8.5 Service Coverage by Target Year

8.5.1 Water Supply

(1) Population to be served by Level II system in Phase I

No untapped spring sources were confirmed to be suitable for Level II systems in rural water supply by the time of PW4SP preparation. However, Table 8.5.1 was prepared as reference for future update of this PW4SP. Conditions and assumptions applied for this estimate are as follows:

Table 8.5.1 Population to be Served by Level II System in Phase I

Municipality	Number of Un-tapped Spring	Number of Barangay to be Served	Number of Households to be Served	Population to be Served
Antipolo	0	0	0	0
Baras	0	0	0	0
Binangonan (Talim)	0	0	0	0
Cardona	0	0	0	0
Jala-jala	0	0	0	0
Morong	0	0	0	0
Pililla	0	0	0	0
Rodriguez	0	0	0	0
San Mateo	0	0	0	0
Tanay	0	0	0	0
Teresa	0	0	0	0
PW4SP Study Area	0	0	0	0

Source capacity:

The average source capacity of untapped spring was assumed to be capable to serve 100 households based on the review of existing Level II systems with spring sources.

Number of system:

One untapped spring was considered to serve one Level II system in one rural barangay.

(2) Population to be served by target year

Phase I

For urban area, the additional service coverage was estimated to be served by Level III service. For rural area, the population to be served by Level II systems with untapped springs was first calculated and the rest of the additional service coverage was estimated to be served by Level I facilities.

Phase II:

For urban area, the population served by Level I and II facilities in base year was considered to be absorbed by Level III service aside from the additional service coverage to be estimated by the sector target. For rural area, all existing facilities in Phase I was assumed to be utilized through the future.

The population to be served by target year is exhibited in Table 8.5.2 and Table 8.5.3.

Table 8.5.2 Population to be Served in Phase I (Water Supply)

Municipality	Type	Population Served in the Base Year				Total Population	Phase I Coverage (2000)							
							Service Coverage				Additional Population to be Served			
		Level III	Level II	Level I	Total		Total	Level III	Level II	Level I	Level III	Level II	Level I	Total
Antipolo	Urban	152,571	0	8,017	160,588	282,186	231,393	223,376	0	8,017	70,805	0	0	70,805
	Rural	0	0	33,135	33,135	98,365	83,610	0	0	83,610	0	0	50,475	50,475
	Total	152,571	0	41,152	193,723	380,551	315,003	223,376	0	91,627	70,805	0	50,475	121,280
Baras	Urban	2,079	216	9,276	11,571	16,735	13,723	4,231	216	9,276	2,152	0	0	2,152
	Rural	5,183	0	1,113	6,296	8,047	6,840	5,183	0	1,657	0	0	544	544
	Total	7,262	216	10,389	17,867	24,782	20,563	9,414	216	10,933	2,152	0	544	2,696
Binangonan (Talim)	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	0	143	16,973	17,116	28,565	24,280	0	143	24,137	0	0	7,164	7,164
	Total	0	143	16,973	17,116	28,565	24,280	0	143	24,137	0	0	7,164	7,164
Cardona	Urban	8,528	0	12,283	20,811	24,862	20,811	8,528	0	12,283	0	0	0	0
	Rural	0	0	8,791	8,791	11,273	9,582	0	0	9,582	0	0	791	791
	Total	8,528	0	21,074	29,602	36,135	30,393	8,528	0	21,865	0	0	791	791
Jala-jala	Urban	0	0	2,753	2,753	5,123	4,201	1,448	0	2,753	1,448	0	0	1,448
	Rural	0	194	6,951	7,145	12,691	10,787	0	194	10,593	0	0	3,642	3,642
	Total	0	194	9,704	9,898	17,814	14,988	1,448	194	13,346	1,448	0	3,642	5,090
Morong	Urban	12,572	77	12,453	25,102	37,940	31,111	18,581	77	12,453	6,009	0	0	6,009
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	12,572	77	12,453	25,102	37,940	31,111	18,581	77	12,453	6,009	0	0	6,009
Pilila	Urban	6,816	170	20,632	27,618	38,884	31,885	11,083	170	20,632	4,267	0	0	4,267
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	6,816	170	20,632	27,618	38,884	31,885	11,083	170	20,632	4,267	0	0	4,267
Rodriguez	Urban	20,945	0	38,606	59,551	89,702	73,556	34,950	0	38,606	14,005	0	0	14,005
	Rural	0	98	5,004	5,102	10,256	8,718	0	98	8,620	0	0	3,616	3,616
	Total	20,945	98	43,610	64,653	99,958	82,274	34,950	98	47,226	14,005	0	3,616	17,621
San Mateo	Urban	50,097	0	38,563	88,660	121,263	99,436	60,873	0	38,563	10,776	0	0	10,776
	Rural	0	0	38	38	916	779	0	0	779	0	0	741	741
	Total	50,097	0	38,601	88,698	122,179	100,215	60,873	0	39,342	10,776	0	741	11,517
Tanay	Urban	28,466	159	14,155	42,780	69,224	56,764	42,450	159	14,155	13,984	0	0	13,984
	Rural	0	0	5,022	5,022	12,662	10,763	0	0	10,763	0	0	5,741	5,741
	Total	28,466	159	19,177	47,802	81,886	67,527	42,450	159	24,918	13,984	0	5,741	19,725
Teresa	Urban	0	0	15,743	15,743	23,034	18,888	3,145	0	15,743	3,145	0	0	3,145
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	15,743	15,743	23,034	18,888	3,145	0	15,743	3,145	0	0	3,145
PW4SP Study Area	Urban	282,074	622	172,481	455,177	708,953	581,768	408,665	622	172,481	126,591	0	0	126,591
	Rural	5,183	435	77,027	82,645	182,775	155,359	5,183	435	149,741	0	0	72,714	72,714
	Total	287,257	1,057	249,508	537,822	891,728	737,127	413,848	1,057	322,222	126,591	0	72,714	199,305

Table 8.5.3 Population to be Served in Phase II (Water Supply)

Municipality	Type	Population Served in 2000				Phase II Coverage (2010)								
						Total Population	Service Coverage				Additional Population to be Served			
		Level III	Level II	Level I	Total		Total	Level III	Level II	Level I	Level III	Level II	Level I	Total
Antipolo	Urban	223,376	0	8,017	231,393	392,320	364,858	364,858	0	0	141,482	0	0	141,482
	Rural	0	0	83,610	83,610	136,756	129,918	0	0	129,918	0	0	46,308	46,308
	Total	223,376	0	91,627	315,003	529,076	494,776	364,858	0	129,918	141,482	0	46,308	187,790
Baras	Urban	4,231	216	9,276	13,723	23,267	21,638	21,638	0	0	17,407	0	0	17,407
	Rural	5,183	0	1,657	6,840	11,188	10,629	5,183	0	5,446	0	0	3,789	3,789
	Total	9,414	216	10,933	20,563	34,455	32,267	26,821	0	5,446	17,407	0	3,789	21,196
Binangonan (Talim)	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	0	143	24,137	24,280	39,714	37,728	0	143	37,585	0	0	13,448	13,448
	Total	0	143	24,137	24,280	39,714	37,728	0	143	37,585	0	0	13,448	13,448
Cardona	Urban	8,528	0	12,283	20,811	34,566	32,146	32,146	0	0	23,618	0	0	23,618
	Rural	0	0	9,582	9,582	15,673	14,889	0	0	14,889	0	0	5,307	5,307
	Total	8,528	0	21,865	30,393	50,239	47,035	32,146	0	14,889	23,618	0	5,307	28,925
Jala-jala	Urban	1,448	0	2,753	4,201	7,123	6,624	6,624	0	0	5,176	0	0	5,176
	Rural	0	194	10,593	10,787	17,643	16,761	0	194	16,567	0	0	5,974	5,974
	Total	1,448	194	13,346	14,988	24,766	23,385	6,624	194	16,567	5,176	0	5,974	11,150
Morong	Urban	18,581	77	12,453	31,111	52,747	49,055	49,055	0	0	30,474	0	0	30,474
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	18,581	77	12,453	31,111	52,747	49,055	49,055	0	0	30,474	0	0	30,474
Pililla	Urban	11,083	170	20,632	31,885	54,060	50,276	50,276	0	0	39,193	0	0	39,193
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	11,083	170	20,632	31,885	54,060	50,276	50,276	0	0	39,193	0	0	39,193
Rodriguez	Urban	34,950	0	38,606	73,556	124,712	115,982	115,982	0	0	81,032	0	0	81,032
	Rural	0	98	8,620	8,718	14,259	13,546	0	98	13,448	0	0	4,828	4,828
	Total	34,950	98	47,226	82,274	138,971	129,528	115,982	98	13,448	81,032	0	4,828	85,860
San Mateo	Urban	60,873	0	38,563	99,436	168,591	156,790	156,790	0	0	95,917	0	0	95,917
	Rural	0	0	779	779	1,273	1,209	0	0	1,209	0	0	430	430
	Total	60,873	0	39,342	100,215	169,864	157,999	156,790	0	1,209	95,917	0	430	96,347
Tanay	Urban	42,450	159	14,155	56,764	96,242	89,505	89,505	0	0	47,055	0	0	47,055
	Rural	0	0	10,763	10,763	17,604	16,724	0	0	16,724	0	0	5,961	5,961
	Total	42,450	159	24,918	67,527	113,846	106,229	89,505	0	16,724	47,055	0	5,961	53,016
Teresa	Urban	3,145	0	15,743	18,888	32,023	29,781	29,781	0	0	26,636	0	0	26,636
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	3,145	0	15,743	18,888	32,023	29,781	29,781	0	0	26,636	0	0	26,636
PW4SP Study Area	Urban	408,665	622	172,481	581,768	985,651	916,655	916,655	0	0	507,990	0	0	507,990
	Rural	5,183	435	149,741	155,359	254,110	241,404	5,183	435	235,786	0	0	86,045	86,045
	Total	413,848	1,057	322,222	737,127	1,239,761	1,158,059	921,838	435	235,786	507,990	0	86,045	594,035

8.5.2 Sanitation

Table 8.5.4 Additional Number of Households to be Served in Phase I (Household Toilets)

Municipality	Area	No. of Households Served in the Base Year				No. of Households in 2000	Phase I Coverage (2000)							
							Household Coverage				Add'l. No. of Households to be Served			
		Flush	Pour Flush	VIP Latrine	Total		Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total
Antipolo	Urban	23,933	2,949	3,549	30,431	55,331	36,020	10,292	5,146	51,458	12,087	7,343	1,597	21,027
	Rural	0	3,932	2,237	6,169	20,074	0	14,935	3,734	18,669	0	11,003	1,497	12,500
	Total	23,933	6,881	5,786	36,600	75,405	36,020	25,227	8,880	70,127	12,087	18,346	3,094	33,527
Baras	Urban	308	1,569	371	2,248	3,099	783	1,811	288	2,882	475	242	0	717
	Rural	196	593	153	942	1,518	196	988	282	1,466	0	395	129	524
	Total	504	2,162	524	3,190	4,617	979	2,799	571	4,349	475	637	129	1,241
Binangonan (Talim)	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	0	1,823	681	2,504	5,011	0	3,728	932	4,660	0	1,905	251	2,156
	Total	0	1,823	681	2,504	5,011	0	3,728	932	4,660	0	1,905	251	2,156
Cardona	Urban	1,131	834	1,539	3,504	4,781	1,640	2,362	445	4,447	509	1,528	0	2,037
	Rural	0	1,981	417	2,398	2,127	0	1,582	396	1,978	0	0	0	0
	Total	1,131	2,815	1,956	5,902	6,908	1,640	3,944	840	6,424	509	1,528	0	2,037
Jala-jala	Urban	0	219	202	421	967	273	536	90	899	273	317	0	590
	Rural	0	1,101	325	1,426	2,350	0	1,748	437	2,185	0	647	112	759
	Total	0	1,320	527	1,847	3,317	273	2,284	527	3,084	273	964	112	1,349
Morong	Urban	1,752	3,705	674	6,131	7,439	3,643	2,583	692	6,918	1,891	0	18	1,909
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1,752	3,705	674	6,131	7,439	3,643	2,583	692	6,918	1,891	0	18	1,909
Pililla	Urban	2,715	349	1,457	4,521	7,337	2,715	4,050	572	7,337	0	3,701	0	3,701
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2,715	349	1,457	4,521	7,337	2,715	4,050	572	7,337	0	3,701	0	3,701
Rodriguez	Urban	3,222	2,486	3,005	8,713	17,250	6,721	7,717	1,604	16,042	3,499	5,231	0	8,730
	Rural	0	616	609	1,225	2,093	0	1,557	389	1,946	0	941	0	941
	Total	3,222	3,102	3,614	9,938	19,343	6,721	9,274	1,994	17,989	3,499	6,172	0	9,671
San Mateo	Urban	7,858	907	1,975	10,740	23,777	11,936	7,965	2,211	22,112	4,078	7,058	236	11,372
	Rural	0	157	0	157	195	0	145	36	181	0	0	36	36
	Total	7,858	1,064	1,975	10,897	23,972	11,936	8,110	2,248	22,294	4,078	7,058	273	11,409
Tanay	Urban	4,297	1,729	2,465	8,491	13,061	8,009	2,923	1,215	12,147	3,712	1,194	0	4,906
	Rural	0	1,172	201	1,373	2,584	0	1,922	481	2,403	0	750	280	1,030
	Total	4,297	2,901	2,666	9,864	15,645	8,009	4,845	1,695	14,549	3,712	1,944	280	5,936
Teresa	Urban	0	3,401	373	3,774	4,430	605	3,103	412	4,120	605	0	39	644
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	3,401	373	3,774	4,430	605	3,103	412	4,120	605	0	39	644
PW4SP Study Area	Urban	45,216	18,148	15,610	78,974	137,472	72,345	43,342	12,675	128,362	27,129	26,614	1,896	55,639
	Rural	196	11,375	4,623	16,194	35,952	196	26,605	6,687	33,488	0	15,641	2,305	17,946
	Total	45,412	29,523	20,233	95,168	173,424	72,541	69,947	19,362	161,850	27,129	42,255	4,195	73,579

Table 8.5.5 Additional Number of Households to be Served in Phase II (Household Toilets)

Municipality	Area	No. of Households Served in 2000				No. of Households in 2010	Phase II Coverage (2010)							
							Households Coverage				Add'l. No. of Households to be Served			
		Flush	Pour Flush	VIP Latrine	Total		Flush	Pour Flush	VIP Flush	Total	Flush	Pour Flush	VIP Flush	Total
Antipolo	Urban	36,020	10,292	5,146	51,458	98,080	69,882	23,294	0	93,176	33,862	13,002	0	46,864
	Rural	0	14,935	3,734	18,669	34,189	0	32,480	0	32,480	0	17,545	0	17,545
	Total	36,020	25,227	8,880	70,127	132,269	69,882	55,774	0	125,656	33,862	30,547	0	64,409
Baras	Urban	783	1,811	288	2,882	5,817	4,145	1,382	0	5,527	3,362	0	0	3,362
	Rural	196	988	282	1,466	2,797	266	2,391	0	2,657	70	1,403	0	1,473
	Total	979	2,799	571	4,349	8,614	4,411	3,773	0	8,184	3,432	1,403	0	4,835
Binangonan (Talim)	Urban	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rural	0	3,728	932	4,660	9,929	0	9,432	0	9,432	0	5,704	0	5,704
	Total	0	3,728	932	4,660	9,929	0	9,432	0	9,432	0	5,704	0	5,704
Cardona	Urban	1,640	2,362	445	4,447	8,642	6,157	2,052	0	8,209	4,517	0	0	4,517
	Rural	0	1,582	396	1,978	3,918	0	3,722	0	3,722	0	2,140	0	2,140
	Total	1,640	3,944	840	6,424	12,560	6,157	5,774	0	11,931	4,517	2,140	0	6,657
Jala-jala	Urban	273	536	90	899	1,781	1,269	423	0	1,692	996	0	0	996
	Rural	0	1,748	437	2,185	4,411	0	4,190	0	4,190	0	2,442	0	2,442
	Total	273	2,284	527	3,084	6,192	1,269	4,613	0	5,882	996	2,442	0	3,438
Morong	Urban	3,643	2,583	692	6,918	13,187	9,396	3,132	0	12,528	5,753	549	0	6,302
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	3,643	2,583	692	6,918	13,187	9,396	3,132	0	12,528	5,753	549	0	6,302
Pililla	Urban	2,715	4,050	572	7,337	13,515	9,629	3,210	0	12,839	6,914	0	0	6,914
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2,715	4,050	572	7,337	13,515	9,629	3,210	0	12,839	6,914	0	0	6,914
Rodriguez	Urban	6,721	7,717	1,604	16,042	31,178	22,214	7,405	0	29,619	15,493	0	0	15,493
	Rural	0	1,557	389	1,946	3,565	0	3,387	0	3,387	0	1,830	0	1,830
	Total	6,721	9,274	1,994	17,989	34,743	22,214	10,792	0	33,006	15,493	1,830	0	17,323
San Mateo	Urban	11,936	7,965	2,211	22,112	42,148	30,030	10,010	0	40,040	18,094	2,045	0	20,139
	Rural	0	145	36	181	318	0	302	0	302	0	157	0	157
	Total	11,936	8,110	2,248	22,294	42,466	30,030	10,312	0	40,342	18,094	2,202	0	20,296
Tanay	Urban	8,009	2,923	1,215	12,147	24,060	17,143	5,714	0	22,857	9,134	2,791	0	11,925
	Rural	0	1,922	481	2,403	4,401	0	4,181	0	4,181	0	2,259	0	2,259
	Total	8,009	4,845	1,695	14,549	28,461	17,143	9,895	0	27,038	9,134	5,050	0	14,184
Teresa	Urban	605	3,103	412	4,120	8,006	5,704	1,901	0	7,605	5,099	0	0	5,099
	Rural	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	605	3,103	412	4,120	8,006	5,704	1,901	0	7,605	5,099	0	0	5,099
PWASP Study Area	Urban	72,345	43,342	12,675	128,362	246,414	175,569	58,523	0	234,092	103,224	18,387	0	121,611
	Rural	196	26,605	6,687	33,488	63,528	266	60,085	0	60,351	70	33,480	0	33,550
	Total	72,541	69,947	19,362	161,850	309,942	175,835	118,608	0	294,443	103,294	51,867	0	155,161

Table 8.5.6 Additional Number of Public School Students to be Served in Phases I and II (School Toilets)

Municipality	Std. No. of Public School Students that can be Served in the Base Year	Projected No. of Public School Students in 2000	Phase I Coverage (2000)		Std. No. of Public School Students that can be Served in 2000	Projected No. of Public School Students in 2010	Phase II Coverage (2010)	
			Public School Students Coverage	Add'l. No. of Public School Students to be Served			Public School Students Coverage	Add'l. No. of Public School Students to be Served
Antipolo	14,150	82,462	41,231	27,081	41,231	128,335	89,835	45,604
Baras	1,400	4,508	2,254	854	2,254	6,268	4,388	2,134
Binangonan (Talim)	1,050	7,251	3,626	2,576	3,626	17,485	12,240	8,614
Cardona	2,100	5,782	2,891	791	2,891	7,780	5,446	2,555
Jala-jala	1,000	4,335	2,168	1,168	2,168	5,512	3,858	1,690
Morong	1,750	3,804	1,902	152	1,902	5,288	3,702	1,800
Pililla	2,650	8,901	4,451	1,801	4,451	11,106	7,774	3,323
Rodriguez	7,350	19,565	9,783	2,433	9,783	27,627	19,339	9,556
San Mateo	7,000	23,000	11,500	4,500	11,500	32,476	22,733	11,233
Tanay	4,850	20,137	10,069	5,219	10,069	31,108	21,776	11,707
Teresa	1,350	4,012	2,006	656	2,006	6,244	4,371	2,365
PW4SP Study Area	44,650	183,757	91,881	47,231	91,881	279,230	195,462	103,581

Table 8.5.7 Additional Number of Public Utilities with Sanitary Toilets in Phases I and II

Municipality	Type	Coverage in 1994		Phase I Coverage (2000)				Phase II Coverage (2010)		
		No. of PU with Toilets Facilities	No. of PU with Sanitary Toilet	No. of PU with Toilets	Add'l. No. of Public Utilities with Sanitary Toilet	No. of PU with Sanitary Toilet	No. of PU with Sanitary Toilets in 2000	No. of PU with Toilets	Add'l. No. of Public Utilities with Sanitary Toilet	No. of PU with Sanitary Toilet
Antipolo	Public Market	1	1	1	0	1	1	1	0	1
	Bus/Jeep Term.	0	0	1	1	1	1	1	0	1
	Total	1	1	2	1	2	2	2	0	2
Baras	Public Market	1	1	2	1	2	2	2	0	2
	Bus/Jeep Term.	0	0	0	0	0	0	1	1	1
	Total	1	1	2	1	2	2	3	1	3
Binangonan (Talim)	Public Market	0	0	1	1	1	1	1	0	1
	Bus/Jeep Term.	0	0	0	0	0	0	1	1	1
	Total	0	0	1	1	1	1	2	1	2
Cardona	Public Market	1	1	2	1	2	2	2	0	2
	Bus/Jeep Term.	0	0	0	0	0	0	0	0	0
	Total	1	1	2	1	2	2	2	0	2
Jala-jala	Public Market	1	1	2	1	2	2	2	0	2
	Bus/Jeep Term.	0	0	0	0	0	0	1	1	1
	Total	1	1	2	1	2	2	3	1	3
Morong	Public Market	1	1	1	0	1	1	1	0	1
	Bus/Jeep Term.	0	0	1	1	1	1	1	0	1
	Total	1	1	2	1	2	2	2	0	2
Pililla	Public Market	1	1	1	0	1	1	1	0	1
	Bus/Jeep Term.	0	0	0	0	0	0	1	1	1
	Total	1	1	1	0	1	1	2	1	2
Rodriguez	Public Market	1	1	2	1	2	2	2	0	2
	Bus/Jeep Term.	0	0	0	0	0	0	1	1	1
	Total	1	1	2	1	2	2	3	1	3
San Mateo	Public Market	2	2	2	0	2	2	3	1	3
	Bus/Jeep Term.	0	0	1	1	1	1	2	1	2
	Total	2	2	3	1	3	3	5	2	5
Tanay	Public Market	1	1	1	0	1	1	3	2	3
	Bus/Jeep Term.	1	0	2	2	2	2	3	1	3
	Total	2	1	3	2	3	3	6	3	6
Teresa	Public Market	1	1	1	0	1	1	1	0	1
	Bus/Jeep Term.	0	0	0	0	0	0	1	1	1
	Total	1	1	1	0	1	1	2	1	2
PW4SP Study Area	Public Market	11	11	15	5	16	16	19	3	19
	Bus/Jeep Term.	1	0	5	5	5	5	13	8	13
	Total	12	11	21	10	21	21	32	11	32

Note: PU - Public Utilities

8.6 Facilities, Equipment and Rehabilitation Required to Meet the Target Services

8.6.1 Water Supply

(1) Required water supply facilities

Urban water supply:

Urban water supply facilities required by target year shown in Table 8.6.1 were estimated as required number of house connections based on the additional service coverage.

