

Chapter 6 Evaluation of Long-Term Development Plan

S 6.2 Financial and Economic Evaluation

Evaluation of the Long-Term Development Plan for the water supply system of Tashkent City from both financial and economic aspects is made in chapter 6.2. In this supporting report, details of the financial projections under various interest rates are presented.

Table S 6.2.1 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2017 = 1.4 fold)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	143%	143%	143%	143%	143%
Unit: Thousand US\$																		
Income Statements																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	30,403	30,403	30,403	30,403	30,403
Expense																		
Operating Expense other	21,397	20,485	19,588	18,553	17,415	16,611	16,332	16,031	15,733	15,487	15,244	15,253	15,262	15,271	15,282	15,292	19,463	19,475
Loss on Write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,027	2,027	2,027	2,027	2,027
Depreciation (Investment)	460	1,119	2,380	3,262	4,401	6,489	8,528	9,155	11,408	13,818	13,264	12,401	10,930	9,557	8,738	7,113	5,111	3,996
Depreciation (Existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Interest Cost	69	196	368	528	626	777	988	1,136	1,343	1,682	1,838	1,808	1,775	1,737	1,693	1,645	1,595	1,545
Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	26,331	25,438	25,868	25,739	25,710	27,044	28,935	29,330	31,413	33,840	33,123	32,172	30,543	28,592	27,739	26,077	28,196	27,044
Net Income	-1,510	-540	-699	-755	-797	-1,780	-3,023	-2,754	-4,157	-5,886	-4,454	-2,649	-140	1,811	2,664	4,326	2,207	3,359
Balance Sheets																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	5,890	10,780	24,084	32,098	41,477	59,039	78,351	86,366	114,569	143,119	143,119	143,119	143,119	143,119	143,119	143,119	143,535	143,535
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-460	-1,579	-3,959	-7,220	-11,621	-18,110	-26,638	-35,792	-47,200	-61,018	-74,282	-86,684	-97,614	-107,171	-115,909	-123,022	-128,133	-132,129
Existing Asset	-21,677	-23,655	-25,509	-27,239	-28,846	-30,329	-31,689	-32,925	-34,037	-35,026	-35,891	-36,633	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	22,597	24,391	33,461	36,483	39,854	49,444	58,669	56,493	72,176	85,919	71,789	58,647	47,167	37,610	28,872	21,759	17,064	13,068
Current Asset																		
Cash	1,439	2,429	6,822	10,806	15,471	20,783	26,727	33,442	40,882	48,876	57,540	67,005	76,891	86,522	95,717	104,350	107,758	111,496
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	11,521	11,541	6,712	6,662	6,643	6,737	6,910	7,087	7,268	7,454	7,645	7,873	8,107	8,107	8,107	8,107	8,107	8,107
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	14,067	15,077	14,641	18,575	23,221	28,627	34,744	41,636	49,257	57,437	66,292	75,985	86,105	95,736	104,932	113,564	116,972	120,710
Total Asset	36,665	39,468	48,101	55,058	63,075	78,071	93,613	98,128	121,433	143,356	138,082	134,631	133,272	133,346	133,804	135,324	134,036	133,778
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-796	-1,337	-2,035	-2,790	-3,587	-5,367	-8,390	-11,144	-15,301	-21,187	-25,641	-28,289	-28,429	-26,618	-23,954	-19,628	-17,421	-14,062
Total Equity	25,368	24,827	24,129	23,374	22,577	20,797	17,774	15,020	10,863	4,977	523	-2,125	-2,265	-454	2,210	6,536	8,743	12,102
Liabilities																		
Current Liabilities	6,314	6,324	3,909	3,885	3,875	3,922	4,008	4,097	4,188	4,281	4,376	4,490	4,607	4,607	4,607	4,607	4,607	4,607
Loan	4,983	8,316	20,063	27,800	36,622	53,351	71,830	79,012	106,382	134,098	133,183	132,267	130,930	129,193	126,987	124,181	120,686	117,069
Total Liabilities	11,297	14,640	23,973	31,684	40,497	57,273	75,839	83,109	110,570	138,379	137,559	136,757	135,538	133,801	131,594	128,788	125,294	121,676
Total Equity & Liabilities	36,665	39,468	48,101	55,058	63,075	78,071	93,613	98,128	121,433	143,356	138,082	134,631	133,273	133,346	133,804	135,324	134,037	133,779

Table S 6.2.1 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2017 = 1.4 fold)

Real Tariff Level	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Unit: Thousand US\$																		
Income Statements																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403
Expense																		
Operating Expense other	19,487	19,500	19,514	20,568	20,583	20,599	19,575	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633
Loss on Write off	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027
Depreciation (Investment)	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
Depreciation (Existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	1,489	1,415	1,331	1,247	1,163	1,079	995	911	827	743	659	575	492	409	329	254	185	125
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	26,198	25,335	25,206	27,522	27,742	26,554	25,404	26,377	26,293	25,746	24,259	23,235	23,152	23,069	22,989	22,914	22,845	22,784
Net Income	4,205	5,068	5,197	2,881	2,661	3,849	4,999	4,026	4,110	4,657	6,144	7,168	7,251	7,334	7,414	7,489	7,558	7,619
Balance Sheets																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	143,535	143,535	143,535	152,895	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-135,324	-137,717	-140,052	-143,732	-147,702	-150,551	-153,358	-156,165	-158,971	-161,315	-162,255	-162,255	-162,255	-162,255	-162,255	-162,255	-162,255	-162,255
Existing Asset	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	9,873	7,480	5,145	10,825	16,215	13,366	10,559	7,752	4,946	2,602	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Current Asset																		
Cash	113,868	114,874	115,951	106,697	97,512	97,756	99,107	99,484	99,945	100,490	101,120	101,833	102,712	103,673	105,136	107,074	109,550	112,965
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107	8,107
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	123,083	124,089	125,165	115,912	106,727	106,970	108,321	108,698	109,160	109,705	110,334	111,047	111,926	112,888	114,350	116,289	118,765	122,179
Total Asset	132,956	131,568	130,310	126,736	122,942	120,336	118,880	116,451	114,105	112,307	111,996	112,709	113,588	114,550	116,012	117,951	120,427	123,841
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-9,857	-4,789	407	3,289	5,949	9,798	14,797	18,823	22,932	27,589	33,733	40,901	48,152	55,487	62,901	70,390	77,948	85,567
Total Equity	16,307	21,375	26,571	29,453	32,113	35,962	40,961	44,987	49,096	53,753	59,897	67,065	74,316	81,651	89,065	96,554	104,112	111,731
Liabilities																		
Current Liabilities	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607	4,607
Loan	112,042	105,587	99,132	92,677	86,222	79,767	73,312	66,857	60,402	53,947	47,492	41,037	34,665	28,292	22,341	16,790	11,708	7,504
Total Liabilities	116,649	110,194	103,739	97,284	90,829	84,374	77,919	71,464	65,009	58,554	52,099	45,645	39,272	32,900	26,948	21,397	16,315	12,111
Total Equity & Liabilities	132,956	131,569	130,310	126,737	122,942	120,336	118,880	116,451	114,106	112,308	111,996	112,710	113,588	114,550	116,013	117,951	120,427	123,842

Table S 6.2.1 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2017 = 1.4 fold)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	143%	143%	143%	143%	143%
Overall Cash Flow Projection																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operating activity																		
Net Income	-1,510	-540	-699	-755	-797	-1,780	-3,023	-2,754	-4,157	-5,886	-4,454	-2,649	-140	1,811	2,664	4,326	2,207	3,359
+ Depreciation	2,561	3,097	4,234	4,992	6,008	7,972	9,887	10,391	12,520	14,807	14,129	13,143	11,479	9,557	8,738	7,113	5,111	3,996
- Increase in receivables	-1,298	-20	4,830	49	19	-94	-173	-177	-181	-186	-191	-228	-235	0	0	0	0	0
+ Increase in current liabilities	649	10	-2,415	-25	-9	47	86	89	91	93	95	114	117	0	0	0	0	0
Cash from operating activity	402	2,546	5,950	4,262	5,220	6,145	6,778	7,548	8,273	8,828	9,580	10,380	11,222	11,368	11,402	11,439	7,318	7,356
Investment activity																		
Investment	5,890	4,890	13,304	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	416	0
Cash used for investment activity	-5,890	-4,890	-13,304	-8,014	-9,378	-17,562	-19,312	-8,014	-28,204	-28,550	0	0	0	0	0	0	-416	0
Financial activity																		
Loan borrowed	4,983	3,333	11,747	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	0	0
Principal repayment	0	0	0	278	556	833	833	833	833	833	916	916	1,336	1,737	2,206	2,806	3,494	3,617
Cash from (used for) financial activity	4,983	3,333	11,747	7,736	8,823	16,729	18,479	7,181	27,371	27,716	-916	-916	-1,336	-1,737	-2,206	-2,806	-3,494	-3,617
Increase (decrease) in cash during the year	-505	989	4,393	3,984	4,665	5,312	5,945	6,715	7,440	7,995	8,664	9,465	9,886	9,631	9,196	8,633	3,408	3,738
Cash at beginning of the year	1,944	1,439	2,429	6,822	10,806	15,471	20,783	26,727	33,442	40,882	48,876	57,540	67,005	76,891	86,522	95,717	104,350	107,758
Cash at end of the year	1,439	2,429	6,822	10,806	15,471	20,783	26,727	33,442	40,882	48,876	57,540	67,005	76,891	86,522	95,717	104,350	107,758	111,496
Cash Flow Projection for Water Supply																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash from operating activity	402	2,546	5,950	4,262	5,220	6,145	6,778	7,548	8,273	8,828	9,580	10,380	11,222	11,368	11,402	11,439	7,318	7,356
+Interest expense	69	196	368	528	626	777	988	1,136	1,343	1,682	1,838	1,808	1,775	1,737	1,693	1,645	1,595	1,545
+Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	50	74	99	124	174	199	199	149	99	99	99	108	117	127	137	147	4,319	4,330
①Cash from operating activity before interest, M/P, repair	1,171	2,817	6,417	4,914	6,021	7,121	7,965	8,833	9,715	10,609	11,517	12,296	13,114	13,231	13,231	13,231	13,231	13,231
②Cash from Water supply operation (①X75%)	878	2,112	4,813	3,685	4,515	5,341	5,973	6,625	7,286	7,957	8,638	9,222	9,835	9,923	9,923	9,923	9,923	9,923
③Repayment	0	0	0	278	556	833	833	833	833	833	916	916	1,336	1,737	2,206	2,806	3,494	3,617
④Interest payment	69	196	368	528	626	777	988	1,136	1,343	1,682	1,838	1,808	1,775	1,737	1,693	1,645	1,595	1,545
⑤Cash used for M/P	6,540	4,890	13,304	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	416	0
⑥Cash used for repair	50	74	99	124	174	199	199	149	99	99	99	108	117	127	137	147	4,319	4,330
⑦Loan Borrowed	4,983	3,333	11,747	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	0	0
⑧Balance(⑩/(last year) +②-③-④-⑤-⑥+⑦)	292	577	3,366	6,121	9,281	12,812	16,766	21,272	26,283	31,625	37,410	43,801	50,408	56,731	62,619	67,944	68,044	68,475
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	292	577	3,366	6,121	9,281	12,812	16,766	21,272	26,283	31,625	37,410	43,801	50,408	56,731	62,619	67,944	68,044	68,475

Table S 6.2.1 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2017 = 1.4 fold)

Real Tariff Level	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Overall Cash Flow Projection																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Operating activity																		
Net Income	4,205	5,068	5,197	2,881	2,661	3,849	4,999	4,026	4,110	4,657	6,144	7,168	7,251	7,334	7,414	7,489	7,558	7,619
+ Depreciation	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
- Increase in receivables	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ Increase in current liabilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash from operating activity	7,399	7,461	7,532	6,561	6,630	6,698	7,806	6,832	6,916	7,000	7,084	7,168	7,251	7,334	7,414	7,489	7,558	7,619
Investment activity																		
Investment	0	0	0	9,360	9,360	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash used for investment activity	0	0	0	-9,360	-9,360	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial activity																		
Loan borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Principal repayment	5,027	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,372	6,372	5,952	5,551	5,082	4,204
Cash from (used for) financial activity	-5,027	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,372	-6,372	-5,952	-5,551	-5,082	-4,204
Increase (decrease) in cash during the year	2,372	1,006	1,077	-9,254	-9,185	243	1,351	377	461	545	629	713	879	962	1,463	1,938	2,476	3,415
Cash at beginning of the year	111,496	113,868	114,874	115,951	106,697	97,512	97,756	99,107	99,484	99,945	100,490	101,120	101,833	102,712	103,673	105,136	107,074	109,550
Cash at end of the year	113,868	114,874	115,951	106,697	97,512	97,756	99,107	99,484	99,945	100,490	101,120	101,833	102,712	103,673	105,136	107,074	109,550	112,965
Cash Flow Projection for Water Supply																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Cash from operating activity	7,399	7,461	7,532	6,561	6,630	6,698	7,806	6,832	6,916	7,000	7,084	7,168	7,251	7,334	7,414	7,489	7,558	7,619
+Interest expense	1,489	1,415	1,331	1,247	1,163	1,079	995	911	827	743	659	575	492	409	329	254	185	125
+Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	4,343	4,355	4,369	5,423	5,438	5,454	4,430	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488
①Cash from operating activity before interest, M/P, repair	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231	13,231
②Cash from Water supply operation(①X75%)	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923	9,923
③Repayment	5,027	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,372	6,372	5,952	5,551	5,082	4,204
④Interest payment	1,489	1,415	1,331	1,247	1,163	1,079	995	911	827	743	659	575	492	409	329	254	185	125
⑤Cash used for M/P	0	0	0	9,360	9,360	0	0	0	0	0	0	0	0	0	0	0	0	0
⑥Cash used for repair	4,343	4,355	4,369	5,423	5,438	5,454	4,430	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488
⑦Loan Borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑧Balance(⑩'(last year) +②-③-④-⑤-⑥)+⑦)	67,539	65,237	63,006	50,444	37,952	34,887	32,930	30,000	27,153	24,391	21,712	19,117	16,688	14,342	12,497	11,127	10,296	10,403
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	67,539	65,237	63,006	50,444	37,952	34,887	32,930	30,000	27,153	24,391	21,712	19,117	16,688	14,342	12,497	11,127	10,296	10,403

Table S 6.2.2 Details of Revenue and Expenses for Table S 6.2.1

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	143%	143%	143%	143%	143%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Unit: Thousand US\$																		
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	6,024	6,024	6,024	6,024	6,024	6,024
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,358	3,358	3,358	3,358	3,358	3,358
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	9,087	9,087	9,087	9,087	9,087	9,087
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,631	11,156	11,156	11,156	11,156	11,156	11,156
Others	191	191	628	641	655	669	683	698	713	729	745	761	778	778	778	778	778	778
Total	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	30,403	30,403	30,403	30,403	30,403
Expense																		
Materials (imported)	422	396	369	343	318	290	718	698	678	658	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	214	200	187	174	161	147	363	353	343	333	323	323	323	323	323	323	323	323
Elect.power	9,827	8,804	7,836	6,925	6,070	5,224	4,529	4,355	4,184	4,015	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850
Salary (all employees)	4,170	4,257	4,300	4,150	4,237	4,009	3,780	3,733	3,686	3,640	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Capital repairs	568	592	617	642	692	717	717	667	617	617	617	626	635	645	655	665	4,837	4,848
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	1,119	2,380	3,262	4,401	6,489	8,528	9,155	11,408	13,818	13,264	12,401	10,930	9,557	8,738	7,113	5,111	3,996
Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	69	196	368	528	626	777	988	1,136	1,343	1,682	1,838	1,808	1,775	1,737	1,693	1,645	1,595	1,545
Loss on write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,027	2,027	2,027	2,027	2,027
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	26,331	25,438	25,868	25,739	25,710	27,044	28,935	29,330	31,413	33,840	33,123	32,172	30,543	28,592	27,739	26,077	28,196	27,044

Table S 6.2.2 Details of Revenue and Expenses for Table S 6.2.1

Rea Tariff Level	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Unit: Thousand US\$																		
Revenue																		
Apartment	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024	6,024
Detached House	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358	3,358
Enterprise	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087	9,087
Communal Service Group	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156	11,156
Others	778	778	778	778	778	778	778	778	778	778	778	778	778	778	778	778	778	778
Total	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403	30,403
Expense																		
Materials (imported)	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
Elect.power	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850
Salary (all employees)	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Capital repairs	4,861	4,873	4,887	5,941	5,956	5,972	4,948	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	1,489	1,415	1,331	1,247	1,163	1,079	995	911	827	743	659	575	492	409	329	254	185	125
Loss on write off	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027	2,027
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	26,198	25,335	25,206	27,522	27,742	26,554	25,404	26,377	26,293	25,746	24,259	23,235	23,152	23,069	22,989	22,914	22,845	22,784

