268	1,452,452	
Hlawga		4	0	0	0	0	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	3,680	47,760	
	L/C		0	0	0	0	104,962	104,962	104,962	104,962	104,962	104,962	104,962	104,962	104,962	104,962	104,962	104,962	104,962	102,680	
	F/C		0	0	0	0	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,994,278	1,950,924	
Central North		5	0	0	0	0	0	0	0	1,450	1,450	1,450	0	0	0	0	0	0	0	4,360	
	L/C		0	0	0	0	0	0	0	20,702	20,702	20,845	0	0	0	0	0	0	0	52,250	
	F/C		0	0	0	0	0	0	0	393,344	393,344	396,057	0	0	0	0	0	0	0	1,182,745	
East South		6	0	0	0	0	1,480	1,480	1,480	890	890	890	890	890	890	890	890	890	890	830	
	L/C		0	0	0	0	36,343	36,343	36,343	21,855	21,855	21,855	21,855	21,855	21,855	21,855	21,855	21,855	21,855	20,382	
	F/C		0	0	0	0	690,516	690,516	690,516	415,243	415,243	415,243	415,243	415,243	415,243	415,243	415,243	415,243	415,243	387,249	
East Central		7	0	0	0	0	0	3,280	3,280	3,280	3,280	3,280	3,280	3,280	3,280	3,280	3,280	3,280	3,280	3,250	
	L/C		0	0	0	0	0	34,193	34,193	34,193	34,193	34,193	34,193	34,193	34,193	34,193	34,193	34,193	34,193	33,881	
	F/C		0	0	0	0	0	649,673	649,673	649,673	649,673	649,673	649,673	649,673	649,673	649,673	649,673	649,673	649,673	643,731	
East North		8	0	0	0	0	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,150	2,180	
	L/C		0	0	0	0	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,404	26,773	
	F/C		0	0	0	0	501,679	501,679	501,679	501,679	501,679	501,679	501,679	501,679	501,679	501,679	501,679	501,679	501,679	508,679	
West South		9	0	0	0	0	0	0	0	880	880	0	0	0	0	0	0	0	0	1,760	
	L/C		0	0	0	0	0	0	0	7,702	7,702	0	0	0	0	0	0	0	0	15,404	
	F/C		0	0	0	0	0	0	0	146,341	146,341	0	0	0	0	0	0	0	0	292,681	
West Central		10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	L/C		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	F/C		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
West North		11	0	0	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,760	1,730	
	L/C		0	0	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,908	29,399	
	F/C		0	0	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	568,259	558,573	
	L/C		0	109,820	217,438	272,212	439,921	474,331	456,889	374,460	371,097	363,538	342,693	342,693	342,693	342,693	342,693	342,693	342,693	338,000	
	F/C		0	2,086,576	4,131,328	5,172,025	8,358,497	9,012,298	8,680,899	7,114,740	7,050,849	6,907,221	6,511,164	6,511,164	6,511,164	6,511,164	6,511,164	6,511,164	6,511,164	6,422,009	
	Total		0	2,196,396	4,348,766	5,444,237	8,798,418	9,486,629	9,137,789	7,489,200	7,421,946	7,270,759	6,853,857	6,853,857	6,853,857	6,853,857	6,853,857	6,853,857	6,853,857	6,760,010	
																				109,477,293	

Distribution Zone Name	No.	Total length (m)	Primary mains new installation plan by diameter (mm)													Total Cost (US\$)			
			300	350	400	500	600	700	800	900	1,000	1,100	1,200	1,350	1,400	1,500	L/C	F/C	Total
Downtown	1	22,550	0	0	0	5,000	3,370	3,340	4,950	70	1,880	0	0	3,290	650	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	0	1,214,500	1,079,276	1,380,422	2,519,006	43,702	1,400,412	0	0	4,153,559	876,317	0	633,360	#####	12,667,194
Downtown East	2	32,920	0	0	3,630	6,770	8,670	1,410	7,640	830	940	0	1,160	1,870	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	637,718	1,644,433	2,776,654	582,753	3,887,920	518,186	700,206	0	1,193,698	2,360,838	0	0	715,120	#####	14,302,405
Central West	3	51,640	0	3,360	13,670	5,340	2,370	7,080	7,510	0	6,070	0	4,030	2,210	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	488,880	2,401,546	1,297,086	759,016	2,926,164	3,821,764	0	4,521,543	0	4,147,072	2,790,081	0	0	1,157,658	#####	23,153,151
Hlawga	4	47,760	0	0	2,030	18,660	2,490	0	2,530	3,330	6,680	3,610	3,080	2,270	2,520	360			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	356,630	4,581,094	797,447	0	1,287,492	2,078,986	4,975,932	3,187,125	3,169,474	2,865,830	3,397,414	547,056	1,362,224	#####	27,244,479
Central North	5	4,360	0	0	2,060	780	0	1,210	0	310	0	0	0	0	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	361,901	189,462	0	500,093	0	193,539	0	0	0	0	0	0	62,250	1,182,745	1,244,995
East South	6	13,280	0	0	1,770	1,730	2,660	810	0	3,220	1,770	1,030	0	290	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	310,954	420,217	851,892	334,773	0	2,010,310	1,318,473	909,346	0	366,119	0	0	326,104	6,195,979	6,522,084
East Central	7	39,330	25,660	0	5,170	1,880	1,220	820	1,890	0	2,690	0	0	0	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			3,140,014	0	908,266	456,652	390,717	338,906	961,802	0	2,003,781	0	0	0	0	0	410,007	7,790,131	8,200,138
East North	8	27,980	8,800	0	6,620	1,880	7,900	0	0	2,580	0	0	0	0	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			1,076,856	0	1,198,138	456,652	2,530,054	0	0	1,610,746	0	0	0	0	0	0	343,622	6,528,823	6,872,445
West South	9	1,760	500	0	880	380	0	0	0	0	0	0	0	0	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			61,185	0	154,598	92,302	0	0	0	0	0	0	0	0	0	0	15,404	292,681	308,085
West Central	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West North	11	26,370	0	0	4,970	9,680	0	6,850	1,740	2,870	0	260	0	0	0	0			
Unit Cost			122.37	145.50	175.68	242.90	320.26	413.30	508.89	624.32	744.90	882.86	1,029.05	1,262.48	1,348.18	1,519.60			
Cost			0	0	873,130	2,351,272	0	2,831,105	885,469	1,791,798	0	229,544	0	0	0	0	448,116	8,514,201	8,962,317
		267,950	34,960	3,360	41,000	52,300	28,680	21,520	26,260	13,210	20,030	4,900	8,270	9,930	3,170	360	5,473,865	#####	#####