As reference, the following requirements were also estimated:

- daily average water demand at 100 lpcd consumption rate, and
- number of deep wells to meet the daily maximum water demand based on the groundwater productivity.
  (daily maximum water demand = 1.3 x daily average water demand)

Information pertaining to the expansion plan of Level III systems was arranged to be indicated in Table 8.6.1 and details in Table 8.6.2, however no information was available during this PW4SP preparation.

Rural water supply:

Rural water supply facilities required by target year shown in Table 8.6.3 were estimated as the number of Level II systems with number of communal faucets and the number of Level I wells broken-down to deep and shallow wells. However, no untapped spring suitable for Level II system was confirmed during this PW4SP preparation.

(2) Required equipment and support vehicle

Presently, there are each one unit of truck-mounted percussion drilling rig, portable mechanized rotary drilling rig and air compressor for well rehabilitation held by DPWH-DEO in the province. Among these equipment, rotary type rig is only capable to drill shallow wells with less than 10 m depth owing to its penetration capacity and therefore not applicable for the planned shallow well construction.

Taking into account the maximum utilization of existing equipment, additional number of required equipment is estimated as described below.

Table 8.6.1 Urban Water Supply Facilities Required by Target Year

Municipality	Reference on Expansion of Existing Level III System										Phase II (2010) Requirements			
	Name of System (Operating Body)	Type	Coverage in 1994		Type of Water Sources[1]	Plan for Expansion[2]	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (cu.m/day)	Number of Deep Well	Additional Population to be Served	Number of House Connections	Daily Average Water Demand (cu.m/day)	Number of Deep Well
			No. of Brgy.	Served Population										
Angeles	MWSS	Urban	8	30,636	DW	No	70,805	13,883	2,081	7	141,482	28,271	14,148	13
		Rural	0	0										
		Total	8	30,636										
	Subdivision	Urban	1	121,941	DW	No								
		Rural	0	0										
		Total	1	121,941										
	Municipal Total	Urban	9	152,577										
		Rural	0	0										
		Total	9	152,577										
Bacs	Bacs WS	Urban	6	1,834	DW	No	2,352	399	235	1	17,407	4,352	1,741	1
		Rural	0	0										
		Total	6	1,834										
	Subdivision	Urban	1	945	DW	No								
		Rural	1	5,183										
		Total	2	6,128										
	Municipal Total	Urban	7	2,079										
		Rural	1	5,183										
		Total	8	7,262										
Barangonan (Talim)	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	0	0	0	0	0	0	0	0
		Rural	N.A.	N.A.										
		Total	N.A.	N.A.										
Cardona	Brgy. Bool Assn.	Urban	1	166	DW	No	0	0	0	0	23,611	5,905	2,362	2
		Rural	0	0										
		Total	1	166										
	Brgy. Calahan Assn.	Urban	1	1,226	DW	No								
		Rural	0	0										
		Total	1	1,226										
	Brgy. Dalig Assn.	Urban	1	723	DW	No								
		Rural	0	0										
		Total	1	723										
	Brgy. Love Assn.	Urban	1	2,236	DW	No								
		Rural	0	0										
		Total	1	2,236										
	Brgy. San Roque Assn.	Urban	1	1,529	DW	No								
		Rural	0	0										
		Total	1	1,529										
	Min. Govt.	Urban	4	2,568	DW	No								
		Rural	0	0										
		Total	4	2,568										
	Municipal Total	Urban	9	8,528										
		Rural	0	0										
		Total	9	8,528										
Cogeo	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	1,448	273	145	1	5,176	1,294	518	1
		Rural	N.A.	N.A.										
		Total	N.A.	N.A.										
Morong	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	6,009	1,876	601	1	30,474	7,619	3,047	3
		Rural	N.A.	N.A.										
		Total	N.A.	N.A.										
Pililla	Pililla WD	Urban	5	6,645	DW	No	4,262	865	427	1	39,193	9,798	3,919	2
		Rural	0	0										
		Total	5	6,645										
	Subdivision	Urban	1	321	DW	No								
		Rural	0	0										
		Total	1	321										
	Municipal Total	Urban	6	6,816										
		Rural	0	0										
		Total	6	6,816										
Rodriguez	MWSS	Urban	7	15,818	Surf	No	14,005	2,693	1,401	1	81,032	20,258	8,103	6
		Rural	0	0										
		Total	7	15,818										
	Subdivision	Urban	1	5,127	DW	No								
		Rural	0	0										
		Total	1	5,127										
	Municipal Total	Urban	8	20,945										
		Rural	0	0										
		Total	8	20,945										
San Mateo	MWSS	Urban	9	17,921	Surf	No	10,776	2,113	1,078	2	95,917	23,979	9,592	13
		Rural	0	0										
		Total	9	17,921										
	Subdivision	Urban	2	32,176	DW	No								
		Rural	0	0										
		Total	2	32,176										
	Municipal Total	Urban	11	50,097										
		Rural	0	0										
		Total	11	50,097										
Tanay	Tanay Eastern Rural WD	Urban	10	26,818	DW	No	13,984	2,636	1,398	1	47,055	11,764	4,706	3
		Rural	0	0										
		Total	10	26,818										
	Subdivision	Urban	1	1,648	DW	No								
		Rural	0	0										
		Total	1	1,648										
	Municipal Total	Urban	11	28,466										
		Rural	0	0										
		Total	11	28,466										
Teresa	Not Applicable	Urban	N.A.	N.A.	N.A.	N.A.	3,145	605	315	1	25,036	6,259	2,504	3
		Rural	N.A.	N.A.										
		Total	N.A.	N.A.										
PWSSP Study Area		Urban	61	269,505			126,591	24,587	12,659	16	502,996	126,919	50,299	47
		Rural	1	5,183										
		Total	62	274,688										

Note: 1. *DW* - Deep Well, *SP* - Spring, *DgW* - Dug Well, and *Surf* - Surface Water.
2. Refer to supporting Table 8.6.3 for details.

Table 8.6.2 Plan for Expansion of Existing Level III System

Municipality	Name of Operating Body	Additional Areas Barangay to be Covered	Additional Population to be Served	Additional Water Sources	
				Type[1]	Capacity (cu. m/day)
Angono	Brgy. Council	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Antipolo	MWSS	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Baras	Baras WS	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Binangonan	Brgy. Darangan Coop.	0	0	N.A.	0
	Brgy. Palangoy Coop.	0	0	N.A.	0
	Brgy. Pantok Coop.	0	0	N.A.	0
	Mun. Gov't.	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Cardona	Brgy. Boor Assn.	0	0	N.A.	0
	Brgy. Calahan Assn.	0	0	N.A.	0
	Brgy. Dalig Assn.	0	0	N.A.	0
	Brgy. Looc Assn.	0	0	N.A.	0
	Brgy. San Roque Ass.	0	0	N.A.	0
	Mun. Gov't.	0	0	N.A.	0
	Municipal Total	0	0		0
Cainta	Subdivision	0	0	N.A.	0
Morong	Morong WD	0	0	N.A.	0
Pililla	Pililla WD	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Rodriguez	MWSS	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
San Mateo	MWSS	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Tanay	Tanay Eastern Rizal WD	0	0	N.A.	0
	Subdivision	0	0	N.A.	0
	Municipal Total	0	0		0
Taytay	Subdivision	0	0	N.A.	0
PW4SP Study Area		0	0		0

Note: 1. *DW* - Deep Well, *SP* - Spring, *DgW* - Dug Well, and *Surf* - Surface Water Intake.

Table 8.6.3 Rural Water Supply Facilities Required by Target Year

Municipality	Phase I (2000) Requirements								Phase II (2010) Requirements					
	Level II		Level I						Level I					
	Number of System	No. of Communal Faucets	Number of Deep Wells			Sub-total	Number of Shallow Wells	Total	Number of Deep Wells			Sub-total	Number of Shallow Wells	Total
			40 m	80 m	120 m				40 m	80 m	120 m			
Antipolo	0	0	0	0	549	549	138	687	0	0	618	618	154	772
Baras	0	0	0	0	7	7	0	7	0	0	64	64	0	64
Binangonan (Talim)	0	0	0	84	0	84	0	84	0	225	0	225	0	225
Cardona	0	0	0	10	0	10	0	10	0	89	0	89	0	89
Jala-jala	0	0	0	45	0	45	0	45	0	100	0	100	0	100
Morong	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pililla	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rodriguez	0	0	0	34	0	34	15	49	0	57	0	57	24	81
San Mateo	0	0	0	4	0	4	7	11	0	3	0	3	5	8
Tanay	0	0	0	0	78	78	0	78	0	0	100	100	0	100
Teresa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW4SP Study Area	0	0	0	177	634	811	160	971	0	474	782	1,256	183	1,439

Applicable type of well drilling equipment is determined considering the geological formation of the province that 50% of target area is medium to hard formation suitable to percussion type and the rest is soft to medium formation suitable to rotary type. Idling time for equipment overhauling/maintenance and rest days of workers are considered at 25% of the year.

Small size rotary drilling rig (hand-feed spindle type for shallow well):

Average performance

- 1 well/15 days (3 m/day of drilling rate with finishing work)

Annual accomplishment

- 18 wells/year (365 days/year ÷ 15 days/well x 0.75)

Required number

- 2 sets for the total 160 shallow wells

Medium size rotary drilling rig (truck-mounted top-head drive type for deep well):

Average performance

- 1 well/20 days (10 m/day of drilling rate with finishing work)

Annual accomplishment

- 13 wells/year (365 days/year ÷ 20 days/well x 0.75)

Required number

- 7 sets for 50% of the total 811 deep wells

Medium size percussion drilling rig (truck-mounted type for deep well):

Average performance

- 1 well/30 days (5 m/day of drilling rate with finishing work)

Annual accomplishment

- 9 wells/year (365 days/year ÷30 days/well x 0.75)

Required number

- 9 sets for 50% of the total 811 deep wells

Well rehabilitation equipment:

Average performance

- 1 well/7 days (well redevelopment and finishing work

Annual accomplishment

- 39 wells/year (365 days/year ÷7 days/well x 0.75)

Required number

- 1 set for 10% of 811 Level I deep wells

Support vehicle:

Type - pick-up truck with winch, double cab

Required number

- 4 units (3 units for small size rotary rig and 1 unit for well rehabilitation)

Considering the utilization of existing percussion drilling rig and well rehabilitation equipment, the following equipment shall be mobilized/procured either by private sector or LGUs to accomplish the physical targets:

- 2 sets of small size rotary rig for shallow wells,
- 7 sets of medium size rotary rig for 50% of deep wells,
- 9 sets of medium size percussion rig for 50% of deep wells
- 1 set of well rehabilitation equipment for 10% of deep wells (at least 1 set shall be held by the provincial government), and
- 4 units of support vehicles for shallow well construction and well rehabilitation.

In addition to the above, service trucks equipped with crane are required for each unit of medium size rotary and percussion rigs for hauling drilling tools and water.

8.6.2 Sanitation

Table 8.6.4 Urban Household Toilets Required by Target Year

Municipality	Phase I (2000) Requirements								Phase II (2010) Requirements							
	Add'l HHs to be Served				No.of HHs Toilets				Add'l HHs to be Served				No.of HHs Toilets			
	Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total
Antipolo	12,087	7,343	1,597	21,027	12,087	7,343	1,597	21,027	33,862	13,002	0	46,864	33,862	13,002	0	46,864
Baras	475	242	0	717	475	242	0	717	3,362	0	0	3,362	3,362	0	0	3,362
Binangonan (Talim)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardona	509	1,528	0	2,037	509	1,528	0	2,037	4,517	0	0	4,517	4,517	0	0	4,517
Jala-jala	273	317	0	590	273	317	0	590	996	0	0	996	996	0	0	996
Morong	1,891	0	18	1,909	1,891	0	18	1,909	5,753	549	0	6,302	5,753	549	0	6,302
Pililla	0	3,701	0	3,701	0	3,701	0	3,701	6,914	0	0	6,914	6,914	0	0	6,914
Rodriguez	3,499	5,231	0	8,730	3,499	5,231	0	8,730	15,493	0	0	15,493	15,493	0	0	15,493
San Mateo	4,078	7,058	236	11,372	4,078	7,058	236	11,372	18,094	2,045	0	20,139	18,094	2,045	0	20,139
Tanay	3,712	1,194	0	4,906	3,712	1,194	0	4,906	9,134	2,791	0	11,925	9,134	2,791	0	11,925
Teresa	605	0	39	644	605	0	39	644	5,099	0	0	5,099	5,099	0	0	5,099
PW4SP Study Area	27,129	26,614	1,890	55,633	27,129	26,614	1,890	55,633	103,224	18,387	0	121,611	103,224	18,387	0	121,611

Table 8.6.5 Rural Household Toilets Required by Target Year

Municipality	Phase I (2000) Requirements								Phase II (2010) Requirements							
	Add'l HHs to be Served				No.of HHs Toilets				Add'l HHs to be Served				No.of HHs Toilets			
	Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total	Flush	Pour Flush	VIP Latrine	Total
Antipolo	0	11,003	1,497	12,500	0	11,003	1,497	12,500	0	17,545	0	17,545	0	17,545	0	17,545
Baras	0	395	129	524	0	395	129	524	70	1,403	0	1,473	70	1,403	0	1,473
Binangonan (Talim)	0	1,905	251	2,156	0	1,905	251	2,156	0	5,704	0	5,704	0	5,704	0	5,704
Cardona	0	0	0	0	0	0	0	0	0	2,140	0	2,140	0	2,140	0	2,140
Jala-jala	0	647	112	759	0	647	112	759	0	2,442	0	2,442	0	2,442	0	2,442
Morong	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pililla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rodriguez	0	941	0	941	0	941	0	941	0	1,830	0	1,830	0	1,830	0	1,830
San Mateo	0	0	36	36	0	0	36	36	0	157	0	157	0	157	0	157
Tanay	0	750	280	1,030	0	750	280	1,030	0	2,259	0	2,259	0	2,259	0	2,259
Teresa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW4SP Study Area	0	15,641	2,305	17,946	0	15,641	2,305	17,946	70	33,480	0	33,550	70	33,480	0	33,550

Table 8.6.6 Public School Toilets Required by Target Year

Municipality	Phase I (2000) Requirements			Phase II (2010) Requirements		
	Add'l Public School Students to be Served	No. of Toilet Units	No. of Toilet Facilities	Add'l Public School Students to be Served	No. of Toilet Units	No. of Toilet Facilities
Antipolo	27,081	542	108	48,604	972	194
Baras	854	17	3	2,134	43	9
Binangonan (Talim)	2,576	52	10	8,614	172	34
Cardona	791	16	3	2,555	51	10
Jala-jala	1,168	23	5	1,690	34	7
Morong	152	3	1	1,800	36	7
Pililla	1,801	36	7	3,323	66	13
Rodriguez	2,433	49	10	9,556	191	38
San Mateo	4,500	90	18	11,233	225	45
Tanay	5,219	104	21	11,707	234	47
Teresa	656	13	3	2,365	47	9
PW4SP Study Area	47,231	945	189	103,581	2,071	413

Table 8.6.7 Public Toilets Required by Target Year

Municipality	Type	Phase I (2000) Requirements Number of Public Toilets	Phase II (2010) Requirements Number of Public Toilets
Antipolo	Public Market	0	0
	Bus/Jeepney Term.	1	0
	Total	1	0
Baras	Public Market	1	0
	Bus/Jeepney Term.	0	1
	Total	1	1
Binangonan (Talim)	Public Market	1	0
	Bus/Jeepney Term.	0	1
	Total	1	1
Cardona	Public Market	1	0
	Bus/Jeepney Term.	0	0
	Total	1	0
Jala-jala	Public Market	1	0
	Bus/Jeepney Term.	0	1
	Total	1	1
Morong	Public Market	0	0
	Bus/Jeepney Term.	1	0
	Total	1	0
Pililla	Public Market	0	0
	Bus/Jeepney Term.	0	1
	Total	0	1
Rodriguez	Public Market	1	0
	Bus/Jeepney Term.	0	1
	Total	1	1
San Mateo	Public Market	0	1
	Bus/Jeepney Term.	1	1
	Total	1	2
Tanay	Public Market	0	2
	Bus/Jeepney Term.	2	1
	Total	2	3
Teresa	Public Market	0	0
	Bus/Jeepney Term.	0	1
	Total	0	1
PW4SP Study Area	Public Market	5	3
	Bus/Jeepney Term.	5	8
	Total	10	11

9. SECTOR MANAGEMENT PLAN

9.4 Project Management Arrangements

Table 9.4.1 Format for Level I Project Data

Form _____

PROPOSED LEVEL I PROJECT DATA

Notice : This form shall be accomplished upon instruction on PST/PWSD

LOCATION

1.1 Barangay/Sitio	1.3 Province
1.2 Municipality	1.4 Region

POP. DATA

2.1 Total Community/Barangay Population	2.3 Proposed Population to be Served
2.2 Total Number of Households	2.4 Proposed Number of Households to be Served

INFORMATION ON THE WELL SITE

3.1 Ownership : ☐ Public ☐ Private	3.3 Location:
3.2 Description :	3.4 Donor (If Private Lot):

DESCRIPTION OF EXISTING NEARBY SOURCE(S) (Use separate sheets if necessary)

4.1 Type of Point Source:
- ☐ Deep Well
- ☐ Shallow Well
- ☐ Spring
- ☐ Others (dug well pond)

4.2 Ownership :
- ☐ Public
- ☐ Private

4.3 For wells :
- Casing diameter_____ in. or_____m.
- Casing depth _____ ft. or_____m.
- Water level Well _____ ft. or_____m.
- Well capacity/yield _____ gpm. or_____m.

4.4 For Springs : Capacity/yield _____ gpm. or_____lps.

Approx. elevation above or below
Service Area _____ ft. or _____ m

Location
- ☐ Inside of service area
- ☐ Outside of service area

Approximate distance from center of service area _____km.

Prepared by :

_____ _____

Municipal Liason Staff Date

Table 9.4.2 Format for Level II Feasibility Study

Form _____

FEASIBILITY STUDY (Level II) Notice : This form shall be accomplished upon instruction of the PST/PWSO.	Barangay	Municipality
	Province	Region

PROJECT SUMMARY

POPULATION DATA

1. Present Population	2. Design Population	3. Number of Households
		6. Number of Faucets

TECHNICAL DATA

4. Type of Source ☐ Spring ☐ Well ☐ Surface Water	5. Type of System ☐ Gravity ☐ Pumped	
	7. Pump Horsepower _____ HP	8. Pumping Time _____ Hours per Day
9. Total Average Daily Demand _____ Liters	10. Storage Tank Capacity _____ Liters	11. Pump Discharge Capacity _____ LPS

FINANCIAL DATA

12. Total System Cost ₱ _____	13. Maximum Loan Amount ₱ _____	14. Interest Rate _____
15. Local Equity ₱ _____	16. Funding Cost per Household ₱ _____	17. Repayment Period (months) _____

18. Type of Local Equity
☐ Cash ☐ Labor ☐ Materials ☐ Others, _____

19. Total Monthly Expense ₱ _____	20. Monthly Fee Per Household ₱ _____

ANNEXES

☐ 1 Survey Form	☐ 5 Design of Pipe Lines	☐ 9A Fittings Schedule	☐ 12 Financial Analysis
☐ 2 Map of the Project Area	☐ 6 Design of Reservoir	(G.I. Pipes)	☐ 13 Availability of Local
☐ 3 Design Criteria and	and Pump	☐ 9B Fittings Schedule	Equity
Basic Design Data	☐ 7 Detailed Design Plan	☐ 10 Bill of Materials	
☐ 4 Schematic Diagram of	☐ 8 Pipes Schedule	☐ 11 Cost Summary	
the System			

Prepared by :	Endorsed by :
_____ _____ Municipal Liason Staff Date	_____ _____ PST/PWSO Coordinator Date

Annex 1

SURVEY FORM
_____ Rural Water Supply Project

A. LOCATION

Barangay : _____ Province : _____
Municipality : _____ Region Number : _____

B. GENERAL INFORMATION

1. Population _____
2. Number of households _____
3. Distance from poblacion _____ kilometers
4. Availability of electricity Yes ☐ No ☐
5. Distance form electric line _____ kilometers
6. Power cost per kilowatt hour P _____
7. Availability of public transportation _____
8. Main livelihood of residents
   - ☐ Land transport
   - ☐ Water transport
   - ☐ Farming
   - ☐ Industry ☐ Others
   - ☐ Fishing

C. TECHNICAL INFORMATION

1. Are there reliable sources of potable water?
   ☐ Yes ☐ No

a) For Wells
- Well capacity : _____ lps
- Casing diameter : _____
- Casing depth : _____
- Water level from top of well : _____
- Location :
  - ☐ Within service area
  - ☐ Outside _____M. from service area

b) For Springs
- Average dry season flow : _____ ☐ GPM ☐ LPS
- Relative elevation of spring
  - a. _____ ☐ ft. ☐ m. above service area
  - b. _____ ☐ ft. ☐ m. below service area
- Location :
  - ☐ Within service area
  - ☐ Outside _____ m. from service area

2. Are there water supply system materials and equipment (pumps, pipes, fittings) which can be donated for this project from other source?