Table S 6.2.3 Details of Revenue and Expenses for Table 6.2.2

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Unit: Thousand US\$																		
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	6,024	6,205	6,391	6,582	6,780	6,983
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,358	3,458	3,562	3,669	3,779	3,892
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	9,087	9,359	9,640	9,929	10,227	10,534
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,631	11,156	11,491	11,836	12,191	12,557	12,933
Others	191	191	628	641	655	669	683	698	713	729	745	761	778	796	814	833	852	872
Total	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Materials (imported)	422	396	369	343	318	290	718	698	678	658	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	214	200	187	174	161	147	363	353	343	333	323	323	323	323	323	323	323	323
Elect.power	9,827	8,804	7,836	6,925	6,070	5,224	4,529	4,355	4,184	4,015	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850
Salary (all employees)	4,170	4,257	4,300	4,150	4,237	4,009	3,780	3,733	3,686	3,640	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Capital repairs	568	592	617	642	692	717	717	667	617	617	617	626	635	645	655	665	4,837	4,848
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	1,119	2,380	3,262	4,401	6,489	8,528	9,155	11,408	13,818	13,264	12,401	10,930	9,557	8,738	7,113	5,111	3,996
Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	100	257	584	1,049	1,469	2,118	3,011	3,665	4,541	5,931	6,613	6,580	6,536	6,472	6,386	6,271	6,120	5,944
Loss on write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	26,362	25,499	26,084	26,259	26,552	28,385	30,958	31,858	34,611	38,088	37,898	36,944	35,304	33,388	32,555	30,889	32,974	31,763

Table S 6.2.3 Details of Revenue and Expenses for Table 6.2.2

Rea Tariff Level	170%	175%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Unit: Thousand US\$																		
Revenue																		
Apartment	7,193	7,409	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631
Detached House	4,009	4,129	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253
Enterprise	10,850	11,175	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511
Communal Service Group	13,321	13,721	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133
Others	892	913	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935
Total	36,266	37,348	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463
Expense																		
Materials (imported)	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
Elect.power	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850
Salary (all employees)	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Capital repairs	4,861	4,873	4,887	5,941	5,956	5,972	4,948	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	5,728	5,441	5,118	4,795	4,472	4,150	3,827	3,504	3,181	2,859	2,536	2,213	1,893	1,574	1,266	978	712	480
Loss on write off	2,418	2,490	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	30,828	29,824	29,531	31,607	31,589	30,162	28,773	29,508	29,185	28,399	26,673	25,410	25,089	24,771	24,463	24,175	23,909	23,677

Table S 6.2.4 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Unit: Thousand US\$																		
Income Statements																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Operating Expense other	21,397	20,485	19,588	18,553	17,415	16,611	16,332	16,031	15,733	15,487	15,244	15,253	15,262	15,271	15,282	15,292	19,463	19,475
Loss on Write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Depreciation (Investment)	460	1,119	2,380	3,262	4,401	6,489	8,528	9,155	11,408	13,818	13,264	12,401	10,930	9,557	8,738	7,113	5,111	3,996
Depreciation (Existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Interest Cost	141	340	877	1,752	2,607	3,930	5,745	7,082	8,863	11,672	13,066	13,029	12,970	12,871	12,728	12,522	12,234	11,888
Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	26,403	25,582	26,377	26,963	27,690	30,197	33,692	35,275	38,934	43,829	44,351	43,392	41,738	39,787	38,897	37,141	39,088	37,707
Net Income	-1,581	-684	-1,208	-1,979	-2,778	-4,933	-7,780	-8,700	-11,678	-15,876	-15,682	-13,869	-11,335	-8,478	-6,654	-3,936	-4,894	-2,492
Balance Sheets																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	5,890	10,780	24,084	32,098	41,477	59,039	78,351	86,366	114,569	143,119	143,119	143,119	143,119	143,119	143,119	143,119	143,535	143,535
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-460	-1,579	-3,959	-7,220	-11,621	-18,110	-26,638	-35,792	-47,200	-61,018	-74,282	-86,684	-97,614	-107,171	-115,909	-123,022	-128,133	-132,129
Existing Asset	-21,677	-23,655	-25,509	-27,239	-28,846	-30,329	-31,689	-32,925	-34,037	-35,026	-35,891	-36,633	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	22,597	24,391	33,461	36,483	39,854	49,444	58,869	56,493	72,176	85,919	71,789	58,647	47,167	37,610	28,872	21,759	17,064	13,088
Current Asset																		
Cash	1,368	2,213	6,097	8,857	11,541	13,700	14,888	15,657	15,576	13,581	11,017	9,261	7,951	7,173	6,926	7,168	3,343	1,094
Government Subsidy	0	0	0	0	0	0	0	0	0	3,670	9,113	13,943	18,531	22,799	26,751	30,439	38,423	45,069
Accounts Receivable	11,521	11,541	6,712	6,662	6,643	6,737	6,910	7,087	7,268	7,454	7,645	7,873	8,107	8,349	8,598	8,854	9,119	9,391
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	13,996	14,862	13,916	16,626	19,291	21,544	22,905	23,851	23,951	25,812	28,882	32,184	35,697	39,428	43,382	47,569	51,992	56,661
Total Asset	36,593	39,252	47,377	53,109	59,145	70,988	81,774	80,344	96,127	111,731	100,671	90,830	82,864	77,038	72,254	69,328	69,056	69,729
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	3,670	9,113	13,943	18,531	22,799	26,751	30,439	38,423	45,069
Retained Earnings	-868	-1,552	-2,760	-4,739	-7,517	-12,449	-20,229	-28,929	-40,606	-56,482	-72,164	-86,034	-97,369	-105,846	-112,500	-116,436	-121,330	-123,822
Total Equity	25,296	24,612	23,404	21,425	18,647	13,715	5,935	-2,765	-14,442	-26,648	-36,887	-45,927	-52,674	-56,883	-59,585	-59,833	-56,743	-52,589
Liabilities																		
Current Liabilities	6,314	6,324	3,909	3,885	3,875	3,922	4,008	4,097	4,188	4,281	4,376	4,490	4,607	4,728	4,853	4,981	5,113	5,249
Loan	4,983	8,316	20,063	27,800	36,622	53,351	71,830	79,012	106,382	134,098	133,183	132,267	130,930	129,193	126,987	124,181	120,686	117,069
Total Liabilities	11,297	14,640	23,973	31,684	40,497	57,273	75,839	83,109	110,570	138,379	137,559	136,757	135,538	133,921	131,840	129,162	125,799	122,318
Total Equity & Liabilities	36,593	39,252	47,377	53,109	59,145	70,988	81,774	80,344	96,127	111,731	100,671	90,830	82,864	77,038	72,255	69,328	69,056	69,729

Table S 6.2.4 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	170%	175%	181%	186%	192%	197%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%
Unit: Thousand US\$																		
Income Statements																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue	36,266	37,348	38,463	39,611	40,793	42,011	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266
Expense																		
Operating Expense other	19,487	19,500	19,514	20,568	20,583	20,599	19,575	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633	20,633
Loss on Write off	2,418	2,490	2,564	2,641	2,720	2,801	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884
Depreciation (Investment)	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
Depreciation (Existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	11,456	10,881	10,236	9,590	8,945	8,299	7,654	7,008	6,363	5,717	5,072	4,426	3,785	3,148	2,532	1,957	1,425	961
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	36,555	35,265	34,649	36,479	36,217	34,549	32,920	33,332	32,687	31,578	29,529	27,943	27,302	26,665	26,049	25,474	24,942	24,478
Net Income	-290	2,083	3,814	3,131	4,576	7,463	10,346	9,934	10,579	11,688	13,737	15,322	15,964	16,601	17,217	17,792	18,324	18,788
Balance Sheets																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	143,535	143,535	143,535	152,895	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255	162,255
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-135,324	-137,717	-140,052	-143,732	-147,702	-150,551	-153,358	-156,165	-158,971	-161,315	-162,255	-162,255	-162,255	-162,255	-162,255	-162,255	-162,255	-162,255
Existing Asset	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	9,873	7,480	5,145	10,825	16,215	13,366	10,559	7,752	4,946	2,602	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Current Asset																		
Cash	-1,168	-3,291	-3,746	-12,903	-20,330	-16,635	-10,105	-3,819	3,112	10,689	18,911	27,778	37,369	47,598	58,864	71,105	84,347	98,932
Government Subsidy	51,972	58,987	64,594	79,168	92,288	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569
Accounts Receivable	9,671	9,959	10,257	10,563	10,878	11,203	11,538	11,538	11,538	11,538	11,538	11,538	11,538	11,538	11,538	11,538	11,538	11,538
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	61,582	66,762	72,211	77,935	83,943	90,244	97,109	103,395	110,326	117,902	126,124	134,992	144,583	154,812	166,077	178,319	191,561	206,145
Total Asset	71,455	74,242	77,356	88,760	100,159	103,610	107,668	111,147	115,271	120,504	127,786	136,654	146,245	156,474	167,739	179,981	193,223	207,807
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	51,972	58,987	64,594	79,168	92,288	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569	94,569
Retained Earnings	-124,112	-122,029	-118,215	-115,084	-110,507	-103,045	-92,699	-82,765	-72,186	-60,498	-46,761	-31,439	-15,475	1,126	18,344	36,136	54,460	73,249
Total Equity	-45,976	-36,878	-27,457	-9,752	7,945	17,688	28,034	37,968	48,547	60,235	73,972	89,294	105,258	121,859	139,077	156,869	175,193	193,982
Liabilities																		
Current Liabilities	5,389	5,533	5,682	5,835	5,993	6,155	6,322	6,322	6,322	6,322	6,322	6,322	6,322	6,322	6,322	6,322	6,322	6,322
Loan	112,042	105,587	99,132	92,677	86,222	79,767	73,312	66,857	60,402	53,947	47,492	41,037	34,665	28,292	22,341	16,790	11,708	7,504
Total Liabilities	117,431	111,120	104,814	98,512	92,215	85,922	79,634	73,179	66,724	60,270	53,815	47,360	40,987	34,615	28,663	23,112	18,030	13,826
Total Equity & Liabilities	71,455	74,242	77,357	88,760	100,159	103,610	107,668	111,147	115,272	120,505	127,787	136,654	146,245	156,474	167,740	179,981	193,223	207,807

Table S 6.2.4 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Overall Cash Flow Projection																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operating activity																		
Net Income	-1,581	-684	-1,208	-1,979	-2,778	-4,933	-7,780	-8,700	-11,678	-15,876	-15,682	-13,869	-11,335	-8,478	-6,654	-3,936	-4,894	-2,492
+ Depreciation	2,561	3,097	4,234	4,992	6,008	7,972	9,887	10,391	12,520	14,807	14,129	13,143	11,479	9,557	8,738	7,113	5,111	3,996
- Increase in receivables	-1,298	-20	4,830	49	19	-94	-173	-177	-181	-186	-191	-228	-235	-242	-249	-256	-264	-272
+ Increase in current liabilities	649	10	-2,415	-25	-9	47	86	89	91	93	95	114	117	121	124	128	132	136
Cash from operating activity	330	2,403	5,441	3,038	3,239	2,992	2,021	1,602	752	-1,162	-1,648	-840	27	959	1,960	3,048	85	1,368
Investment activity																		
Investment	5,890	4,890	13,304	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	416	0
Cash used for investment activity	-5,890	-4,890	-13,304	-8,014	-9,378	-17,562	-19,312	-8,014	-28,204	-28,550	0	0	0	0	0	0	-416	0
Financial activity																		
Loan borrowed	4,983	3,333	11,747	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	0	0
Principal repayment	0	0	0	278	556	833	833	833	833	833	916	916	1,336	1,737	2,206	2,806	3,494	3,617
Cash from (used for) financial activity	4,983	3,333	11,747	7,736	8,823	16,729	18,479	7,181	27,371	27,716	-916	-916	-1,336	-1,737	-2,206	-2,806	-3,494	-3,617
Increase (decrease) in cash during the year	-577	846	3,884	2,760	2,684	2,159	1,188	769	-81	-1,995	-2,564	-1,756	-1,310	-778	-247	242	-3,825	-2,249
Cash at beginning of the year	1,944	1,368	2,213	6,097	8,857	11,541	13,700	14,888	15,657	15,576	13,581	11,017	9,261	7,951	7,173	6,926	7,168	3,343
Cash at end of the year	1,368	2,213	6,097	8,857	11,541	13,700	14,888	15,657	15,576	13,581	11,017	9,261	7,951	7,173	6,926	7,168	3,343	1,094
Cash Flow Projection for Water Supply																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash from operating activity	330	2,403	5,441	3,038	3,239	2,992	2,021	1,602	752	-1,162	-1,648	-840	27	959	1,960	3,048	85	1,368
+Interest expense	141	340	877	1,752	2,607	3,930	5,745	7,082	8,863	11,672	13,066	13,029	12,970	12,871	12,728	12,522	12,234	11,888
+Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	50	74	99	124	174	199	199	149	99	99	99	108	117	127	137	147	4,319	4,330
①Cash from operating activity before interest, M/P, repair	1,171	2,817	6,417	4,914	6,021	7,121	7,965	8,833	9,715	10,609	11,517	12,296	13,114	13,956	14,824	15,718	16,638	17,586
②Cash from Water supply operation (①X75%)	878	2,112	4,813	3,685	4,515	5,341	5,973	6,625	7,286	7,957	8,638	9,222	9,835	10,467	11,118	11,788	12,479	13,190
③Repayment	0	0	0	278	556	833	833	833	833	833	916	916	1,336	1,737	2,206	2,806	3,494	3,617
④Interest payment	141	340	877	1,752	2,607	3,930	5,745	7,082	8,863	11,672	13,066	13,029	12,970	12,871	12,728	12,522	12,234	11,888
⑤Cash used for M/P	6,540	4,890	13,304	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	416	0
⑥Cash used for repair	50	74	99	124	174	199	199	149	99	99	99	108	117	127	137	147	4,319	4,330
⑦Loan Borrowed	4,983	3,333	11,747	8,014	9,378	17,562	19,312	8,014	28,204	28,550	0	0	0	0	0	0	0	0
⑧Balance(⑩/(last year) +②-③-④-⑤-⑥+⑦)	220	361	2,641	4,172	5,351	5,730	4,926	3,487	978	-3,670	-5,443	-4,830	-4,588	-4,268	-3,952	-3,688	-7,984	-6,646
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	3,670	5,443	4,830	4,588	4,268	3,952	3,688	7,984	6,646
⑩Ending Balance(⑧+⑨)	220	361	2,641	4,172	5,351	5,730	4,926	3,487	978	0	0	-0	-0	0	-0	0	-0	0

Table S 6.2.4 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	170%	175%	181%	186%	192%	197%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%
Overall Cash Flow Projection																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Operating activity																		
Net Income	-290	2,083	3,814	3,131	4,576	7,463	10,346	9,934	10,579	11,688	13,737	15,322	15,964	16,601	17,217	17,792	18,324	18,788
+ Depreciation	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
- Increase in receivables	-280	-289	-297	-306	-315	-325	-335	0	0	0	0	0	0	0	0	0	0	0
+ Increase in current liabilities	140	144	149	153	158	162	167	0	0	0	0	0	0	0	0	0	0	0
Cash from operating activity	2,765	4,332	6,000	6,658	8,388	10,150	12,985	12,741	13,386	14,031	14,677	15,322	15,964	16,601	17,217	17,792	18,324	18,788
Investment activity																		
Investment	0	0	0	9,360	9,360	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash used for investment activity	0	0	0	-9,360	-9,360	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial activity																		
Loan borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Principal repayment	5,027	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,372	6,372	5,952	5,551	5,082	4,204
Cash from (used for) financial activity	-5,027	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,455	-6,372	-6,372	-5,952	-5,551	-5,082	-4,204
Increase (decrease) in cash during the year	-2,263	-2,123	-455	-9,157	-7,427	3,695	6,530	6,286	6,931	7,577	8,222	8,868	9,591	10,229	11,266	12,241	13,242	14,584
Cash at beginning of the year	1,094	-1,168	-3,291	-3,746	-12,903	-20,330	-16,635	-10,105	-3,819	3,112	10,689	18,911	27,778	37,369	47,598	58,864	71,105	84,347
Cash at end of the year	-1,168	-3,291	-3,746	-12,903	-20,330	-16,635	-10,105	-3,819	3,112	10,689	18,911	27,778	37,369	47,598	58,864	71,105	84,347	98,932
Cash Flow Projection for Water Supply																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Cash from operating activity	2,765	4,332	6,000	6,658	8,388	10,150	12,985	12,741	13,386	14,031	14,677	15,322	15,964	16,601	17,217	17,792	18,324	18,788
+Interest expense	11,456	10,881	10,236	9,590	8,945	8,299	7,654	7,008	6,363	5,717	5,072	4,426	3,785	3,148	2,532	1,957	1,425	961
+Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	4,343	4,355	4,369	5,423	5,438	5,454	4,430	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488
①Cash from operating activity before interest, M/P, repair	18,563	19,569	20,605	21,672	22,771	23,903	25,069	25,237	25,237	25,237	25,237	25,237	25,237	25,237	25,237	25,237	25,237	25,237
②Cash from Water supply operation (①X75%)	13,922	14,677	15,454	16,254	17,078	17,928	18,802	18,928	18,928	18,928	18,928	18,928	18,928	18,928	18,928	18,928	18,928	18,928
③Repayment	5,027	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,455	6,372	6,372	5,952	5,551	5,082	4,204
④Interest payment	11,456	10,881	10,236	9,590	8,945	8,299	7,654	7,008	6,363	5,717	5,072	4,426	3,785	3,148	2,532	1,957	1,425	961
⑤Cash used for M/P	0	0	0	9,360	9,360	0	0	0	0	0	0	0	0	0	0	0	0	0
⑥Cash used for repair	4,343	4,355	4,369	5,423	5,438	5,454	4,430	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488	5,488
⑦Loan Borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑧Balance(⑩/(last year) +②-③-④-⑤-⑥+⑦)	-6,903	-7,015	-5,607	-14,574	-13,120	-2,281	263	239	861	2,128	4,041	6,600	9,882	13,801	18,758	24,690	31,623	39,898
⑨Government Subsidy	6,903	7,015	5,607	14,574	13,120	2,281	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	-0	-0	0	-0	0	0	263	239	861	2,128	4,041	6,600	9,882	13,801	18,758	24,690	31,623	39,898