5 YEARLY INSTALLATION WORK OF SECONDARY MAINS

Distribution Zone Name	No.	Pipe replacement length and cost by implementation year																		Total		
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020				
Downtown	1	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	3,900	78,900		
		L/C	0	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	90,750	70,785	1,432,032
		F/C	0	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	27,961	21,810	441,225	
Downtown East	2	0	0	0	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	16,900	17,800	237,500		
		L/C	0	0	0	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	307,175	323,533	4,316,803	
		F/C	0	0	0	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	93,536	96,517	1,314,485	
Central West	3	0	0	12,100	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,400	14,200	213,500		
		L/C	0	0	220,033	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	261,858	258,221	3,882,403	
		F/C	0	0	66,162	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	78,739	77,945	1,167,409	
Hlawga	4	0	0	0	7,400	13,800	13,800	13,800	13,800	13,800	13,800	13,800	13,800	13,800	13,800	13,800	13,800	13,800	14,100	187,100		
		L/C	0	0	0	134,566	250,947	250,947	250,947	250,947	250,947	250,947	250,947	250,947	250,947	250,947	250,947	250,947	256,409	3,402,336		
		F/C	0	0	0	40,719	75,935	75,935	75,935	75,935	75,935	75,935	75,935	75,935	75,935	75,935	75,935	75,935	77,586	1,029,526		
Central North	5	0	0	0	0	0	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,000	15,300			
		L/C	0	0	0	0	0	23,721	23,721	23,721	23,721	23,721	23,721	23,721	23,721	23,721	23,721	23,721	18,247	279,174		
		F/C	0	0	0	0	0	7,029	7,029	7,029	7,029	7,029	7,029	7,029	7,029	7,029	7,029	7,029	5,407	82,730		
East South	6	0	0	0	0	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,900	9,300	128,100		
		L/C	0	0	0	0	179,934	179,934	179,934	179,934	179,934	179,934	179,934	179,934	179,934	179,934	179,934	179,934	179,934	169,029	2,328,243	
		F/C	0	0	0	0	54,701	54,701	54,701	54,701	54,701	54,701	54,701	54,701	54,701	54,701	54,701	54,701	51,386	707,799		
East Central	7	0	0	0	0	0	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,100	64,500			
		L/C	0	0	0	0	0	98,129	98,129	98,129	98,129	98,129	98,129	98,129	98,129	98,129	98,129	98,129	92,678	1,172,098		
		F/C	0	0	0	0	0	30,014	30,014	30,014	30,014	30,014	30,014	30,014	30,014	30,014	30,014	30,014	28,346	358,496		
East North	8	0	0	0	0	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,000	50,400			
		L/C	0	0	0	0	85,304	85,304	85,304	85,304	85,304	85,304	85,304	85,304	85,304	85,304	85,304	85,304	72,599	1,096,251		
		F/C	0	0	0	0	26,466	26,466	26,466	26,466	26,466	26,466	26,466	26,466	26,466	26,466	26,466	22,524	340,111			
West South	9	0	0	0	0	0	0	0	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	1,700	20,600			
		L/C	0	0	0	0	0	0	0	38,216	38,216	38,216	38,216	38,216	38,216	38,216	38,216	38,216	30,936	374,876		
		F/C	0	0	0	0	0	0	0	11,245	11,245	11,245	11,245	11,245	11,245	11,245	11,245	11,245	9,103	110,306		
West Central	10	0	0	0	0	0	0	0	0	0	3,000	3,000	3,000	3,000	3,000	3,000	3,000	2,700	23,700			
		L/C	0	0	0	0	0	0	0	0	0	54,750	54,750	54,750	54,750	54,750	54,750	54,750	49,275	432,523		
		F/C	0	0	0	0	0	0	0	0	0	16,290	16,290	16,290	16,290	16,290	16,290	16,290	14,661	128,691		
West North	11	0	0	0	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,600	4,300	64,100			
		L/C	0	0	0	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	83,631	78,176	1,165,374	
		F/C	0	0	0	25,067	25,067	25,067	25,067	25,067	25,067	25,067	25,067	25,067	25,067	25,067	25,067	25,067	23,432	349,304		
L/C	0	90,750	310,783	877,979	1,259,599	1,381,448	1,381,448	1,419,564	1,419,564	1,474,414	1,474,414	1,474,414	1,474,414	1,474,414	1,474,414	1,474,414	1,474,414	1,474,414	1,419,882	19,882,113		
F/C	0	27,961	94,123	286,022	382,405	419,447	419,447	430,692	430,692	446,982	446,982	446,982	446,982	446,982	446,982	446,982	446,982	446,982	430,417	6,030,083		
Total		0	118,711	404,906	1,144,000	1,642,003	1,800,896	1,800,896	1,850,356	1,850,356	1,921,396	1,921,396	1,921,396	1,921,396	1,921,396	1,921,396	1,921,396	1,850,299	25,912,196			

**APPENDIX O**  
**DATABASE  
DEVELOPMENT  
AND  
MANAGEMENT**

## **APPNDIX O DATABASE DEVELOPMENT AND MANAGEMENT**

### **TABLE OF CONTENTS**

<b>1</b>	<b>PRESENT STATUS .....</b>	<b>0-1</b>
<b>2</b>	<b>TYPES OF RECORDS .....</b>	<b>0-2</b>
	2.1 DRAWINGS .....	0-2
	2.2 DATA RECORDS .....	0-2
	2.3 UNAVAILABLE RECORDS .....	0-3
<b>3</b>	<b>RECOMMENDATIONS.....</b>	<b>0-3</b>

### **List of Tables**

Table O.1	Status of Engineering Drawings in WSS Department .....	0-4
Table O.2	Status of Data relating to Water Supply Institutions and Organizations.....	0-25

## **APPENDIX O DATABASE DEVELOPMENT AND MANAGEMENT**

A water supply organization will base its day-to-day decisions on the collection and analysis of records of various types. The records are a fine tool to measure past performance base on which future directions could be planned. Hence, the development and management of databases become an integral function of water supply organizations. The aim of this Appendix is to describe briefly the status of collection, utilization and management of data pertaining to the YCDC-owned City water supply system, and thereby to identify areas where an up-to-date and accurate databases should be developed. It does not discuss about the status of data relating to the City water supply in general where there are several players in addition to YCDC.

The data referred to in this Appendix comprises of records (containing numerical figures) and drawings (ie. Maps, design drawings of buildings, structures, pipelines, etc.). The records themselves may be split into hardware (water flow measurements, dimension of pipelines, reservoir water levels, etc.) and software (data pertaining to customers, training, staffing, etc.).

### **1 PRESENT STATUS**

As presented in Chapters 2 and 3, the lack of data is one of the most important problems affecting the management of the water supply system at present. There are several data problems currently facing the organization. They are (a) unavailability of data (b) inaccurate data (c) out-dated data (d) out-of-scale data. The unavailability is either a result of data not collected at all or data is available somewhere within the organization but cannot be retrieved when needed. The latter suggests that the present system of data storage is far from what is required by the organization.

At present, the Water Supply and Sanitation (WSS) department does not have a unit explicitly responsible for tasks such as the design of collection instruments, data gathering itself, storage and analysis. All of its 6 divisions, 4 sections, and 4 district and 30 township offices collect data of various types as part of their legitimate operations. The collection itself is both unsystematic and poorly organized. There is no evidence of attempt to streamline data collection instruments. As well, there are no established lines of data flow and data analysis is extremely poor. Many of collected data are buried in voluminous records making it extremely difficult if not impossible to retrieve for analyses. Partly because of the weak data analysis and almost absence of reports presenting the results of such analysis, whatever data is available cannot be utilized for planning.

## **2 TYPES OF RECORDS**

As noted above, the types of records collected by the department are basically two types namely, numerical figures and drawings. The status of these categories are briefly outlined below followed by other useful records which are not available in the department at present.

### **2.1 DRAWINGS**

The drawings are relating mainly to water supply and sewage plans, buildings plans, organization charts and maps. The Appendix Table O.1 provides a list of drawings reported to be available within the department and their status. These drawings are kept mainly in the Research section. As this section is neither properly equipped nor manpowered to maintain drawings, they are scattered all over the office. The section does not have a proper filing system. As expected some of these drawings appear to have been lost. Moreover, as the drawings themselves are kept as paper-printed original copies, deterioration is a potential problem. In fact, some of them have already deteriorated, either torn or stained. It is suggested that the valuable drawings are reproduced using either the CAD programme or are copied on vinyl bases.

It is suggested that certain drawings such as the septic tanks, elevated water tanks etc. be standardized by their capacity and be drawn using the CAD programme.

### **2.2 DATA RECORDS**

Various records containing numerous data are scattered all over the head office and field offices. They have never been summarized or analyzed in a systematic way to facilitate planning and decisions. It was not possible to identify all types of data records that are in existence within the organization. The Appendix Table O-2 presents the status of data for some areas that were of particular relevance to the study team.

It was noted that the absence of properly designed and specific data collection formats have left the field staff making their own formats. As a result, a wide range of formats are in place which make some of the collected data (using existence formats) incomparable within the organization. Obviously, the qualified professionals have done their job better than those who do not have such qualifications.

## **2.3 UNAVAILABLE RECORDS**

Records such as township and ward boundaries are not available at present. The Appendix Tables O-1 and O-2 reveal several areas where data are not available. Considering their importance in water supply planning, the study team has collected the relevant information and prepared maps (Appendix D).

## **3 RECOMMENDATIONS**

In order to remedy the current situation, several proposals are submitted. It is suggested that the highest priority be given to the implementation of the proposals listed below:

- (1) Creation of a division of planning, programming and progress control which would provide overall leadership and planning in data collection and other relevant functions (see Chapter 6, section 6.3.1-1)
- (2) Recruitment and placement of planning staff in each of the 6 divisions and 30 townships (ibid)
- (3) Design and institutionalize formal training including data collection, analysis and reporting for the professional staff (Sections 6.3.2 and 6.3.3)
- (4) Design and institutionalize a computer-aided filing system
- (5) Standardize drawings and draw them using CAD programme
- (6) Reproduce valuable drawings using CAD or vinyl bases