☐ Yes ☐ No

For pumps : Type : _____ Power : _____ HP

For pipes : ☐ Galvanized Iron ☐ PVC
☐ Others, specify _____

3. Is there an existing water tank that can be used? ☐ Yes ☐ No

Type : ☐ Steel ☐ Reinforced Concrete

Capacity : _____ ☐ Gallons ☐ Cubic Meters

Location: (Please indicate in the map of the project area)

Relative elevation with respect to service area ____ ☐ ft. ____ ☐ m.

4. Are there other sites where water tanks may be erected? ☐ Yes ☐ No

Location : (please indicate in the map of the project area)

Relative elevation with respect to service area ____ ☐ ft. ____ ☐ m.

5. Does the barrio have skilled personnel? ☐ Yes ☐ No

If yes, how many? Estimated Number

Plumbers : _____
Masons : _____
Carpenters : _____
Others : _____

If no, are there competent contractors near the area?

Plumbing contractor : ☐ Yes ☐ No
Tank fabricator : ☐ Yes ☐ No

Are there suppliers of materials (pumps, pipes, fittings) in the municipality?

☐ Yes ☐ No

D. FINANCIAL INFORMATION

1. What can the barangay provide as local equity?

Cash	:	P_____	
Labor	:	_____	man-days
Materials :	Sand	: _____	cu. m.
	Gravel	: _____	cu. m.
	Cement	: _____	bags
	Others, specify :	_____	

2. Have the people been informed of the current financing policies for Level II systems, particularly the monthly fees required to repay loan & provide for O & M?

☐ Yes ☐ No

3. How much are the people willing to pay per household per month as a water fee?

Below	P 6.00	☐	P 10.00 - 15.00	☐	Others ☐
P 6.00 -	10.00	☐	15.00 - 20.00	☐	Specify : _____

4. Average income per household P _____ per month

E. INSTITUTIONAL INFORMATION

1. Is there an existing association who is ready, willing and able to manage the system
   ☐ Yes ☐ No
   If yes, please specify. _____

2. Are people willing to join a water association to operate and manage a water supply system? ☐ Yes ☐ No

3. How many households are willing to be members? _____ households.

4. Name at least three (3) leaders of the community who can act as officers of the association, if required.

Name	Address
_____	_____
_____	_____
_____	_____
_____	_____

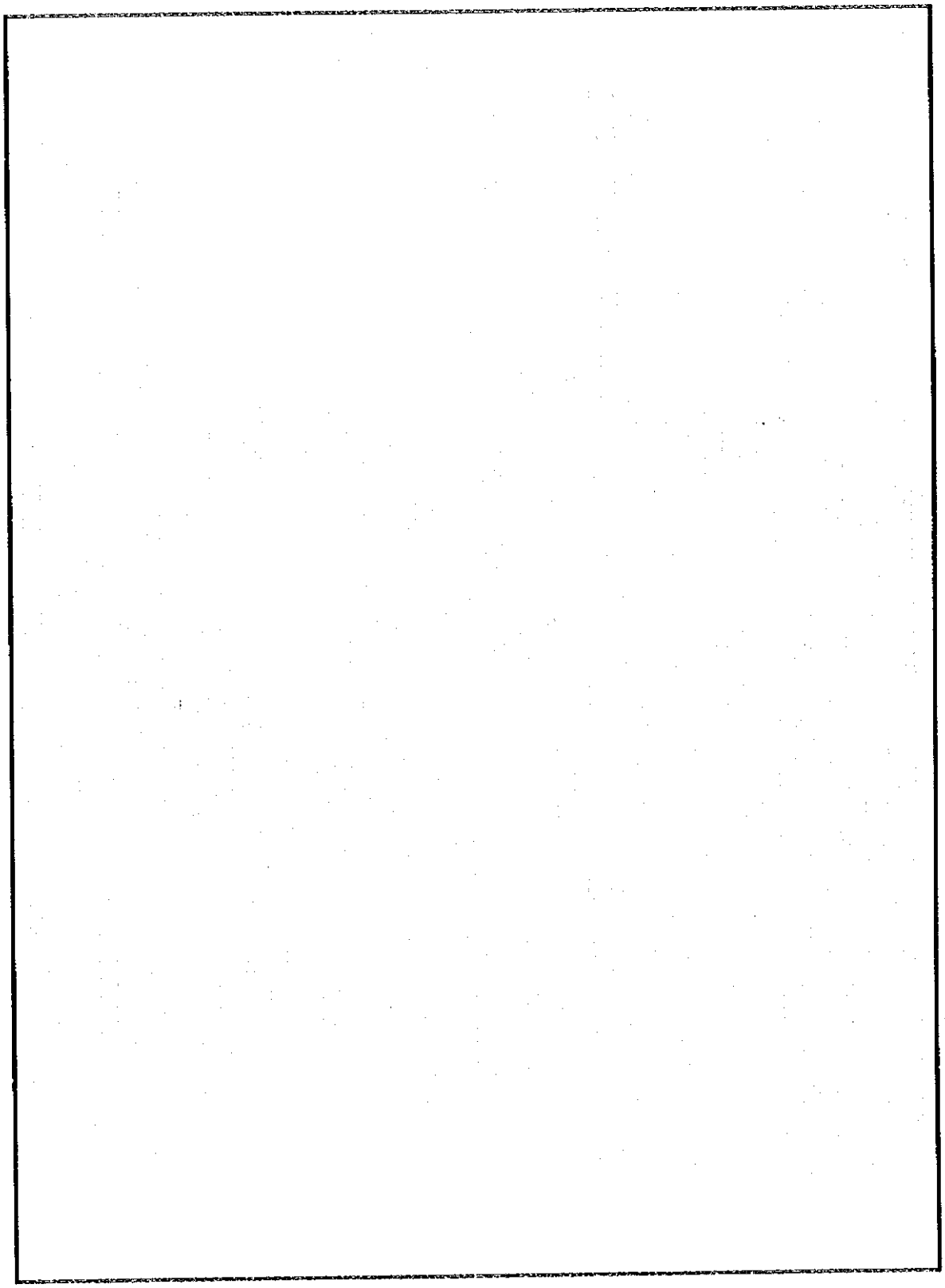
F. MAP OF THE AREA

Please attach map of the area proposed to be served. Indicate location of houses, buildings and other structures to be served including roads, the water source(s) and possible locations of storage tanks. The map should preferably be drawn to scale.

Important : If map cannot be drawn to scale, indicate distance measurements between important points along roads, or possible routes of distribution pipes with households properly indicated. For rolling terrain, indicate elevation differences between measurement points.

G. REMARKS :

Annex 2
MAP OF THE PROJECT AREA
_____ Rural Water Supply Project



Annex 3

DESIGN CRITERIA AND BASIC DESIGN DATA
_____ Rural Water Supply Project

I. Design Criteria

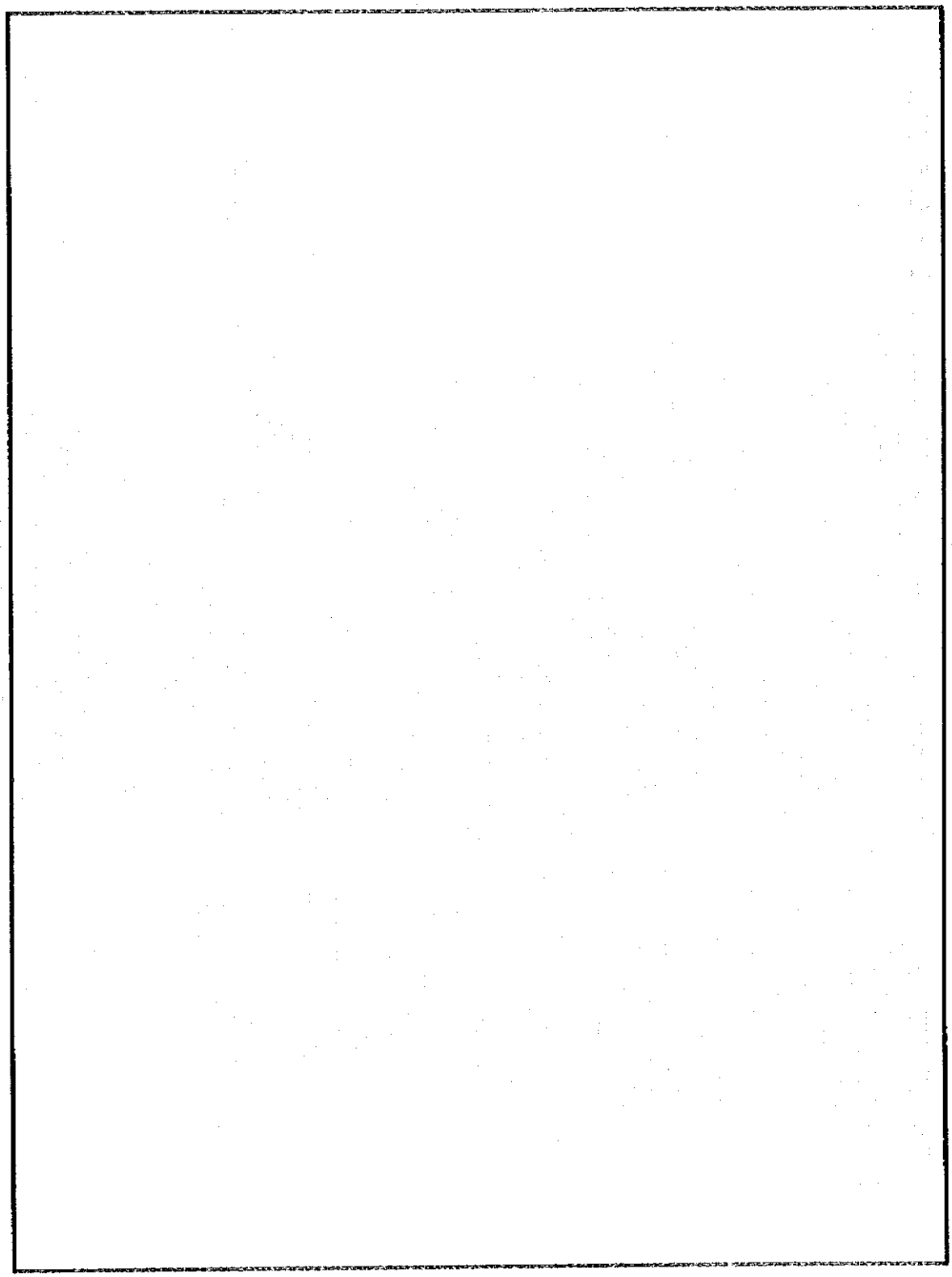
1. Design Period : 5 years
2. Population
   - Annual Growth : 3%
   - Average Household Size : 6 persons/HH
   - Design Population : Present Population x 1.16
3. Per Capita Water Consumption
   - Level II : 60 lpcd
   - Level II with garden : 75 lpcd
   - Level III : 100 lpcd
4. Water Demand
   - Average Day Demand : Design Population X Per Capita Consumption
   - Maximum Day Demand : 1.3 X Average Day Demand
   - Maximum Hour Demand : 2.5 X Average Day Demand
5. Pump Operation
   - Pumping Hours : 8 -15 hours
   - Pumping Rate : Maximum Day Demand/PumpingHrs. = _____
6. Storage Capacity : 1/4 of Average Day Demand
7. System Pressure : 5 - 10 psi at faucet
8. Households Served Per Faucet : 4 - 6 HH

II. Basic Design Data

1. Present Population : _____
2. Design Population (Present Population X 1.16) : _____
3. Average Day Demand: _____ X _____ : _____
   (Per Capita Consumption) (Design Pop.)
4. Maximum Day Demand: 1.3 X _____ : _____
   (Average Day Demand)

Annex 4

SCHEMATIC DIAGRAM OF THE SYSTEM
_____ Rural Water Supply Project



Annex 5

DESIGN OF PIPE LINES

_____ Rural Water Supply Project

SECTION (1)	NODES From (2)	NODES To (3)	SECTION LENGTH(M) (4)	HOUSEHOLD SERVED (5)	PEAKFLOW (LPS) (6)	PIPE DIA (MM) (7)	HEAD LOSS PER 100M (8)	ACTUAL HEADLOSS (9)	REMARK (10)

Annex 6

DESIGN OF RESERVOIR AND PUMP

_____ Rural Water Supply Project

A. DESIGN

1. Determine Capacity of Reservoir, (C_r)

   C_r = 1/4 x Average Day Demand

   C_r = 1/4 x D_s (LPD)

   C_r = _____ liters

2. Determine Minimum Water Elevation, (WL_m)

   WL_m = total head loss + Minimum Pressure in Main (Meters)

   For Barangay System, Min. Pressure = 5 psi (use 3M.)

   For Poblacion System, Min. Pressure = 10 psi (use 7M.)

   WL_m = _____ M.

   Note : The bottom of the storage tank should be higher than this elevation.

B. DESIGN OF PUMP

1. Determine Pump Capacity, Q_p (LPS)

   Q_p = Max. Day Demand (LPD)/ Operating Time (Sec.)

   Q_p = 78 P_d/T where: P_d = Design Population

   T = Operating Time in Seconds

   Q_p = _____ LPS

2. Calculate Total Dynamic Head, TDH (Meters)

   TDH = Depth of Pumping Level + by Maximum Reservoir Elevation + friction loss

   TDH = _____ m

3. Calculate Brake Horsepower Requirement :

$$\text{Brake Horsepower} = \frac{Q_p \times TDH}{75 \times \text{Efficiency}}$$

Brake Horsepower = _____ Hp

Where :

Efficiency for Centrifugal Pump, 30-60 %

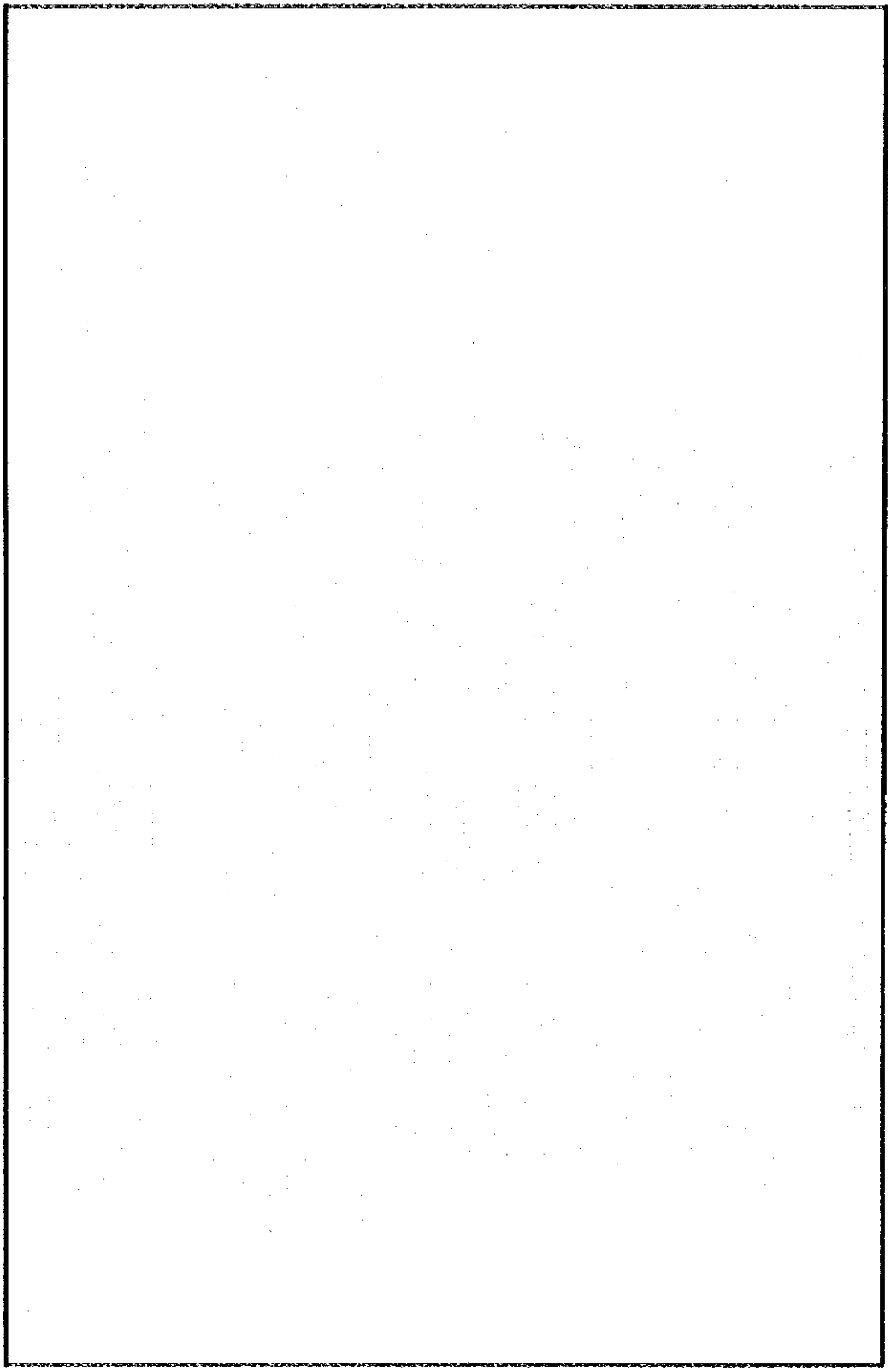
Efficiency for Submersible Pump, 50-60 %

Efficiency for Jetmatic Pump, 20-30 %

Annex 7

DETAILED DESIGN PLAN

_____ Rural Water Supply Project



Annex 8

PIPES SCHEDULE

______________________ Rural Water Supply Project

PIPE (1)	DIAMETER mm	SECTION (2)	LENGTH m	REQUIRED PIPES (3)	ACTUAL NO. OF PIPES (4)	ADDITIONAL PIPES (5)

Annex 9A

FITTINGS SCHEDULE (G.I. PIPES)

_____ Rural Water Supply Project

NODES / SECT LENGTH	COUPLING		UNION PATENTE	TEE STD.	TEE REDUCER	BUSHING REDUCER	ELBOW STD / ELBOW REDUCER	COUPLING REDUCER	FAUCET	NIPPLE	VALVES
	Qty.	Size	Qty.								

Annex 9B

FITTINGS SCHEDULE (PVC PIPES)

_____ Rural Water Supply Project

NODES / SECT LENGTH	SOCKET		STD. ELBOW REDUCER	STD. TEE REDUCER	SOCKET ADAPTOR	SOCKET REDUCER	G. I. FITTINGS			OTHERS
	Qty.	Size					VALVES	FAUCET	ELBOW	

Annex 10

BILL OF MATERIALS

________________ **Rural Water Supply Project**

QUANTITY	UNIT	DESCRIPTION	UNIT COST	TOTAL COST

Annex 11

COST SUMMARY

_____ Rural Water Supply Project

I. ESTIMATED COST OF THE SYSTEM

1. a) Cost of Pipes ₱ _____

   b) Cost of Fittings _____

   Total Cost of Pipes and Fittings ₱ _____

2. Cost of Reservoir _____

3. Cost of Pump _____

4. Labor Cost _____

   a) 10% of Pipes & Fittings (For G.I. Pipes)

   b) 25% of Pipes & Fittings (For PVC Pipes)

5. Cost of Freight and Handling _____

6. Contingencies 5% (Pipes & Fittings - Labor) _____

   Total Cost of the System ₱ _____

For gravity system, omit cost of pump.

II. FINANCIAL DATA

1. Total Cost of the System ₱ _____
2. Local Equity _____
3. Amount of Loan _____

Note:

Cost of freight and handling:

0%, - Rizal; 2.5%, - Zambales; 7% - Mindoro Fittings

Annex 12

FINANCIAL ANALYSIS

_____ Rural Water Supply Project

A. RELEVANT DATA

1. Pumping Hours : _____ hrs.
2. Pump Horsepower : _____ HP
3. Cost/KWH : ₱_____
4. Pump Cost : ₱_____
5. Amount of Loan : ₱_____
6. Loan Terms : _____ % (interest per annum)
   : _____ years (Repayment Period)
7. Number of Households : _____

B. COMPUTATION OF MONTHLY EXPENSES (Omit non-applicable items)

1. Operations
   a. Salaries _____ x _____ = P _____
   b. Office Supplies _____ x _____ = P _____
   c. Power _____ x _____ = P _____
   d. Chemical _____ x _____ = P _____
   e. Miscellaneous _____ x _____ = P _____

2. Asset Replacement
   a. Pump _____ / _____ = P _____
   Life (mos.)
   b. Pipelines _____ / _____ = P _____
   Life (mos.)
   c. Tank _____ / _____ = P _____
   Life (mos.)
   d. Others _____ / _____ = P _____
   Life (mos.)
3. Amortization _____ x _____ = P _____
   (CRF) (Loan Amt.)
4. Maintenance (2% of Capital Equipt.costs annually)
   .02 X _____ /12 = P _____
6. Total Monthly Expenses = P _____

C. COMPUTATION OF WATER FEE

Monthly Water Fee Per Household :

_____ / _____ = P _____

(Total Monthly Expenses) (No. of HH)

Annex 13

AVAILABILITY OF LOCAL EQUITY

Item	Amount
I. Cash	₱ _____

II. Labor

Type of Labor	No. of Workers	No. of Days	Rate Per Day	
_____	_____	_____	_____	
_____	_____	_____	_____	
_____	_____	_____	_____	
_____	_____	_____	_____	
_____	_____	_____	_____	_____

III. Materials

Type of Materials	Quantity	Unit Cost	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	
_____	_____	_____	_____

TOTAL ₱ _____

I certify that the items listed above represent the local share of the project cost. _____ _____ Association President Date	Noted by : _____ _____ Municipal Sector Liason Date

9.5 Community Development Models

Community Development Model Study (Level I)
Model Site: Sitio Yagit, Barangay San Rafael, Rodriguez, Rizal

1. Socio-Economic Profile of the Model Site

Sitio Yagit is less than one kilometer away from the center of Bgy. San Rafael. The proposed project site covers one hectare of land at the foot of the Montalban hills, about 500 meters from Wawa Dam. Most of the houses are located along a stretch of gravel road and the abandoned MWSS raw water transmission line (Wawa Dam to Balara). The sitio is at the back of a new medium-cost housing subdivision. It has a population of 1,500 comprising 350 families. Each family has an average of 4 members. Most of the residents are Catholics; about 30% belong to other religious groups such as Mormons, Iglesia ni Cristo, and others.