Table S 6.2.5 Details of Revenue and Expenses for Table S 6.2.4

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
	Unit: Thousand US\$																	
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	6,024	6,205	6,391	6,582	6,780	6,983
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,358	3,458	3,562	3,669	3,779	3,892
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	9,087	9,359	9,640	9,929	10,227	10,534
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,831	11,156	11,491	11,836	12,191	12,557	12,933
Others	191	191	628	641	655	669	683	698	713	729	745	761	778	796	814	833	852	872
Total	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Materials (imported)	422	396	369	343	318	290	718	698	678	658	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	214	200	187	174	161	147	363	353	343	333	323	323	323	323	323	323	323	323
Elect.power	9,827	8,804	7,836	6,925	6,070	5,224	4,529	4,355	4,184	4,015	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850
Salary (all employees)	4,170	4,257	4,300	4,150	4,237	4,009	3,780	3,733	3,686	3,640	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Capital repairs	568	592	617	642	692	717	717	667	617	617	617	626	635	645	655	665	4,837	4,848
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	1,119	2,380	3,262	4,401	6,489	8,528	9,155	11,408	13,818	13,264	12,401	10,930	9,557	8,738	7,113	5,111	3,996
Expense for M/P	650	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	141	340	877	1,752	2,607	3,930	5,745	7,082	8,863	11,672	13,066	13,029	12,970	12,871	12,728	12,522	12,234	11,888
Loss on write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	26,403	25,582	26,377	26,963	27,690	30,197	33,692	35,275	38,934	43,829	44,351	43,392	41,738	39,787	38,897	37,141	39,088	37,707

Table S 6.2.5 Details of Revenue and Expenses for Table S 6.2.4

Rea Tariff Level	170%	175%	181%	186%	192%	197%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%	203%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
	Unit: Thousand US\$																	
Revenue																		
Apartment	7,193	7,409	7,631	7,860	8,096	8,339	8,589	8,589	8,589	8,589	8,589	8,589	8,589	8,589	8,589	8,589	8,589	8,589
Detached House	4,009	4,129	4,253	4,381	4,512	4,648	4,787	4,787	4,787	4,787	4,787	4,787	4,787	4,787	4,787	4,787	4,787	4,787
Enterprise	10,850	11,175	11,511	11,856	12,212	12,578	12,955	12,955	12,955	12,955	12,955	12,955	12,955	12,955	12,955	12,955	12,955	12,955
Communal Service Group	13,321	13,721	14,133	14,557	14,993	15,443	15,906	15,906	15,906	15,906	15,906	15,906	15,906	15,906	15,906	15,906	15,906	15,906
Others	892	913	935	957	980	1,004	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029	1,029
Total	36,266	37,348	38,463	39,611	40,793	42,011	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266	43,266
Expense																		
Materials (imported)	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
Elect.power	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850	3,850
Salary (all employees)	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Capital repairs	4,861	4,873	4,887	5,941	5,956	5,972	4,948	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	3,195	2,393	2,335	3,680	3,969	2,850	2,807	2,807	2,807	2,344	940	0	0	0	0	0	0	0
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	11,456	10,881	10,236	9,590	8,945	8,299	7,654	7,008	6,363	5,717	5,072	4,426	3,785	3,148	2,532	1,957	1,425	961
Loss on write off	2,418	2,490	2,564	2,641	2,720	2,801	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884	2,884
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	36,555	35,265	34,649	36,479	36,217	34,549	32,920	33,332	32,687	31,578	29,529	27,943	27,302	26,665	26,049	25,474	24,942	24,478

Table S 6.2.6 Financial Simulation “without LTDP”

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Unit: Thousand US\$																		
Income Statements																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	24,822	24,898	24,732	24,534	24,449	24,787	25,420	26,069	26,734	27,416	28,115	28,953	29,815	30,704	31,620	32,562	33,534	34,534
Expense																		
Operating Expense other	21,365	21,124	19,682	19,455	18,813	18,466	24,180	24,346	32,827	29,865	24,816	26,031	26,446	25,587	25,772	25,961	31,353	31,549
Loss on Write off	1,655	1,660	1,649	1,636	1,630	1,652	1,695	1,738	1,782	1,828	1,874	1,930	1,988	2,047	2,108	2,171	2,236	2,302
Depreciation (Investment)	460	919	1,379	1,379	1,379	1,341	1,278	1,103	871	663	567	567	567	567	441	311	180	175
Depreciation (Existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Interest Cost	58	175	292	345	331	306	277	248	219	190	160	131	102	73	44	19	5	0
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	25,638	25,855	24,855	24,545	23,759	23,249	28,790	28,671	36,811	33,534	28,283	29,400	29,651	28,274	28,365	28,462	33,774	34,027
Net Income	-817	-958	-123	-12	690	1,538	-3,370	-2,602	-10,077	-6,118	-168	-448	164	2,430	3,254	4,101	-240	507
Balance Sheets																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	4,890	9,780	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-460	-1,379	-2,757	-4,136	-5,515	-6,855	-8,133	-9,237	-10,108	-10,771	-11,337	-11,904	-12,471	-13,038	-13,479	-13,790	-13,970	-14,145
Existing Asset	-21,677	-23,655	-25,509	-27,239	-28,846	-30,329	-31,689	-32,925	-34,037	-35,026	-35,891	-36,633	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	21,597	23,591	25,248	22,139	19,153	16,330	13,692	11,353	9,369	7,718	6,286	4,977	3,861	3,294	2,853	2,542	2,362	2,187
Current Asset																		
Cash	1,493	1,864	5,891	8,737	11,868	15,352	13,702	12,519	3,503	-1,887	-1,549	-1,634	-1,302	743	3,484	7,214	6,747	7,296
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	11,521	11,541	6,595	6,542	6,520	6,610	6,779	6,952	7,129	7,311	7,497	7,721	7,951	8,188	8,432	8,683	8,942	9,209
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	14,121	14,513	13,593	16,386	19,495	23,068	21,587	20,578	11,739	6,531	7,055	7,194	7,756	10,038	13,023	17,004	16,796	17,612
Total Asset	35,718	38,104	38,841	38,525	38,648	39,398	35,279	31,931	21,109	14,249	13,341	12,171	11,617	13,333	15,876	19,547	19,158	19,799
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-93	-1,051	-1,173	-1,185	-495	1,043	-2,327	-4,929	-15,006	-21,124	-21,292	-21,740	-21,575	-19,145	-15,891	-11,790	-12,030	-11,523
Total Equity	26,071	25,113	24,991	24,979	25,669	27,207	23,837	21,235	11,158	5,040	4,872	4,424	4,589	7,019	10,273	14,374	14,134	14,641
Liabilities																		
Current Liabilities	6,314	6,324	3,851	3,825	3,813	3,858	3,943	4,029	4,118	4,209	4,302	4,414	4,529	4,647	4,769	4,895	5,025	5,158
Loan	3,333	6,666	9,999	9,721	9,166	8,333	7,499	6,666	5,833	5,000	4,166	3,333	2,500	1,667	833	278	0	0
Total Liabilities	9,647	12,990	13,850	13,546	12,979	12,191	11,442	10,695	9,951	9,208	8,468	7,747	7,029	6,314	5,603	5,173	5,025	5,158
Total Equity & Liabilities	35,718	38,104	38,841	38,525	38,648	39,398	35,279	31,931	21,109	14,249	13,341	12,171	11,617	13,333	15,876	19,547	19,159	19,799

Table S 6.2.6 Financial Simulation “without LTDP”

Real Tariff Level	170%	175%	181%	186%	192%	197%	203%	209%	216%	222%	229%	236%	243%	250%	258%	265%	273%	281%
Unit: Thousand US\$																		
Income Statements																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue	35,564	36,625	37,718	38,844	40,004	41,198	42,428	43,696	45,001	46,345	47,730	49,156	50,625	52,138	53,696	55,301	56,955	58,658
Expense																		
Operating Expense other	31,750	34,034	34,242	41,734	41,951	32,812	29,917	30,147	31,187	31,187	32,227	30,147	29,107	29,107	28,067	28,067	28,067	28,067
Loss on Write off	2,371	2,442	2,515	2,590	2,667	2,747	2,829	2,913	3,000	3,090	3,182	3,277	3,375	3,476	3,580	3,687	3,797	3,911
Depreciation (Investment)	175	175	117	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation (Existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	34,295	36,650	36,873	44,382	44,618	35,559	32,746	33,060	34,187	34,277	35,409	33,424	32,482	32,583	31,647	31,754	31,864	31,978
Net Income	1,269	-25	845	-5,538	-4,614	5,640	9,682	10,635	10,813	12,068	12,320	15,731	18,142	19,554	22,049	23,547	25,090	26,680
Balance Sheets																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670	14,670
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-14,320	-14,495	-14,612	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670	-14,670
Existing Asset	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	2,012	1,837	1,720	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Current Asset																		
Cash	8,602	8,611	9,427	3,797	-972	4,509	14,027	24,493	35,132	47,021	59,156	74,698	92,644	111,997	133,838	157,171	182,041	208,493
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	9,484	9,767	10,058	10,358	10,668	10,986	11,314	11,652	12,000	12,359	12,728	13,108	13,500	13,903	14,319	14,747	15,188	15,642
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	19,193	19,484	20,592	15,262	10,803	16,602	26,448	37,252	48,239	60,487	72,991	88,913	107,251	127,007	149,264	173,025	198,336	225,242
Total Asset	21,205	21,321	22,312	16,924	12,465	18,264	28,110	38,914	49,901	62,149	74,653	90,575	108,913	128,669	150,926	174,687	199,998	226,904
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-10,254	-10,279	-9,434	-14,972	-19,586	-13,946	-4,264	6,371	17,184	29,252	41,572	57,304	75,446	95,000	117,049	140,596	165,687	192,366
Total Equity	15,910	15,885	16,730	11,192	6,578	12,218	21,900	32,535	43,348	55,416	67,736	83,468	101,610	121,164	143,213	166,760	191,851	218,530
Liabilities																		
Current Liabilities	5,295	5,437	5,583	5,733	5,887	6,047	6,211	6,380	6,554	6,733	6,917	7,108	7,303	7,505	7,713	7,927	8,147	8,375
Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Liabilities	5,295	5,437	5,583	5,733	5,887	6,047	6,211	6,380	6,554	6,733	6,917	7,108	7,303	7,505	7,713	7,927	8,147	8,375
Total Equity & Liabilities	21,205	21,322	22,313	16,925	12,465	18,264	28,111	38,915	49,902	62,149	74,654	90,575	108,913	128,670	150,926	174,687	199,998	226,905

Table S 6.2.6 Financial Simulation “without LTDP”

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%	
Overall Cash Flow Projection																			
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Operating activity																			
Net Income	-817	-958	-123	-12	690	1,538	-3,370	-2,602	-10,077	-6,118	-168	-448	164	2,430	3,254	4,101	-240	507	
+ Depreciation	2,561	2,897	3,233	3,109	2,985	2,824	2,638	2,339	1,983	1,652	1,432	1,308	1,116	567	441	311	180	175	
- Increase in receivables	-1,298	-20	4,946	53	23	-90	-169	-173	-177	-182	-186	-223	-230	-237	-244	-251	-259	-267	
+ Increase in current liabilities	649	10	-2,473	-26	-11	45	84	87	89	91	93	112	115	118	122	126	129	133	
Cash from operating activity	1,095	1,929	5,583	3,124	3,687	4,317	-817	-349	-8,183	-4,557	1,171	749	1,165	2,879	3,574	4,286	-189	549	
Investment activity																			
Investment	4,890	4,890	4,890	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cash used for investment activity	-4,890	-4,890	-4,890	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Financial activity																			
Loan borrowed	3,333	3,333	3,333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Principal repayment	0	0	0	278	556	833	833	833	833	833	833	833	833	833	833	556	278	0	
Cash from (used for) financial activity	3,333	3,333	3,333	-278	-556	-833	-833	-833	-833	-833	-833	-833	-833	-833	-833	-556	-278	0	
Increase (decrease) in cash during the year	-462	372	4,026	2,846	3,131	3,484	-1,650	-1,182	-9,016	-5,390	337	-84	332	2,045	2,740	3,730	-467	549	
Cash at beginning of the year	1,955	1,493	1,864	5,891	8,737	11,868	15,352	13,702	12,519	3,503	-1,887	-1,549	-1,634	-1,302	743	3,484	7,214	6,747	
Cash at end of the year	1,493	1,864	5,891	8,737	11,868	15,352	13,702	12,519	3,503	-1,887	-1,549	-1,634	-1,302	743	3,484	7,214	6,747	7,296	
Cash Flow Projection for Water Supply																			
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
Cash from operating activity	1,095	1,929	5,583	3,124	3,687	4,317	-817	-349	-8,183	-4,557	1,171	749	1,165	2,879	3,574	4,286	-189	549	
+Interest expense	58	175	292	345	331	306	277	248	219	190	160	131	102	73	44	19	5	0	
+Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+Capital Repair for Water supply	50	74	99	124	174	199	5,124	5,124	13,444	10,324	5,124	6,164	6,164	5,124	5,124	5,124	10,324	10,324	
① Cash from operating activity before interest, M/P, repair	1,203	2,178	5,974	3,593	4,191	4,822	4,584	5,023	5,480	5,957	6,455	7,044	7,431	8,076	8,741	9,429	10,139	10,873	
② Cash from Water supply operation (①X75%)	902	1,633	4,480	2,695	3,143	3,617	3,438	3,767	4,110	4,468	4,841	5,283	5,573	6,057	6,556	7,072	7,605	8,155	
③ Repayment	0	0	0	278	556	833	833	833	833	833	833	833	833	833	833	556	278	0	
④ Interest payment	58	175	292	345	331	306	277	248	219	190	160	131	102	73	44	19	5	0	
⑤ Cash used for M/P	4,890	4,890	4,890	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑥ Cash used for repair	50	74	99	124	174	199	5,124	5,124	13,444	10,324	5,124	6,164	6,164	5,124	5,124	5,124	10,324	10,324	
⑦ Loan Borrowed	3,333	3,333	3,333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑧ Balance(⑩)(last year) +②-③-④-⑤-⑥+⑦)	334	162	2,694	4,642	6,726	9,004	6,208	3,770	-6,616	-13,496	-14,772	-16,617	-18,144	-18,117	-17,562	-16,189	-19,191	-21,360	
⑨ Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑩ Ending Balance(⑧+⑨)	334	162	2,694	4,642	6,726	9,004	6,208	3,770	-6,616	-13,496	-14,772	-16,617	-18,144	-18,117	-17,562	-16,189	-19,191	-21,360	

Table S 6.2.6 Financial Simulation “without LTDP”