Table O-1 Status of Engineering Drawings in WSS Department

SEWERAGE

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
1	Public W.C 5.Unit At Mingala Taungnyunt Township	36	28.4.87				Available
2	Yangon Corporation Department Of Water & Sewerage Existing Sanitary Sewerage System Diagram Force Man System	106	12.12.88				Available
3	North Okkalapa Market 8 seated W.C and sewage repair system Market ( 2 )	34	12.12.88				Available
4	Lay out plan for public W.C at Mingala Taungnyunt Township	103	16.12.88				Available
5	Lay out plan for public W.C at Mingala Taungnyunt Township	38	28.4.87				Available
6	Yangon water & sewerage project sewerage study Location plan sewage ejector stations & air lines						Available
7	Lamadaw sewerage pipe diagram	84	16.12.88				Available
8	Location plan sewage ejector stations & force sewer mains						Available
9	Shone 's Hydro . Pnuematic Ejector	38	12.12.88				Available
10	Botataung sewage pipe diagram		21.3.86				Available
11	Under ground sewage machine No.( 15 )		16.1.90				Available
12	Ejector station No. 19 1/2	157	9.3.90				Available
13	400 persons septic tank at west Yankin new bazaar	37	9.7.87				Available
14	Sptic tank for 27 persons	63	14.12.88.				Available
15	Sptic tank for 10 persons	65	14.12.88				Available
16	200 person septic tank at Mingalar Taungnyunt Township	35	28.4.87				Available
17	Septic tank for 200 persons	119	3.1.89				Available
18	Sanitary installation at Bahan market	28	12.12.83				Available
19	Sewerage system of Latha circle						Available
20	Sewerage system of Pabedan circle, scale 400 feet to 1 inch						Available
21	Sewerage system of Kyauktada circle						Available
22	Plan showing repairing to existing manholes & manhole covers at No.6 region Yangon						Available
23	Layout Plan of sewerage system						Available
24	Sewerage system of Mahabandula Road ( 22th St, to 24th St )						Available
25	Sewerage system of Bahosi Ward, Lamadaw	166	20.6.90				Available

## Sewerage (continued)

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
26	Proposed fancy for main compressing station.	115	17.1.89				Available
27	North Okkalapa 2 block Market 6 seated W.C & repairing of sewage system	33	12.12.88				Available
28	North Okkalapa Market 6 seated W.C & repair sewage system	35	12.12.88				Available
29	Kyeemyindaing , Sanchaung Township ( Kyung Taw) Market 9 seated W.C & repairing of sewage system	36	12.12.88				Available
30	" C " Seated W.C	30	22.10.82				Available
31	Layout Plan of sewerage water supply system & sewerage system	139	31.8.89				Available
32	Sewerage system of Tayathtaw	81	14.12.88				Available
33	Construction of under ground lavatory at Kabaraye Pagoda	218	14.1.92				Available
34	Diagram showing separate connection of sewage pipe 9" Strand Hotel & Wedding Room	246	2.10.92				Available
35	Plan showing repairing to existing manholes & manhole covers at U Pho Kyar St		28.10.92				Available
36	Sanitary installation at Thiha cinema.		28.10.92				Available
37	Repairing & installation of sewage system at A.I.D compound	249	27.11.92				Available
38	Proposed plan for overhead bridge at Teingyizei	198	18.12.89				Available
39	Construction of temporary toilet for new building in sewage pipe line area	278	16.3.95				Available
40	Under GRD Lavatory block						Available
41	12500 Gallons ground sump	152	2.2.90				Available
42	Detail of pipe support for 24 " concrete pipe	414	12.12.96				Available
43	Sanitary installation at Alone	376	24.4.96				Available
44	Proposed sanitary to under ground lavatory block	299					Available
45	Shone 's Hydro-pneumatic ejector	2					Available
46	Sanitary installation at Insein Pauktaw offical quarter	322	4.12.95				Available
47	Proposed diagram for water filtering tank for residential quarters	287	29.6.95				Available
48	Sanitary installation at Alone Thaitpan Market	376	24.4.96				Available
49	500 persons septic tank	321	4.12.95				No
50	600 persons septic tank	325	7.12.95				Available
51	Septic tank for 750 persons	335	3.1.96				Available
52	Sanitary installation at Central storage Dept.	300	5.9.95				Available



## Sewerage (continued)

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
53	500 persons septic tank	378	26.4.98				Available
54	Insein Pauktaw & Yankin Township	292	27.7.95				Available
55	Construction of tube well & 6 seated W.C at Htan Yeikthar						No
56	Connection of 9" sewage pipe to 101 St.		8.7.96				Available
57	Construction of 4 seated W.C & septic tank for 200 persons at Thingangyun E.O Office						Available
58	Repairing of septic tank & sanitary installation at concerte pipe plant						Available
59	200 persons septic tank (flush type)	386	23.5.96				Available
60	Construction of septic tank at Nanattaw circle	281	1.6.95				Available
61	Construction of 4 seated W.C & septic tank for 200 persons at Thingangyun E.O Office	376	25.9.96				Available
62	Construction of septic tank for Yangon Hotel	395	6.11.96				Available
63	Repairing of ejector station No.19 1/2						Available
64	2100 persons septic tank	435	30.1.97				Available
65	Repairing of septic tank for Theingyizay ( C )						Available
66	Repairing of sewage pipe & septic tank for YCDC bank						Available
67	Repairing of sewage pipe 24" at Merchant Rd & 64th St.	384	15.5.96				Available
68	Repairing of sewage pipe 24" at Than Lyet Soon St.						Available
69	200 persons septic tank		14.6.96				Available
70	300 persons septic tank	413	11.2.96				Available
71	Construction of temporary toilet at Stwetawmyat Pagoda	412	10.12.96				Available
72	30 persons septic tank						Available
73	Connection of sewage pipe to War War Win Construction.	396	12.6.96				Available
74	Repairing of sewage pipe 12" at Lamadaw Township						Available
75	Replacement of airline 4" diameter from above the drain						Available
76	Construction of sewage pipe at No.(310) War Dan St						Available
77	Construction of privity toilet at E.O office in Pabedan	361	16.8.96				Available
78	Replacement of exhaust pipe instead of ejector station No.15						Available
79	Drainage pipe system at Shukhinthar Hotel , Thaketa Township	313	23.11.95				Available

## Sewerage (continued)

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
80	50 persons septic tank	356	1.2.96				Available
81	Repairing of sewage pipe 24" at Merchant Rd & 64th St.						Available
82	Proposed plan showing repairing and extension to existing store-office	86	16.12.88				Available
83	Building at air compressor compound	127	30.5.89				No
84	Sewerage system						Available
85	Showing of sewage system at MC ( 1 ) hostel	192	10.1.91				Available
86	Repairing of Under GRD Lavatory block No (15)		17.1.90				Available
87	Sanitary installation at Official quarter						Available
88	Infiltration tank for food - shops near Kantawgyi						Available
89	Sanitary installation at No.( 20 )building own by committee , Pala St.	372	5.3.96				Available
90	Lay out of water supply system and sewage system	137	31.8.89				No
91	Sanitary installation at Animal Husbandry & Veterinary	365	26.2.96				Available
92	Sanitary installation & sewage system at Ma U Gone gymnasium						No
93	Cubical type sewerage pumping station at forest street Ahlone Township	337	3.1.95				No
94	Detail diagram						Available
95	Profile of sewage main						Available
96	Sewerage system						Available
97	Septic tank ( Section )						Available
98	Under GRD Lavatory block						Available
99	88th Street to Myan Ma Gon Yee Profile						Available
100	1500 persons septic tank	43	23.3.98				Available
101	50 persons septic tank						Available
102	Sanitary installation & sewage system at Ma U Gone gymnasium						Available
103	Cubical type sewerage pumping station at forest street Ahlone Township	337	3.1.95				Available
104	50 persons septic tank						Available
105	100 persons septic tank		30.6.97				Available
106	Cleaning of blocked sewage pipe and reconnection						Available
107	22 persons septic tank						Available

## WATER SUPPLY

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
1	20000 Gallons Ground Tank	349	22.1.96				
2	50000 Gallons Ground Sump	341	5.1.96				
3	25000 Gallons Ground Sump	152	2.2.90				
4	20000 Gallons Ground Sump	365	26.8.96				
5	5000 Gallons Ground Sump	373	17.9.96				
6	5000 Gallons Ground Sump						
7	50000 Gallons Ground Sump						
8	20000 Gallons Ground Sump						
9	20000 Gallons Ground Sump	433	24.1.97				
10	Plan showing repairing to existing 24" water main in front No.2 gate Pyithu Hlut Taw compound at prome road	46	14.12.88				Available
11	Plan showing extension of water supply project to North Okkalapa Township	191	5.12.90				Available
12	A plan for recostruction of water pipes in 5 fire - razed wards at Meihtalar	195	6.5.91				
13	Pipe layout plan Ahlone West Shwegondaing Road	142	19.9.89				
14	The map of Water Distribution at 1981 Union Day in Kyaikasan						
15	Longitudinal section along centreung of inlet channel						Available
16	Existing water main at the conor of Kabaraye Pagoda Rd & Hamatic Rd						
17	Existing water main near Mingala Ze area	45	14.12.88				Available
18	400 Gallons Ground Tank						
19	Plan showing connection of pipe line system to Ministers ' Office	9					Available
20	Mayangone Township Thamine ( 1 ) Map	94	16.12.88				Available
21	Plan showing connection of pipe line system Hiawga from Shwepyitha new Township		23.1.91				Available
22	Connection 42" pipe from 3" pipe in Memorial to the Fallen Heros		14.3.91				Available
23	Longitudinal section along centreung of inlet channel						Available
24	Layout plan of water supply system	138	31.8.89				Available
25	Plan showing connection of pipe line system to Mayangone Township (link St) Kyaukwine Pagoda Rd	61	14.12.88				Available
26	Proposed dam site kwin No. 93.C Thitsi kwin at Twente Township	144	27.9.89				
27	Proposed Thitsi San kwin dam side and transmission water main	143	27.9.89				

## Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
28	Replacement of pipe line system to Thamada Hotel	91	16.12.88				Available
29	Proposed dam site kwin No. 93.C Thitsi kwin at Twente Township	144					Available
30	Plan showing pipe line system for Thuwana - Thakata suspension bridge	164	6.6.90				Available
31	Cleaning of 2" diameter pipe in Seikkyi Kanaungto						Available
32	Reinstallation of pipe line near the Yangon-Thanyin access road	184	28.10.90				Available
33	Replacement of 4" GIP from 4" PVC pipe	181	19.10.90				Available
34	Plan showing pipe line system for Worker Hospital	122	12.10.90				Available
35	Connection of pipe line to Kyartawya Owk St	141	12.9.89				Available
36	Plan showing pipe line to Inya - Kantawgyi	12	12.12.88				Available
37	Plan showing connection of pipe line system Hlawga from Shwepyitha Township						Available
38	Connection of 2 pipe line to Ministry of Irrigation						Available
39	Replacement of pipe line extension at Shanyaur St, Mayangone Township						Available
40	Repairing of Gyophyu pipe line under the fly-over bridge in Yegu Buteryon St						Available
41	Repairing of Gyophyu pipe line under the Oukponseik Bridge						Available
42	Replacement of pipe line extension in West Maykha St						Available
43	Connection of 6" diameter pipe line for water sufficiency ( 7 ), ( 8 ) Ward in Pabedan Township						Available
44	Showing of Water Distribution Pipe line System for Mayangone, 8 mile Rd ,Myainghawon	382	1.10.96				
45	Proposed pipe line from existing pipe line under U Ba Han St	328	11.12.95				Available
46	Cross section through inlet channel for Hlawga, Shwepyitha, Yangon pipe line	427	2.1.97				Available
47	Water Distribution System for Yangon						Available
48	Cleaning of Gyophyu pipe near Gandamar St	329	13.12.95				Available
49	Showing of pipe line system for No.( 8 ) ward, Mayangone Township	316	27.11.95				Available
50	Layout plan of water supply system & sewerage system	140	31.8.89				Available
51	Cross section through inlet channel for Hlawga, Shwepyitha, Yangon pipe line						Available
52	Diagram of a hydrant for water sprayer						Available
53	Longitudinal section along centreung of inlet channel						Available
54	Water pipe line showing on Ok Pon Seik Rd	167	2.7.90				Available

## Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
55	Vertical noncolg sewage pump and piping	336	3.1.95				Available
56	Drinking water plank						Available
57	Cross section through culvert						Available
58	Cold water system riser diagram for Myodaw Hotel project	355	31.1.98				Available
59	Plan showing water construction in Yankin	138	12.9.89				Available
60	Connection of 9 pipe to Yangon Airport	327	11.12.95				Available
61	Location plan for a new connection of 4" diameter pipe in 11th St (upper ) Lanmadaw						Available
62	Replacement of Gyophyu & Hlawga reservoir pipe lines in Yangon International Airport extension project						Available
63	Repairing of Gyophyu pipe line						Available
64	Repairing of pumping station in Thingangyun Township	408	29.11.96				Available
65	New connection of 6" diameter pipe line in Yangon International Airport	409	3.12.96				Available
66	Cleaning of Gyophyu pipe ( 39 mile )						Available
67	Diagram of a 16" diameter sluice valve to existing 24" diameter pipe						Available
68	Drainage pipe system at Thakata Shukhinthar Hotel	313	23.11.95				Available
69	Concrete pipe support for Water Distribution Plan						Available
70	Ejector Station( No 171/2 )						Available
71	Map of sprinkler area & consumption rate						Available
72	Replacement of 4" diameter pipe						Available
73	YCDC						Available
74	Connection of pipe line 27" to 8" for		23.2.91				Available
75	Brick gravity wall section A.A	358	15.2.96				Available
76	Water Distribution System for Hlawga	367	27.2.96				Available
77	Water Distribution System for Myotaw Hotel	362	26.2.96				Available
78	Water Distribution System for Myotaw Hotel	364	26.2.96				Available
79	Water supply system Diagram , YCDC Fire brigade						Available
80	Water supply system for Wartan Port Hotel & other bank of Yangon River						Available
81	Repairing of Gyophyu Filter	318	28.11.95				Available
82	Showing of pipe line system for Alanpya Pagoda Rd & Bogyoke Aung San Rd	128	30.5.89				Available
83	Plan showing water connection in Yankin area	138	12.9.89				Available
84	Connection of 4" diameter pipe line for other bank of Yangon River , Map	159	12.3.90				Available

## Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
85	Repairing of existing manholes & concrete drain from Kokkine to Sayasan Rd	105	21.12.88				Available
86	Connection of 4" pipe for Water Distribution in Airport Hotel	314	23.11.95				Available
87	Laterite pitching retaining wall for U Se Bridge						
88	Connection of 4" CI pipe to Airport Hotel						Available
89	2" tube well plan for Dawbon Township		4.9.96				Available
90	56 ductile iron pipe crossing at Yangon Mandalay 6 lane High Way		4.11.96				Available
91	66" Phugyi pipe line from Mingalardon Garden	419	19.12.96				Available
92	66" Phugyi pipe line from Mingalardon Garden	420	19.12.96				Available
93	Installation of water meter at Insein & Bahan Townships						Available
94	Cleaning of tubewell pipe line diagram						
95	Installation of water meter at (19) ward , Mayangone Township	420	19.12.96				Available
96	Sanitary installation at Pala Rd	359	9.8.96				Available
97	Sanitary installation at No.(16) Official Quarter ,Yankin Township	360	12.8.96				Available
98	Water supply system for Airport fire brigade						Available
99	Submersible stage pump & motor set assembly and tube well diagram						
100	Sanitary installation at Insein Township	428	2.1.97				Available
101	Replacement of tank at YCDC						Available
102	Sanitary Installation & Repairing of buildings own by committee in No.( 20 ) Pala St	416	16.12.96				Available
103	Installation of Water meter in Townships						Available
104	Drinking water plank						Available
105	Replacement of pipe line from tube well in Resistance Park						Available
106	Connection of 6" pipe at Pyi Rd	431	22.1.97				Available
107	Connection of 6" pipe at Pyi Rd						
108	Connection of pipe line No.( 3 )housing in Hlaing		3.1.97				Available
109	Cleaning of earth deposited at point 36/38 in Gyophyu pipe line						Available
110	Sanitary Installation at YCDC compound Insein Township ( Pauptaw )						Available
111	Sanitary Installation at YCDC compound Insein Township ( Pauptaw )						Available
112	Sanitary Installation at Tharthanar Zaya Mingalar Monastery	404	14.11.96				Available
113	Water meter installation at No.(9) Ward , Mayangone Township						Available

## Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
114	Installation of new pump & repairing 3 pump at Theingyi Zay ( C )						Available
115	Installation for Hlawga pumping station No( 2 ) over head crane						Available
116	Sanitary Installation for 3 Engineering Dept , South Dagon						Available
117	Repairing of pipe line for Yeku water pressure pumping plant						Available
118	Sanitary Installation for E.O office , North Dagon						Available
119	Repairing of toilet & sanitary installation at No.( 19 )Pala St	410	4.12.96				Available
120	Repairing of pipe & replacement tank at Official Quarter , Yankin Township	392	4.11.96				Available
121	Construction of 20000 ballons water tank at Yangon Airport	434	24.1.97				
122	Showing pipe line system at Inya Myaing & Seik Kan Thar St		6.2.92				Available
123	Showing pipe line system at Shan St & Winsar St						Available
124	Alan Pya Pagoda Rd & Kan Rd						Available
125	Showing pipe line system at Bogyoke Aung San St & Anawyahtar St						Available
126	Showing pipe line system between Merchant Rd & Kanar Rd						Available
127	Construction of pipe culvert in 10th St, Compressor Station						Available
128	Map of near YCDC office , Kyeemyindyne Township						Available
129	Conner of Bank Rd & Mahar Bandula St diagram	129					Available
130	YCDC	102	16.12.88				Available
131	Showing sewage system in Bogyoke St, Anawyahtar , Shwedagon Pagoda Rd						No
132	Pautalut new Township diagram						Available
133	Dala new Township diagram						Available
134	Coner of Anawyahtar Rd & Shwedagon Pagoda Rd Map						Available
135	Layout of primary and secondary mains network						Available
136	Index maps of Yangon Bago division						Available
137	Map of Water pipe line & sewage pipe line						Available
138	Coner of Shwedagon Pagoda Rd & York St diagram						Available
139	Kyaik Wine Pagoda Rd Pipe line diagram						Available
140	Fencing of the Hlawga Lake Compound						
141	Repairing of Hlawga lake						Available
142	Shwe Gone Taing St water pipe line diagram ( Between Kabaraye Pagoda Rd & Tamwe )	201	6.8.91				Available
143	Extension of water supply project for North Okkalapa Township	101	5.12.9.				Available
144	Yangon International Air port (Key Map for water main)						Available
145	48" DIA m.s " Y " Details						Available

## Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
146	Proposed connection of Pugyi main to existing main at Yegu pls						Available
147	Coagulation Bassin Gyophyu		13.8.69				Available
148	Water Supply System Diagram , using pipe line system for Kabaraye						Available
149	Rangoon Cyty Development Committee Greater Rangoon Town Plan						Available
150	Water distribution & connection pipe line of Yangon International Airport Greening project						Available
151	Connection of CIP pipe in University Avenue Rd						Available
152	Connection to building own by committee in Pabedan Township , Coner of Anawyathar St & Konezaytan St	226	23.11.92				Available
153	Pipe line diagram near bridge in Railways Head Office	205	23.8.91				Available
154	Flow diagram of Yegu Pumping station	136	17.11.91				Available
155	Rangoon City Development Committee Water Supply System	10	12.12.88				
156	Water distribution system Bahosi Ward in Landaw	165	19.6.90				Available
157	Connection of pipe Inya Lake Hotel entrance from Inya Lake	209	2.12.91				Available
158	50000 Gallons Ground Tank for water supply in Dala Township	203	5.9.91				Available
159	Water distribution pipe line system No.( 19 A ) in new Dagon Township	240	7.9.92				Available
160	Water distribution pipe line system from tube well No.( 56 ) in No.(19A) new Dagon Township diagram	242	8.9.92				Available
161	Planning of Minyekyawswar Housing in Tarmwe						Available
162	Connection of pipe line at Shwe Gon Taing		3.2.92				Available
163	Planning of Minyekyawswar Housing in Tarmwe	45					Available
164	Police officer family line 's water supply in Kyantaw development committee	250	10.12.92				Available
165	Pipe line system in Trader Hotel (Coner of Sula Pagoda Rd & Bogoke St)	41	6.10.94				Available
166	Water supply system of U Wisara Housing apartment in Dagon Township	42	27.4.93				Available
167	Map of pipe line in Bogyoke Aung San Rd & Theinphyu Rd	43					Available
168	Inya lake pipe line diagram						Available
169	Tube well plan in No( 1 ) Oil Plant Kyaikwine Pagoda Rd, Mayangone Township						Available
170	Pipe line diagram in Bogyoke St & Sula Pagoda Rd	41					Available
171	Connection of pipe & water distribution for Yangon International Airport Greening project						Available
172	Layout plan of Rangoon water supply system		23.3.83				Available



## Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
173	25000 Gallons Ground Sump	152	2.2.90				
174	Water Distribution in Thardu Ward	40	14.12.88				Available
175	Proposed 11" pipe connection from 12" water main to existing 3" distribution line in Phayre St Kyauktada Township	116	17.1.89				Available
176	36" diameter interconnection between 66" diameter per stressed concrete pipe 42" diameter cast iron pipe	122	24.4.89				Available
177	Diagram of Phugyi restrict area	193	17.10.89				
178	Repairing of pipe line in Ministers' Office		1.12.92				Available
179	Map of water trunks mains						
180	Water distribution system	126	30.6.89				Available
181	Detail plan of water distribution junction of main roads	21					
182	Detail plan of water distribution junction of main roads	51	14.12.88				Available
183	No. ( 8 ) region pipe line system	51	14.12.88				Available
184	Flow diagram of Yegu Pumping station	135	12.11.91				Available
185	Yegu pumping station and pipe lines layout plan	113	12.1.89				Available
186	Proposed 8" diameter connection in other bank of Yangon Map						Available
187	Water supply system for gymnasium		22.9.92				Available
188	Permanent water supply for City Golf project	257	19.8.94				Available
189	Territory map of Hlawga water supply section restrict area	194	17.1.90				Available
190	Water supply in South Okkalapa Township along with Waizayandar Rd	261	1.9.94				Available
191	Lot out plan of Sangyiwa Pumping Station	22	2.12.88				Available
192	Map of tube well, pumps, pipes in Resistance Park	239	4.9.92				Available
193	Map of water supply for secondary ( 18 ) holes in City Golf	257	19.8.94				Available
194	Water pipe layout alone Prome Rd	145	17.10.89				Available
195	Water Distribution Map of trunk mains	233	29.4.92				Available
196	Water supply from Tha Khin Mya Park to Dala Township	85					Available
197	Hlaing River Water Supply Project	1	4.2.99				
198	"	2					
199	"	3					
200	"	4					
201	"	5					
202	"	6					
203	"	7					
204	"	8					

Water Supply ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
205	Hlaing River Water Supply Project	9					
206	"	Sheet No					
207	"						
208	Hlawga - Shwepyithar pipe line drawing ( Copy )	1					absent No.9
209	"	2					
210	"	3					
211	"	4					
212	"	5					
213	"	6					
214	"	7					
215	"	8					
216	"	10					
217	"	11					
218	"	12					
219	"	13					
220	"	14					
221	Layout plan of Twantay Township pipe line						

## General Building

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
1	Toilet renovation in South Okkalapa						
2	Substitution of brick fencing construction	398	24.6.96				
3	Construction of pipe culvert	334	26.12.95				
4	5 servant quarters drawing (Hlawga)						
5	Ngamoe Yeik intaken tower construction plan						
6	Brick and concrete block at kokine reservoir	174	13.9.90				
7	Fabricated collar						
8	Toilet renovation & sanitary installation in No.( 19 ) , Pale St	410	4.12.96				
9	Construction of Shwedagon Pagoda reservoir fencing						
10	Incharge engineer office of Gyophyu reservoir drawing	353	31.7.96				
11	Police officer family line 's water supply, 6 seated W.C construction in Narnattaw compound	284	1.6.95				
12	Police officer family line 's water supply, measuring water pond drawing in Narnattaw compound	282	1.6.95				
13	GOH CRUSHER						
14	A plan for a 4 seated toilet at the parking lot of road transport, Mingalartaungnyunt						
15	Asphalt concrete pitching in access road	358	7.8.96				
16	Retaining wall and earth filling work near the Goephyu reservoir filtration						
17	Concrete sleeper production for water pipe line crossing	399	8.11.96				
18	Retaining wall and earth filling work near the alum store in Gyophyu reservoir						
19	Pump house construction , Kyeemyindaing	398	9.11.96				
20	8000 Gallons over head tank						
21	C.G.I sheet roofing in servant quarter						
22	( 7 ) seated W.C construction, Hantharwatee	370	11.9.96				
23	Kyaukye Twan pumping station electrical wiring layout plan						
24	Bath room construction in Nawaday gymnasium	355	5.8.96				
25	Painting in distilled water container factory	415	13.12.96				

## General Building ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
26	Electrical wiring , Oakpone Seik pumping station						
27	Electrical wiring , Ahnanpin pumping station						
28	Electrical wiring, distilled water factory						
29	12500 Gallons Ground Tank	293	31.7.95				
30	Septic tank & masonry water tank, Tamwe Township	376	9.4.96				
31	Plan for sticking ceramic to the floor of distilled water factory						
32	Repairing of Gyophyu servant quarter						
33	Primary school drawing , Gyophyu reservoir						
34	Repairing of Phugyi reservoir spillway corrosion						
35	Concerting in Yankin officer housing	405	4.11.96				
36	Repairing floor , walltie , sticking ceramic to the floor in distilled water factory						
37	Painting in distilled water factory						
38	Substitution of walling in pumping station						
39	Pump house construction , Kyeemyindaing						
40	Kantaw Gyi pat lan St map		24.7.94				
41	Hlawga reservoir territory line	254	10.8.94				
42	Repairing of concrete road in Teik Gyi - Gyophyu	357	6.8.96				
43	Repairing of concrete road in Teik Gyi - Gyophyu		4.11.96				
44	50000 Gallons Ground Tank	346	22.1.96				
45	Repairing plan in Gyophyu servant toilet	353	31.1.96				
46	Repairing of trolley, Gyophyu reservoir	352	31.1.96				
47	Painting in Guest House , Phu Gyi reservoir	326	11.12.95				
48	Repairing of alum pond	323	6.12.95				
49	3 masonry pond construction in Shukinthar ward		24.9.90				
50	Heavy machinery store , Hlawga						
51	Shelf for distilled water container	411	9.12.96				
52	Myotaw water supply project , Ngamoe Yeik						