Most of the residents are seasonal laborers and farm helpers. About 30% are engaged in upland farming; the rest run small scale businesses. The sitio has 4 sari-sari stores. Most of the basic social infrastructures like the schools, churches, health center and the public market, are concentrated in the town proper which is about two kilometers away.

About 90% of the families live below the poverty level and earn an average monthly income of less than P4,000.00. Houses are made of light materials, coco lumber, nipa and GI sheet roofing. None of the households enjoy electricity although the streets are lighted in the evening.

The Hillside Neighborhood Association, Inc. (HNA) is the only community organization in the sitio. It was established in 1988 mainly to take care of a handpump which was then newly-constructed. The head of this water association is generally considered the sitio leader. The HNA is also registered with the Presidential Commission on Urban Poverty. NGOs are not yet active in the sitio although a women's club for livelihood program and a youth club for educational and social development will shortly be established

Ownership of the land is being disputed by several parties. The sitio residents have also staked a claim through the association.

2. Present Water Supply/Sanitation Situation

There are three existing shallow wells to serve the needs of the residents All are being maintained by the HNA. Two of these wells were installed through municipal fund; the other one was constructed through barangay fund. Each well has a depth of about 60 ft. Fees are collected, although not regularly, by the association. Whenever the facilities break down, voluntary contributions are collected. According to the HNA leaders, there are no problems with the system of occasional collection.

Some residents get their water for washing and bathing from Tarimis Spring. It is, however, not well protected. Stray animals loiter around the spring; residents nearby throw their wastes near the spring.

Only 50% of the households have toilet facilities. There is no public toilet in the area. Families without toilets practice "wrap and throw" method.

3 Assessment

3.1. Water Sources

There is inadequate water supply available to the residents of Sitio Yagit and this has resulted in poor environmental health and sanitation condition, The existing shallow wells are not provided with protection works. The spring is not protected either and has become a dumping site of wastes and garbage by the residents

3.2. Sanitation Facilities

Half of the total number of households do not have sanitary toilets. People practice "wrap and throw" method.

3.3. Health

This situation explains why water-related diseases account for the leading causes of morbidity and mortality in the province. Yet, the residents do not see this as a direct result of using unsafe water or from the lack of sanitary toilets. People seem to be accustomed in using water from unsanitary

shallow wells. They do not complain of the quality anymore nor do they suspect it as the cause of their illnesses.

3.4. Institutional Analysis

There is one existing community organization in Sitio Yagit - the Hillside Neighborhood Association - established mainly to take care of a hand pump which was constructed in 1988. However, the association has not been very active in developing more reliable and sufficient water supply systems and in promoting good hygiene among is members. Analyzing the situation, the reasons for these could be the following:

(1) The access of residents to shallow wells and the spring even if these sources do not provide adequate water;

(2) Social issues such as land disputes tend to occupy much of the time of the association rather than the more pressing issues on water and sanitation ;

(3) The residents' lack of awareness on the potential of people's organization to provide solutions to their existing health and sanitation problems.

(4) The negligence of Barangay Council and other NGOs to mobilize the residents;

There is a need to reactivate and reorient the interest of the members of the community organization which will result initially in the prioritizing of their health and environment problems.

4. Future Development Needs

4.1. Potential Source and Service Level

The construction of two additional shallow wells for Level 1 service would alleviate the prevailing situation in Sitio Yagit. Proper construction method and provision of adequate drainage and source protection facilities are needed to avoid contamination of water source.

An all-out campaign for the construction of individual household sanitary toilets should be launched.

4.2. Deputizing a Local Organization as BWSA

The Hillside Neighborhood Association can be formed into a Barangay Water Association inasmuch as its main concern is the maintenance of the existing shallow wells

5. Capital and O&M Funds

5.1. Water Source Facility and Sanitary Toilet

Capital cost required to construct a shallow well including installation of pump is estimated at P57,000. Total cost of the two wells shall be P114,000.

Capital cost of household toilets shall be shouldered by the owners. If a family is not able put up the initial capital cost, the BWSA can make arrangements for the extension of loan from the fund sources (rural bank, cooperatives, etc.).

5.2. Operation and Maintenance

The community should raise an amount equivalent to 1% of the capital cost (in this case its P1,140.00) which shall be set aside for the operation and maintenance of the facilities.

Operation and maintenance of household toilets shall be done by the owners.

6. Community Involvement

6.1. Pre-Construction (Project Preparation and Planning)

(1) The Barangay Council of San Rafael, in coordination with the Municipal Sector Liaison (MSL), could initiate a meeting among the residents to discuss water and sanitation problems and needs in the area. A discussion on the prevailing health situation in the area, such as recent epidemics or the government's immunization campaign can be the opening agenda in the meeting. The opportunities in the sector and possible implementation of water and sanitation project in the sitio can then be discussed.

(2) The residents shall endorse the Hillside Neighborhood Association as the community organization to assume the role of a BWSA and handle this particular project. The Board of Directors and officers of the Association should call a meeting among its members to discuss

the implementation of Level I water system and the provision of sanitary toilets by the residents. The association can form a committee to act as the project team that will regularly coordinate with the municipal staff.

(3) The association should determine the monthly fees that the members will contribute to cover all O&M costs, as well as to establish a reserve fund.

(4) The BWSA should submit a formal request to the municipality/provincial government, duly endorsed by the Barangay Council, for technical and financial assistance in undertaking Level I project in Sitio Yagit. The request is accompanied by a written set of commitments signed by the members indicating willingness to participate in the project, assume the responsibility for the operation and maintenance, including the collection of fees to pay for the operation and maintenance cost. An initial reserve fund representing the membership fees of beneficiaries will be collected and deposited in a bank.

(5) Upon approval of such request, the association will mobilize its project team to assist in project implementation and in undertaking the following:

a) Conduct of community study (barangay diagnostics);
b) Identification of alternative sites available where the shallow wells would be installed;
c) Negotiation for written permits granting use of land and right of way where hand pumps would be put up, and;
d) Negotiation with qualified local contractor who can undertake well drilling

(6) Monitoring Activities: During this stage, the association will submit a progress report to MSL indicating the status of project planning and preparation. The report will include such information as the composition and membership of the BWSA, scope of project to be implemented, project specifications, work plan and schedule, and financial arrangement (if any).

6.2. Construction Phase (Project Implementation)

(1) During construction of facilities, the association has to assign team/s which shall coordinate and monitor the implementation of the project.
(2) Beneficiaries could provide labor during well construction, pump installation and preparation of drains and soakway pits.

(3) The community may be asked to contribute materials which are locally available. These may take in the form of gravel and sand, roofing sheets, timber or tools for excavation.

(4) The residents should provide information which may be necessary expedite the construction of the facility.

(5) Monitoring Activities: The BWSA will have a meeting discussion with MSL on the status of construction project.

6.3. Post Construction (Operation and Maintenance)

(1) BWSA, through the Hillside Homeowners Association, should monitor whether the contractors conduct proper disinfecting of the wells immediately after their completion. Also, the association shall request PHO to conduct periodic surveillance and, if necessary, disinfection of the wells.

(2) The BWSA shall monitor whether the facilities are properly maintained or not.

(3) Beneficiaries should be involved directly in the operation and maintenance of the facilities. They shall practice to keep the premises of the water facility clean, sanitary and free from excess water, which may cause contamination of the water source. Breakdown should be reported immediately to the BWSA and necessary repair work must be undertaken at once.

(4) Operation and maintenance cost will be shouldered by the beneficiaries through their membership fees. The association shall regularly collect monthly contribution and deposit them in the bank. Expenses for repairs and improvement as well as spare parts commonly used will also be purchased out of this fund.

(5) The member-beneficiaries should provide labor in the repair and rehabilitation of the facilities.

(6) The association shall adopt a disaster response program which focuses on securing facilities and in providing water supply in times of emergencies.

(7) Water quality surveillance should be a priority activity of the BWSA. Members should see to it that regular water examination is being done by the Rural Health Unit or PHO. Results will be furnished to the BWSA.

(8) Maintenance of individual household toilets should be the responsibility of the owners.

(9) Monitoring Activities: The BWSA is required to submit annual reports to MSL. The first report should be submitted immediately upon the completion of the project. It should well log data, number of sanitary toilets constructed, overall cost (both for water system and toilets), project modification (if any), and timetable of maintenance activities. Succeeding reports will indicate breakdowns and repairs, expenses, problems encountered in operating the system and, if possible, recommendations, and other relevant data.

7. Project Elements

7.1. Health and Hygiene Education

(1) Health and hygiene education should be launched as early as the start of the project and should be sustained. In fact, it will be a good entry point in discussing existing water and sanitation issues among the community residents.

(2) The MSL, in cooperation with the Rural Health Unit should conduct a continuous health education campaign in the project area. Special presentations can also be done by the RHU staff during meetings of the group. Significantly, the facilities to be established would provide more opportunities to discuss hygiene practices and identify areas for improvement.

(3) This local effort can be reinforced by multi-media campaign being organized by higher institutions such as the DOH and the government's information agency.

(4) The barangay elementary school adopt DEC's Teacher-Child-Parent Approach which involves parents and other members of the family in teaching practical lessons in hygiene education.

7.2. Human Resources Development and Training

(1) BWSA members, including women, will be trained on basic hand pump operation and maintenance; simple tasks like replacing rubber washer, etc. Workshops and on-the-job training will be conducted by the municipal government.

(2) Qualified young members will be enrolled at the National Manpower and Youth Council Training Center which conducts regular training course on Plumbing. Internship of graduates can be arranged with the nearest water district or with the municipal/provincial government.

7.3. Women's Involvement

(1) The female members of BWSA shall be involved from the start of the project and on major decisions like the selection of sites for the wells and the collection of fees/contributions.

(2) Women should be involved in operation and maintenance of the facilities, doing simple tasks. They should therefore be included in training programs conducted for the members.

(3) The women sector must be encouraged to spearhead the health and hygiene education campaign in the community.

Community Development Model Study (Level II)
Model Site: Barangay Prinza, Teresa, Rizal

1. Socio-Economic Profile of the Model Site

The study area covers a land area of about 480 hectares which represents 3% of the municipality's total land area. Topography is mostly hilly. Barangay Prinza has a population of 1,245 comprising 239 households. Fifty-one percent are males and 49 per cent females. Of the total population, 93% are Catholic while the rest belong to various sects (Iglesia ni Cristo, Protestant and Born Again Christian).

Barangay. Prinza is composed of three puroks - Siplang, Bulak and Gulod, each headed by a coordinator. Siplang and Bulak are relatively better off economically than Gulod as indicated by the type of housing structures built in these two puroks Both also enjoy electric power supply and are strategically located along the main national highway. Gulod is situated at a higher elevation.

Eighty per cent of the population in the study area are economically productive. Of these, 40 per cent are factory workers, 30 per cent are professionals and the ten per cent are blue collar workers (masons, carpenters, etc.). Annual family income averages P25,000.00.

There is a primary school in the barangay but high school students have to go to the nearby town of Morong. A day care center operates while a health center provides regular medical and family planning services to the residents. There are also a Catholic church, a public market and eleven sari-sari stores in the barangay.

The barangay officials meet once a month. Various sub-committees have been formed to take care of the different needs of the constituents, especially health and sanitation. There are also various organizations existing in the area such as the PTA, RIC, Dreamer's Club, Starlight Club and the Youth Club which are concerned with the educational, social and spiritual development of the members of the community. Construction of a bypass road across the barangay is perceived as the major need.

2. Present Water Supply/Sanitation Situation

In Siplang, about 10 households and the school are presently served by a small Level III system. Service is available for only two hours per day because of the inadequate source. A flat fee of ₱ 60.00 per month is paid to the water association. The service area extends beyond Siplang to another 50 houses outside Bgy Prinza. This Level III system is operated by the Prinza Water Works Association.

In Bulak, the DPWH constructed a deep well (depth of 200 feet) although it has not been operational since it was installed in 1985. The Barangay Council has requested the Mayor and the Governor for assistance in rehabilitating the well. Only 3 households have private deep wells which they share with their neighbors. A large majority of the residents in Siplang and Gulod rely on a local water vendor for their supply. The vendor, who is also a small-scale well driller operates a private well and sells water commercially. Water is sold at ₱ 10.00 per drum (200 liters). Each household spends an average of ₱ 300.00 per month for water. No data is available on water quality. In Gulod, there is a small spring which is used by the residents. The yield however is very limited. The Barangay Council has constructed a small spring box to collect the water but the spring still runs dry during the summer.

Sanitation is not perceived to be a problem in Siplang and Bulak. Most of the houses have toilet facilities. There are no public toilets.

MWSS has offered to extend its service to the barangay. An assembly will be held shortly to explain the options and cost implications and to get the consensus of the barangay whether they would connect to MWSS or not.

3. Assessments

3.1. Water Sources

Residents of Barangay Prinza lacks a reliable source of water for their daily use. The Prinza Waterworks Association which operates a Level III system covers only 10 houses in Purok Siplang. The deep well in Bulak is not operational while the spring in Purok Gulod yields a limited amount of water. Residents have to buy water from water vendors.

3.2. Sanitation Facilities

Most of the households in the barangay have sanitary toilets so sanitation is not perceived to be a problem in the area.

3.3. Health

The general health status of the residents in Barangay Prinza is relatively fair compared to other barangays in the municipality. This could be attributed to the availability of water systems and sanitary toilets to the residents. However, there are still cases of water-related diseases and this is attributed to the lack of safety precautions of hauling and storing water.

3.4. Institutional Analysis

There are community associations existing in Barangay Prinza. In fact, the Prinza Waterworks Association was formed to deliver Level III water service although its system could only serve very few houses in Purok Siplang. Other organizations in the community include the youth club, the PTA and other small groupings. However, these organizations have not embarked on a full-scale water and sanitation development project.

In order to pursue the improvement of the water and sanitation condition in the barangay, the residents should decide and delegate the community organization to coordinate this activity.

4. Future Development Needs

4.1. Potential Source and Service Level

The Prinza Waterworks Association shall expand its coverage to Purok Siplang. A new deep well can be constructed to serve the residents in Puroks Bulak and Gulod. There is also a possibility that the barangay would be covered by the MWSS service.

Level II water system shall be developed in Barangay Prinza. The existing individual service concessionaires shall be maintained and expansion program shall be limited to communal faucets to bring service to more users in Puroks Siplang and Bulak.

(3) Families still without toilets hall be encouraged to construct individual household toilets.

4.2. Strengthening of RWSA

The existing Prinza Waterworks Association can assume the functions and responsibilities of the Rural Waterworks and Sanitation Association (RWSA) in the implementation of water and sanitation projects. It will be reorganized to include the sanitation activity in the community.

5. Capital and O&M Funds

5.1. Water System

Capital cost required to construct Level II system is estimated at P2,500,000. Of this amount, cost of materials is 70% while labor cost accounts for 30%.

The cost will be shouldered by the RWSA through a loan from lending institutions (LWUA, cooperatives, rural banks, etc.). To bring down the cost of the system, the community should provide free labor during the construction of the system. They can assist in excavations, pipe laying and installation of faucets. The water charges to be collected by the association from the water consumers will cover costs of operation and maintenance and loan amortization.

5.2. Sanitary Toilets

Capital cost of individual household toilets (pour flush type) shall be shouldered by the owners. If a family is not able to put up the initial capital cost, RWSA can make arrangements for the extension of loan from various institutions.

5.3. Operation and Maintenance

As mentioned earlier, the water charges to be collected by the association from the water consumers will cover costs of operation and maintenance.

6. Community Involvement

6.1. Pre-Construction (Project Preparation and Planning)

(1) The barangay residents shall initiate the holding of a meeting to discuss their water and sanitation problems and needs. The incumbent officers of Prinza Waterworks Association

can facilitate the discussion. The people shall decide among themselves the action that will be taken to answer their present needs as far as water and sanitation are concerned.

(2) The people shall reorganize Prinza Waterworks Association into RWSA to manage, operate and maintain the water system. Members of the water association shall be the main users of the water system. They appoint committees which shall be responsible for all the undertakings of the association.

(3) The members shall pay their initial membership dues .

(4) The RWSA shall request the municipal/provincial government for technical assistance in determining the scope of water and sanitation project they shall undertake.

(5) The Association shall submit a request to the municipal/provincial government or other lending institutions (commercial banks, cooperatives, etc.) for the necessary loan to finance the project. The request is accompanied by a commitment sheet signed by the beneficiaries indicating their willingness to participate in the project, assume the responsibility for the maintenance, including the collection of fees to pay for the cost of operation and maintenance and for loan amortization. A reserve fund representing the initial contribution/membership fee of beneficiaries will be collected and deposited in a bank.

(6) As soon as there's fund available, the RWSA shall mobilize its own team to assist the municipal/provincial team in:

1) undertaking community study (barangay diagnostics)
2) selection of water source and location of communal faucets
3) detailed planning and as a baseline for evaluation (including technical and social aspects as well as knowledge, attitudes, practices related to water, sanitation, and hygiene).
4) negotiation for the acquisition of the right of way
5) establishing the technology, level and design of the water system.
6) short listing of local contractors for the conduct of bidding

(7) The members shall also attend all briefings and presentations related to the project

(8) The association shall meet with the beneficiaries to set water fees to generate fund that will be used for the system's loan repayment and for operation and maintenance.

(9) Monitoring: During this stage, the RWSA shall submit a progress report to the Municipal Sector Liaison (MSL) indicating the status of project planning and preparation. The report will include, among others, the scope of project to be implemented, project specifications, work plan and schedule, delineation of responsibilities, and financial arrangements.

6.2. Construction Phase (Project Implementation)

(1) The beneficiaries shall provide self-help labor in the following activities:

1) clearing of the spring premises
2) construction of intake box and drainage around the spring
3) digging and pipe laying
4) installation of public faucets and meter
5) preparation of drains and soak way pits
6) excavation of pits and construction of latrine structures

(2) Granting of right of way for pipe laying, construction of pump stations and for installation of other necessary facilities

(3) Dissemination of information on the on-going construction

(4) Provision of access to contractors

(5) Monitoring Activities: The association will submit progress reports to MSL indicating the status of the project. It contains information such as modifications, project team composition, people's contributions (cash, materials and labor), and others.

6.3. Post Construction (Operation and Maintenance)

(1) The RWSA should monitor the practices of the users to ensure proper handling of the water and sanitation facilities as well as prudent use of water. Every member-consumer should also cooperate with RWSA to protect from loss or damage communal faucets with meters. The loss or damage due to the fault or negligence of the member shall be borne by him.

(2) The association should assign person/s to regularly monitor the performance of the water source and public faucets. Water samples should be collected in cooperation with the IPHO staff.

(3) The members should pay their membership dues/water consumption charges regularly in order for the association maintain good service of the water system.

(4) Maintenance of individual household toilets shall be the responsibility of the owners.

(5) Monitoring Activities: The association should submit quarterly reports to MSL. The first post-construction report should be submitted immediately upon the completion of the project. It should indicate scope of work (water system) such as: scope of spring development undertaken, number of communal faucets installed, length and diameter of pipes laid, sanitary toilets constructed, modifications (if any), overall cost (both for water system and toilets), and timetable of maintenance activities. Succeeding reports will indicate breakdowns and repairs, expenses, problems encountered in operating the system and, if possible, recommendations, and other relevant data.

7. Project Elements

7.1. Training and Hygiene education

(1) To create awareness among the residents on the value of safe water and sanitary toilet facilities, the RWSA assisted by MSL, shall conduct hygiene education in the barangay. The campaign should be launched as early as the commencement of the project and should be sustained.

(2) The hygiene education conducted by RWSA could, in fact, be the entry point for the improvement of water and sanitation systems in the area. Moreover, the new facilities shall provide more opportunities to discuss hygiene practices and identify areas for improvement.

(3) The barangay elementary school adopts DEC's Teacher-Child-Parent Approach which involves parents and other members of the family in teaching practical lessons in hygiene education.

(4) The efforts of the MSL and the school shall be reinforced by multi-media campaign being implemented by other government institutions such as the DOH and the Philippine Information Agency.

7.2. Human Resources Development and Training

(1) Members of the association, including women, shall be trained on:

1) basic utility operation and maintenance
2) simple tasks like replacing rubber washer
3) leak detection and repair
4) meter reading,

(2) Workshops and on-the-job training will be conducted by the municipal/provincial government.

(3) Qualified young members will be enrolled at the National Manpower and Youth Council Training Center which conducts regular training course on water system operation. Internship of graduates can be arranged with the nearest water district or the municipal waterworks system.