Real Tariff Level	170%	175%	181%	186%	192%	197%	203%	209%	216%	222%	229%	236%	243%	250%	258%	265%	273%	281%	
Overall Cash Flow Projection																			
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Operating activity																			
Net Income	1,269	-25	845	-5,538	-4,614	5,640	9,682	10,635	10,813	12,068	12,320	15,731	18,142	19,554	22,049	23,547	25,090	26,680	
+ Depreciation	175	175	117	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
- Increase in receivables	-275	-283	-291	-300	-309	-319	-328	-338	-348	-358	-369	-380	-392	-403	-416	-428	-441	-454	
+ Increase in current liabilities	137	141	146	150	155	159	164	169	174	179	185	190	196	202	208	214	220	227	
Cash from operating activity	1,306	8	816	-5,630	-4,769	5,480	9,518	10,466	10,639	11,889	12,136	15,541	17,946	19,353	21,841	23,333	24,870	26,453	
Investment activity																			
Investment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cash used for investment activity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Financial activity																			
Loan borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Principal repayment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cash from (used for) financial activity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Increase (decrease) in cash during the year	1,306	8	816	-5,630	-4,769	5,480	9,518	10,466	10,639	11,889	12,136	15,541	17,946	19,353	21,841	23,333	24,870	26,453	
Cash at beginning of the year	7,296	8,602	8,611	9,427	3,797	-972	4,509	14,027	24,493	35,132	47,021	59,156	74,698	92,644	111,997	133,838	157,171	182,041	
Cash at end of the year	8,602	8,611	9,427	3,797	-972	4,509	14,027	24,493	35,132	47,021	59,156	74,698	92,644	111,997	133,838	157,171	182,041	208,493	
Cash Flow Projection for Water Supply																			
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Cash from operating activity	1,306	8	816	-5,630	-4,769	5,480	9,518	10,466	10,639	11,889	12,136	15,541	17,946	19,353	21,841	23,333	24,870	26,453	
+Interest expense	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+Capital Repair for Water supply	10,324	12,404	12,404	19,684	19,684	10,324	7,204	7,204	8,244	8,244	9,284	7,204	6,164	6,164	5,124	5,124	5,124	5,124	
①Cash from operating activity before interest, M/P, repair	11,630	12,412	13,220	14,054	14,915	15,804	16,722	17,670	18,883	20,133	21,420	22,745	24,110	25,517	26,965	28,457	29,994	31,577	
②Cash from Water supply operation (①X75%)	8,723	9,309	9,915	10,541	11,186	11,853	12,542	13,253	14,162	15,099	16,065	17,059	18,083	19,138	20,224	21,343	22,495	23,682	
③Repayment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
④Interest payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑤Cash used for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑥Cash used for repair	10,324	12,404	12,404	19,684	19,684	10,324	7,204	7,204	8,244	8,244	9,284	7,204	6,164	6,164	5,124	5,124	5,124	5,124	
⑦Loan Borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑧Balance(⑩)(last year) +②-③-④-⑤-⑥+⑦)	-22,962	-26,056	-28,545	-37,688	-46,186	-44,657	-39,319	-33,270	-27,352	-20,497	-13,716	-3,861	8,058	21,031	36,131	52,350	69,721	88,280	
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
⑩Ending Balance(⑧+⑨)	-22,962	-26,056	-28,545	-37,688	-46,186	-44,657	-39,319	-33,270	-27,352	-20,497	-13,716	-3,861	8,058	21,031	36,131	52,350	69,721	88,280	

Table S 6.2.7 Details of Revenue and Expenses for Table S 6.2.6

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Unit: Thousand US\$																		
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	6,024	6,205	6,391	6,582	6,780	6,983
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,358	3,458	3,562	3,669	3,779	3,892
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	9,087	9,359	9,640	9,929	10,227	10,534
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,831	11,156	11,491	11,836	12,191	12,557	12,933
Others	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191
Total	24,822	24,898	24,732	24,534	24,449	24,787	25,420	26,069	26,734	27,416	28,115	28,953	29,815	30,704	31,620	32,562	33,534	34,534
Expense																		
Materials (imported)	422	407	390	373	356	326	842	859	876	892	908	926	945	964	983	1,003	1,023	1,043
Materials (made in Uzbek)	214	206	198	189	180	165	426	435	443	452	459	469	478	488	497	507	517	528
Elect.power	9,795	9,469	8,136	7,782	7,411	6,797	6,809	6,949	7,085	7,217	7,346	7,492	7,642	7,795	7,951	8,110	8,272	8,438
Salary (all employees)	4,170	4,214	4,063	4,150	4,237	4,237	4,237	4,237	4,237	4,237	4,237	4,237	4,474	4,474	4,474	4,474	4,474	4,474
Capital repairs	568	592	617	642	692	717	5,642	5,642	13,962	10,842	5,642	6,682	6,682	5,642	5,642	5,642	10,842	10,842
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	919	1,379	1,379	1,379	1,341	1,278	1,103	871	663	567	567	567	567	441	311	180	175
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	58	175	292	345	331	306	277	248	219	190	160	131	102	73	44	19	5	0
Loss on write off	1,655	1,660	1,649	1,636	1,630	1,652	1,695	1,738	1,782	1,828	1,874	1,930	1,988	2,047	2,108	2,171	2,236	2,302
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	25,638	25,855	24,855	24,545	23,759	23,249	28,790	28,671	36,811	33,534	28,283	29,400	29,651	28,274	28,365	28,462	33,774	34,027

Table S 6.2.7 Details of Revenue and Expenses for Table S 6.2.6

Rea Tariff Level	170%	175%	181%	186%	192%	197%	203%	209%	216%	222%	229%	236%	243%	250%	258%	265%	273%	281%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
	Unit: Thousand US\$																	
Revenue																		
Apartment	7,193	7,409	7,631	7,860	8,096	8,339	8,589	8,846	9,112	9,385	9,667	9,957	10,255	10,563	10,880	11,206	11,542	11,889
Detached House	4,009	4,129	4,253	4,381	4,512	4,648	4,787	4,931	5,079	5,231	5,388	5,550	5,716	5,888	6,064	6,246	6,434	6,627
Enterprise	10,850	11,175	11,511	11,856	12,212	12,578	12,955	13,344	13,744	14,157	14,581	15,019	15,469	15,933	16,411	16,904	17,411	17,933
Communal Service Group	13,321	13,721	14,133	14,557	14,993	15,443	15,906	16,384	16,875	17,381	17,903	18,440	18,993	19,563	20,150	20,754	21,377	22,018
Others	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191	191
Total	35,564	36,625	37,718	38,844	40,004	41,198	42,428	43,696	45,001	46,345	47,730	49,156	50,625	52,138	53,696	55,301	56,955	58,658
Expense																		
Materials (imported)	1,064	1,085	1,107	1,129	1,152	1,175	1,198	1,222	1,222	1,222	1,222	1,222	1,222	1,222	1,222	1,222	1,222	1,222
Materials (made in Uzbek)	538	549	560	571	583	594	606	618	618	618	618	618	618	618	618	618	618	618
Elect.power	8,606	8,779	8,954	9,133	9,316	9,502	9,692	9,886	9,886	9,886	9,886	9,886	9,886	9,886	9,886	9,886	9,886	9,886
Salary (all employees)	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474	4,474
Capital repairs	10,842	12,922	12,922	20,202	20,202	10,842	7,722	7,722	8,762	8,762	9,802	7,722	6,682	6,682	5,642	5,642	5,642	5,642
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	175	175	117	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Expense for M/P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Loss on write off	2,371	2,442	2,515	2,590	2,667	2,747	2,829	2,913	3,000	3,090	3,182	3,277	3,375	3,476	3,580	3,687	3,797	3,911
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	34,295	36,650	36,873	44,382	44,618	35,559	32,746	33,060	34,187	34,277	35,409	33,424	32,482	32,583	31,647	31,754	31,864	31,978

Chapter 8 Preliminary Design for Priority Project

S 8.2.5 Survey and Investigation for improvement of Booster PSs

(1) PSs and their Supply Areas

A survey for PSs including distribution PSs in WTPs is conducted in Hamza, Mirabat, Sergeli and Bectemir Districts. The number of Booster PSs and Distribution PS in WTPs in the four Districts is 35 as shown in Table S 8.2.5.3(1) to (4).

The number of buildings (consumers) at each supply area of PSs is counted and the flat number for each story of apartment buildings was decided according to the survey result in each District as shown as Table S 8.2.5.1.

Table S 8.2.5.2 shows the consumer number for each category of building.

Table S 8.2.5.2 Flat Number for Apartment Buildings

Story of apartment	Flat number for apartment buildings			
	Hamza	Mirabat	Sergeli	Bectemir
2	6	6	6	6
3	12	12	12	12
4	70	50	40	55
5	90	60	50	65
7	60	40	40	40
8	70	35	35	35
9	120	100	65	90
12	60	48	48	48
14	112	112	112	112
16	128	128	128	128

Table S 8.2.5.2 Consumer Number for each Category of Building

Building	Consumer number
School	1,400
Preschool	150
Hospital	150
Police Office	300
Dormitory	500

Based on Table S8.2.5.1 and 2, population of supply area for PSs are calculated as shown in Table S8.2.5.3 (1) to (4). The average residents for each flat are decided to be at 3.29 persons/flats as mentioned in Chapter 8.2.1 (3).

In Hamza and Mirabat District, water for some apartments buildings is supplied by gravity, and water for other apartments is supplied by booster PSs.

Table S 8.2.5.3 (1) Survey Results of PS Supply Area in Hamza District

No.	Capacity of PS	Consumers	Number	Flat Number	Resident Number	Population
116	90	4 stories	10	700	2,303	3,934
		5 stories	5	450	1,481	
		Ground	1		0	
		Hospital	1		150	
117	1000	12 stories	3	180	592	34,399
120	300	9 stories	28	3360	11,054	
		5 stories	62	5580	18,358	
		4 stories	13	910	2,994	
		Ground	7		0	
		School	1		1,400	
118	1000	4 stories	32	2240	7,370	38,413
		5 stories	48	4320	14,213	
		8 stories	1	70	230	
		9 stories	34	4080	13,423	
		12 stories	9	540	1,777	
		Factory of bakery	1		0	
		School	1		1,400	
		Ground	1	0	0	
119	1000	4 stories	6	420	1,382	13,047
		9 stories	25	3000	9,870	
		2 stories	2	120	395	
		School	1		1,400	
		Grounds	2		0	
121	1000	4 stories	3	210	691	4,244
		9 stories	6	720	2,369	
		12 stories	6	360	1,184	
		Ground	1		0	
123	200	5 stories	6	540	1,777	1,777
126	600	9 stories	5	600	1,974	15,598
		5 stories	21	1890	6,218	
		4 stories	20	1400	4,606	
		Schools	2		2,800	
		Grounds	4	0	0	
124	45	4 stories	5	350	1,152	1,152
125	20	4 stories	2	140	461	461
127	600	4 stories	21	1470	4,836	6,623
		3 stories	1	12	39	
		2 stories	10	60	197	
		Grounds	3	0	0	
		School	1		1,400	
		Hospital	1		150	
128	45	5 stories	3	270	888	888
129	20	4 stories	2	140	461	632
		2 stories	8	48	158	
		1 story	1	4	13	
		Ground	1	0	0	
130-1	20	5 stories	3	270	888	888
Total			430	34,454	122,054	122,054
Flat Number by TKEO data				42,508		

Table S 8.2.5.3 (2) Survey Results of PS Supply Area in Mirabat District

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Current Population
10	1000	12 stories	4	192	632	26,038
		9 stories	48	4800	15,792	
		7 stories	3	120	395	
		5 stories	3	180	592	
		4 stories	33	1650	5,429	
		2 stories	5	30	99	
		Preschools	2		300	
		Schools	2		2,800	
11	600	12 stories	1	48	158	11,142
		9 stories	14	1400	4,606	
		7 stories	2	80	263	
		4 stories	26	1300	4,277	
		3 stories	3	36	118	
		2 stories	1	6	20	
		School	1		1,400	
		Preschools	2		300	
12	1000	9 stories	14	1400	4,606	8,794
		5 stories	1	60	197	
		4 stories	8	400	1,316	
		4 stories	5	250	825	
		Preschools	3		450	
		School	1		1,400	
		Factries	3			
17	600	5 stories	11	660	2,171	21,479
		4 stories	4	200	658	
		3 stories	1	12	16,800	
		School	1		1,400	
		Hospitals	2		300	
		Preschool	1		150	
13	1000	9 stories	2	200	658	3,540
		5 stories	1	60	197	
		4 stories	13	650	2,139	
		3 stories	4	48	158	
		2 stories	3	18	59	
		Detached house	100		329	
14	150	9 stories	6	600	1,974	2,961
		4 stories	6	300	987	
15	150	9 stories	14	1400	4,606	7,787
		7 stories	3	120	395	
		5 stories	11	660	2,171	
		4 stories	1	50	165	
		Hospital	1		150	
		Police office	1		300	
16	90	5 stories	1	60	197	855
		4 stories	4	200	658	
18	45	5 stories	1	60	197	197
19	800	4 stories	47	2350	7,732	9,582
		School	1		1,400	
		Preschools	3		450	
20	20	9 stories	1	100	329	329
21	20	5 stories	2	120	395	1,546
		4 stories	7	350	1,152	
22	60	4 stories	18	900	2,961	4,661
		School	1		1,400	
		Preschools	2		300	
		Market	1		0	
Total			460	21,070	98,912	98,912
Flat number by TKEO data				26,410		

Table S 8.2.5.3 (3) Survey Results of PS Supply Area in Sergeli District

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Current Population
130	1000	9 stories	63	4095	13,473	13,473
131	3000	5 stories	91	4550	14,970	23,952
		4 stories	20	800	2,632	
		Schools	4		5,600	
		Preschools	5		750	
132	1000	9 stories	19	1235	4,063	8,808
		5 stories	10	500	1,645	
		4 stories	0	0	0	
		Schools	2		2,800	
		Preschools	2		300	
133	1000	9 stories	289	18785	61,803	70,342
		14 stories	1	112	368	
		16 stories	1	128	421	
		Preschools	4		600	
		Schools	5		7,000	
		Hospital	1		150	
134	1000	9stories	26	2340	7,699	9,399
		School	1		1,400	
		Preschool	1		150	
		Detached house	30		150	
Sergeli WTP	4000	5 stories	56	2800	9,212	35,686
		2 stories	832	4992	16,424	
		Schools	6		8,400	
		Preschools	11		1,650	
Total		total	1480	40,337	161,659	161,659
Flat number by TKEO data				40,211		

Table S 8.2.5.3 (4) Survey Results of PS Supply Area in Bectemir District

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Current Population
----		9 stories	15	1,350	4,442	4,442
Bectemir WTP	960	4 stories	65	3,575	11,762	21,151
		2 stories	78	468	1,540	
		Detached house	1090	---	5,450	
		Schools	1		1,400	
		Dormitory	2		1,000	
		Market	2			
		140	100	4 stories	8	
		2 stories	20	120	348	
Total		Total	3,734	5,953	27,217	27,217
Flat number by TKEO data				5,945		

In Sergeli and Bectemir Districts, water for almost all apartment buildings and some detached houses are distributed by the PSs including distribution PS in WTP.

As shown in S 8.2.5.3(1) –(4), calculated flat number of Sergeli and Bectemir District is almost match with the data of TKEO, and that of Hamza and Mirabat District is smaller

than the data. Therefore the estimated total number of flat in each District is considered reasonable.

(2) Investigation for refurbishing of PSs

Basically, most of the distribution areas in the City are expected to keep over 26m of water head in target year. If the pressure can be kept, water for low story buildings will be distributed by gravity. However majority of large scale PSs distribute low story buildings as well as 9-story buildings.

Those PSs cannot be simply abandoned or decreased the population to be supplied. The location of distribution pipeline and apartment buildings for each PS, especially 9-story buildings, are investigated. Abandonment of PSs and refurbishing plan are decided as follows:

- The PS can be abandoned when all apartments of supply area is lower than 5-story;
- Pump units for 9-story buildings is installed each one or several buildings when the number of 9-story buildings is few in the supply area. In this case the PS can be abandoned;
- Basically, the area, where low story buildings are concentrated, should be separated from the supply area by pumps and gravity distribution pipe should be connected to the area;
- In below case, the PS will be remained without decrease of building number to be supplied:
 - The number of 9-story buildings is major in supply area and the area of low story buildings cannot separated from main area
 - The number of 9-story buildings is many and dividing into supply area between low story and 9-story building is difficult;
- Current required daily supply water amount and pump capacity is calculated as below:

Required daily supply water

$$Q1 = N1 \times 500 \text{ lpcd}/1000/0.75 \text{ (25\% of leakage)} + N2 \times 200 \text{ lpcd}/1000 + N3 \times 500 \text{ lpcd}/1000 + \text{Others}$$

N1: Number of apartment resident,

N2: Number of consumers in School,

N3: Bed number in hospital

Required pumps capacity

Capacity = $Q1 \times 1/24 \text{ m}^3/\text{hr}$; and

- Future required daily supply water amount and pumps capacity is calculated as below:

Required daily supply water

$Q2 = N1 \times 150 \text{ lpd}/1000 + N2 \times 60 \text{ lpd}/1000 + N3 \times 200 \text{ lpd}/1000 +$

Others

N1: Number of apartment resident,

N2: Number of consumers in School,

N3: Bed number in hospital

Required pumps capacity

Capacity = $Q2 \times 2/24 \text{ m}^3/\text{hr}$ (In this case, flow fluctuation will be large, therefore pump capacity = average demand x 2).