## General Building ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
53	Road construction in Taikgyi - Gyophyu						
54	Road construction in Phugyi reservoir access road	349	31.7.96				
55	Two ( 6 ) seated servant quarters	340	11.7.96				
56	Sanitary installation in 4 storey building , Police Force		11.6.96				
57	Pump house						
58	Pump house	301	12.9.95				
59	19/A pump house fencing work in South Dagon						
60	Incharge engineer office of Gyophyu reservoir drawing						
61	Retaining wall , earth filling in South Okkalapa Township ( 13 ) ward						
62	Reinforced concrete retaining wall work in explanation hall	369	9.4.96				
63	6400 Gallons Ground Tank	290	14.2.95				
64	Fencing in squarters area						
65	Repairing of Gyophyu servant quarter	353	31.1.96				
66	Fire protection system riser diagram for Myodaw Hotel project	354	31.1.96				
67	Reducing water pressure fencing and drainage construction	175	22.9.90				
68	Location of 9'x 9' excavated by E.P.C						
69	800 gallons over head tank and ticket booth	37	28.4.87				
70	Road construction in Taikgyi - Gyophyu	324	5.12.95				
71	Reducing water pressure fencing in coner of Mingalartaungnyunt Township & Upper Pansodan St						
72	Junction of South Dagon & North Dagon						
73	Vegetable Market in Bogyoke						
74	Roofing sheet store	268	20.12.94				
75	Electrical wiring in security gate		20.10.95				
76	Construction of trolley store in Gyophyu	264	3.11.94				
77	Ministry of No.( 1 ) industry	95	16.12.88				
78	( 10 ) nos servant quarter diagram ( Hlawga)						
79	( 36' x 16' ) site store construction ( Y.C.D.C )						
79	( 20' x 16' ) site store construction ( Y.C.D.C )						

General Building ( continue )

No	TITLE	DRG No	DATE	OUT-GOING	TO	RETURN	REMARKS
79	( 16' x 10' ) site store construction ( Y.C.D.C )						
80	Plan showing housing development construction in Pazundaung	214	7.1.92				
81	Restrict area in Gyophyu water supply Dept	18	12.12.88				
82	Plan showing water connection in Yankin area	139	12.9.89				Available
83	Plan showing water connection in Yankin area	137	12.9.89				Available
84	Section Through Tower ( Ngamoeyeik)						Available
85	Typical section of earth bank						Available
86	Plan showing water connection in Yankin area	140	12.9.89				
87	Fittings of Furnace						Available
88	Concrete manhole cover for municipal manhole in B.O.S						Available
89	Masonry water tank construction in North Okkalapa Township		14.11.90				Available
90	Detailed diagram of public tap	35	16.12.88				Available

## Maps

No	TITLE	DR No.	DATE	OUT-GOING	TO	RETURN	REMARKS
1	Map of Inya Lake						Available
2	Map of permanent pipe line for first (18) holes in City golf project	257	19.8.94				Available
3	Re excavation of Shin U Pa Goo Da Lake						Available
4	Pugyi storage reservation project		1.4.68				Available
5	Re excavation of Shin U Pa Goo Da Lake						Available
6	Great Yangon extension boundary						Available
7	Yangon Myanmar Water Distribution Map of trunk mains showing flow and " C " for each text						Available
8	Yangon Map						Available
9	Yankin Township						
10	No.( 2 ) region in North Okkalapa Township	50	14.12.88				Available
11	Type of Water Supply System from reservoirs to Yangon	91	12.12.88				Available
12	Key map for Yangon Water Supply System						No
13	Map of Yangon Water Supply System						Available
14	Pabedan Township	29					Available
15	Thakata township map	246	27.10.69				Available
16	Lot No. ( 18 ), ( 8 ), ( 19 ), ( 24 ) in YCDC						Available
17	Rangoon city development committee survey and map section general map of city of Rangoon						Available
18	Rangoon Burma Water Distribution map of trunk mains showing flow and " C " for each test						Available
19	Thein Goo dara Garden	130	28.6.89				Available
20	Map of Royal Lake		19.11.67				Available
21	Yangon City						Available
22	Location of 12" tubewell in Mechaungkan ( 2 ) ward in Thingangyun		22.8.67				Available
23	Thakata township map						Available
24	Map of Yangon No ( 4 ) region in South Okkalapa & Thuwanna Township						Available
25	New Dagon						Available
26	Dala development project						Available

Maps ( continue )

No	TITLE	DR No.	DATE	OUT-GOING	TO	RETURN	REMARKS
27	North Okkalapa Map						Available
28	Map of North Okkalapa in No( 2 ) region						Available
29	( A ) ward , Tamwe Township No. ( 9 )	38					Available
30	No.( 4 ) region in South Okkalapa Township						Available
31	Map of South Okkalapa & Thuwanna						Available
32	Yangon Map						Available
33	No. ( 3 ) region Hlaing Township						Available
34	No. ( 1 ) region Mingalardon Township						Available
35	No. ( 4 ) region Thingangyun Township , Yangon Extension boundary						Available
36	No. ( 10 ) map Thakata - Yangon extension boundary						Available
37	Proposed alignment for Hlawga-Rangoon pipe line						Available
38	South Okkalapa & Thuwanna map						Available
39	Ahlon, Kyeemyindaing , Sanchaung in Yangon						Available
40	Map of water distribution system type in lot No.( 19 ) , new Dagon township						Available
41	No ( 7 ) region in Yangon						Available
42	Kyeemyindaing Township map						Available
43	Botataung Township map						No
44	No. ( 4 ) region in Thingangyun Township						Available
45	Rangoon Burma map of trunk mains showing flow and " t " for each test						Available
46	Map ( 10 B ) ward , Dawbon Township						Available
47	Ahlon, Kyeemyindaing , Sanchaung in Yangon						Available
48	Map of Yankin region section in No ( 4 ) region Yangon						Available
49	No ( 2 ) Township, South Okkalapa Township						Available
50	Botataung Township						Available
51	City Golf	390	29.10.96				Available
52	Pipe line drawing , Kyeemyindaing Township						Available
53	Burma						
54	Burma						



Maps ( continue )

No	TITLE	DR No.	DATE	OUT-GOING	TO	RETURN	REMARKS
55	Type cross section for Earthen dams 6 high From 50 to 60 feet Scale 20 feet to 1 inch						Available
56	Type of Water Distribution in Narnattaw compound		14.8.91				Available
57	Index map of Grater Rangoon Town	85	12.12.88				Available
58	Zee Kone West Ward in Insein						Available
59	Pauktaw ( A ), ( B ), ( C ) ward in Insein						Available
60	Gyokone East & West in Insein						Available
61	Map of Water Supply Plan in Mayangone	178	16.10.90				Available
62	Ragoon cooperation water distribution system and proposed immodiale improvement North - West section	96					Available
63	Lot No. ( 18 A ), ( 19 ), ( 20 ), ( 24 ) new Dagon Township						Available
64	Key map of Gyophyu Pipe line						No
65	Hlawgar reservoir tubewell drawing	22	12.12.88				Available
66	Renovation of security gate	134	28.7.89				Available
67	Proposal pipe line drawing for road construction in Yangon-Thanyin Bridge construction project						Available
68	Pugyi storage reservoir		24.11.70				Available
69	Proposal golf course location map	280	19.5.95				No
70	New Dagon	162	10.5.90				Available
71	Pugyi transmission main	126	1.3.89				Available
72	Grater Yangon extension territory map						Available
73	Layout of Hlawga						Available
74	Flow planning Layout						Available
75	Flow planning Layout						Available
76	Flow planning Layout						Available
77	Layout of Hlawga						Available
78	Pugyi storage reservoir project						Available
79	Flow planning Layout						Available

Maps ( continue )