7.3. Women's Involvement

(1) The RWSA should campaign for female members and give them equal opportunity in the Board and in the management of the association. They (the women) must be involved from the start of the project and on major decisions like the selection of sites for the wells and the faucets and in the collection of fees/contributions.

(2) Women should be involved in operation and maintenance of the facilities, doing simple tasks. They should therefore be included in training programs conducted for the members.

(3) The women sector must take the lead in the conduct of health and hygiene education campaign in the community.

Community Development Model Study (Level III)
Model Site: AFP Village, Barangay Silangan, San Mateo, Rizal

1. Socio-Economic Profile of the Model Site

The AFP Village is about five (5) kilometers from the town proper of San Mateo and covers approximately three (3) hectares of rolling uplands. On clear days, its location offers a good view of Rizal province and Metro Manila. It is easily accessible by means of a short 15-minute jeepney ride from the poblacion.

The Village was established out of a subdivision as part of housing assistance program of the Armed Forces of the Philippines for its personnel, dependents and retirees. Seventy (70) percent of the residents are/were from the AFP services. The others are either dependents, tenants or those who subsequently acquired the property from the original owners.

2. Present Water Supply/Sanitation Situation

The residents have organized the AFP Village Homeowners Association, Inc. to manage various subdivision services, including water supply. The Association has a Board of Directors and is staffed by a bookkeeper, water meter reader, collector and operator. Water supply is a principal service of the Association. It also supervises a security contract, street lighting arrangements, garbage collection, beautification, etc. The Association is registered with SEC. Rules and regulations have been adopted for the operations of the water system. ater rates are approved by the Board of Directors.

The Association took out a loan (18% interest) from the Armed Forces of the Philippines Savings and Loans Association, Inc. (AFPSLAI) for the construction of a new water source and an elevated water tank. Facilities provided by the original developer is no longer operational. The new facilities have been in place for a year serving 300 households (5 members per household). All households are metered; the average monthly water bill is about P70.00 which also includes charges for security and other services of the Association. Source of water is a deep well (750 ft.); static water level (SWL) at 400 ft; a 15-hp motor drives the pump. Service is available 24 hours a day.

Although the residents are preoccupied with other community activities, maintenance of the water system remains their priority concern. The Association's officers ensure that rules and regulations are followed through close supervision.

All of the households have sanitary toilet facilities. There is a garbage truck which regularly collects and disposes household wastes

The situation in AFP Village offers a viable alternative model for the provision of Level III service.

3. Assessment

3.1. Water Sources

The water source provides adequate supply to the village residents through a 750 ft. deep well equipped with an elevated steel tank.

3.2. Sanitation Facilities

All households have sanitary toilets.

3.3. Health

The health condition in the area is relatively favorable as compared to the rest of the barangays in San Mateo.

3.4. Institutional Analysis

This is a model case in which the whole community participates in the development, management, operation and maintenance of its water supply and the promotion of hygiene education.

The residents of the AFP Village (initially a subdivision) organized the Homeowners Association to administer basic services in the village, including water supply. The previous developer of the area put up water system facilities but the facilities were immediately became

non-operational due to poor maintenance. The Association decided to take over the management of the water system. It secured a loan to construct new facilities. Non-operational facilities were rehabilitated. Presently, the Association operates the system which provides efficient service to 300 individual house connections.

4. Future Development Needs

4.1. Potential Source and Service Level

New deep wells shall be properly constructed to provide additional source of water to the increasing number of concessionaires. The Association shall continue to provide Level III water system and expand it to include new areas.

4.2. Identification of a Community Organization

The Homeowners Association is still the most appropriate organization to manage, operate and maintain the water system.

5. Capital and O&M Funds

5.1. Water System

The entire water system has already been developed and constructed. Future expenses shall be required for the system expansion. However, cost shall be determined after the conduct of feasibility study and detailed design thereafter.

Expansion cost for the system will be shouldered by the Association through a loan secured from funding sources, most likely from the AFP Savings and Loan Association.

5.2. Individual Sanitary Toilets

Capital cost of household toilets shall be shouldered by the homeowners.

6. Community Involvement

Since the water system has already been developed, the community involvement shall be focused on the operation and maintenance of the system. The users/beneficiaries can participate through the following:

(1) Paying of water bills on time
(2) Reporting of water leaks at the main pipeline
(3) Giving access to meter readers
(4) Conservation of water
(5) Campaign for more service connections
(6) Reporting of unlawful practices such as illegal connections and tampering of water meters
(7) Monitoring of water quality
(8) Attending meetings and other activities of the Association
(9) Safe disposal of waste water
(10) Information dissemination on health and hygiene

7. Project Elements

7.1. Training and Hygiene Education

The Association, together with the Rural Health Unit (RHU) should conduct a continuous health education campaign in the community. Special presentations can also be done by the RHU staff during meetings of the group.

This local effort can be reinforced by multi-media campaign being organized by higher government institutions such as the DOH and the Philippine Information Agency to be coordinated by the provincial/municipal staff.

The public elementary school in the village is required to adopt DEC's Teacher-Child-Parent Approach which involves parents and other members of the family in the teaching of practical lessons in hygiene education

7.2. Human Resources Development and Training

Training and human resource development programs shall be directed to those who manage, operate and maintain the water systems. The officers, management and staff of the Association shall be sent to provincial government and/or other relevant central government agencies to attend basic and advance training programs such as policy making, financial management, systems design, construction supervision, among others.

Qualified young members will also be enrolled at the National Manpower and Youth Council Training Center which offers water system-related courses. Internship of graduates can be arranged with the municipal/provincial government or other institutions.

7.3. Women's Involvement

The Association should campaign for female members and give them equal opportunity in the Board and in the management of the system. Women should be involved in operation and maintenance of the facilities and be allowed to do simple tasks. They should therefore be included in training programs conducted for the members.

The women sector must spearhead in the conduct of health and hygiene education campaign in the community.

10. COST ESTIMATES FOR FUTURE SECTOR DEVELOPMENT

10.2 Assumptions for Cost Estimates

(1) Unit Construction Cost

Table 10.2.1 Unit Cost of Level I (Deep Well - 40m Depth)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		3,300
B. Drilling of Well & Installation of Steel Casing/Screen				
1. Materials				
(1) 100mm x 3m Steel Casing with coupling	11	pcs.	2,625	28,875
(2) 100mm x 3m Steel Casing with one end closed	1	pc.	2,719	2,719
(3) 100mm x 3m Low Carbon Steel Screen	2	pcs.	4,313	8,626
2. Labor, Fuel, Lubricant and others				
Well Drilling for 40 m depth at 200mm borehole	40	m	1,100	44,000
Sub-Total of B				84,220
C. Well Development		L.S.		5,000
D. Gravel Packing, Installation of Handpump and Construction of Platform				
1. Materials				
(1) Improved Deep Well Cylinder Pump (Malawi Type)	1	set	9,000	9,000
(2) 63mm x 6m GI Pipe with coupling	6	pcs.	1,706	10,236
(3) #10 Sieved Gravel	0.7	cu.m	870	609
(4) Coarse Sand	1	cu.m	304	304
(5) Cement for Sanitary Seal	4	bags	117	468
(6) Pump Base and Platform				
1) Cement	4	bags	117	468
2) Gravel	2	cu.m	385	770
3) Sand	1	cu.m	304	304
4) Plywood (1,200mm x 2,400mm x 6mm)	1	pc.	250	250
5) Form Lumber (50mm x 75mm x 1,800mm)	6	pcs.	45	270
6) Nail	1	kg.	32	32
Sub-Total of D-1				22,711
2. Labor (40% of D-1.)		L.S.		9,084
Sub-Total of D				31,795
E. Indirect Cost				
Profit (10% of A, B, C & D)		L.S.		12,432
VAT (10% of Profit & Labor)		L.S.		6,552
Sub-Total of E				18,984
Total of Construction Cost (A+B+C+D+E)				143,299
F. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		3,000
2. Construction Supervision		L.S.		2,000
3. Water Quality Analysis		L.S.		1,088
Sub-Total of F				6,088
GRAND TOTAL				149,387
SAY				149,400

Note: L.S. - Lump Sum

Source: DPWH standard price in 1994

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.2 Unit Cost of Level I (Deep Well - 80m Depth)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		3,300
B. Drilling of Well & Installation of Steel Casing/Screen				
1. Materials				
(1) 100mm x 3m Steel Casing with coupling	24	pcs.	2,625	63,000
(2) 100mm x 3m Steel Casing with one end closed	1	pc.	2,719	2,719
(3) 100mm x 3m Low Carbon Steel Screen	2	pcs.	4,313	8,626
2. Labor, Fuel, Lubricant and others				
Well Drilling for 80 m depth at 200mm borehole	80	m	1,100	88,000
Sub-Total of B				**162,345**
C. Well Development		L.S.		5,000
D. Gravel Packing, Installation of Handpump and Construction of Platform				
1. Materials				
(1) Improved Deep Well Cylinder Pump (Malawi Type)	1	set	9,000	9,000
(2) 63mm x 6m GI Pipe with coupling	8	pcs.	1,706	13,648
(3) #10 Sieved Gravel	1.6	cu.m	870	1,392
(4) Coarse Sand	1	cu.m	304	304
(5) Cement for Sanitary Seal	4	bags	117	468
(6) Pump Base and Platform				
1) Cement	4	bags	117	468
2) Gravel	2	cu.m	385	770
3) Sand	1	cu.m	304	304
4) Plywood (1,200mm x 2,400mm x 6mm)	1	pc.	250	250
5) Form Lumber (50mm x 75mm x 1,800mm)	6	pcs.	45	270
6) Nail	1	kg.	32	32
Sub-Total of D-1				26,906
2. Labor (40% of D-1.)		L.S.		10,762
Sub-Total of D				**37,668**
E. Indirect Cost				
Profit (10% of A, B, C and D)		L.S.		20,831
VAT (10% of Profit & Labor)		L.S.		11,959
Sub-Total of E				**32,790**
Total of Construction Cost (A+B+C+D+E)				**241,103**
F. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		3,000
2. Construction Supervision		L.S.		2,000
3. Water Quality Analysis		L.S.		1,088
Sub-Total of F				**6,088**
GRAND TOTAL				**247,191**
SAY				**247,200**

Note: L.S. - Lump Sum

Source: DPWH standard price in 1994

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.3 Unit Cost of Level I (Deep Well - 120m Depth)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		3,300
B. Drilling of Well & Installation of Steel Casing/Screen				
1. Materials				
(1) 100mm x 3m Steel Casing with coupling	37	pcs.	2,625	97,125
(2) 100mm x 3m Steel Casing with one end closed	1	pc.	2,719	2,719
(3) 100mm x 3m Low Carbon Steel Screen	2	pcs.	4,313	8,626
2. Labor, Fuel, Lubricant and others				
Well Drilling for 120 m depth at 200mm borehole	120	m	1,100	132,000
Sub-Total of B				**240,470**
C. Well Development		L.S.		5,000
D. Gravel Packing, Installation of Handpump and Construction of Platform				
1. Materials				
(1) Improved Deep Well Cylinder Pump (Malawi Type)	1	set	9,000	9,000
(2) 63mm x 6m GI Pipe with coupling	15	pcs.	1,706	25,590
(3) #10 Sieved Gravel	2.5	cu.m	870	2,175
(4) Coarse Sand	1	cu.m	304	304
(5) Cement for Sanitary Seal	4	bags	117	468
(6) Pump Base and Platform				
1) Cement	4	bags	117	468
2) Gravel	2	cu.m	385	770
3) Sand	1	cu.m	304	304
4) Plywood (1,200mm x 2,400mm x 6mm)	1	pc.	250	250
5) Form Lumber (50mm x 75mm x 1,800mm)	6	pcs.	45	270
6) Nail	1	kg.	32	32
Sub-Total of D-1				39,631
2. Labor (40% of D-1.)		L.S.		15,852
Sub-Total of D				**55,483**
E. Indirect Cost				
Profit (10% of A, B, C and D)		L.S.		30,425
VAT (10% of Profit & Labor)		L.S.		17,828
Sub-Total of E				**48,253**
Total of Construction Cost (A+B+C+D+E)				**352,506**
F. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		3,000
2. Construction Supervision		L.S.		2,000
3. Water Quality Analysis		L.S.		1,088
Sub-Total of F				**6,088**
GRAND TOTAL				**358,594**
SAY				**358,600**

Note: L.S. - Lump Sum

Source: DPWH standard price in 1994

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.4 Unit Cost of Level I (Deep Well Rehabilitation)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		**L.S.**		**3,300**
B. Well Rehabilitation				
1. Materials				
(1) Cylinder Pump Set	1	set	9,000	9,000
(2) Cement for Surface Sealing	4	bags	117	468
(3) Pump Base and Platform				
1) Cement	4	bags	117	468
2) Gravel	2	cu.m	385	770
3) Sand	1	cu.m	304	304
4) Plywood (4' x 8' x 1/4")	1	pc.	250	250
5) Form Lumber (2" x 3" x 6")	6	pcs.	45	270
6) Nail	1	kg.	32	32
Sub-Total of B-1				11,562
2. Labor (40% of B-1)		L.S.		4,625
Sub-Total of B				**16,187**
C. Well Development		**L.S.**		**6,500**
D. Indirect Cost				
Profit (10% of A, B &C)		L.S.		2,599
VAT (10% of Profit & Labor)		L.S.		1,372
Sub-Total of D				**3,971**
Total of Construction Cost (A+B+C+D)				**29,958**
E. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		1,100
2. Supervision		L.S.		650
3. Water Quality Analysis		L.S.		1,088
Sub-Total of E				**2,838**
GRAND TOTAL				**32,796**
SAY				**32,800**

Note: L.S. - Lump Sum

Source: DPWH standard price in 1994

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.5 Unit Cost of Level I (Shallow Well - 18m Depth)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		**L.S.**		**1,100**
B. Drilling of Well & Installation of Steel Casing/Screen				
1. Materials				
(1) 50mm x 6m PVC Pipe with socket	2	pcs.	813	1,626
(2) 50mm x 3m PVC Pipe with plug	1	pc.	410	410
(3) 50mm PVC Socket	1	pc.	90	90
(4) 50mm x 3m PVC Screen	1	pc.	1,300	1,300
2. Labor, Fuel, Lubricant and others				
Well Drilling for 18 m depth at 150mm borehole	18	m	520	9,360
Sub-Total of B				**12,786**
C. Well Development		**L.S.**		**500**
D. Gravel Packing, Installation of Handpump and Construction of Platform				
1. Materials				
(1) 50mm Jetmatic Handpump	1	set	2,380	2,380
(2) 50mm x 1m GI Pipe (Sch. 40)	1	pc.	75	75
(3) #10 Sieved Gravel	0.1	cu.m	870	87
(4) Coarse Sand	0.07	cu.m	304	21
(5) Cement for Sanitary Seal	1	bag	117	117
(6) Pump Base and Platform				
1) Cement	4	bags	117	468
2) Gravel	1	cu.m	385	385
3) Sand	1	cu.m	304	304
4) Plywood (1,200mm x 2,400mm x 6mm)	1	pc.	250	250
5) Form Lumber (50mm x 75mm x 1,800 mm)	1	pc.	45	45
6) Nail	1	kg.	32	32
Sub-Total of D-1				4,164
2. Labor (40% of D-1.)		L.S.		1,666
Sub-Total of D				**5,830**
E. Indirect Cost				
Profit (10% of A, B, C & D)		L.S.		2,022
VAT (10% of Profit & Labor)		L.S.		1,305
Sub-Total of E				**3,327**
Total of Construction Cost (A+B+C+D+E)				**23,543**
F. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		2,000
2. Construction Supervision		L.S.		1,500
3. Water Quality Analysis		L.S.		1,088
Sub-Total of F				**4,588**
GRAND TOTAL				**28,131**
SAY				**28,100**

Note: L.S. - Lump Sum

Source: DPWH standard price in 1994

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.6 Unit Cost of Level II (600 Service Population)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		3,000
B. Construction of Spring Box				
1. Materials		L.S.		36,300
2. Labor (30% of 1.)		L.S.		10,890
Sub-Total of B				**47,190**
C. Installation of Pipelines & Fittings				
1. Transmission Main				
(1) Materials				
1) 63mm dia. PVC Pipe (Class 12.5 with pusher type socket	330	pcs.	813	268,290
2) 63mm dia. Tee	1	no.	88	88
3) Solvent Cement	26	cans	46	1,196
4) 63mm dia. x 150mm Nipple	3	nos.	136	408
5) 63mm dia. Union Patente	1	pc.	173	173
6) 63mm dia. x 50mm dia. Reducing Socket	2	pcs.	105	210
7) 63mm dia. Elbow (90 deg.)	1	pc.	76	76
8) 63mm dia. Elbow (45 deg.)	1	pc.	75	75
9) 63mm dia. Gate Valve	3	pcs.	763	2,289
Sub-Total of Materials				272,805
(2) Labor (30% of Material Cost)		L.S.		81,842
Sub-Total of Transmission Main				354,647
2. Distribution Pipeline				
(1) Materials				
1) 50mm dia. PVC Pipe (Class 12.5 with pusher type socket)	20	pcs.	450	9,000
2) 38mm dia. PVC Pipe (Class 12.5 with pusher type socket)	30	pcs.	300	9,000
3) 20mm dia. PVC Pipe (Class 40 with pusher type socket)	10	pcs.	100	1,000
4) 13mm dia. x 1 m Stand Pipe	10	pcs.	94	940
5) Solvent Cement	4	cans	46	184
6) Fittings				
a. 50mm dia. x 150mm PVC Nipple	3	pcs.	125	375
b. 32mm dia. x 150mm PVC Nipple	3	pcs.	76	228
c. 13mm dia. x 150mm GI Nipple	40	pcs.	25	1,000
d. 50mm dia. Union Patente	1	pcs.	163	163
e. 32mm dia. Union Patente	2	pcs.	71	142
f. 13mm dia. Union Patente	10	pcs.	25	250
g. 50mm dia. x 32mm dia. Reducing Socket	6	pcs.	90	540
h. 32mm dia. x 20mm dia. Reducing Socket	10	pcs.	70	700
i. 20mm dia. x 13mm dia. Reducing Socket	10	pcs.	55	550
j. 50mm dia. PVC Elbow (90 deg.)	2	pcs.	68	136
k. 13mm dia. GI Elbow (90 deg.)	20	pcs.	13	260
l. 20mm dia. x 13mm dia. Socket Adaptor	10	pcs.	41	410
m. 50mm dia. GI Gate Valve	2	pcs.	671	1,342
n. 32mm dia. GI Gate Valve	2	pcs.	380	760
o. 13mm dia. GI Gate Valve	24	pcs.	230	5,520
p. 13mm dia. Brass Faucet	24	pcs.	41	984
q. 50mm dia. Tee	4	pcs.	130	520
r. 32mm dia. Tee	6	pcs.	110	660
s. Water Meter	24	pcs.	750	18,000
t. Water Meter Box	24	pcs.	1,100	26,400
Sub-Total of Materials				79,064
(2) Labor (30% of Material Cost)		L.S.		23,719
Sub-Total of Distribution Pipeline				102,783
Sub-Total of C				**457,430**

Table 10.2.6 Unit Cost of Level II (600 Service Population)

Sheet-2 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
D. Indirect Cost				
1. Transmission Main				
(1) Profit (10% of C-1)		L.S.		35,465
(2) VAT (10% of Profit and Labor)		L.S.		11,731
2. Source Facilities and Distribution Pipeline				
(1) Profit (10% of A, B, C-2)		L.S.		15,297
(2) VAT (10% of Profit and Labor)		L.S.		4,991
Sub-Total of D.				**67,484**
Total Construction Cost (A+B+C+D)				**575,104**
E. Estimated Government Expenses				
1. Preliminary & Detailed Engineering and RWSA Formation		L.S.		2,000
2. Supervision		L.S.		12,000
3. Water Quality Analysis		L.S.		1,088
Sub-Total of E.				**15,088**
Total Estimated Cost				**590,192**
Unit Cost per Person Served				984
			Say	**1,000**

Note: L.S. - Lump Sum
Source: DPWH standard price in 1994
Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.7 Unit Cost of Level III (5,000 Service Population)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		300,000
B. Source Development and Storage				
1. Deep Well	1	No.	1,540,000	1,540,000
2. Deep Well Pump	1	No.	550,000	550,000
3. Chlorinator House & Equipment	1	L.S.		440,000
4. Storage Tank (250 cu.m)	1	No.	1,100,000	1,100,000
Sub-Total of B				**3,630,000**
C. Transmission Main				
1. 160mm dia.	500	L.M.	1,120	560,000
Sub-Total of C				**560,000**
D. Distribution Main				
1. 160mm dia.	1,000	L.M.	1,120	1,120,000
2. 110mm dia.	3,000	L.M.	925	2,775,000
3. 90mm dia.	3,000	L.M.	580	1,740,000
4. 75mm dia.	5,000	L.M.	540	2,700,000
Sub-Total of D				**8,335,000**
E. Service Connections	**1,000**	**Nos.**	**1,940**	**1,940,000**
F. Miscellaneous				
1. Vehicle	1	No.	550,000	550,000
2. Office & Workshop Bldg.	1	No.	550,000	550,000
3. Office Equipment		L.S.		100,000
4. Tools and Spare Parts		L.S.		100,000
Sub-Total of F				**1,300,000**
Total Direct Cost (A+B+C+D+E+F)				**16,065,000**
G. Indirect Cost (25% of Direct Cost)		L.S.		**4,016,250**
Total Estimated Cost				**20,081,250**
Unit Cost per Person Served				
For New Construction				4,016
			Say	4,000
For Expansion of Existing System (Exclude F.)				3,691
			Say	3,700