Current and future required capacity for PSs are calculated in Table S 8.2.5.4 (1) to (4).

In the table, water distribution for yellow column of consumers can be changed from “by pumps” to “by gravity”, when the water pressure at the PS’s supply area will be raised over 26m of water head.

Table S 8.2.5.4 (1) Current and Future required Capacities for PSs (Hamza)

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Population		Daily Demand (m ³ /d)		Required Cap. (m ³ /h)	
						Future	Current	Future	Current	Future	Current
116	90	4 stories	10	700	2,303	0	3,934	0	1,531	0	64
		5 stories	5	450	1,481						
		Ground	1		0						
		Hospital	1		150						
117	1000	12 stories	3	180	592						
120	300	9 stories	28	3360	11,054	11,054	34,399	2,211	22,279	184	928
		5 stories	62	5580	18,358						
		4 stories	13	910	2,994						
		Ground	7		0						
		School	1		1,400						
118	1000	4 stories	18	1260	4,145	26,601	38,413	5,240	25,025	437	1,043
		4 stories	14	980	3,224						
		5 stories	25	2250	7,403						
		5 stories	23	2070	6,810						
		8 stories	1	70	230						
		9 stories	34	4080	13,423						
		12 stories	9	540	1,777						
		Factory	1		0						
		School	1		1,400						
Ground	1	0	0								
119	1000	4 stories	6	420	1,382	13,047	13,047	2,479	8,084	207	337
		9 stories	25	3000	9,870						
		2 stories	2	120	395						
		School	1		1,400						
		Grounds	2		0						
121	1000	4 stories	3	210	691	4,244	4,244	859	2,849	72	119
		9 stories	6	720	2,369						
		12 stories	6	360	1,184						
		Ground	1		0						
123	200	5 stories	6	540	1,777	0	1,777	0	1,184	0	49
126	600	9 stories	5	600	1,974	1,974	15,598	395	9,112	33	380
		5 stories	21	1890	6,218						
		4 stories	20	1400	4,606						
		Schools	2		2,800						
		Grounds	4	0	0						
124	45	4 stories	5	350	1,152	0	1,152	0	768	0	32
125	20	4 stories	2	140	461	0	461	0	307	0	13
127	600	4 stories	21	1470	4,836	0	6,623	0	3,737	0	156
		3 stories	1	12	39						
		2 stories	10	60	197						
		Grounds	3	0	0						
		School	1		1,400						
		Hospital	1		150						
128	45	5 stories	3	270	888	0	888		592	0	25
129	20	4 stories	2	140	461	0	632	0	441	0	18
		2 stories	8	48	158						
		1 story	1	4	13						
		Ground	1	0	0						
130-1	20	5 stories	3	270	888	0	888	0	592	0	25

Separated from supply area

Table S 8.2.5.4 (2) Current and Future required Capacities for PSs (Mirabat)

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Population		Daily Demand (m ³ /d)		Required Cap.(m ³ /h)	
						Future	Current	Future	Current	Future	Current
10	1000	12 stories	4	192	632	26,038	26,038	4,898	15,912	408	663
		9 stories	48	4800	15,792						
		7 stories	3	120	395						
		5 stories	3	180	592						
		4 stories	33	1650	5,429						
		2 stories	5	30	99						
		Preschools	2		300						
		Schools	2		2,800						
11	600	12 stories	1	48	158	4,606	11,142	921	6,635	77	276
		9 stories	14	1400	4,606						
		7 stories	2	80	263						
		4 stories	26	1300	4,277						
		3 stories	3	36	118						
		2 stories	1	6	20						
		School	1		1,400						
		Preschools	2		300						
12	1000	9 stories	14	1400	4,606	5,431	8,794	1,086	5,000	91	208
		5 stories	1	60	197						
		4 stories	8	400	1,316						
		4 stories	5	250	825						
		Preschools	3		450						
		School	1		1,400						
17	600	5 stories	11	660	2,171	0	21,479	0	13,546	0	564
		4 stories	4	200	658						
		3 stories	1	12	16,800						
		School	1		1,400						
		Hospitals	2		300						
		Preschool	1		150						
13	1000	9 stories	2	200	658	658	3,540	132	2,360	11	98
		5 stories	1	60	197						
		4 stories	13	650	2,139						
		3 stories	4	48	158						
		2 stories	3	18	59						
		Detached house	100		329						
14	150	9 stories	6	600	1,974	2,961	2,961	592	1,974	49	82
		4 stories	6	300	987						
15	150	9 stories	14	1400	4,606	7,787	7,787	1,512	5,191	126	216
		7 stories	3	120	395						
		5 stories	11	660	2,171						
		4 stories	1	50	165						
		Hospital	1		150						
		Police office	1		300						
16	90	5 stories	1	60	197	0	855	0	570	0	24
		4 stories	4	200	658						
18	45	5 stories	1	60	197	0	197	0	132	0	5
		4 stories	47	2350	7,732						
19	800	School	1		1,400	0	9,582	0	5,524	0	230
		Preschools	3		450						
20	20	9 stories	1	100	329	329	329	66	219	5	9
21	20	5 stories	2	120	395	0	1,546	0	1,031	0	43
		4 stories	7	350	1,152						
22	60	4 stories	18	900	2,961	0	4,661	0	2,314	0	96
		School	1		1,400						
		Preschools	2		300						
		Market	1		0						

Separated from supply area

Table S 8.2.5.4 (3) Current and Future required Capacities for PSs (Sergeli)

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Population		Daily Demand (m3/d)		Necessary Cap. (m3/h)		
						Future	Current	Future	Current	Future	Current	
130	1000	9 stories	63	4095	13,473	13,473	13,473	13,473	2,695	8,982	225	374
131	3000	5 stories	91	4550	14,970	0	23,952	0	13,004	0	542	
		4 stories	20	800	2,632							
		Schools	4		5,600							
		Preschools	5		750							
132	1000	9 stories	19	1235	4,063	8,808	8,808	1,452	4,425	121	184	
		5 stories	10	500	1,645							
		4 stories	0	0	0							
		Schools	2		2,800							
		Preschools	2		300							
133	1000	9 stories	289	18785	61,803	70,342	70,342	13,293	43,323	1,108	1,805	
		14 stories	1	112	368							
		16 stories	1	128	421							
		Preschools	4		600							
		Schools	5		7,000							
		Hospital	1		150							
134	1000	9stories	26	2340	7,699	9,249	9,399	1,695	5,542	141	231	
		School	1		1,400							
		Preschool	1		150							
		Detached house	30		150							
Sergeli WTP	4000	5 stories	56	2800	9,212	0	35,686	0	19,100	0	796	
		2 stories	832	4992	16,424							
		Schools	6		8,400							
		Preschools	11		1,650							

Separated from supply area

Table S 8.2.5.4 (3) Current and Future required Capacities for PSs (Bectemir)

No.	Capacity of PS	Consumers	Building Number	Flat Number	Resident Number	Population		Daily Demand (m3/d)		Necessary Cap. (m3/h)		
						Future	Current	Future	Current	Future	Current	
---		9 stories	15	1350	4,442	4,442	4,442	4,442	888	2,961	74	123
Bectemir PS	960	4 stories	65	3575	11,762	0	21,151	0	11,728	0	489	
		2 stories	78	468	1,540							
		House	1090	---	5,450							
		Schools	1		1,400							
		Dormitory	2		1,000							
		Market	2									
140	100	4 stories	8	440	1,276	0	1,624	0	1,083	0	45	
		2 stories	20	120	348							

Separated from supply area

(3) Refurbishing of PSs with over 26m of Water Pressure

PSs whether it will be abandoned or remained are decided in the four Districts, and the required capacity for remained PSs are designed based on Table 8.2.5.4(1) –(4).

Currently, excessive staff is assigned for booster PSs, because operation of pumps is operated manually. Therefore auto-control for pumps should be introduced. Since refurbished PSs will be operated automatically by step control of pump number according to the flow rate of PSs, the number of duty pumps should be many to properly control. The number of PSs with capacity of 600-1000m³/hr is many, at 57, and the capacity of their main pumps is 320m³/hr. Since it is too large compared with actual required capacity, just one pump is operating in many PSs despite fluctuation of the water demand. Those kinds of operation are harmful for pumps and bring electricity wastage. Basically, each capacity of pump in PSs in the City is excessive compared with the actual requirement of water in the City.

Based on survey, if the capacity of pumps in a PS is suitable even for future requirement and the rank of judgment by the diagnosis, carried out in the Study, is “A” or “B”, pumps will not be replaced and just monitoring system will be introduced. When the required future capacity is over 500m³/hr, the pumps (with capacity of 320m³/hr) for the PS will not need to be replaced in above cases.

In other case, pumps for refurbishing PSs should be replaced by smaller capacity of them. The number of duty pumps for those refurbishing PSs will be basically installed over three, however minimum two duty pumps will be allowed for small scale PSs.

Table S 8.2.5.5 lists population, required capacity, specifications for refurbishing PS/or abandonment, abandoned PSs and estimated power consumption. In the table, the required future capacity of No.133 PS is 1,108 m³/hr and it meets with above condition. However because the diagnosis result of the PS is “C2”, its pumps need to be replaced.

Table S 8.2.5.5 List of Refurbishing or Abandonment for PSs (Water Pressure > 26m)

District	No.	Capacity of PS	Population		Daily Deamnd(m3/d)		Required Cap(m3/h)		New Pump Specifications				Current Power		Futue Power		
			Future	Current	Future	Current	Future	Current	Q(m3/h)	h(m)	kw	Number	Design	Actual	Design	Actual	
Hamza	116	90	0	3,934	0	2,597	0	108	Abandonment				30.0	21.0	0.0	0.0	
	117	1000	11,054	34,399	2,211	22,279	184	928	a			5	280.0	160.0	31.1	18.6	
		b									3						
		c									3						
		d									1						
		e									3						
	120	300							150	50	30.0	4(1)					
	118	1000	26,601	38,413	5,240	25,025	437	1,043	c			2	280.0	180.0	94.4	47.2	
	119	1000	13,047	13,047	2,479	8,084	207	337	70	50	15.0	4(1)	225.0	45.0	45.0	22.5	
	121	1000	4,244	4,244	859	2,849	72	119	30	50	7.5	4(1)	225.0	45.0	15.0	7.5	
	123	200	0	1,777	0	1,184	0	49	a			2	36.0	10.8	1.5	0.9	
	126	600	1,974	15,598	395	9,112	33	380	e			1	110.0	46.2	6.0	3.0	
	124	45	0	1,152	0	768	0	32	Abandonment				5.0	3.0	0.0	0.0	
	125	20	0	461	0	307	0	13	Abandonment				5.5	3.3	0.0	0.0	
	127	600	0	6,623	0	3,737	0	156	Abandonment				110.0	33.0	0.0	0.0	
128	45	0	888	0	592	0	25	Abandonment				15.0	9.0	0.0	0.0		
129	20	0	632	0	441	0	18	Abandonment				11.0	3.3	0.0	0.0		
130-1	20	0	888	0	592	0	25	Abandonment				55.0	33.0	0.0	0.0		
Total	5940	5940	56,921	122,054	11,184	77,569	932	3,231					1387.5	592.6	193.0	99.7	
Mirabat	10	1000	26,038	26,038	4,898	15,912	408	663	140	50	30.0	4(1)	225.0	112.5	90.0	45.0	
	11	600	4,606	11,142	921	6,635	77	276	a			4	150.0	52.5	7.5	3.7	
									b			2					
									c			1					
	12	1000	5,431	8,794	1,086	5,000	91	208		45	50	11.0	3(1)	165.0	38.5	25.8	12.9
									a			5					
	17	600	0	21,479	0	13,546	0	564	Abandonment				110.0	77.0	0.0	0.0	
	13	1000	658	3,540	132	2,360	11	98	d			1	185.0	33.0	3.0	1.8	
	14	150	2,961	2,961	592	1,974	49	82	25	50	5.5	3(1)	11.0	7.7	11.0	5.5	
	15	150	7,787	7,787	1,512	5,191	126	216	45	50	11.0	4(1)	30.0	36.0	33.0	16.5	
	16	90	0	855	0	570	0	24	Abandonment				18.5	4.5	0.0	0.0	
	18	45	0	197	0	132	0	5	Abandonment				11.0	6.6	0.0	0.0	
	19	800	0	9,582	0	5,524	0	230	Abandonment				200.0	120.0	0.0	0.0	
20	20	329	329	66	219	5	9	No Change			1	16.0	9.6	1.5	0.9		
21	20	0	1,546	0	1,031	0	43	Abandonment				16.0	9.6	0.0	0.0		
22	60	0	4,661	0	2,314	0	96	Abandonment				5.5	3.3	0.0	0.0		
Total	5,535	5,535	47,810	98,912	9,207	60,408	767	2,517					1143.0	510.8	171.7	86.3	
Sergeli	130	1,000	13,473	13,473	2,695	8,982	225	374	80	50	22.0	4(1)	165.0	66.0	66.0	33.0	
	131	3,000	0	23,952	0	13,004	0	542	Abandonment				830.0	105.0	0.0	0.0	
	132	1,000	8,808	8,808	1,452	4,425	121	184	60	50	15.0	3(1)	165.0	33.0	30.0	15.0	
	133	1,000	70,342	70,342	13,293	43,323	1,108	1,805	260	50	55.0	6(1)	225.0	313.6	220.0	110.0	
	134	1,000	9,249	9,399	1,695	5,542	141	231	50	50	11.0	4(1)	165.0	33.0	33.0	16.5	
	Sergeli	4,000	0	35,686	0	19,100	0	796	Abandonment				825.0	162.5	0.0	0.0	
Total	11,000	11,000	101,872	161,659	19,134	94,377	1,595	3,932					2,375	713	349	175	
Bectemir	---	160	4,442	4,442	888	2,961	74	123	Existing		3.7	8	30.0	21.0	30.0	21.0	
	Bectemir	960	0	21,151	0	11,728	0	489	Abandonment				170.0	68.0	0.0	0.0	
	140	100	0	1,624	0	1,083	0	45	Abandonment				22.0	18.0	0.0	0.0	
	Total	1,220	4,442	27,217	888	15,771	74	657					222	107	30	21	
Total		74,676	211,043	409,842	40,414	248,126	3,368	10,338					5,128	1,924	744	382	

In the table, “a” to “e” of specifications for pumps mean pump units to be installed for each one or several apartment buildings. For some abandoned PSs, these pump units are installed for 9-story buildings, and water for other low story buildings can be distributed by gravity. The specifications of each pump units shows Table S 8.2.5.6 and Figure S 8.2.5.1.

Table S 8.2.5.6 Lists of Pump Units

Mark	Capacity (m ³ /hr)	Head (m)	Power (kW)	Required Number
A	3.3	50	0.75	14
B	5.5	50	1.5	7
C	11	50	2.2	6
D	13.8	50	3.7	2
E	16.5	50	4.5	5
Total				34

Note: Required pump number is total of Table S 8.2.5.7

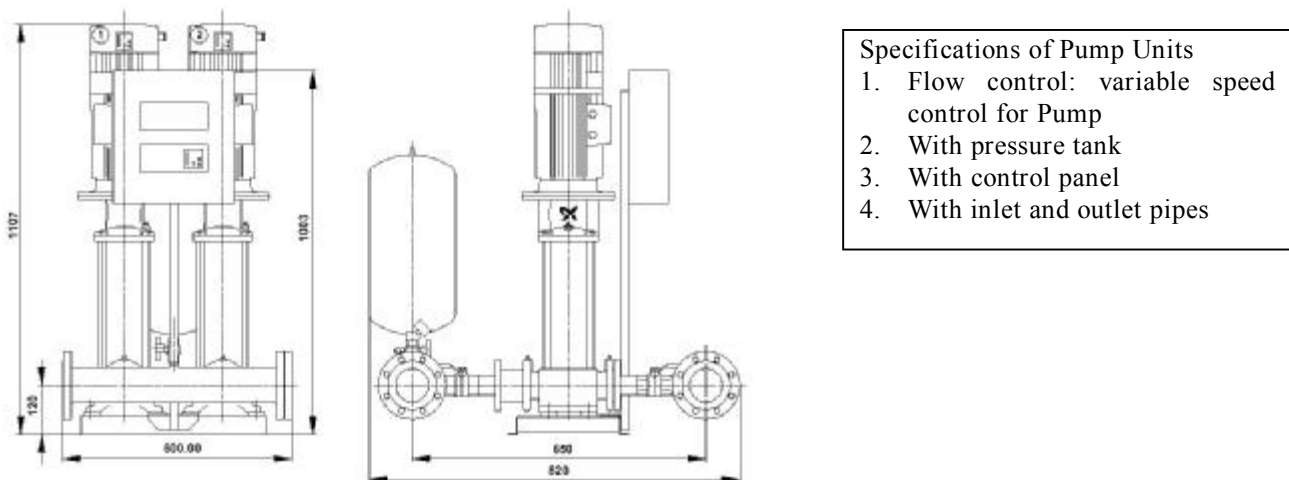


Figure S 8.2.5.1 Standard Drawings of Pump Unit

Table S 8.2.5.7 shows comparisons between current and future required capacity for PSs. Distribution PSs in WTPs are excluded from the comparison. All of the PSs with capacity of 1,000m³/hr distribute 9-story buildings as well as low story buildings, and only two PSs of them can be abandoned by installation of pump units for 9-story buildings. Table S 8.2.5.8 shows capacities of remained PSs, and majority of PSs with capacity of 1000m³/hr are remained.