No	TITLE	DR No.	DATE	OUT-GOING	TO	RETURN	REMARKS
80	Schema D' Ensemble general operating diagram	24	12.12.88				Available
81	Region No.( 3 ) Hlaing Township						Available
82	Maps and lists of transferred land to YCDC between No.( 4 ) main road and Hlawga reservoir in Shwe Pye Thar Township						Available
83	Thiri Mingalar Kabaraye Pagoda 's multi development project						Available
84	Dala area development project	200	21.6.91				Available
85	Map of No.( 3 ) region, Kamayut , Yangon	79	14.12.88				Available
86	Map of Yangon Water Supply System						No
87	Proposal plan & table						No
88	Detail plan of junction ( York Rd & Bogyoke Aung San St )	52	14.12.88				No
89	Extension asphalt concrete access road drawing to Gyophyu reservoir	255	12.8.94				Available
90	Key map of Gyophyu Pipe line						Available
91	Map of Inya Lake		29.4.88				Available
92	Location of Gyophyu filtration Dept drawing	220					Available
93	Guophyu reservoir						Available
94	Pipe line drawing of No ,( 10 ) region Thakata						Available
95	Rangoon city development committee water supply system ( proposed water mains installation )						Available
96	Pipe Line drawing , Insein Township ( Pauk Taw Ward )						Available

### YCDC Organization Chart

No	TITLE	DR No.	DATE	OUT-GOING	TO	RETURN	REMARKS
1	Proposal Organization Chart of YCDC						
2	Organization Chart of Engineering Dept ( Water & Sanitation )						
3	Y.C.D.C						
4	Organization Chart of E.O Office , Parks & Play ground	107	21.12.88				
5	Water meter section organization chart, distribution power of duty & obligation	107	21.12.88				
6	Organization Chart of Engineering Dept ( Water & Sanitation ) (Secret)						
7	Engineering Dept ( Water & Sanitation )						
8	Engineering Dept ( Water & Sanitation )						
9	Gyophyu reservoir organization chart & roof servants						
10	Engineering Dept ( Water & Sanitation )						
11	Water distribution organization chart						
12	Proposal Organization Chart for reservoir						
13	Sewage & Water charges Dept						
14	Machine & Electrical Engineering Section						
15	Pre stressed concrete pipe factory						
16	Organization Chart of Engineering Dept( Water & Sanitation ) (Secret)_						
17	Waster water & mechanical section organization ( 1,2,3,4 )						
18	Organization chart of water & sanitation						
19	Proposal Organization Chart of water & sanitation						
20	Engineering Dept ( Water & Sanitation ) YCDC						
21	Pyisa Nikarya Bimantaw Thitsar Wardee Hillock, Kanbe						
22	Ground water & mechanical section organization chart						
23	Engineering Dept ( Water & Sanitation ) YCDC						
24	Chief Engineering Office , Engineering Dept ( Water & Sanitation )						
25	Organization chart of each section						

Table O-2 Status of Data relating to Water Supply Institutions and Organizations

Subject	Types of Data Available	Remarks
Population	Population data for 2000	Data sourced from Township Peace & Development Council (TP&DC). Data not checked or verified. Ward data available only for some townships.
Households	Number of households	Data not available for all townships while ward data are available only for some. Data neither checked nor verified. Sourced from P&DC. Very difficult to obtain. Study team estimated township and ward area which need to be further checked and modified. Data must be computerised.
Township/Ward area	Not available	Study team estimated township and ward boundaries which need to be further checked and modified. Data must be computerised.
Ward boundary	Available for some wards	Records are in computer section. Connection date not available. Number of households using water from connection unknown. Data summaries not available
Flat rate customers	Name, address, rate amount	Records are in each township. Number of households using water from each connection unknown. Data not computerised
Metered customers	Name, address, monthly rate amount, connection date, whether domestic, industry or government	Records are not up-to-date. Most data not available. Data kept in township office. Not computerised
Free water customers	List of names and address available only for some townships	Number of customers and households using the facility, date of cleaning, date chemicals added, quantity, etc. unknown.
Other YCDDC-owned water facility users	Number of facilities by type	Study team made estimations.
Non-YCDDC water users	Not available	Was not possible for the study team to collect and verify data.
Non-YCDDC water facilitiers	Unknown	Was not possible for the study team to collect and verify data.
Other institutions of water supply	Data not available	Was not possible for the study team to collect and verify data.
NGOs involved in City water supply	No data collected by YCDDC	Study team collected some data which need to be up-dated.
Repairs	Patchy data	Whenever data are available, either unreliable or not up-to-date. Data by sectors of the system is unknown. Data not computerised.
Customer complaints	Data not kept properly	Some township offices have data which are incomplete. Data not recorded properly. Collection formats not in existence.
Customer education & training	Data not available	Customer education and awareness undertaken only rarely by staff. What ever is collected is not available. Collection formats not in existence.
Private plumbers	Name & address of plumbers	This information is available in water distribution division. Number and types of repairs completed with their location, cost, types of materials used, purpose of repair etc. not recorded.
Spareparts dealers	No data available	Number of dealers and the quality of materials sold are unknown.
Chemical dealers	Not available	Number of dealers and the quality of materials sold are unknown.
Revenue	Revenue for the department by water charge, connection fee, other fee since 1991/92  Amount spent on O&M, salaries & wages and overhead charges since 1991/92	Data for commercial and foreign customers cannot be separated. Late payment details unavailable. Data kept in Finance & Administration division
Expenditure	Staff number by rank	O&M cost by activity such as reservoirs, transmission pipes, distribution lines, etc not available. Also, cost by spareparts, type of repairs done etc. are not available. Not possible to separate O&M cost by sector of the supply system. Available data kept in Finance & Administration division.
Number of staff	Patchy data	Data kept in Finance & Administration division. Details such as skills, training undergone, years of experience, work location etc. are either difficult to obtain or not available
Staff training	Not available	Very difficult to obtain whatever is available
Job descriptions	Available for some positions	Information is not up-to-date and vague too. Whatever available is in print
Job functions/duties	Records not kept	Available information is in written. Needs updating
Functions of divisions/sections	Records not kept	Study team made estimations.

## **APPENDIX P**

### **DESIGN OF FACILITIES**

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**APPNDIX P  
DESIGN OF FACILITIES**

**List of Tables**

Table P.1	Allocation of Network Pipeline Wells.....	P-1
Table P.2	Allocation of Pipeline Network Wells.....	P-4
Table P.3	Allocation of Independent Wells .....	P-5

Table P-1 Allocation of Network Pipeline Wells ( Wells to be used as Regular Wells)

Well	Identification		Pump Type	Motor (kW)	Impellor (stages)	Dia (inch)	Discharge (m <sup>3</sup> /hr)	Head (m)	GW Level (GL-m)	Drawdown (m)	Remaining Head (m)	Evaluation (1 = No)	Transferred From
	T/S	No.											
1	Ahl	L 01	Submersible	15	7	3	45	40	3	10	27		
2	Ahl	L 02	Submersible	22	4	4	55	45	3	10	32		
3	Ahl	L 03	Submersible	7.5	4	4	44	70	3	10	57		
4	Ahl	L 04	Submersible	7.5	6	3	40	43	3	10	30		
5	Ahl	L 05	Submersible	15	7	4	75	120	3	10	107		
6	Ahl	L.06	Submersible	11	6	3	45	40	3	10	27		
7	Ahl	L 07	Submersible	11	5	4	59	90	3	10	77		
8	Ahl	L 08	Submersible	9.3	6	3	36	40	3	10	27		
9	Ahl	L 09	Submersible	15	6	3	36	40	3	10	27		
10	Ahl	L 10	Submersible	7.5	6	3	40	43	3	10	30		
15	Dag	1	Submersible	7.5	6	3	40	43	6	10	27		
16	Dag	2	Submersible	7.5	4	3	44	70	6	10	54		
17	Dag	3	Submersible	7.5	6	3	45	50	6	10	34		
19	Dag	5	Submersible	7.5	6	3	40	43	6	10	27		
20	Dag	6	Submersible	7.5	6	3	40	43	6	10	27		
21	Dag	7	Submersible	7.5	6	3	40	43	6	10	27		
78	Ins	No. 04	Submersible	7.5	6	3	32	35	9	10	16		
79	Kam	No. 01	Submersible	5.5	4	3	30	34	9	10	15	1	No.85
80	Kam	No. 02	Submersible	7.5	6	3	32	35	9	10	16		
98	Kya	No. 01	Submersible	7.5	6	3	40	43	3	10	30		
99	Kya	No. 02	Submersible	at Thingyan Festival Time (No pump)								1	No.11
100	Kya	No. 03	Submersible	at Thingyan Festival Time (No pump)								1	No.14
101	Kya	No. 04	Submersible	11	7	3	50	48	3	10	35		
102	Kye	No. 01	Submersible	7.5	6	3	32	35	3	10	22		
103	Kye	No. 02	Submersible	7.5	6	3	30	35	3	10	22		
104	Kye	No. 03	Submersible	11	5	3	59	90	3	10	77		
105	Kye	No. 04	Submersible	11	6	3	45	40	3	10	27		
106	Kye	No. 05	Submersible	11	7	3	40	43	3	10	30		
107	Kye	No. 06	Submersible	7.5	6	3	32	35	3	10	22		
108	Kye	No. 07	Submersible	7.5	4	4	44	70	3	10	57		
109	Kye	No. 08	Submersible	9.3	6	3	36	40	3	10	27		
110	Kye	No. 09	Airlifting									1	No.114
111	Kye	No. 10	Submersible	Low Voltage (No pump)								1	No.124
112	Kye	No. 11	Submersible	7.5	6	3	36	38	3	10	25		