Note: L.S. - Lump Sum
Source: LWUA standard price in 1994
Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.8 Unit Cost of Level III (10,000 Service Population)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		**L.S.**		**300,000**
B. Source Development and Storage				
1. Deep Well	1	No.	1,540,000	1,540,000
2. Deep Well Pump	1	No.	550,000	550,000
3. Chlorinator House & Equipment	1	L.S.		440,000
4. Storage Tank (250 cu.m)	1	No.	1,100,000	1,100,000
Sub-Total of B				**3,630,000**
C. Transmission Main				
1. 160mm dia.	500	L.M.	1,120	560,000
Sub-Total of C				**560,000**
D. Distribution Main				
1. 160mm dia.	2,000	L.M.	1,120	2,240,000
2. 110mm dia.	5,000	L.M.	925	4,625,000
3. 90mm dia.	6,000	L.M.	580	3,480,000
4. 75mm dia.	8,000	L.M.	540	4,320,000
Sub-Total of D				**14,665,000**
E. Service Connections	**2,000**	**Nos.**	**1,940**	**3,880,000**
F. Miscellaneous				
1. Vehicle	1	No.	550,000	550,000
2. Office & Workshop Bldg.	1	No.	550,000	550,000
3. Office Equipment		L.S.		100,000
4. Tools and Spare Parts		L.S.		100,000
Sub-Total of F				**1,300,000**
Total Direct Cost (A+B+C+D+E+F)				**24,335,000**
G. Indirect Cost (25% of Direct Cost)		**L.S.**		**6,083,750**
Total Estimated Cost				**30,418,750**
Unit Cost per Person Served				
For New Construction				3,042
			Say	3,000
For Expansion of Existing System (Exclude F.)				2,879
			Say	2,900

Note: L.S. - Lump Sum
Source: LWUA standard price in 1994
Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.9 Unit Cost of Level III (15,000 Service Population)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization/Demobilization		L.S.		300,000
B. Source Development and Storage				
1. Deep Well	2	No.	1,540,000	3,080,000
2. Deep Well Pump	2	No.	550,000	1,100,000
3. Chlorinator House & Equipment	2	L.S.		440,000
4. Storage Tank (250 cu.m)	2	No.	1,100,000	2,200,000
Sub-Total of B				**6,820,000**
C. Transmission Main				
1. 160mm dia.	1,000	L.M.	1,120	1,120,000
Sub-Total of C				**1,120,000**
D. Distribution Main				
1. 160mm dia.	3,000	L.M.	1,120	3,360,000
2. 110mm dia.	7,000	L.M.	925	6,475,000
3. 90mm dia.	9,000	L.M.	580	5,220,000
4. 75mm dia.	11,000	L.M.	540	5,940,000
Sub-Total of D				**20,995,000**
E. Service Connections	3,000	Nos.	1,940	5,820,000
F. Miscellaneous				
1. Vehicle	1	No.	550,000	550,000
2. Office & Workshop Bldg.	1	No.	550,000	550,000
3. Office Equipment		L.S.		100,000
4. Tools and Spare Parts		L.S.		100,000
Sub-Total of F				**1,300,000**
Total Direct Cost (A+B+C+D+E+F)				**36,355,000**
G. Indirect Cost (25% of Direct Cost)		L.S.		**9,088,750**
Total Estimated Cost				**45,443,750**
Unit Cost per Person Served				
For New Construction				3,030
			Say	3,000
For Expansion of Existing System (Exclude F.)				2,921
			Say	2,900

Note: L.S. - Lump Sum

Source: LWUA standard price in 1994

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.10 Unit Cost of Flush Water Sealed with Septic Tank Toilet

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Demolition		**L.S.**		**1,000**
B. Earthwork				
1. Materials				
(1) Gravel Fill	1	cu.m.	385	385
Sub-Total of B-1				385
2. Labor				
(1) Excavation	6	cu.m.	119	714
(2) Backfill	2	cu.m.	108	216
(3) Gravel Fill	1	cu.m	141	141
Sub-Total of B-2				1,071
Sub-Total of B				**1,456**
C. Walls & Posts				
1. Materials				
(1) 0.15 x 0.20 x 0.40 Ord. CHB	180	pcs.	6	1,080
(2) Cement	17	bags	117	1,989
(3) Sand	2	cu.m	304	608
(4) Rebars: 12 mm dia. x 6.0 m	5	pcs.	68	340
10 mm dia. x 6.0 m	2	pcs.	49	98
(5) #16 Tie Wire	1	kg.	49	49
(6) Scaffolding:				
10-2" x 4" x 8" (Ord. Lumber)	53	bf.	32	1,696
Sub-Total of C-1				5,860
2. Labor (30% of C-1)		L.S.		1,758
Sub-Total of C				**7,618**
D. Roofing Work				
1. Materials				
(1) GA #26 Corr. GI (L=3.0 m)	3	bd.ft.	274	822
(2) GA #26 Plain GI Flushing	1	pc.	264	264
(3) GA # 24 Plain GI Gutter	1	pc.	264	264
(4) Roof Nails	2	kgs.	44	88
(5) Rafter - 2" x 5 x 10', 4 pcs.	33.33	bd.ft	32	1,067
(6) Purlins - 2" x 2" x 12', 3 pcs.	12	bd.ft	32	384
(7) Wood Cleats - 2" x 2" x 12', 1 pc.	3.33	bd.ft	32	107
(8) Nailers - 2" x 2" x 12', 5 pcs.	20	bd.ft	32	640
2" x 2" x 10', 5 pcs.	20	bd.ft	32	640
(9) Fascia Board - 1" x 12" x 18', 2 pcs.	36	bd.ft	32	1,152
(10) Common Wire Nails (Assorted)	3	kgs.	29	87
(11) Downspout (PVC)				
75 mm dia. x 3.0 m	2	pcs.	81	162
(12) Elbow (PVC) - 75 mm dia.	2	pcs.	15	30
(13) Coupling (PVC) - 75 mm dia.	1	pc.	14	14
Sub-Total of D-1				5,721
2. Labor (30% of D-1)		L.S.		1,716
Sub-Total of D				**7,437**

Table 10.2.10 Unit Cost of Flush Water Sealed with Septic Tank Toilet

Sheet 2 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
E. Plumbing				
1. Materials				
(1) Water Closet	1	set	2,000	2,000
(2) Water line and sanitary fixtures with septic tank		L.S.		6,192
Sub-Total of E-1				8,192
2. Labor (30% of E-1)		L.S.		2,458
Sub-Total of E				**10,650**
F. Carpentry Work				
1. Materials				
(1) Flush Type Door w/Lower Jambs	1	pc.	1,428	1,428
(2) Windows (wooden jalousy) w/Jambs	2	sets	298	596
Sub-Total of F-1				2,024
2. Labor (30% of E-1)		L.S.		607
Sub-Total of F				**2,631**
G. Freight Cost (0% of Materials for B-F excluding indigenous materials)		**L.S.**		**0**
H. Indirect Cost				
Profit (10% of A - G)		L.S.		3,079
VAT (10% of Profit & Labor)		L.S.		1,069
Sub-Total of H				**4,148**
Total of Construction Cost (A+B+C+D+E+F+G+H)			**Say**	**34,940** **34,900**

Source: DOH standard price in1993.
Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.11 Unit Cost of Pour Flush with Double Pit Latrine

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Earthwork				
1. Materials				
(1) Gravel Fill	1	cu.m.	385	385
Sub-Total of A-1				385
2. Labor				
(1) Excavation	6	cu.m.	119	714
(2) Backfill	2	cu.m.	108	216
(3) Gravel Fill	1	cu.m.	141	141
Sub-Total of A-2				1,071
Sub-Total of A				**1,456**
B. Concrete Work				
1. Materials				
Slab on wood planks				
(1) 16 - 2" x 8" x 6' Coco Lumber	128	bd.ft.	8	1,024
(2) 10mm dia x 6.0m Rebar	3	pcs.	49	147
(3) #16 Tie Wire	0.5	kg.	49	25
(4) Cement	10	bags	117	1,170
(5) Sand	1.5	cu.m.	304	456
(6) Gravel	2	cu.m.	385	770
(7) Stone Lining with Mortar		L.S.	1,014	1,014
Sub-Total of B-1				4,606
2. Labor (25% of B-1)		L.S.		1,152
Sub-Total of B				**5,758**
C. Walls & Posts				
1. Materials				
(1) 4 - 4" x 4" x 10' Coco Lumber	53.33	bd.ft.	8	427
(2) 6 - 2" x 3" x 10' Coco Lumber	30	bd.ft.	8	240
(3) 8 - 2" x 3" x 8' Coco Lumber	32	bd.ft.	8	256
(4) 2.0 m x 5.0 m Sawali	2	rolls	357	714
(5) Assorted Nails	6	kgs.	29	174
(6) Bamboo Clips		L.S.	119	119
Sub-Total of C-1				1,930
2. Labor (25% of C-1)		L.S.		483
Sub-Total of C				**2,413**
D. Roofing Work				
1. Materials				
Rafters				
(1) 4 - 2" x 4" x 6' Coco Lumber	16	bd.ft.	8	128
(2) Bamboo Purlins		L.S.	119	119
(3) Nipa Roofing	2	100	238	476
Sub-Total of D-1		pcs./bandle		723
2. Labor (25% of D-1)		L.S.		181
Sub-Total of D				**904**
E. Plumbing				
1. Material				
(1) Toilet Bowl-Squat Type	1	pc.	547	547
(1) 75mm dia x 6.0m PVC Pipe	1	pc.	129	129
Sub-Total of E-1				676
2. Labor (25% of E-1)		L.S.		169
Sub-Total of E				**845**
F. Freight Cost (0% of Materials for B - E excluding indigenous materials)		L.S.		0
G. Indirect Cost				
Profit (10% of A - F)		L.S.		1,138
VAT (10% of Profit & Labor)		L.S.		419
Sub-Total of G				**1,557**
Total Construction Cost (A+B+C+D+E+F+G)				**12,933**
			Say	**12,900**

Note: L.S. - Lump Sum

Source: DOH standard price in 1993.

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.12 Unit Cost of Ventilated Improved Pit Latrine (VIP)

(Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Earthwork				
1. Materials				
(1) Gravel Fill	0.5	cu.m	385	193
Sub-Total of A-1				193
2. Labor				
(1) Excavation	3	cu.m	119	357
(2) Backfill	1	cu.m	108	108
(3) Gravel Fill	0.5	cu.m	141	71
Sub-Total of A-2				536
Sub-Total of A				729
B. Concrete Work				
1. Materials				
Slab on wood planks				
(1) 8 - 2" x 8" x 6' Coco Lumber	64	bd.ft.	8	512
(2) 10mm dia x 6.0m Rebar	2	pcs.	49	98
(3) #16 Tie Wire	0.5	kg.	49	25
(4) Cement	4	bags	117	468
(5) Sand	0.5	cu.m	304	152
(6) Gravel	0.5	cu.m	385	193
(7) Stone Lining with Mortar		L.S.	1,014	1,014
Sub-total of B-1				2,462
2. Labor (25% of B-1)		L.S.		616
Sub-Total of B				3,078
C. Walls & Posts				
1. Materials				
(1) 4 - 4" x 4" x 10' Coco Lumber	53.33	bd.ft.	8	427
(2) 6 - 2" x 3" x 10' Coco Lumber	30	bd.ft.	8	240
(3) 8 - 2" x 3" x 8' Coco Lumber	32	bd.ft.	8	256
(4) 2.0 m x 5.0 m Sawali	2	rolls	357	714
(5) Assorted Nails	6	kgs.	29	174
(6) Bamboo Clips		L.S.	119	119
Sub-Total of C-1				1,930
2. Labor (25% of C-1)		L.S.		483
Sub-Total of C				2,413
D. Roofing Work				
1. Materials				
Rafters				
(1) 4 - 2" x 4" x 6' Coco Lumber	16	bd.ft.	8	128
(2) Bamboo Purlins		L.S.	119	119
(3) Nipa Roofing	2	100 pcs./bundle	238	476
Sub-Total of D-1				723
2. Labor (25% of D-1)		L.S.		181
Sub-Total of D				904
E. Plumbing				
1. Materials				
(1) 50mm dia PVC Pipe	1	pc.	65	65
(2) Fly Screen		L.S.	50	50
Sub-Total of E-1				115
2. Labor (25% of E-1)		L.S.		29
Sub-Total of E				144
F. Freight Cost (0% of Materials for B-E excluding sand and gravel)		L.S.		0
G. Indirect Cost				
Profit (10% of A - F)		L.S.		727
VAT (10% of Profit & Labor)		L.S.		204
Sub-Total of G				931
Total of Construction Cost (A+B+C+D+E+F+G)			Say	8,199 8,200

Note: L.S. - Lump Sum

Source: DOH standard price in 1993.

Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.13 Unit Cost of School Toilet

Sheet-1 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization and Demobilization		**L.S.**		**5,300**
B. Earthwork				
1. Materials				
(1) Gravel Fill	3.00	cu.m	385	1,155
Sub-Total of B-1				1,155
2. Labor				
(1) Excavation	15.88	cu.m	119	1,890
(2) Backfill	4.97	cu.m	108	537
(3) Gravel Fill	3.00	cu.m	141	423
Sub-Total of B-2				2,850
Sub-Total of B				**4,005**
C. Concrete Work				
1. Materials				
(1) Cement	61.00	bags	117	7,137
(2) Sand	4.00	cu.m	304	1,216
(3) Gravel	8.00	cu.m	385	3,080
(4) Rebars: 12mm dia x 6m	38.00	pcs.	68	2,584
10mm dia x 6m	57.00	pcs.	49	2,793
(5) #16 Tie Wire	8.00	kgs.	49	392
(6) Formworks:				
1/4" Plywood	6.00	pcs.	405	2,430
2"x2"x10" (Coco Lumber)	200.00	bd.ft.	8	1,600
Sub-Total of C-1				21,232
2. Labor (30% of C-1)		L.S.		6,370
Sub-Total of C				**27,602**
D. Masonry Work				
1. Materials				
(1) 6" CHB	800.00	pcs.	6	4,800
(2) 4" CHB	260.00	pcs.	5	1,300
(3) Cement	97.00	bags	117	11,349
(5) Sand	10.00	cu.m	304	3,040
(6) Rebars: 12mm dia x 6m	30.00	pcs.	68	2,040
10mm dia x 6m	11.00	pcs.	49	539
(7) #16 Tie Wire	4.00	kgs.	49	196
(8) Scaffolding:				
2"x4"x8" = 10 pcs. (Coco Lumber)	53.33	bf.	8	427
Sub-Total of D-1				23,691
2. Labor (30% of D-1)		L.S.		7,107
Sub-Total of D				**30,798**
E. Roofing Work				
1. Materials				
(1) GA #26 Corr. GI (1 = 10')	20.00	pcs.	274	5,480
(2) GA #24 Pln. GI Flashing	3.00	pcs.	264	792
(3) GA #24 Pln. GI Gutter (Pre-Fab)	9.00	pcs.	264	2,376
(4) Umbrella Nails 2 - 1/2"	12.00	kgs.	44	528
(5) Rafter - 2"x5"x18' = 5 pcs.	75.00	bf.	32	2,400
(6) Purlins - 2"x2"x12' = 18 pcs.	72.00	bf.	32	2,304
(7) WD Cleats - 2"x2"x10" = 6 pcs.	20.00	bf.	32	640

Table 10.2.13 Unit Cost of School Toilet

Sheet-2 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(8) Nailers - 2"x2"x1012' = 30 pcs.	120.00	bf.	32	3,840
- 2"x2"x10' = 36 pcs.	120.00	bf.	32	3,840
(9) Fascia Board				
1"x12"x12' = 4 pcs.	48.00	bf.	32	1,536
1"x12"x18' = 2 pcs.	36.00	bf.	32	1,152
(10) Wood Plate				
2"x4"x20' = 2 pcs.	26.66	bf.	32	853
(11) 1/4" Thk. Mar. Plywood 4'x8'	14.00	pcs.	29	406
(12) C.W.N. Assorted	15.00	kgs.	29	435
(13) 3" dia x 3m Downspout (PVC)	3.00	pcs.	81	242
(14) 3" dia Elbow (PVC)	2.00	pcs.	15	30
(15) 3"dia Coupling (PVC)	1.00	pcs.	14	14
(16) Ceiling Vent				
1"x1"x8' = 4 pcs.	2.67	bf.	26	69
(17) Screen (1/8"x1/8")	1.00	yd.	81	81
Sub-Total of E-1				27,018
2. Labor (30% of E-1)		L.S.		8,105
Sub-Total of E				**35,123**
F. Carpentry Work				
1. Materials				
(1) D - 1 Hollow Core Tanguile				
Flush Type Door w/ Louver (.80x2.20)	2.00	sets	1,428	2,856
(2) D - 2 Hollow Core Tanguile				
Flush Type Door (.60x2.10)	1.00	sets	1,071	1,071
(3) D - 3 Louver Door (.60x1.40)	5.00	sets	893	4,465
(4) Door Jambs (Apitong)				
2"x6"x14" = 1 pc.	14.00	bf.	32	448
2"x6"x10" = 2 pcs.	20.00	bf.	32	640
2"x6"x10" = 1 pc.	18.00	bf.	32	576
2"x4"x12" = 5 pcs.	40.00	bf.	32	1,280
(7) Wooden Jalousie Window				
With 5 Blades (.40x.50)	14.00	set	298	4,172
(8) Window Jambs (Apitong)				
2"x6"x16" = 5 pcs.	80.00	bf.	32	2,560
2"x6"x14" = 1 pc.	14.00	bf.	32	448
2"x6"x10" = 1 pc.	10.00	bf.	32	320
(9) Cabinet				
3/4"x4'x8' = 1 pc. (plyboard)	1.00	pc.	774	774
Sub-Total of F-1				19,610
2. Labor (30% of F-1)		L.S.		5,883
Sub-Total of F				**25,493**
G. Tile Work				
1. Materials				
(1) 4 - 1/4"x4 - 1/4" Glazed Tiles	1,950.00	pcs.	4	7,800
(2) 0.10x0.20m Floor Tiles	900.00	pcs.	7	6,300
(3) Cement	4.00	bags	117	468
(4) White Cement	1.00	bag	629	629
Sub-Total of G-1				15,197

Table 10.2.13 Unit Cost of School Toilet

Sheet-3 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
2. Labor (30% of G-1)		L.S.		4,559
Sub-Total of G				**19,756**
II. Plumbing Work				
1. Materials				
(1) Toilet Bowl - Squat Type	3.00	sets	596	1,788
(2) Toilet Bowl-Sit Type	2.00	sets	596	1,192
(3) Lavatory	2.00	sets	845	1,690
(4) 4" dia x 3m PVC San. Pipe	4.00	pcs.	149	596
(5) 3" dia x 3m PVC San. Pipe	7.00	pcs.	84	588
(6) 1 1/ 2" dia x 3m PVC San. Pipe	4.00	pcs.	53	212
(7) 2" dia. x 3m PVC San. Pipe	2.00	pcs.	50	100
(8) 6" x 4" Floor Drain	5.00	pcs.	84	420
(9) 2" dia. Elbow PVC	4.00	pcs.	7	28
(10) 4" dia WYB PVC	2.00	pcs.	25	50
(11) 4" dia. x 3" dia. WYB PVC	12.00	pcs.	30	360
(12) 4" dia. x 2" dia. TEE PVC	2.00	pcs.	31	62
(13) 4" dia. TEE PVC	3.00	pcs.	31	93
(14) 1 1/2" dia. WYB PVC	1.00	pcs.	12	12
(15) 4" dia. Clean Out PVC	3.00	pcs.	35	105
(16) 3" dia. Clean Out PVC	1.00	pcs.	28	28
(17) Faucet	3.00	pcs.	50	150
(18) 3" dia. x 2" dia. WYB PVC	2.00	pcs.	25	50
(19) 1 1/2" dia. Elbow PVC	6.00	pcs.	13	78
(20) PVC Cement	1.00	can	121	121
(21) 2" dia. PVC San. Pipe x 3m	2.00	pcs.	79	158
(22) 4" dia. x 2" dia. TEE	2.00	pcs.	21	42
(23) Check Valve 1 1/2"	1.00	pcs.	182	182
(24) 4" P-Trap	5.00	pcs.	66	330
Sub-Total of H-1				8,435
2. Labor (30% of H-1)		L.S.		2,531
Sub-Total of II				**10,966**
I. Painting				
1. Materials				
(1) Acrylic, Semi Gloss	8.00	gals.	261	2,088
(2) Concrete Sealer	4.00	gals.	206	824
(3) Acri Color: Wood	4.00	gals.	80	320
(4) Enamel, QDE	6.00	gals.	266	1,596
(5) Wood Putty	1.00	gals.	302	302
(6) Paint Thinner	1.00	gals.	60	60
(7) Tinting Color	4.00	pint	40	160
(8) Sand Paper (Assorted)	15.00	pcs.	7	105
(9) Misecellaneous		L.S.	1,000	0
(10) Roof Paint (green, ready-mix)	2.00	gals.	281	562
Sub-Total of I-1				6,017
2. Labor (30% of I-1)		L.S.		1,805
Sub-Total of I				**7,822**