Remained PSs with capacity of 1000m³/d can be decreased the capacity to be at 312 m³/hr averagely.

Four PSs out of five with capacity of 800-600m³/hr can be abandoned, and two PSs out of four with capacity of 150-200m³/d can be also abandoned.

Table S 8.2.5.7 Comparisons between required current and future Capacity

Capacity	No.	Required Capacity (m ³ /hr)		Capacity	No.	Required Capacity (m ³ /hr)	
		Current	Future			Current	Future
1000	117	928	0	800-600	19	230	0
	118	1,043	437		126	380	0
	119	337	207		127	156	0
	121	119	72		11	276	77
	10	663	408		17	564	0
	12	208	91		Total	1,606	77
	13	98	0		Average	321	15
	130	374	225	200-150	123	49	0
	132	184	121		14	82	49
	133	1,805	1,108		15	216	126
	134	231	141		140	45	0
	Total	5,990	2,810		Total	392	175
	Average	545	312		Average	98	88

Table S 8.2.5.8 Required Capacity of Remained PSs

Capacity (m ³ /h)	Number			Total remained capacity (m ³ /h)	Average remained capacity (m ³ /h)
	Total	Abandoned	Remained		
3000	1	1	0	0	
1000	10	2	9	2,810	312
600-800	5	5	0	0	
500-300	1	1	0	0	
200-100	5	2	3	249	83
100>	11	10	1	5	5
Total	34	21	13		
Ratio(%)	100	62	38		

Table S 8.2.5.9 shows summarized evaluation Results of PSs for each District, in which distribution PSs are not included. As shown in the table, remained number of booster PSs are 13, and it means 21 of PSs can be abandoned. The required current capacity is 48% of current design capacity and the required future capacity will be only 18% of that. It means that required future capacity will be reduced at 1/3 (0.18/0.48).

The total capacity and power consumption of refurbished PSs will be reduced drastically.

Table S 8.2.5.9 Summarized Evaluation Results of Booster PSs

District	Capacity (m ³ /hr)	Number		Population		Required Capacity (m ³ /hr)		Power consumption (kW)	
		Current	Future	Current	Future	Current	Future	Current	Future
Hamza	5,970	14	3	122,054	56,921	3,232	932	569	100
Mirabat	5,535	13	5	98,912	45,010	2,517	767	511	86
Sergeli	7,000	5	4	125,973	101,872	3,136	1,595	551	175
Bectemir	310	2	1	6,066	4,442	168	74	39	21
Total	18,815	34	13	353,005	208,245	9,053	3,368	1,670	382
Ratio	---	1.00	0.38	1.00	0.59	0.48	0.18	1.00	0.23

(4) Refurbishing of PSs with lower than 26m of Water Pressure

When water pressure is less than 26 m, PSs distributing to no more than 5-story buildings will not be able to be abandoned. In this case, if PSs are designed as proper capacities, pumps for most of the PSs will not need to be replaced in the condition of diagnosis result of “A” or “B”. However, since most of the pump capacities installed at PSs are excessive compared with required future capacities. Therefore, pumps for most PSs need to be replaced.

Table S 8.2.5.10 shows population, required capacity, specifications for refurbishing PS and estimated power consumption in this case. As shown in the table, pump units shown in Table S 8.2.5.6 are applied for refurbishing of small scale PSs.

Table S 8.2.5.11 shows comparisons between current and future required capacity for PSs. Average required capacity for each design capacity range is shown in Table S 8.2.5.12. As shown in the tables the difference between required current and future capacities is not so much.

As shown in Table S 8.2.12, PSs with capacity of 1000m³/hr are categorized two; first: existing pumps will be remained if the required future capacity will exceed 500m³/hr and the diagnosis result is “A” or “B” as aforementioned, and second: existing pumps will be replaced and the capacities will be changed if the required capacity will be lower than 500m³/hr or the diagnosis result is “C1” or “C2” .

Table S 8.2.5.11 List of Refurbishing for PSs (Water Pressure < 26m)

District	No.	Capacity of PS	Population		Daily Demand (m ³ /d)		Required Capacity (m ³ /h)		New Pump Specifications				Current Power (kW)		Future Power (kW)	
			Future	Current	Future	Current	Future	Current	Q(m ³ /h)	h(m)	kW	Number	Design	Actual	Design	Actual
Hamza	116	90	3,934	3,934	787	2,597	66	108	100	50	30	1	30.0	21.0	30.0	18.0
	117	1000	34,399	34,399	6,880	22,279	573	928	320	50	75	5(2)	280.0	160.0	160.0	80.0
	120	300														
	118	1000	38,413	38,413	7,683	25,025	640	1,043	320	50	75	5(2)	165.0	132.0	165.0	100.0
	119	1000	13,047	13,047	2,609	8,084	217	337	70	50	15	4(1)	225.0	45.0	45.0	22.5
	121	1000	4,244	4,244	849	2,849	72	119	40	50	8	3(1)	225.0	45.0	15.0	7.5
	123	200	1,777	1,777	355	1,184	30	49	e			2	36.0	10.8	9.0	4.5
	126	600	15,598	15,598	3,120	9,112	260	380	90	50	22	4(1)	110.0	46.2	66.0	27.0
	124	45	1,152	1,152	230	768	19	32	c			2	5.0	3.0	4.4	3.0
	125	20	461	461	92	307	8	13	c			1	5.5	3.3	2.2	1.5
	127	600	6,623	6,623	1,325	3,737	110	156	40	50	11	4(1)	110.0	33.0	33.0	16.0
	128	45	888	888	178	592	15	25	e			1	15.0	9.0	4.5	2.5
	129	20	632	632	126	441	11	18	c			1	11.0	3.3	2.2	1.5
	130-1	20	888	888	178	592	15	25	e			1	15.0	9.0	4.5	2.5
Total	5940	122,055	122,055	24,411	77,569	2,035	3,231					1,348	569	541	287	
Mirabat	10	1000	26,038	26,038	5,208	15,912	408	663	140	50	30	4(1)	225.0	112.5	90.0	45.0
	11	600	11,142	11,142	2,228	6,635	186	276	70	50	15	4(1)	150.0	52.5	45.0	23.0
	12	1000	8,794	8,794	1,759	5,000	147	208	50	50	11	4(1)	165.0	38.5	33.0	17.0
	17	600	21,479	21,479	4,296	13,546	358	564	120	50	30	4(1)	110.0	77.0	90.0	45.0
	13	1000	3,540	3,540	708	2,360	59	98	30	50	11	3(1)	185.0	33.0	22.0	11.0
	14	150	2,961	2,961	592	1,974	49	82	25	50	6	3(1)	11.0	7.7	11.0	5.5
	15	150	7,787	7,787	1,557	5,191	130	216	45	50	11	4(1)	30.0	36.0	33.0	16.5
	16	90	855	855	171	570	14	24	25	50	6	3(1)	18.5	4.5	11.0	5.5
	18	45	197	197	39	132	3	5	a			1	11.0	6.6	0.8	0.5
	19	800	9,582	9,582	1,916	5,524	160	230	60	50	15	4(1)	200.0	120.0	45.0	22.5
	20	20	329	329	66	219	5	9	b			1	16.0	9.6	1.5	0.9
	21	20	1,546	1,546	309	1,031	26	43	e			2	16.0	9.6	9.0	5.0
	22	60	4,661	4,661	932	2,314	78	96	50	50	11	3(1)	5.5	3.3	22.0	12.0
Total	5,535	98,912	98,912	19,782	60,408	1,649	2,517					1,143	511	413	209	
Sergeli	130	1,000	13,473	13,473	2,695	8,982	225	374	80	50	22	4(1)	165.0	66.0	66.0	33.0
	131	3,000	23,952	23,952	4,790	13,004	399	542	140	40	30	4(1)	830.0	105.0	90.0	45.0
	132	1,000	8,808	8,808	1,762	4,425	147	184	60	50	15	3(1)	165.0	33.0	30.0	15.0
	133	1,000	70,342	70,342	14,068	43,323	1,172	1,805	320	50	75	6(2)	375.0	313.6	300.0	130.0
	134	1,000	9,399	9,399	1,880	5,542	157	231	50	50	11	4(1)	165.0	33.0	33.0	16.5
	Total	11,000	125,973	125,973	25,195	75,277	2,100	3,137					4791	1732	714	361
Bectemir	---	160	4,442	4,442	888	2,961	74	123	10	50	6	8	30.0	21.0	30.0	21.0
	140	100	1,624	1,624	325	1,083	27	45	d			2	22.0	18.0	9.0	5.0
	Total	1,220	6,066	6,066	1,213	4,044	101	168					52	39	39	26
Total		139,810	353,005	353,005	70,041	217,298	5,884	9,053					7,258	2,789	1,707	882

█ Pumps are remained

Table S 8.2.5.11 Comparisons between current and future required Capacity

Capacity (m ³ /hr)	No.	Required Capacity (m ³ /hr)		Capacity (m ³ /hr)	No.	Required Capacity (m ³ /hr)	
		Current	Future			Current	Future
1000	117	928	552	800-600	19	230	160
	118	1,043	634		126	380	260
	119	337	207		127	156	110
	121	119	72		11	276	186
	10	663	408		17	564	358
	12	208	131		Total	1,606	1,074
	13	98	59		Average	321	215
	130	374	225	200-150	123	49	30
	132	184	121		14	82	49
	133	1,805	1,108		15	216	126
	134	231	141		140	45	27
	Total	5,990	3,658		Total	392	232
	Average	545	333		Average	98	58

Table S 8.2.5.12 Average Required Capacities

Capacity (m ³ /hr)		Number	Average Required Capacity (m ³ /h)	
			Current	Future
Total	To remain Pumps	2	986	593
	To replace Pumps	9	447	275
	Total	11	545	333
800-600		5	321	215
200-150		3	116	68

Table S 8.2.5.12 shows summarized evaluation results of PSs for each District, in which distribution PSs are not included. In this case, because proper pressure cannot be kept, booster will not able to be abandoned. Required future capacity is 65%(0.31/0.48) and power consumption is 44% compared with the current condition.

Table S 8.2.5.13 Summarized Evaluation Results of Booster PSs (Water pressure < 26m)

District	Capacity (m ³ /hr)	Number	Population		Required Capacity (m ³ /hr)		Power consumption (kW)	
			Current	Future	Current	Future	Current	Future
Hamza	5,970	14	122,054	122,054	3,232	2,035	569	280
Mirabat	5,535	13	98,912	98,912	2,517	1,602	511	209
Sergeli	7,000	5	125,973	125,973	3,137	2,100	551	220
Bectemir	310	2	6,066	6,066	168	101	39	26
Total	18,815	34	353,005	353,005	9,054	5,838	1,670	735
Ratio			1.00	1.00	0.48	0.31	1.00	0.44

(5) Refurbishing Plan in the Survey Area with Evaluation of Pressure Range

Pressure distribution map in the City in 2011 as target year of F/S and in 2015 as target year of M/P were made by the simulation of the hydraulic model of Water CAD. Based on the simulated map, booster PSs are judged whether the water pressure is over 26m and refurbishing plan for PSs in the four Districts are formulated in Table S 8.2.5.14. As shown in the table, the specifications of blue columns are applied for the case of the pressure less than 26m shown in shown Table S 8.2.5.10. The pressure of PSs marked yellow will be lower than 26m in 2011 and it will increase and will be over 26m. The refurbishing plan was decided based on judgment in 2015 as target year of MP.

In Hamza and Mirabat District, pressure of many PSs is lower than 26m even in 2015, therefore some PSs needs to be remained although they can be abandoned if the pressure is over 26m.

However the areas of the water pressure lower than 26m in 2011 and 2015 is more than other districts by the evaluation results for the pressure distribution map in 2011 and 2015. Accordingly, the ratio between PSs with pressure over 26m and less than 26m in the four Districts (Hamza, Mirabat, Sergeli and Bectemir) should not be applied for evaluation

(5) Judgment of Pressure range in whole City and Decision of refurbishing Plan

All booster PSs in the City are judged their pressure range by the pressure distribution map including location of PSs. The results are shown in Table S.8.2.5.15 (1) and (2) with diagnosis results.

The number of PSs with pressure over 26m or less than 26m for each capacity range can be decided by Table S.8.2.5.15 (1) and (2). Based on Section (3) and (4), contents of refurbishing for booster PSs with pressure over 26m and less than 26m are decided as shown in Table S 8.2.5.16, which only includes capacity of no more than 1000m³/d. Considering Table S 8.2.5.15 and S 8.2.5.16, refurbishing plans for booster PSs are shown in S 8.2.5.17.

Table S 8.2.5.14 Refurbishing Plan in the Survey Area with Evaluation of Pressure Range

District	No.	Pressure: 26m		Capacity of PS	Population		Daily Deamnd(m3/d)		Required Cap(m3/h)		New Pump Specifications				Current Power		Futue Power	
		2011	2015		Future	Current	Future	Current	Future	Current	Q(m3/h)	h(m)	kw	Number	Design	Actual	Design	Actual
Hamza	116	No	No	90	3,934	3,934	787	2,597	66	108	40	50	11	3(1)	30.0	21.0	30.0	18.0
	117	No	No	1000	33,807	34,399	6,621	22,279	552	928	320	50	75.0	5	280.0	160.0	280.0	80.0
	120	No	No	300														
	118	No	No	1000	38,413	38,413	7,603	25,025	634	1,043	320	38	55.0	5	165.0	180.0	165.0	100.0
	119	No	No	1000	13,047	13,047	2,479	8,084	207	337	70	50	15.0	4(1)	225.0	45.0	45.0	22.5
	121	O.K	O.K	1000	4,244	4,244	859	2,849	72	119	30	50	7.5	4(1)	225.0	45.0	15.0	7.5
	123	No	O.K	200	1,777	1,777	0	1,184	0	49	a			2	36.0	10.8	1.5	0.9
	126	No	O.K	600	1,974	15,598	395	9,112	33	380	e			1	110.0	46.2	6.0	3.0
	124	No	No	45	1,152	1,152	0	768	0	32	c			2	5.0	3.0	5.0	3.0
	125	O.K	O.K	20	0	461	230	307	19	13	Abandonment				5.5	3.3	0.0	0.0
	127	No	No	600	6,623	6,623	967	3,737	81	156	40	50	11	4(1)	110.0	33.0	110.0	33.0
	128	No	No	45	888	888	178	592	15	25	e			1	15.0	9.0	15.0	9.0
	129	O.K	O.K	20	0	632		441	0	18	Abandonment				11.0	3.3	0.0	0.0
	130-1	No	No	20	888	888	178	592	15	25	e			1	15.0	9.0	15.0	9.0
Total				5940	106,747	122,054	20,297	77,569	1,693	3,231					1,232.5	568.6	687.5	285.9
Mirabat	10	O.K	O.K	1000	26,038	26,038	4,898	15,912	408	663	140	50	30.0	4(1)	225.0	112.5	90.0	45.0
	11	O.K	O.K	600	4,606	11,142	921	6,635	77	276	a			4	150.0	52.5	7.5	3.7
											b			2				
											c			1				
	12	No	No	1000	5,431	8,794	1,086	5,000	131	208	45	50	11.0	4(1)	165.0	38.5	33.0	17.0
	17	No	O.K	600	0	21,479	0	13,546	0	564	Abandonment				110.0	77.0	0.0	0.0
	13	No	O.K	1000	658	3,540	132	2,360	11	98	d			1	185.0	33.0	3.0	1.8
	14	O.K	O.K	150	2,961	2,961	592	1,974	49	82	25	50	5.5	3(1)	11.0	7.7	11.0	5.5
	15	O.K	O.K	150	7,787	7,787	1,512	5,191	126	216	45	50	11.0	4(1)	30.0	36.0	33.0	16.5
	16	O.K	O.K	90	0	855	0	570	0	24	Abandonment				18.5	4.5	0.0	0.0
	18	No	O.K	45	0	197	0	132	0	5	Abandonment				11.0	6.6	0.0	0.0
	19	O.K	O.K	800	0	9,582	0	5,524	0	230	Abandonment				200.0	120.0	0.0	0.0
	20	O.K	O.K	20	329	329	66	219	5	9	Existing			1	16.0	9.6	1.5	0.9
	21	O.K	O.K	20	0	1,546	0	1,031	0	43	Abandonment				16.0	9.6	0.0	0.0
22	O.K	O.K	60	0	4,661	0	2,314	0	96	Abandonment				5.5	3.3	0.0	0.0	
Total				5,535	47,810	98,912	9,207	60,408	808	2,517					1,143.0	510.8	179.0	90.4
Sergeli	130	O.K	O.K	1,000	13,473	13,473	2,695	8,982	225	374	80	50	22.0	4(1)	165.0	66.0	66.0	33.0
	131	O.K	O.K	3,000	0	23,952	0	13,004	0	542	Abandonment				830.0	105.0	0.0	0.0
	132	O.K	O.K	1,000	8,808	8,808	1,452	4,425	121	184	60	50	15.0	3(1)	165.0	33.0	30.0	15.0
	133	O.K	O.K	1,000	70,342	70,342	13,293	43,323	1,108	1,805	260	50	55.0	6(1)	225.0	313.6	220.0	110.0
	134	O.K	O.K	1,000	9,249	9,399	1,695	5,542	141	231	50	50	11.0	4(1)	165.0	33.0	33.0	16.5
	Sergeli				4,000	0	35,686	0	19,100	0	796	Abandonment				825.0	162.5	0.0
Total				11,000	101,872	161,659	19,134	94,377	1,595	3,932					2,375.0	713.1	349.0	174.5
Bectemir	---	O.K	O.K	160	4,442	4,442	888	2,961	74	123	Existing			8	30.0	21.0	30.0	21.0
	Bectemir	O.K	O.K	960	0	21,151	0	11,728	0	489	Abandonment				170.0	68.0	0.0	0.0
	140	O.K	O.K	100	0	1,624	0	1,083	0	45	Abandonment				22.0	18.0	0.0	0.0
	Total				1,220	4,442	27,217	888	15,771	74	657					222.0	107.0	30.0
Total				124,502	260,869	409,842	49,526	248,126	4,169	10,338					4,973	1,900	1,245	572