Table P-1 Allocation of Network Pipeline Wells ( Wells to be used as Regular Wells)

Well	Identification		Pump Type	Motor (kW)	Impellor (stages)	Dia (inch)	Discharge (m <sup>3</sup> /hr)	Head (m)	GW Level (GL-m)	Drawdown (m)	Remaining Head (m)	Evaluation (1 = No)	Transferred From	
	T/S	No.												
113	Kye	No. 12	Submersible	11	7	3	50	48	3	10	35			
115	Lan	No. 02	Submersible	9.3	6	3	32	35	3	10	22			
116	Lan	No. 03	Submersible	15	7	3	45	40	3	10	27			
117	Lan	No. 04	Submersible	22	4	4	55	45	3	10	32			
118	Lan	No. 05	Submersible	18.5	7	4	45	50	3	10	37			
119	Lan	No. 06	Submersible	7.5	6	3	40	43	3	10	30			
120	Lat	No. 01	Submersible	7.5	6	3	40	43	3	10	30			
121	Lat	No. 02	Submersible	7.5	6	3	40	43	3	10	30			
122	Lat	No. 03	Submersible	7.5	6	3	40	43	3	10	30			
123	Lat	No. 04	Submersible	7.5	6	3	40	43	3	10	30			
128	N-Okk	No. 5	Submersible	changed to Air Lift Pump									1	No.86
130	N-Okk	No. 2	Submersible	7.5	6	3	40	43		10	33			
150	Pab	No. 01	Submersible	7.5	6	3	36	38	3	10	25			
151	Pab	No. 02	Submersible	7.5	6	3	36	38	3	10	25			
152	Pab	No. 03	Submersible	7.5	6	3	36	38	3	10	25			
153	San	San/01	Submersible	7.5	6	3	32	35	6	10	19			
154	San	San/03	Submersible	7.5	4	4	44	70	6	10	54			
155	San	San/04	Submersible	7.5	6	4	45	50	6	10	34			
156	San	San/05	Submersible	9.3	6	3	36	40	6	10	24			
157	San	San/08	Submersible	7.5	6	3	36	38	6	10	22			
158	San	San/10	Submersible	7.5	4	4	44	70	6	10	54			
159	San	San/11	Submersible	7.5	6	3	30	35	6	10	19			
160	San	San/12	Submersible	7.5	4	3	44	70	6	10	54			
161	San	San/14	Submersible	9.3	6	3	36	40	6	10	24			
162	San	San/15	Submersible	22	6	4	55	40	6	10	24			
163	San	San/16	Submersible	9.3	6	3	36	40	6	10	24			
164	San	San/17	Submersible	5.5	4	3	30	34	6	10	18			
165	San	San/22	Submersible	7.5	6	3	36	38	6	10	22			
166	San	San/24	Submersible	7.5	6	3	36	38	6	10	22			
167	San	San/25	Submersible	well damaged (No pump)									1	No.205
168	San	San/26	Submersible	9.3	6	3	36	40	6	10	24			
178	S-Okk	1	Submersible	7.5	6	3	40	43	4.5	10	28.5			
180	S-Okk	3	Airlifting									1	No.209	
182	S-Okk	5	Airlifting									1	No.212	



Table P-1 Allocation of Network Pipeline Wells ( Wells to be used as Regular Wells)

Identification			Pump	Motor	Impellor	Dia	Discharge	Head	GW Level	Drawdown	Remaining	Evaluation	Transferred	
Well	T/S	No.	Type	(kW)	(stages)	(inch)	(m <sup>3</sup> /hr)	(m)	(GL-m)	(m)	Head (m)	(I = No)	From	
183	S-Okk	6	Airlifting									1	No.214	
193	Tha	Tha/12	Submersible	11	6	3	45	40	4.5	10	25.5			
198	Tha	Tha/20	Submersible	11	7	3	36	40	4.5	10	25.5			
202	Thin	1	Submersible	22	4	4	55	45	9	10	26			
203	Thin	2	Submersible	18.5	7	4	45	50	9	10	31			
204	Thin	3	Submersible	7.5	6	3	40	43	9	10	24			
208	Thin	7	Submersible	well damaged (No pump)									1	No.215

Table P-2 Allocation of Pipeline Network Wells ( Wells to be abandoned)

Well	Identification		Pump Type	Motor (kW)	Impellor (stages)	Dia (inch)	Discharge (m <sup>3</sup> /hr)	Head (m)	GW Level (GL-m)	Drawdown (m)	Remaining Head (m)	Evaluation (I = No)	Transferred to
	T/S	No.											
11	Bot	No. 01	Submersible	7.5	6	3	45	50	3	10	37		No.99
14	Bot	No. 04	Submersible	11	7	3	50	48	3	10	35		No.100
18	Dag	4	Submersible	7.5	6	3	32	35	6	10	19		No.24
26	DMS	18/0A	Submersible	1.25	8	1.5	7.8	26	12	10	4	1	
43	DMS	20/12	Submersible	1.25	8	1.5	7.8	26	12	10	4	1	
49	DMS	24/01	Submersible	change to Air lift pump								1	
85	Kam	No. 07	Submersible	5.5	4	3	30	34	6	10	18		No.79
86	Kam	No. 08	Submersible	11	7	3	50	48	6	10	32		No.128
89	Kam	No. 11	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
90	Kam	No. 12	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
91	Kam	No. 13	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
92	Kam	No. 14	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
93	Kam	No. 15	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
94	Kam	No. 16	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
95	Kam	No. 17	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
96	Kam	No. 18	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
97	Kam	No. 19	Submersible	1.1	8	1.5	7.8	26	6	10	10	1	
114	Lan	No. 01	Submersible	7.5	6	3	36	38	3	10	25		No.110
124	Min-t	No. 01	Submersible	7.5	6	3	40	43	6	10	27		No.111
185	Tha	Tha/01	Submersible	well damaged (No pump)								1	
187	Tha	Tha/03	Submersible	1.25	8	1.5	7.8	26	4.5	10	11.5	1	
190	Tha	Tha/06	Submersible	7.5	6	3	36	38	4.5	10	23.5		No.61
196	Tha	Tha/15	Submersible	well damaged (No pump)								1	
197	Tha	Tha/16	Submersible	1.25	8	1.5	7.8	26	4.5	10	11.5	1	
199	Tha	Tha/21	Submersible	change to Air lift pump								1	
205	Thin	4	Submersible	5.5	6	3	30	36	9	10	17		No.167
209	Thin	8	Submersible	11	6	4	36	40	9	10	21		No.180
212	Thin	11	Submersible	7.5	6	3	40	43	9	10	24		No.182
213	Thin	12	Submersible	change to Air lift pump								1	
214	Thin	13	Submersible	7.5	6	3	40	43	9	10	24		No.183
215	Thin	14	Submersible	11	6	4	36	40	9	10	21		No.208
216	Thin	15	Submersible	15	7	4	40	45	9	10	26		No.181

Table P-3 Allocation of Independednt Wells ( Wells to be used as Stand-by)

Identification			Pump	Motor	Impellor	Dia	Discharge	Head	GW Level	Drawdown	Remaining	Evaluation	Transferred	
Well	T/S	No.	Type	(kW)	(stages)	(inch)	(m <sup>3</sup> /hr)	(m)	(GL-m)	(m)	Head (m)	(1 = No)	From	
22	Dag	8	Submersible	5.5	4	3	30	34	3	10	21			
23	Dag	9	Submersible	15	7	4	75	120	3	10	107			
24	Dag	10	Submersible	under repairing									1	No.18
25	Dag	11	Submersible	7.5	6	3	40	43	3	10	30			
61	Daw	Daw/1	Airlifting									1	No.190	
75	Ins	No. 01	Submersible	11	5	4	59	90	9	10	71			
81	Kam	No. 03	Submersible	7.5	6	3	40	43	6	10	27			
82	Kam	No. 04	Submersible	7.5	6	3	40	43	6	10	27			
84	Kam	No. 06	Submersible	7.5	6	3	40	43	6	10	27			
181	S-Okk	4	Airlifting									1	No.216	