Table 10.2.13 Unit Cost of School Toilet

Sheet-4 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
J. Electrical Work				
1. Materials				
(1) 40 Watts Flourescent Lamp	2.00	sets	255	510
(2) Elect. Wire TW #12	24.00	M	7	168
(3) Elect. Conduit - 1/2" dia x 10"	4.00	pcs.	78	312
(4) Entrance Cap. 1/2" dia	1.00	pc.	29	29
(5) Switch Outlet, Flush Type	2.00	pcs.	39	78
(6) Utility Box 2"x3"	2.00	pcs.	7	14
(7) Porcelain Receptacle 2" dia	2.00	pcs.	7	14
(8) Safety Switch 60A, 250V	1.00	set	490	490
(9) Electrical Tape	1.00	roll	22	22
Sub-Total of J-1				1,637
2. Labor (30% of J-1)		L.S.		491
Sub-Total of J				**2,128**
K. Hardware				
1. Materials				
(1) 3"x3" Butt Hinges (Loose Pin)	10.00	pcs.	15	150
(2) 4"x4" Butt Hinges (Loose Pin)	12.00	pcs.	18	216
(3) Door Lockset (Schlage US)	3.00	pcs.	454	1,362
(4) Barrel Bolt (4")	5.00	pcs.	40	200
(5) Cabinet Pull (4")	5.00	pcs.	7	35
(6) Water Storage Cover				
Checkered Plate 1/4" thick				
1.44x0.645 w/ L bar & flat bar	1.00	set	984	984
0.645x0.633 w/ L bar & flat bar	2.00	set	555	1,110
(7) Padlock	1.00	pcs.	378	378
Sub-Total of K-1				4,435
2. Labor (30% of K-1)		L.S.		1,331
Sub-Total of K				**5,766**
L. Septic Tank and Sewage Basin				
1. Materials				
(1) 4" CHB	180.00	pcs.	5	900
(2) Cement	18.00	bags	117	2,106
(3) Sand	1.50	cu.m	304	456
(4) Gravel	1.00	cu.m	385	385
(5) Rebars: 10mm dia x 6m	29.00	pcs.	68	1,972
(6) #16 Tire Wire	2.00	kgs.	49	98
(7) Formworks: Coco Lumber				
2"x3"x10' = 12 pcs.	60.00	bf.	8	480
1/4" plywood ord. 4'x8'	2.00	pcs.	405	810
C.W.N. (Assorted)	2.00	kgs.	29	58
Sub-Total of L-1				7,265
2. Labor (30% of L-1)		L.S.		2,180
Sub-Total of L				**9,445**

Table 10.2.13 Unit Cost of School Toilet

Sheet-5 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
M. Shallow Well (18 depth)				
a. Drilling of Well & Installation of Steel Casing/Screen				
1. Materials				
(1) 63mm x 6m PVC Pipe with socket	2.00	pcs.	813	1,626
(2) 63mm x 3m PVC Pipe with plug	1.00	pc.	410	410
(3) 63mm PVC Socket	1.00	pc.	90	90
(4) 63mm x 3m PVC Screen	1.00	pc.	1,300	1,300
Sub-Total of M-a-1				3,426
2. Labor, Fuel, Lubricant and others				
Well Drilling for 18m depth at 150mm borehole	18.00	m	520	9,360
Sub-Total of M-a				12,786
b. Well Development		L.S.		500
c. Gravel Packing, Installation of Hand-Pump and Construction of Platform				
1. Materials				
(1) 50mm Jetmatic Handpump	1.00	set	2,380	2,380
(2) 50mm x 1m GI Pipe (Sch. 40)	1.00	pc.	75	75
(3) #10 Sieved Gravel	0.10	cu.m	870	87
(4) Coarse Sand	0.07	cu.m	430	30
(5) Cement for Sanitary Seal	1.00	bag	117	117
(6) Pump Base and Platform				
1) Cement	4.00	bags	117	468
2) Gravel	1.00	cu.m	385	385
3) Sand	1.00	cu.m	304	304
4) Plywood (1,200mm x 2,400mm x 6mm)	1.00	pc.	405	405
5) Form Lumber (50mmx75mmx1,800mm)	1.00	pc.	45	45
6) Nail	1.00	kg.	29	29
Sub-Total of M-c-1				33,823
2. Labor (40% of M-c-1)		L.S.		13,529
Sub-Total of M-c				47,352
Sub-Total of M				**60,638**
N. Freight Cost (0% of Materials for A - M excluding sand and gravel)		**L.S.**		**0**
O. Indirect Cost				
Profit (10% of A - N)				24,484
VAT (10% of Profit & Labor)				8,123
Sub-Total of O				**32,607**
Total of Construction Cost (A to O)				**277,449**
P. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		2,000
2. Construction Supervision		L.S.		1,500
Sub-Total of P				**3,500**
GRAND TOTAL				**280,949**
			Say	280,900

Source: DOH standard price in 1993.
Unit Cost: Adjusted to 1995 Price Level.

Table 10.2.14 Unit Cost of Public Toilet

Sheet-1 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
A. Mobilization and Demobilization (2.4% of B - M)		**L.S.**		**6,400**
B. Earthwork				
1. Materials				
(1) Gravel Fill	3.00	cu.m	385	1,155
Sub-Total of B-1				1,155
2. Labor				
(1) Excavation	15.88	cu.m	119	1,890
(2) Backfill	4.97	cu.m	108	537
(3) Gravel Fill	3.00	cu.m	141	423
Sub-Total of B-2				2,850
Sub-Total of B				**4,005**
C. Concrete Work				
1. Materials				
(1) Cement	61.00	bags	117	7,137
(2) Sand	4.00	cu.m	304	1,216
(3) Gravel	8.00	cu.m	385	3,080
(4) Rebars: 12mm dia x 6m	38.00	pcs.	68	2,584
10mm dia x 6m	57.00	pcs.	48	2,736
(5) #16 Tie Wire	8.00	kgs.	48	384
(6) Formworks:				
1/4" Plywood	6.00	pcs.	405	2,430
2"x2"x10" (Coco Lumber)	200.00	bd.ft.	8	1,600
Sub-Total of C-1				21,167
2. Labor (30% of C-1)				6,350
Sub-Total of C				**27,517**
D. Masonry Work				
1. Materials				
(1) 6" CHB	800.00	pcs.	6	4,800
(2) 4" CHB	260.00	pcs.	5	1,300
(3) Cement	97.00	bags	117	11,349
(5) Sand	10.00	cu.m	304	3,040
(6) Rebars: 12mm dia x 6m	30.00	pcs.	68	2,040
10mm dia x 6m	11.00	pcs.	49	539
(7) #16 Tie Wire	4.00	kgs.	49	196
(8) Scaffolding:				
2"x4"x8" = 10 pcs. (Coco Lumber)	53.33	bf.	8	427
Sub-Total of D-1				23,691
2. Labor (30% of D-1)		L.S.		7,107
Sub-Total of D				**30,798**
E. Roofing Work				
1. Materials				
(1) GA #26 Corr. GI (1 = 10')	20.00	pcs.	274	5,480
(2) GA #24 Pln. GI Flashing	3.00	pcs.	264	792
(3) GA #24 Pln. GI Gutter (Pre-Fab)	9.00	pcs.	264	2,376
(4) Umbrella Nails 2 - 1/2"	12.00	kgs.	44	528
(5) Rafter - 2"x5"x18' = 5 pcs.	75.00	bf.	32	2,400

Table 10.2.14 Unit Cost of Public Toilet

Sheet-2 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(6) Purlins - 2"x2"x12' = 18 pcs.	72.00	bf.	32	2,304
(7) WD Cleats - 2"x2"x10" = 6 pcs.	20.00	bf.	32	640
(8) Nailers - 2"x2"x1012' = 30 pcs.	120.00	bf.	32	3,840
- 2"x2"x10' = 36 pcs.	120.00	bf.	32	3,840
(9) Fascia Board				
1"x12"x12' = 4 pcs.	48.00	bf.	32	1,536
1"x12"x18' = 2 pcs.	36.00	bf.	32	1,152
(10) Wood Plate				
2"x4"x20' = 2 pcs.	26.66	bf.	32	853
(11) 1/4" Thk. Mar. Plywood 4'x8'	14.00	pcs.	452	6,328
(12) C.W.N. Assorted	15.00	kgs.	29	435
(13) 3" dia x 3m Downspout (PVC)	3.00	pcs.	81	243
(14) 3" dia Elbow (PVC)	2.00	pcs.	15	30
(15) 3"dia Coupling (PVC)	1.00	pcs.	14	14
(16) Ceiling Vent, 1"x1"x8', 4 pcs.	2.67	bf.	26	69
(17) Screen (1/8"x1/8")	1.00	yd.	81	81
Sub-Total of E-1				32,941
2. Labor (30% of E-1)		L.S.		9,882
Sub-Total of E				**42,823**
F. Carpentry Work				
1. Materials				
(1) D - 1 Hollow Core Tanguile				
Flush Type Door w/ Louver (.80x2.20)	2.00	sets	1,428	2,856
(2) D - 2 Hollow Core Tanguile				
Flush Type Door (.60x2.10)	1.00	sets	1,071	1,071
(3) D - 3 Louver Door (.60x1.40)	5.00	sets	893	4,465
(4) Door Jambs (Apitong)				
2"x6"x14" = 1 pc.	14.00	bf.	32	448
2"x6"x10" = 2 pcs.	20.00	bf.	32	640
2"x6"x10" = 1 pc.	18.00	bf.	32	576
2"x4"x12" = 5 pcs.	40.00	bf.	32	1,280
(7) Wooden Jalousie Window				
With 5 Blades (.40x.50)	14.00	set	298	4,172
(8) Window Jambs (Apitong)				
2"x6"x16" = 5 pcs.	80.00	bf.	32	2,560
2"x6"x14" = 1 pc.	14.00	bf.	32	448
2"x6"x10" = 1 pc.	10.00	bf.	32	320
(9) Cabinet				
3/4"x4'x8' = 1 pc. (plyboard)	1.00	pc.	774	774
Sub-Total of F-1				19,610
2. Labor (30% of F-1)		L.S.		5,883
Sub-Total of F				**25,493**
G. Tile Work				
1. Materials				
(1) 4 - 1/4"x4 - 1/4" Glazed Tiles	1,950.00	pcs.	4	7,800
(2) 0.10x0.20m Floor Tiles	900.00	pcs.	7	6,300
(3) Cement	4.00	bags	117	468

Table 10.2.14 Unit Cost of Public Toilet

Sheet-3 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(4) White Cement	1.00	bag	629	629
(5) Tiles Pittings		L.S.	4,790	4,790
Sub-Total of G-1				19,987
2. Labor (30% of G-1)		L.S.		5,996
Sub-Total of G				**25,983**
H. Plumbing Work				
1. Materials				
(1) Urinal	3.00	sets	1,063	3,189
(2) Toilet Bowl - Squat Type	6.00	sets	596	3,576
(3) 4" dia x 3m PVC San. Pipe	6.00	pcs.	149	894
(4) 3" dia x 3m PVC San. Pipe	4.00	pcs.	84	336
(5) 2" dia x 3m PVC San. Pipe	3.00	pcs.	50	150
(6) 3/4" dia x 6m G.I. Pipe Sch. 40	5.00	pcs.	244	1,220
(7) 1/2" dia x 6m G.I. Pipe Sch. 40	1.00	pcs.	179	179
(8) 4"x4" WYE PVC	1.00	pcs.	25	25
(9) 3" dia Elbow PVC	10.00	pcs.	30	300
(10) 3" dia 45 degrees Bend PVC	2.00	pcs.	25	50
(11) 2" dia Elbow PVC	6.00	pcs.	7	42
(12) 2" dia 45 degrees Bend PVC	2.00	pcs.	20	40
(13) 1/2" dia Elbow G.I.	5.00	pcs.	10	50
(14) 4" dia 3" dia WYE PVC	8.00	pcs.	40	320
(15) 3/4" dia TEE G.I.	7.00	pcs.	40	280
(16) 1/2" dia TEE G.I.	5.00	pcs.	20	100
(17) 4" dia x 2" dia TEE PVC	6.00	pcs.	40	240
(18) 4" dia Clean Out PVC	3.00	pcs.	35	105
(19) 2" dia Clean Out PVC	1.00	pcs.	25	25
(20) Faucet	10.00	pcs.	50	500
(21) 3" dia x 2" dia Elbow Reducer PVC	1.00	pcs.	28	28
(22) 3" dia x 2" dia WYE PVC	3.00	pcs.	25	75
(23) 2" dia x 2" dia WYE PVC	3.00	pcs.	15	45
(24) PVC Cement	1.00	can	121	121
(25) 4" dia x 2" dia WYE PVC	2.00	pcs.	40	80
(26) Gate Valve 3/4" dia	1.00	pcs.	121	121
(27) Gate Valve 1/2" dia	1.00	pcs.	96	96
(28) Water Meter 3/4" dia	1.00	pcs.	1,261	1,261
(29) 3/4"dia x1/2"dia Elbow Reducer G.I.	1.00	pcs.	14	14
Sub-Total of H-1				13,462
2. Labor (30% of H-1)		L.S.		4,039
Sub-Total of H				**17,501**
I. Painting				
1. Materials				
(1) Acrylic, Semi Gloss	8.00	gals.	261	2,088
(2) Concrete Sealer	4.00	gals.	206	824
(3) Acri Color: Wood	4.00	gals.	80	320
(4) Enamel, QDB	6.00	gals.	266	1,596
(5) Wood Putty	1.00	gals.	302	302
(6) Paint Thinner	1.00	gals.	60	60

Table 10.2.14 Unit Cost of Public Toilet

Sheet-4 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(7) Tinting Color	4.00	pint	40	160
(8) Sand Paper (Assorted)	15.00	pcs.	7	105
(9) Misecellaneous		L.S.	1,005	0
(10) Roof Paint (green, ready-mix)	2.00	gals.	281	562
Sub-Total of I-1				6,017
2. Labor (30% of I-1)		L.S.		1,805
Sub-Total of I				**7,822**
J. Electrical Work				
1. Materials				
(1) 40 Watts Flourescent Lamp	2.00	sets	255	510
(2) Elect. Wire TW #12	24.00	M	7	168
(3) Elect. Conduit - 1/2" dia x 10"	4.00	pcs.	78	312
(4) Entrance Cap. 1/2" dia	1.00	pc.	29	29
(5) Switch Outlet, Flush Type	2.00	pcs.	39	78
(6) Utility Box 2"x3"	2.00	pcs.	7	14
(7) Porcelain Receptacle 2" dia	2.00	pcs.	7	14
(8) Safety Switch 60A, 250V	1.00	set	490	490
(9) Electrical Tape	1.00	roll	22	22
Sub-Total of J-1				1,637
2. Labor (30% of J-1)		L.S.		491
Sub-Total of J				**2,128**
K. Hardware				
1. Materials				
(1) 3"x3" Butt Hinges (Loose Pin)	10.00	pcs.	15	150
(2) 4"x4" Butt Hinges (Loose Pin)	12.00	pcs.	18	216
(3) Door Lockset (Schlage US)	3.00	pcs.	454	1,362
(4) Barrel Bolt (4")	5.00	pcs.	40	200
(5) Cabinet Pull (4")	5.00	pcs.	7	35
(6) Water Storage Cover				
Checkered Plate 1/4" thick				
1.44x0.633 w/ L bar & flat bar	1.00	set	984	984
(7) 0.645x0.633 w/ L bar & flat bar	2.00	set	555	1,110
(8) Padlock	1.00	pcs.	378	378
Sub-Total of K-1				4,435
2. Labor (30% of K-1)		L.S.		1,331
Sub-Total of K				**5,766**
L. Septic Tank and Sewage Basin				
1. Materials				
(1) 4" CHB	180.00	pcs.	5	900
(2) Cement	18.00	bags	117	2,106
(3) Sand	1.50	cu.m	304	456
(4) Gravel	1.00	cu.m	385	385
(5) Rebars: 10mm dia x 6m	29.00	pcs.	68	1,972
(6) #16 Tire Wire	2.00	kgs.	49	98

Table 10.2.14 Unit Cost of Public Toilet

Sheet-5 (Cost: Peso)

Description	Quantity	Unit	Unit Cost	Cost
(7) Formworks: Coco Lumber				
2"x3"x10' = 12 pcs.	60.00	bf.	8	480
1/4" plywood ord. 4'x8'	2.00	pcs.	405	810
C.W.N. (Assorted)	2.00	kgs.	29	58
Sub-Total of L-1				7,265
2. Labor (30% of L-1)		L.S.		2,180
Sub-Total of L				**9,445**
M. Concrete Water Tank (Elevated)				
1. Earth Work				
(1) Materials				
1) Gravel Fill	1.00	cu.m	385	385
Sub-Total of M-1 (1)				385
(2) Labor				
1) Excavation	14.70	cu.m	119	1,749
2) Backfill	13.08	cu.m	108	1,413
3) Gravel Fill	1.00	cu.m	141	141
Sub-Total of M-1 (2)				3,303
Sub-Total of M-1				3,688
2. Materials				
(1) Cement	62.00	bags	117	7,254
(2) Sand	4.50	cu.m	304	1,368
(3) Gravel	8.00	cu.m	385	3,080
(4) Rebars: 12mm dia x 6m	160.00	pcs.	49	7,840
(5) #16 Tie Wire	4.00	kgs.	49	196
(6) Formworks:				
1/4" plywood	12.00	pcs.	405	4,860
2"x3"x16' = 60 pcs.	480.00	bf.	8	3,840
(7) C.W.N. (Assorted)	5.00	kgs.	29	145
Sub-Total of M-2				39,647
3. Labor (30% of M-2)		L.S.		11,894
Sub-Total of M				**55,229**
N. Freight Cost (0% of Materials for A - M excluding sand and gravel)				0
O. Indirect Cost				
Profit (10% of A - M)		L.S.		26,091
VAT (10% of Profit & Labor)		L.S.		8,920
Sub-Total of O				**35,011**
Total of Construction Cost (A to O)				**295,921**
P. Estimated Government Expenses				
1. Preliminary & Detailed Engineering Cost		L.S.		2,000
2. Construction Supervision		L.S.		1,500
Sub-Total of P				**3,500**
GRAND TOTAL				**299,421**
			Say	**299,400**

Source: DOH standard price in 1993.
Unit Cost: Adjusted to 1995 Price Level.

10.2.2 Unit Cost of Equipment

Unit cost (CIF Manila) of equipment was referred to the standard cost estimates of DPWH as follows.

(1) Medium size rotary drilling rig

Type:

Truck-mounted top head drive mud circulation type

Rated drilling capacity:

150 m depth for ϕ250 mm bore hole

Equipment composition:

One unit of truck-mounted drilling rig

Each one set of operating accessories, drilling tools, casing tools and fishing tools

One set of spare parts (equivalent to 10% of above equipment/tool cost)

Unit cost:

Peso 17,370,000 per set

(2) Medium size percussion drilling equipment

Type:

Truck-mounted cable percussion type

Rated drilling capacity:

150 m depth for ϕ250 mm bore hole

Equipment composition:

One unit of truck-mounted drilling rig

Each one set of operating accessories, drilling tools, pipe handling tools and fishing tools

One set of spare parts (equivalent to 10% of above equipment/tool cost)

Unit cost:

Peso 10,280,000 per set

(3) Well rehabilitation equipment

Equipment composition:

One unit of diesel engine driven air compressor (7.5 kg/sq.cm, 500 liter/min.)