Improved later
 Pumps are remained

Table S.8.2.15 (1) Judgment of Pressure and Diagnosis Results at PSs

Capacity range	PS No.	Capacity (m3/hr)	Diagnosis Result	Judgment of Pressure		Capacity range	PS No.	Capacity (m3/hr)	Diagnosis Result	Judgment of Pressure		
				2011	2015					2011	2015	
Over 3000m ³ /hr	75	30000	C1			1000m ³ /hr	118	1000	B			
	47	7200	A				119	1000	B			
	23	3000	B				121	1000	B			
	51	3000	B				130	1000	C3			
	77	3000	B				132	1000	C2			
	97	3000	C2				133	1000	C2			
	131	3000	B				134	1000	C2			
	Ratio (%)				28.6		0.0	Ratio (%)				41.9
1000m ³ /hr	1	1000	B			800-600m ³ /hr	19	800	B			
	5	1000	B				53	800	B			
	7	1000	B				72	800	----			
	10	1000	B				2	600	B			
	12	1000	B				3	600	C2			
	13	1000	B				11	600	B			
	24	1000	B				17	600	B			
	25	1000	B				26	600	B			
	30	1000	B				27	600	B			
	31	1000	B				71	600	B			
	36	1000	B				73	600	B			
	37	1000	B				99	600	C2			
	38	1000	B				126	600	B			
	39	1000	B				127	600	B			
	Ratio (%)						Ratio (%)				50.0	14.3
	1000m ³ /hr	43	1000	C!			500-300m ³ /hr	8	500	B		
		52	1000	B				56	500	B		
		59	1000	B				58	500	B		
		64	1000	B				4	400	B		
		65	1000	B				60	400	B		
		66	1000	B				85	400	C2		
		69	1000	B				109	320	B		
		70	1000	B				98	300	C2		
		78	1000	---				120	300	----		
		79	1000	C2				Ratio (%)				55.6
		80	1000	C2			200-100m ³ /hr	9	200	----		
		81	1000	C2				55	200	B		
		82	1000	C2				57	200	----		
83		1000	C2			123		200	----			
84	1000	C1			28	160		----				
95	1000	C2			90	160		----				
96	1000	C2			14	150		B				
103	1000	C2			15	150		B				
105	1000	C2			54	120		B				
108	1000	C2			101	100		----				
117	1000	B			Ratio (%)				40.0	0.0		

Note: Water pressure of red columns is less than 26m

Table S.8.2.15 (2) Judgment of Pressure and Diagnosis Results at PSs

Capacity range	PS No.	Capacity (m3/hr)	Diagnosis Result	Judgment of Pressure		Capacity range	PS No.	Capacity (m3/hr)	Diagnosis Result	Judgment of Pressure	
				2011	2015					2011	2015
Less than 100m ³ /hr	16	90	B			Less than 100m ³ /hr	21	20	----		
	29	90	----				32	20	----		
	68	90	B				34	20	----		
	76	90	----				35	20	----		
	86	90	----				45	20	----		
	94	90	----				46	20	----		
	102	90	----				48	20	----		
	110	90	----				49	20	----		
	116	90	----				50	20	----		
	88	80	----				61	20	----		
	22	60	A				63	20	B		
	62	60	B				87	20	----		
	74	60	C2				89	20	----		
	91	60	----				92	20	----		
	6	50	----				93	20	----		
	18	45	----				100	20	----		
	124	45	----				104	20	----		
	128	45	----				106	20	----		
	33	40	----				111	20	----		
	41	40	----				112	20	----		
42	40	----			113	20	----				
44	40	----			114	20	----				
67	40	B			115	20	----				
122	40	----			125	20	----				
107	30	----			129	20	----				
20	20	----			Ratio (%)				29.4	7.8	
Total ratio = 51/134 = 38% in 2011, =14/134 = 10% in 2015											

Note: Water pressure of red columns is less than 26m

Table S 8.2.5.16 Refurbishing Plan for two cases of Pressure Range

Capacity (m3/hr)	Category	Pressure (>26m)		Pressure (<26m)	
		Ratio (%)	Ave.Cap (m ³ /hr)	Ratio (%)	Ave.Cap (m ³ /hr)
1000	Abandonment	15	---	0	---
	Monitoring	10	600	20	593
	Refurbishing	75	312	80	275
800-600	Abandonment	60	---	0	---
	Refurbishing	40	215	100	215
500-300	Abandonment	50	---	0	---
	Refurbishing	50	150	100	150
200-100	Abandonment	50	---	0	---
	Refurbishing	50	90	100	70
<100	Abandonment	85	---	0	---
	Refurbishing	15	30	100	30

Table S 8.2.5.17 Refurbishing Plan for Booster PSs

Capacity (m ³ /hr)	PS Number	Category	Evaluated Number			Pressure (>26m)			Pressure (<26m)			Total
			P: >26m		P: <26m	Ratio (%)	Number		Ratio (%)	Number		
			2011	2015	2015-		2011	2015		2015-		
1000	44	Abandonment	26	10	8	15	4	1	0	0	5	
		Monitoring				10	3	1	20	2	6	
		Refurbishing				75	19	8	80	6	33	
800-600	14	Abandonment	7	5	2	60	4	3	0	0	7	
		Refurbishing				40	3	2	100	2	7	
500-300	9	Abandonment	4	4	1	50	2	2	0	0	4	
		Refurbishing				50	2	2	100	1	5	
200-100	10	Abandonment	6	4	0	50	3	2	0	0	5	
		Refurbishing				50	3	2	100	0	5	
<100	51	Abandonment	36	11	4	85	31	9	0	0	40	
		Refurbishing				15	5	2	100	4	11	
Total	128		79	34	15		79	34		15	128	

There are other seven booster PSs excluded from Table S 8.2.5.17 in the City; Mirzo-Unlgbek PS with capacity of 30,000m³/d, Chilanzar PS –7,200m³/hr and five PSs –3,000m³/d. Mirzo-Ulgbek PS will be refurbished as shown in Chapter 5.4.5. One of PSs with capacity of 3000m³/hr is located in Sergeli Districts, and since it is distributing low story apartment buildings, it was already decided to be abandoned as shown in Table S 8.2.5.14. Since Chilanzar PS and other four PSs with capacity of 3000m³/d distribute to many 9-story buildings as well as low story buildings, they will not be able to be abandoned and in addition their pumps are not so deteriorated. Therefore their pump facilities will not be refurbished, however monitoring system, including flow meter, pressure meter and transmission system for the measured results, will be installed.

In Table S 8.2.5.17, the monitoring as a category of PS with capacity of 1000m³/d means that above mentioned facilities will be installed without replacement of pumps. The current (2002-2005) number of PSs with capacity of 1000m³/hr is 43, however a PS will be constructed by the EBRD Project and it will be constructed in an area, where water pressure will be less than 26m in 2015.

Table S8.2.5.18 shows number of categorized PSs for each capacity range. As shown in the table, the number of remained PSs is 73, it is 54% of that of existing PSs. However the

capacities and electricity consumption will be reduced drastically as shown in Table S 8.2.5.19.

Table S 8.2.5.18 Number of Categorized PSs

Category	Large	3000	1000	800-600	500-300	200-100	<100	Total
Monitoring	2	4	6					12
Refurbished in F/S			25	5	3	3	9	45
Refurbished Later*1			8	2	2	2	2	16
Abandoned in F/S		1	4	4	2	3	31	45
Abandoned Later*1			1	3	2	2	9	17
Total	2	5	44	14	9	10	51	135

*1 To be conducted between 2012 and 2015

Table S 8.2.5.19 Decreasing of Capacity and Electricity Consumption

Category	Pressure	Ratio	Ratio of less than 26m	
			2011	2015
			38%	10%
Capacity	>26m	0.18	0.261	0.193
	<26m	0.31		
Electricity Consumption	>26m	0.23	0.360	0.251
	<26m	0.44		

Chapter 11 Project Evaluation

S11.1 Financial Aspects

Financial Evaluation of the F/S projects and financial projection are presented in chapter 11.1. In this supporting report, details of the Equivalent Discount Rate calculation and the financial projections under various borrowing interest rates are presented.

Table S 11.1.1 Details of EDR Calculation (Base Case)

EDR = 8.78%																					
(thousand USD)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Benefits																					
1) Benefits from Pipe Replacement*	264	375	471	535	843	1,117	1,389	1,657	1,921	2,054	2,189	2,326	2,467	2,610	2,756	2,905	3,057	3,212	3,370	3,532	
2) Avoided extra repair costs	0	0	0	0	5,425	5,475	14,645	8,945	3,245	3,236	3,227	2,077	2,067	2,057	3,185	3,174	3,161	6,569	6,555	6,541	
3) Staff reduction	0	0	0	212	425	425	425	425	425	425	425	646	646	646	646	646	646	646	646	646	
4) Energy Saving	0	293	591	717	1051	1055	1057	1057	1055	1053	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	
Total	264	667	1,062	1,464	7,744	8,072	17,516	12,084	6,646	6,768	6,895	6,105	6,235	6,367	7,642	7,780	7,919	11,482	11,626	11,773	
Costs																					
1) Pipe Replacement	9,261	9,261	6,174	6,174	6,174	9,261	9,261	9,261	0												
2) Other Components	0	0	4,665	14,129	16,134	0	0	0	0	0	0	0	0	0	456	0	0	0	0	3,420	
Total	9,261	9,261	10,839	20,303	22,308	9,261	9,261	9,261	0	0	0	0	0	0	456	0	0	0	0	3,420	
Free Cash	-8,997	-8,594	-9,777	-18,839	-14,564	-1,189	8,254	2,822	6,646	6,768	6,895	6,105	6,235	6,367	7,186	7,780	7,919	11,482	11,626	8,353	

* Staff reduction realized from pipe replacement is considered in 3) Staff reduction

Details of Benefits from Pipe Replacement																				
Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Without																				
Production (Thousand m ³ /Day)	2,536	2,426	2,310	2,119	2,123	2,166	2,209	2,250	2,290	2,336	2,382	2,430	2,479	2,528	2,579	2,630	2,683	2,737	2,791	2,847
Production (Mm ³ /Year)	926	885	843	773	775	791	806	821	836	852	870	887	905	923	941	960	979	999	1,019	1,039
With																				
Production (Thousand m ³ /Day)	2,438	2,286	2,134	1,919	1,831	1,780	1,728	1,677	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625
Production (Mm ³ /Year)	890	834	779	700	668	650	631	612	593	593	593	593	593	593	593	593	593	593	593	593
Production Volume Reduction(Mm ³ /Y)	36	51	64	73	106	141	175	209	243	259	276	294	312	330	348	367	386	406	426	446
Future Electricity Cost (USD/m ³)	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069
Benefits from Pipe Replacement (Electricity)	249	354	445	506	738	979	1217	1452	1683	1799	1918	2038	2161	2287	2415	2545	2679	2814	2953	3094
Future Chemical Cost (USD/m ³)	0.0004	0.0004	0.0004	0.0004	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Benefits from Pipe Replacement (Chemical)	14	20	26	29	104	138	172	205	238	254	271	288	305	323	341	360	379	398	417	437
Total Benefits from Pipe Replacement (thousand)	264	375	471	535	843	1,117	1,389	1,657	1,921	2,054	2,189	2,326	2,467	2,610	2,756	2,905	3,057	3,212	3,370	3,532

Table S 11.1.1 Details of EDR Calculation (Base Case)

EDR = 8.78%																					
(thousand USD)	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	
Years	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
Benefits																					
1) Benefits from Pipe Replacement*	3,696	3,864	4,035	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	4,210	
2) Avoided extra repair costs	6,526	3,090	3,074	1,916	3,420	3,420	4,560	2,280	1,140	1,140	0	0	0	0	0	0	0	0	0	0	
3) Staff reduction	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	646	
4) Energy Saving	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	1055	
Total	11,923	8,655	8,810	7,827	9,331	9,331	10,471	8,191	7,051	7,051	5,911	5,911	5,911	5,911	5,911	5,911	5,911	5,911	5,911	5,911	
Costs																					
1) Pipe Replacement																					
2) Other Components	3,420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	3,420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Free Cash	8,503	8,655	8,810	7,827	9,331	9,331	10,471	8,191	7,051	7,051	5,911	5,911	5,911	5,911	5,911	5,911	5,911	5,911	5,911	5,911	

* Staff reduction realized from pipe replacement is considered in 3) Staff reduction

Details of Benefits from Pipe Replacement																				
Years	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Years	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Without																				
Production (Thousand m ³ /Day)	2,904	2,962	3,021	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082
Production (Mm ³ /Year)	1,060	1,081	1,103	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
With																				
Production (Thousand m ³ /Day)	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625	1,625
Production (Mm ³ /Year)	593	593	593	593	593	593	593	593	593	593	593	593	593	593	593	593	593	593	593	593
Production Volume Reduction(Mm ³ /Y)	467	488	510	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532	532
Future Electricity Cost (USD/m ³)	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069
Benefits from Pipe Replacement (Electricity)	3239	3386	3536	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689	3689
Future Chemical Cost (USD/m ³)	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
Benefits from Pipe Replacement (Chemical)	458	478	500	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521
Total Benefits from Pipe Replacement (thousand)	3696	3864	4035	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210	4210