One set of air hose and hose fittings

Unit cost:

Peso 138,000 per set

(4) Service truck

Type:

Diesel engine driven 4 tons truck equipped with crane

Unit cost:

Peso 1,175,000 per unit

(5) Support vehicle

Type:

Diesel engine driven pick-up truck with electric winch

Unit cost:

Peso 500,000 per unit

(6) Refuse collection truck

Type:

Closed type compactor truck with 5 cu.m of payload capacity

Unit cost:

Peso 1,380,000 per unit including spare parts

10.3 Cost of Required Facilities and Equipment

10.3.1 Cost of Required Facilities

Table 10.3.1 Construction Cost of Water Supply Facilities Required for Phase I (2000)

Unit: 1,000 Pesos

Municipalities	Urban Water Supply Level III	Rural Water Supply								Grand Total
		New System						Level I Rehabilitation	Total	
		Level II	Level I							
			Deep Well			Shallow Wells	Sub-Total			
			40 m	80 m	120 m					
Antipolo	205,335	0	0	0	196,871	3,878	200,749	1,801	202,550	407,885
Baras	7,962	0	0	0	2,510	0	2,510	23	2,533	10,495
Binangonan (Talim)	0	0	0	20,765	0	0	20,765	276	21,041	21,041
Cardona	0	0	0	2,472	0	0	2,472	33	2,505	2,505
Jala-jala	5,792	0	0	11,124	0	0	11,124	148	11,272	17,064
Morong	18,027	0	0	0	0	0	0	0	0	18,027
Pililla	15,788	0	0	0	0	0	0	0	0	15,788
Rodriguez	40,615	0	0	8,405	0	422	8,827	112	8,939	49,554
San Mateo	31,250	0	0	989	0	197	1,186	13	1,199	32,449
Tanay	40,554	0	0	0	27,971	0	27,971	256	28,227	68,781
Teresa	12,580	0	0	0	0	0	0	0	0	12,580
Provincial Total	377,903	0	0	43,755	227,352	4,497	275,604	2,662	278,266	656,169

Table 10.3.2 Construction Cost of Water Supply Facilities Required for Phase II (2010)

Unit: 1,000 Pesos

Municipality	Urban Water Supply Level III	Rural Water Supply (Level I)						Grand Total
		New System					Level I Rehabilitation	Total	
		Deep Well			Shallow Wells	Sub-Total			
		40 m	80 m	120 m					
Antipolo	410,298	0	0	221,615	4,327	225,942	2,027	227,969	638,267
Baras	50,480	0	0	22,950	0	22,950	210	23,160	73,640
Binangonan (Talim)	0	0	55,620	0	0	55,620	738	56,358	56,358
Cardona	68,492	0	22,001	0	0	22,001	292	22,293	90,785
Jala-jala	15,010	0	24,720	0	0	24,720	328	25,048	40,058
Morong	88,375	0	0	0	0	0	0	0	88,375
Pililla	113,660	0	0	0	0	0	0	0	113,660
Rodriguez	234,993	0	14,090	0	674	14,764	187	14,951	249,944
San Mateo	278,159	0	742	0	141	883	10	893	279,052
Tanay	136,460	0	0	35,860	0	35,860	328	36,188	172,648
Teresa	77,244	0	0	0	0	0	0	0	77,244
Provincial Total	1,473,171	0	117,173	280,425	5,142	402,740	4,120	406,860	1,880,031

Table 10.3.3 Costs of Sanitation Facilities Required for Phase I (2000)

Unit: 1,000 Pesos

Municipality	Urban Sanitation									Rural Sanitation							
	Household Toilets									Household toilets							
	Flush	Pour Flush	VIP Latrine	Sub-total of Construction Cost	Sub-total of Public Investment Cost	Public School Toilets	Public Toilets	Total Construction Cost	Total Public Investment Cost	Flush	Pour Flush	VIP Latrine	Sub-total of Construction Cost	Sub-total of Public Investment Cost	Public School Toilets	Total Construction Cost	Total Public Investment Cost
Antipolo	421,853	95,725	13,094	529,672	4,017	22,563	299	552,534	26,879	0	141,939	12,273	154,212	6,019	7,865	162,077	13,884
Baras	16,578	3,122	0	19,700	132	648	299	20,647	1,079	0	5,096	1,061	6,157	216	960	7,117	1,176
Binangonan (Talim)	0	0	0	0	0	0	299	299	299	0	24,535	2,059	26,634	1,042	2,894	29,528	3,936
Cardona	17,764	19,711	0	37,475	836	611	299	38,385	1,746	0	0	0	0	0	0	0	0
Jala-jala	9,528	4,089	0	13,617	173	372	299	14,293	849	0	8,346	919	9,265	354	935	10,200	1,289
Morong	65,996	0	146	66,142	0	0	299	66,441	299	0	0	0	0	0	0	0	0
Pililla	0	47,743	0	47,743	2,024	2,024	0	49,767	4,048	0	0	0	0	0	0	0	0
Rodriguez	122,415	67,480	0	189,595	2,861	2,453	299	192,347	5,613	0	12,139	0	12,139	515	0	12,139	515
San Mateo	142,322	91,048	1,937	235,307	3,861	5,018	299	240,624	9,178	0	0	297	297	0	0	297	0
Tanay	129,549	15,403	0	144,952	653	4,957	599	150,508	6,209	0	9,675	2,293	11,968	410	907	12,875	1,317
Teresa	21,115	0	320	21,435	0	737	0	22,172	737	0	0	0	0	0	0	0	0
Provincial Total	946,820	343,321	15,497	1,305,638	14,557	39,388	2,991	1,348,047	56,936	0	201,770	18,902	220,672	8,556	13,561	234,233	22,117

Table 10.3.4 Costs of Sanitation Facilities Required for Phase II (2010)

Unit: 1,000 Pesos

Municipality	Urban Sanitation								Rural Sanitation							
	Household Toilets								Household Toilets							
	Flush	Poor Flush	Sub-total of Construction Cost	Sub-total of Public Investment Cost	Public School Toilets	Public Toilets	Total Construction Cost	Total Public Investment Cost	Urban Sewerage	Flush	Poor Flush	VIP Latrine	Sub-total of Construction Cost	Sub-total of Public Investment Cost	Public School Toilets	Total Construction Cost	Total Public Investment Cost
Antipolo	1,181,767	167,726	1,349,493	7,112	40,495	0	1,389,988	47,607	1,431,968	0	226,331	0	226,331	9,597	54,611	280,942	64,208
Baras	117,334	0	117,334	0	1,619	299	119,252	1,918	84,928	2,443	18,099	0	20,542	767	779	21,321	1,546
Binangonan (Talim)	0	0	0	0	0	299	299	299	0	0	73,582	0	73,582	3,120	9,679	83,261	12,799
Cardona	157,643	0	157,643	0	1,975	0	159,618	1,975	126,166	0	27,606	0	27,606	1,171	2,871	30,477	4,042
Jala-jala	34,760	0	34,760	0	546	299	35,605	845	0	0	31,502	0	31,502	1,336	1,353	32,855	2,689
Morong	200,780	7,082	207,862	300	2,022	0	209,884	2,322	192,530	0	0	0	0	0	0	0	0
Pililla	241,299	0	241,299	0	3,734	299	245,332	4,033	192,319	0	0	0	0	0	0	0	0
Rodriguez	540,706	0	540,706	0	9,635	299	550,640	9,934	455,199	0	23,607	0	23,607	1,001	1,102	24,709	2,103
San Mateo	631,481	26,381	657,862	1,119	12,527	599	670,988	14,245	615,361	0	2,025	0	2,025	86	0	2,025	86
Tanay	318,777	36,004	354,781	1,527	11,620	898	366,799	13,545	351,283	0	29,141	0	29,141	1,236	2,034	31,175	3,270
Teresa	177,955	0	177,955	0	2,657	299	180,911	2,956	116,885	0	0	0	0	0	0	0	0
Provincial Total	3,602,502	237,193	3,839,695	10,058	86,330	3,291	3,929,316	99,679	3,571,642	2,443	431,893	0	434,336	18,314	72,428	506,764	90,742

10.4 Costs of Sector Management

10.4.1 Breakdown of Community Development and Training Cost

Cost of community development and training was estimated at 12% of the total construction cost of Level I & II water supply facilities and public toilets and at 3% of the total construction cost of Level III water supply systems. This was formulated based on the following:

(1) The 12% was derived on the basis of DILG's past experience in BWSA formation; and
(2) The 3% was derived on the basis of LWUA's past experience in the institutional strengthening needs of W.Ds.

These ratios adopted for estimating community development and training cost will allow the province to meet with its needs for community development in the sector management. The following breakdown provides a view of the components under this category.

Table 10.4.1 Breakdown of Community Development and Training Cost

Component	% Share of Cost
1. Preparation for Training Activities	10
1.1 Transportation	1
1.2 Technical Assistance	1
1.3 Food	1
1.4 Supplies and Materials including Production of Training Kits	6
1.5 Generation of Training Aids	1
2. Conduct of Training Activities	53
2.1 Transportation	5
2.2 Food	12
2.3 Accommodation	33
2.4 Training Room Rental	1
2.5 Miscelleneous	2
3. Field Visits to Support BWSA Formation	37
3.1 Transportation	5
3.2 Food	15
3.3 Accommodation	12
3.4 Field	4
Total	100

C. SECTOR IMPLEMENTATION ARRANGEMENTS

C. SECTOR IMPLEMENTATION ARRANGEMENTS

11. FINANCIAL ARRANGEMENTS

11.3 Additional Funding Requirements

Percentages for Annual Investment

Percentages of annual investment for different fields of implementation activities are assumed for each sub-sector as general indication and summarized in Table 11.3.1. Assumptions on investment timing shall be subject to change, especially for individual projects depending on fund availability and relevant conditions such as land acquisition and institutional set-up.

Table 11.3.1 Percentages for Annual Investment

Sub-Sector	Component	1996	1997	1998	1999	2000	Total
Urban Water Supply	Level III System						
	Feasibility Study and Detail Design	50	50	0	0	0	100
	Construction & Supervision	0	20	30	30	20	100
	Community Development & Training	30	20	20	20	10	100
Rural Water Supply	Level I Facility						
	Detail Design	50	50	0	0	0	100
	Construction & Supervision	12	22	22	22	22	100
	Community Development & Training	22	22	22	22	12	100
	Level II System						
	Detail Design	100	0	0	0	0	100
	Construction & Supervision	50	50	0	0	0	100
	Community Development & Training	50	50	0	0	0	100
Sanitation	Urban Household Toilet	12	22	22	22	22	100
	Rural Household Toilet	12	22	22	22	22	100
	Public School Toilet	12	22	22	22	22	100
	Public Toilet	12	22	22	22	22	100
	Disinfection of Level I Wells	12	22	22	22	22	100
	Detail Design	100	0	0	0	0	100
	Construction & Supervision	12	22	22	22	22	100
	Community Development & Training	22	22	22	22	12	100

Urban water supply:

- Engineering services for feasibility study and detailed design will be undertaken in the first two years.
- Construction work accompanied by supervisory services will be commenced partially in 2nd year and in full operation from 3rd year to 4th year.
- Community development will take place from the first year.

Rural water supply (Level I):

- Engineering services for detailed design will be undertaken during the first two years for Level I and completed within the first year for Level II.

- Construction work accompanied by supervisory services will be partially commenced from the first year and in full operation from 2nd year for Level I, while Level II will be completed within first two years.
- Community development and training will take place from the first year for Level I, while Level II will be completed within the first two years.

Sanitation:

- Engineering services for detailed design will be completed within the first year.
- Construction work accompanied by supervisory services will be partially commenced in the first year and in full operation from 2nd year.
- Community development and training will be in full operation from the first year.

11.4 Medium-Term Implementation Arrangements

11.4.2 Alternative Countermeasures

Comprehensive Investment Need Ranking for the Municipalities

Table 11.4.1 Comprehensive Investment Need Ranking of the Municipalities

Municipality	Evaluation Factor (% of Underserved and Unserved Population or Households)				Score by Sub-Sector				Weighted Score by Sub-Sector					Synthetic Investment Need Ranking
	Urban Water Supply	Rural Water Supply	Urban Sani-tation	Rural Sani-tation	Urban Water Supply	Rural Water Supply	Urban Sani-tation	Rural Sani-tation	Urban Water Supply	Rural Water Supply	Urban Sani-tation	Rural Sani-tation	Total Weighted Score	
Antipolo	N.A.	52	16	53	0.61	0.80	0.40	0.80	0.15	0.20	0.10	0.20	0.65	4
Baras	N.A.	1	11	24	0.63	0.20	0.40	0.20	0.16	0.05	0.10	0.05	0.36	10
Binangonan (Talim)	N.A.	27	N.A.	36	N.A.	0.20	N.A.	0.40	N.A.	0.10	N.A.	0.20	0.30	11
Cardona	N.A.	18	23	29	0.46	0.20	0.60	0.20	0.12	0.05	0.15	0.05	0.37	9
Jala-jala	N.A.	41	54	47	1.00	0.60	1.00	0.60	0.25	0.15	0.25	0.15	0.80	1
Morong	N.A.	N.A.	9	N.A.	0.70	N.A.	0.20	N.A.	0.35	N.A.	0.10	N.A.	0.45	8
Pililla	N.A.	N.A.	32	N.A.	0.66	N.A.	0.80	N.A.	0.33	N.A.	0.40	N.A.	0.73	2
Rodriguez	N.A.	37	37	27	0.60	0.40	0.80	0.20	0.15	0.10	0.20	0.05	0.50	6
San Mateo	N.A.	95	44	0	0.40	1.00	1.00	0.20	0.10	0.25	0.25	0.05	0.65	3
Tanay	N.A.	51	24	38	0.67	0.80	0.60	0.40	0.17	0.20	0.15	0.10	0.62	5
Teresa	N.A.	N.A.	9	N.A.	0.73	N.A.	0.20	N.A.	0.37	N.A.	0.10	N.A.	0.47	7
PW4SP Study Area	N.A.	41	25	42										

Note:
(1) Scoring to Underserved and Unserved Percentage. (2) Assumed Weight by Sub-Sector for Synthetic Evaluation by Municipality

Score	Range of Underserved and Unserved Percentage								0.25	0.25	0.25	0.25	Allocated Weight
1.0	61	<%		41	<%		61	<%					
0.8	51	<%<	60	31	<%<	40	51	<%<	60				
0.6	41	<%<	50	21	<%<	30	41	<%<	50				
0.4	31	<%<	40	11	<%<	20	31	<%<	40				
0.2		%<	30		%<	10		%<	30				

Table 12.4.1 Draft Formats for Annual Sector Performance Summary Report (Provincial and Municipal Levels)

Province of _____ Form P- 1

Provincial Water & Sanitation Monitoring System

Annual Sector Performance Summary Report

Period Covered : _____ to _____

I. Service Coverage

Municipality (1)	LAST YEAR				THIS YEAR			
	Population (2)	Persons with Safe Water & Sanitary Toilets (3)	Persons with Safe Water Only (4)	Persons with Sanitary Toilets Only (5)	Population (6)	Persons with Safe Water & Sanitary Toilets (7)	Persons with Safe Water Only (8)	Persons with Sanitary Toilets Only (9)
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
Total								
% Served								
Targets								

II. Sources & Uses of Capital Development Funds

Source of Fund (1)	Budget for Water Supply & Sanitation (2)	Actual Disbursement (3)	Uses of Funds						
			Water Source Development (4)	Water Supply Transmission (5)	Water Storage/ Treatment & Distribution (6)	Household Toilets (7)	School Toilets (8)	Public Toilets (9)	Others (10)
A. Local Funds.									
Provincial Funds									
Municipal Funds									
A.									
B.									
C.									
D.									
E.									
F.									
G.									
H.									
I.									
J.									
SUB-TOTAL									
B. National Funds									
DPWH									
DOH									
LWUA									
SUB-TOTAL									
C. External Funds									
NGO									
NGO									
NGO									
SUB-TOTAL									
TOTAL									

III. School Sanitation (Source, DECS)

School (Location) (1)	No. of Students Enrolled (2)	Water Supply Adequate ? (Y/N) (3)	No. of Functioning Toilet Units (4)	Facility: Student Ratio (5)

IV. Incidence of Diarrhea (Source IPHO)

Month (1)	Last Year (2)	This Year (3)
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		

V. Water Resources: Report any major changes in the availability and quality of water in the province. Attach map.

VI. Unit Cost Summary : Based on projects actually implemented and paid for during the reporting period, indicate the following average unit costs

1. Shallow Well (w/o hand pump) = _____ / Meter Depth
2. Deep Well (w/o pump) = _____ / Meter Depth
3. Pipeline = _____ / meter
4. Storage Tanks =
5. Others,

Form M - 1

Municipality of _____

Provincial Water & Sanitation Monitoring System

Annual Sector Performance Summary Report

Period Covered : _____ to _____

I. Service Coverage

	LAST YEAR				THIS YEAR			
Name of Barangay (1)	Population (2)	Persons with Safe Water & Sanitary Toilets (3)	Persons with Safe Water Only (4)	Persons with Sanitary Toilets Only (5)	Population (6)	Persons with Safe Water & Sanitary Toilets (7)	Persons with Safe Water Only (8)	Persons with Sanitary Toilets Only (9)
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
Total								
% Served								

II. Sources & Uses of Capital Development Funds.

Source of Funds (1)	Budget (2)	Actual Disbursement (3)	Uses of Funds						
			Water Source Development (4)	Water Supply Transmission (5)	Water Storage/ Treatment & Distribution (6)	Household Toilets (7)	School Toilets (8)	Public Toilets (9)	Others (10)
Municipal Funds									
Barangay Funds									
A.									
B.									
C.									
D.									
E.									
F.									
G.									
H.									
I.									
J.									
K.									
L.									
M.									
N.									
O.									
P.									
Q.									
R.									
S.									
T.									
U.									
V.									
W.									
SUB-TOTAL									
NGO									
NGO									
NGO									
SUB-TOTAL									
TOTAL									

DATA REPORT

DATA REPORT

Table 1.3.1 List of Report/Data/Information/Materials collected (1/2)

No.	Title	Year	Prepared by	Related Subjects						Remarks
				WS	HD	SE	CD	SE	O	
	LAWS AND REGULATIONS									
1	The Local Government Code of 1991.	1991	Congress of the Phil.				x			
2	The Code of Sanitation of the Philippines Presidential Decree No. 856	1976	DOH			x				
3	National Handbook on Land and Other Water Resources.	Jul-91	NLUC,NEDA					x		
	STATISTICS - National Level									
1	1991 Family Income and Expenditures Survey of Households Bulletin Series 72.	1991	NSO					x		
2	1992 Philippine Statistical Yearbook.	Oct-92	NSCB			x		x		
3	1992 Philippine Yearbook.	Dec-92	NSO					x		
4	National Health Survey.	1992	DOH			x				
	STATISTICS - Provincial Level									
1	1990 Census of Population and Housing Report No. 3-72 D: Socio-Economic and Demographic	1990	NSO	x		x		x		
	Characteristics Rizal.									
2	Socio-Economic Profile Rizal Province.	1993	OPPDC					x		
	NATIONAL DEVELOPMENT PLAN/ SECTOR PLAN									
1	Water Supply, Sewerage and Sanitation Master Plan of the Philippines 1988-2000.	1988	NEDA	x	x	x				
2	National Physical Framework Plan 1993-2022.	Oct-92	Nat'l. Land Use Com.					x		
3	Philippines : Water Supply Sector Reform Study.	Aug-93	WORLD BANK	x	x	x				Working Papers
4	Philippine Development Report 1987-1992	1993	NEDA					x		
5	Project Benefit Monitoring and Evaluation (PBME).	Oct-93	NJS/Basic Team				x			Final Report
6	Study for the Groundwater Development in Manila Volume 2.	Jun-92	JICA							Main Report
7	First Water Supply, Sewerage and Sanitation Sector Project BWSA Package Phase I & II.	Mar-93	DILG-PMO				x			Training Manual 2nd Edition
8	The Special Assistance for Project Sustainability Program for Rural Water Supply Project.	Mar-92	OECF	x						Final Report (Main Report)
9	BWSA Primer English Version.	Sep-92	DILG,DPWH,DOH				x			Second Edition
10	Database Application for Provincial Water Supply, Sewerage & Sanitation Sector Plan.	Apr-93	WORLD BANK						x	Mission Report
11	Master Plan for the Areas of Central Luzon Affected by the Eruption of Mt. Pinatubo.	Oct-93	USAID	x	x	x	x	x		Preliminary Report
12	Skills Training for Sanitary Engineers	Sep-92				x				Training Manual 1st Edition
13	National Strategy and Action Plan Philippine National Urban Sewerage and Sanitation Strategy and	May-93	World Bank Proj.			x				
	Feasibility Studies Project.		Loan 3242-DH							
14	PAG-ASA Climatological Data				x					
15	Sanitation and Water Supply : Practical Lessons from the Decade.	1992	Sandy Cairncross			x	x			Discussion Paper Series
16	Community Water Supply and Sanitation	1989	WHO			x	x			
17	Institutional Development in Community Water Supply and Sanitation Themes and Questions.	1986	WHO,Geneva				x			
18	Guidelines for Planning Community Participation in Water Supply & Sanitation Projects.		Anne Whyle				x			
19	Participatory Evaluation : Tools for Managing Change in Water and Sanitation.	Feb-93	Deepa Narayan				x			
20	Community Participation and Hygiene Education on Water Supply and Sanitation (CPHE).	Oct-89	Technical Coop.				x			

Related Subject : WS Water Supply, HD Hydrogeology, SE Sanitation and Environment, CD Community Development, SE Socio-Economy, O Others

List of Report/Data/Information/Materials collected (2/2)

No.	Title	Year	Prepared by	Related Subjects						Remarks
				WS	HD	SE	CD	SE	O	
21	Geological Maps of the Phils.		BMGS		x					
22	Water Resource Investigation	1986	NWRC		x					
23	Philippine Atmospheric, Geo-Physical and Astronomical Services Admin. Data.		PAG-ASA		x					
24	Philippine Water Resources Summary Data, Vol-I Stream Flow and Lake or River Stage.		Bureau of Research		x					
25	Hydrogeology of Central Luzon	Aug-70	BM.Sandoval & Mamaril		x					
	PROVINCIAL SECTOR PLAN/DEVELOPMENT PROGRAM									
1	Rizal Province Water supply, Improvement Project (RPWSIP).	Aug-90	NEDA	x	x	x	x	x		F/S Second Phase
2	Major Development Programs and Projects 1986-1992 Rizal.		Aquino Admin.					x		
3	Annual Accomplishment Report Province of Rizal.	1993	PEO					x		
4	1992 Annual Report Province of Rizal	1992	PPDO					x		
5	Annual Investment Program 1993-1997 Rizal Province.	1993	OPPDC					x		Local Dev't. Investment. Prog. Infra.
6	Rizal Integrated Development Plan	1990	OPPDC					x		
7	Bases of the Plan (PPFP) Province of Rizal.	1993	PPDO					x		Draft Only
8	Rapid Assessment of Water Supply Source, Province of Rizal Report No. 36. Vol. 30.				x					
9	Topographical Maps of Rizal PCGS 2511		NAMRIA		x					
10	Water Resource Investigation Province of Rizal.	1986	NWRC		x					
11	Groundwater Resources Survey of Rizal	1983	BMGS		x					
	OTHER REFERENCES									
1	Microsoft Windows Version 3.1	1992	Microsoft Corporation						x	User's Manual
2	Microsoft Excel Version 5.0	1994	Microsoft Corporation						x	User's Manual
3	Microsoft Word Version 6.0	1994	Microsoft Corporation						x	User's Manual

Related Subject : WS Water Supply, HD Hydrogeology, SE Sanitation and Environment, CD Community Development, SE Socio-Economy, O Others

Table 1.4.1 List of Persons and Institutions Who Participated in the Preparation of PW4SP

Name	Position	Office
Provincial Sector Planning Team:		
1. Mr. Crispin P. Pablo	Provincial Planning & Dev't. Coordinator	Provincial Planning & Dev't. Office
2. Mr. Mario Cayetano	Water Supply Engineer	- do -
3. Ms. Thelma Matatquin	Training Specialist	- do -
4. Mr. Audrie Reyes	Computer Encoder	- do -
5. Mr. Jose Mari Tamayo	Water Resource Engineer	Provincial Engineer's Office
6. Mr. Ricardo de Arroz	Sanitary Engineer	Provincial Health Office
Water Supply and Sanitation - Project Management Office:		
1. Mr. Orville M. Roque	Program Manager	WSS-PMO, DILG
2. Ms. Ellen I. Pascua	Asst. Program Manager	- do -
3. Mr. Rogelio B. Ocampo	Chief, Planning Division	- do -
4. Mr. Mario V. De Dios	Development Management Officer V	- do -
5. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer	- do -
6. Ms. Ma. Contessa C. Navarro	Coordinator	- do -