Table S 11.1.2 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2016 = 1.4 fold)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	138%	138%	138%	138%	138%	
Unit: Thousand US\$																		
Income Statements																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	29,523	29,523	29,523	29,523	29,523	29,523
Expense																		
Operating Expense other	21,392	20,483	19,584	18,548	17,409	16,598	16,313	16,064	15,818	17,703	17,512	18,562	25,823	18,063	18,073	18,084	22,255	22,267
Loss on Write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	1,968	1,968	1,968	1,968	1,968	1,968
Depreciation (Investment)	460	919	2,180	2,982	4,121	6,210	8,448	9,075	9,643	10,237	9,683	8,820	7,349	5,976	5,217	3,987	2,647	1,840
Depreciation (Existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Interest Cost	58	175	344	501	600	751	961	1,110	1,185	1,260	1,283	1,253	1,222	1,185	1,142	1,096	1,047	999
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	25,666	25,214	25,640	25,427	25,397	26,726	28,809	29,256	29,575	32,053	31,254	31,346	36,911	27,192	26,400	25,134	27,917	27,074
Net Income	-844	-317	-470	-443	-484	-1,462	-2,898	-2,681	-2,319	-4,099	-2,585	-1,823	-7,388	2,331	3,123	4,389	1,606	2,449
Balance Sheets																		
Asset	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fixed Asset																		
Acquisition Cost																		
New Investment	4,890	9,780	22,684	30,698	40,078	57,647	76,951	84,966	92,980	100,994	100,994	100,994	100,994	100,994	100,994	100,994	101,410	101,410
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-460	-1,379	-3,559	-6,540	-10,661	-16,871	-25,319	-34,393	-44,037	-54,274	-63,957	-72,777	-80,126	-86,102	-91,319	-95,306	-97,953	-99,793
Existing Asset	-21,677	-23,655	-25,509	-27,239	-28,846	-30,329	-31,689	-32,925	-34,037	-35,026	-35,891	-36,633	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	21,597	23,591	32,461	35,763	39,415	49,291	58,788	56,492	53,750	50,539	39,990	30,429	22,531	16,554	11,338	7,351	5,120	3,280
Current Asset																		
Cash	1,454	2,467	6,888	10,904	15,602	20,953	26,943	33,651	41,164	47,365	54,399	61,191	60,467	67,139	73,375	79,046	79,491	80,265
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	11,521	11,541	6,712	6,662	6,643	6,737	6,910	7,087	7,268	7,454	7,645	7,873	7,873	7,873	7,873	7,873	7,873	7,873
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	14,082	15,115	14,707	18,674	23,352	28,797	34,960	41,845	49,539	55,926	63,151	70,171	69,446	76,119	82,354	88,025	88,470	89,245
Total Asset	35,679	38,706	47,168	54,437	62,767	78,088	93,748	98,337	103,289	106,465	103,141	100,599	91,977	92,673	93,692	95,376	93,590	92,525
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-132	-448	-919	-1,361	-1,846	-3,307	-6,205	-8,886	-11,205	-15,304	-17,889	-19,712	-27,100	-24,770	-21,647	-17,258	-15,652	-13,203
Total Equity	26,032	25,716	25,245	24,803	24,318	22,857	19,959	17,278	14,959	10,860	8,275	6,452	-936	1,394	4,517	8,906	10,512	12,961
Liabilities																		
Current Liabilities																		
Loan	3,333	6,666	18,013	25,750	34,574	51,309	69,780	76,962	84,143	91,324	90,491	89,657	88,424	86,789	84,685	81,981	78,589	75,074
Total Liabilities	9,647	12,990	21,923	29,634	38,449	55,232	73,789	81,059	88,330	95,605	94,867	94,147	92,913	91,279	89,175	86,471	83,079	79,564
Total Equity & Liabilities	35,679	38,706	47,168	54,437	62,767	78,088	93,748	98,337	103,289	106,465	103,141	100,599	91,977	92,673	93,692	95,377	93,591	92,525

Note: New investment excludes VAT, Price Contingency, and Import Tax (in Table 10.3.5 in volume 2) and includes EBRD loans, IT infrastructure and replacement costs in the future.

Table S 11.1.2 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2016 = 1.4 fold)

Real Tariff Level	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%
Unit: Thousand US\$																		
Income Statements																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523
Expense																		
Operating Expense other	22,279	21,252	21,266	28,560	28,575	22,351	19,247	20,304	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017
Loss on Write off	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968
Depreciation (Investment)	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
Depreciation (Existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	951	897	841	785	729	673	616	560	504	448	392	336	280	224	170	122	79	45
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	26,237	24,355	24,254	31,901	32,249	25,927	22,767	23,768	23,424	23,214	22,690	22,321	22,265	22,208	22,155	22,107	22,064	22,030
Net Income	3,286	5,168	5,269	-2,378	-2,726	3,596	6,756	5,755	6,098	6,309	6,833	7,202	7,258	7,315	7,368	7,416	7,459	7,493
Balance Sheets																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	101,410	101,410	101,410	104,530	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-100,832	-101,069	-101,248	-101,836	-102,814	-103,749	-104,685	-105,620	-106,556	-107,337	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650
Existing Asset	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	2,241	2,004	1,824	4,356	6,499	5,563	4,628	3,692	2,757	1,975	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Current Asset																		
Cash	80,675	81,764	82,896	73,670	64,485	64,701	68,076	70,450	73,167	75,941	78,771	81,657	84,599	87,598	91,050	94,952	99,365	104,690
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873	7,873
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	89,654	90,744	91,876	82,650	73,465	73,680	77,055	79,429	82,147	84,921	87,751	90,637	93,579	96,578	100,030	103,932	108,345	113,670
Total Asset	91,895	92,748	93,701	87,006	79,964	79,244	81,683	83,121	84,904	86,896	89,413	92,299	95,241	98,240	101,692	105,594	110,007	115,332
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-9,917	-4,749	521	-1,858	-4,584	-988	5,768	11,523	17,621	23,930	30,763	37,965	45,224	52,538	59,906	67,323	74,782	82,274
Total Equity	16,247	21,415	26,685	24,306	21,580	25,176	31,932	37,687	43,785	50,094	56,927	64,129	71,388	78,702	86,070	93,487	100,946	108,438
Liabilities																		
Current Liabilities	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490	4,490
Loan	71,159	66,843	62,526	58,210	53,894	49,578	45,261	40,945	36,629	32,313	27,997	23,680	19,364	15,048	11,132	7,618	4,572	2,404
Total Liabilities	75,649	71,332	67,016	62,700	58,384	54,068	49,751	45,435	41,119	36,803	32,486	28,170	23,854	19,538	15,622	12,107	9,062	6,894
Total Equity & Liabilities	91,896	92,748	93,701	87,006	79,964	79,244	81,684	83,122	84,904	86,897	89,413	92,299	95,242	98,240	101,692	105,594	110,007	115,333

Table S 11.1.2 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2016 = 1.4 fold)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	138%	138%	138%	138%	138%	138%
Overall Cash Flow Projection																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operating activity																		
Net Income	-844	-317	-470	-443	-484	-1,462	-2,898	-2,681	-2,319	-4,099	-2,585	-1,823	-7,388	2,331	3,123	4,389	1,606	2,449
+ Depreciation	2,561	2,897	4,034	4,712	5,728	7,693	9,807	10,311	10,756	11,226	10,548	9,562	7,898	5,976	5,217	3,987	2,647	1,840
- Increase in receivables	-1,298	-20	4,830	49	19	-94	-173	-177	-181	-186	-191	-228	0	0	0	0	0	0
+ Increase in current liabilities	649	10	-2,415	-25	-9	47	86	89	91	93	95	114	0	0	0	0	0	0
Cash from operating activity	1,067	2,570	5,978	4,294	5,253	6,184	6,823	7,541	8,346	7,034	7,868	7,625	510	8,307	8,339	8,375	4,253	4,289
Investment activity																		
Investment	4,890	4,890	12,904	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	416	0
Cash used for investment activity	-4,890	-4,890	-12,904	-8,014	-9,379	-17,569	-19,304	-8,014	-8,014	-8,014	0	0	0	0	0	0	-416	0
Financial activity																		
Loan borrowed	3,333	3,333	11,347	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	0	0
Principal repayment	0	0	0	278	556	833	833	833	833	833	833	833	1,234	1,635	2,104	2,704	3,392	3,515
Cash from (used for) financial activity	3,333	3,333	11,347	7,736	8,824	16,736	18,471	7,181	7,181	7,181	-833	-833	-1,234	-1,635	-2,104	-2,704	-3,392	-3,515
Increase (decrease) in cash during the year	-490	1,013	4,421	4,016	4,697	5,351	5,990	6,708	7,513	6,201	7,035	6,792	-724	6,672	6,236	5,671	445	774
Cash at beginning of the year	1,944	1,454	2,467	6,888	10,904	15,602	20,953	26,943	33,651	41,164	47,365	54,399	61,191	60,467	67,139	73,375	79,046	79,491
Cash at end of the year	1,454	2,467	6,888	10,904	15,602	20,953	26,943	33,651	41,164	47,365	54,399	61,191	60,467	67,139	73,375	79,046	79,491	80,265
Cash Flow Projection for Water Supply																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash from operating activity	1,067	2,570	5,978	4,294	5,253	6,184	6,823	7,541	8,346	7,034	7,868	7,625	510	8,307	8,339	8,375	4,253	4,289
+Interest expense	58	175	344	501	600	751	961	1,110	1,185	1,260	1,283	1,253	1,222	1,185	1,142	1,096	1,047	999
+Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	50	74	99	124	174	199	199	149	99	2,179	2,179	3,228	3,237	3,247	3,257	3,267	7,439	7,450
①Cash from operating activity before interest, F/S, repair	1,176	2,819	6,421	4,919	6,027	7,134	7,984	8,800	9,630	10,473	11,329	12,106	4,968	12,738	12,738	12,738	12,738	12,738
②Cash from Water supply operation(①X75%)	882	2,114	4,816	3,689	4,520	5,351	5,988	6,600	7,222	7,854	8,497	9,080	3,726	9,554	9,554	9,554	9,554	9,554
③Repayment	0	0	0	278	556	833	833	833	833	833	833	833	1,234	1,635	2,104	2,704	3,392	3,515
④Interest payment	58	175	344	501	600	751	961	1,110	1,185	1,260	1,283	1,253	1,222	1,185	1,142	1,096	1,047	999
⑤Cash used for F/S	4,890	4,890	12,904	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	416	0
⑥Cash used for repair	50	74	99	124	174	199	199	149	99	2,179	2,179	3,228	3,237	3,247	3,257	3,267	7,439	7,450
⑦Loan Borrowed	3,333	3,333	11,347	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	0	0
⑧Balance(⑩)(last year) +②-③-④-⑤-⑥+⑦)	305	613	3,429	6,216	9,406	12,974	16,968	21,476	26,582	30,164	34,366	38,132	36,165	39,653	42,704	45,191	42,451	40,041
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	305	613	3,429	6,216	9,406	12,974	16,968	21,476	26,582	30,164	34,366	38,132	36,165	39,653	42,704	45,191	42,451	40,041

Table S 11.1.2 Results of Simulation under Slow Tariff Increase Scenario and 1.3% Interest Rate (Tariff Increase by 2016 = 1.4 fold)

Real Tariff Level	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%
Overall Cash Flow Projection																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Operating activity																		
Net Income	3,286	5,168	5,269	-2,378	-2,726	3,596	6,756	5,755	6,098	6,309	6,833	7,202	7,258	7,315	7,368	7,416	7,459	7,493
+ Depreciation	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
- Increase in receivables	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ Increase in current liabilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash from operating activity	4,325	5,406	5,448	-1,790	-1,749	4,532	7,691	6,690	7,034	7,090	7,146	7,202	7,258	7,315	7,368	7,416	7,459	7,493
Investment activity																		
Investment	0	0	0	3,120	3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash used for investment activity	0	0	0	-3,120	-3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial activity																		
Loan borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Principal repayment	3,916	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	3,916	3,515	3,046	2,167
Cash from (used for) financial activity	-3,916	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-3,916	-3,515	-3,046	-2,167
Increase (decrease) in cash during the year	410	1,090	1,132	-9,226	-9,185	215	3,375	2,374	2,718	2,774	2,830	2,886	2,942	2,998	3,453	3,902	4,413	5,325
Cash at beginning of the year	80,265	80,675	81,764	82,896	73,670	64,485	64,701	68,076	70,450	73,167	75,941	78,771	81,657	84,599	87,598	91,050	94,952	99,365
Cash at end of the year	80,675	81,764	82,896	73,670	64,485	64,701	68,076	70,450	73,167	75,941	78,771	81,657	84,599	87,598	91,050	94,952	99,365	104,690
Cash Flow Projection for Water Supply																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Cash from operating activity	4,325	5,406	5,448	-1,790	-1,749	4,532	7,691	6,690	7,034	7,090	7,146	7,202	7,258	7,315	7,368	7,416	7,459	7,493
+Interest expense	951	897	841	785	729	673	616	560	504	448	392	336	280	224	170	122	79	45
+Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
①Cash from operating activity before interest, F/S, repair	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738	12,738
②Cash from Water supply operation (①X75%)	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554	9,554
③Repayment	3,916	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	3,916	3,515	3,046	2,167
④Interest payment	951	897	841	785	729	673	616	560	504	448	392	336	280	224	170	122	79	45
⑤Cash used for F/S	0	0	0	3,120	3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
⑥Cash used for repair	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
⑦Loan Borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑧Balance(⑩)(last year) +②-③-④-⑤-⑥+⑦)	37,266	35,171	33,119	20,708	8,338	5,369	5,560	4,749	4,282	3,872	3,517	3,219	2,976	2,790	3,058	3,775	5,003	7,144
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	37,266	35,171	33,119	20,708	8,338	5,369	5,560	4,749	4,282	3,872	3,517	3,219	2,976	2,790	3,058	3,775	5,003	7,144

Table S 11.1.3 Details of Revenue and Expenses for Table S 11.1.2

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	138%	138%	138%	138%	138%	138%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Unit: Thousand US\$																		
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	5,848	5,848	5,848	5,848	5,848	5,848
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,260	3,260	3,260	3,260	3,260	3,260
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	8,822	8,822	8,822	8,822	8,822	8,822
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,831	10,831	10,831	10,831	10,831	10,831	10,831
Others	191	191	628	641	655	669	683	698	713	729	745	761	761	761	761	761	761	761
Total	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	29,523	29,523	29,523	29,523	29,523	29,523
Expense																		
Materials (imported)	429	397	372	348	323	290	718	698	678	658	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	217	201	188	176	164	147	363	353	343	333	323	323	323	323	323	323	323	323
Elect.power	9,812	8,799	7,828	6,913	6,055	5,211	4,510	4,341	4,175	4,011	3,850	3,851	3,851	3,851	3,851	3,851	3,851	3,851
Salary (all employees)	4,170	4,257	4,300	4,150	4,237	4,009	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Capital repairs	568	592	617	642	692	717	717	667	617	2,697	2,697	3,746	11,007	3,247	3,257	3,267	7,439	7,450
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	919	2,180	2,982	4,121	6,210	8,448	9,075	9,643	10,237	9,683	8,820	7,349	5,976	5,217	3,987	2,647	1,840
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	58	175	344	501	600	751	961	1,110	1,185	1,260	1,283	1,253	1,222	1,185	1,142	1,096	1,047	999
Loss on write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	1,968	1,968	1,968	1,968	1,968	1,968
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	25,666	25,214	25,640	25,427	25,397	26,726	28,809	29,256	29,575	32,053	31,254	31,346	36,911	27,192	26,400	25,134	27,917	27,074

Table S 11.1.3 Details of Revenue and Expenses for Table S 11.1.2

Rea Tariff Level	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%	138%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
	Unit: Thousand US\$																	
Revenue																		
Apartment	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848	5,848
Detached House	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260	3,260
Enterprise	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822	8,822
Communal Service Group	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831	10,831
Others	761	761	761	761	761	761	761	761	761	761	761	761	761	761	761	761	761	761
Total	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523	29,523
Expense																		
Materials (imported)	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
Elect.power	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851
Salary (all employees)	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Capital repairs	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	951	897	841	785	729	673	616	560	504	448	392	336	280	224	170	122	79	45
Loss on write off	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968	1,968
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	26,237	24,355	24,254	31,901	32,249	25,927	22,767	23,768	23,424	23,214	22,690	22,321	22,265	22,208	22,155	22,107	22,064	22,030

Table S 11.1.4 Results of Simulation under Slow Tariff Increase Scenario and 5% Interest Rate (Tariff Increase by 2025 = 1.8 fold)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Unit: Thousand US\$																		
Income Statements																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Operating Expense other	21,392	20,483	19,584	18,548	17,409	16,598	16,313	16,064	15,818	17,703	17,512	18,562	25,823	18,063	18,073	18,084	22,255	22,267
Loss on Write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Depreciation (Investment)	460	919	2,180	2,982	4,121	6,210	8,448	9,075	9,643	10,237	9,683	8,820	7,349	5,976	5,217	3,987	2,647	1,840
Depreciation (Existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Interest Cost	58	175	492	946	1,366	2,016	2,909	3,562	3,934	4,305	4,477	4,447	4,408	4,349	4,268	4,158	4,012	3,842
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	25,666	25,214	25,788	25,871	26,164	27,991	30,757	31,709	32,325	35,098	34,448	34,540	40,156	30,476	29,708	28,442	31,194	30,296
Net Income	-844	-317	-619	-887	-1,251	-2,727	-4,845	-5,133	-5,068	-7,145	-5,779	-5,017	-9,753	833	2,535	4,762	3,001	4,919
Balance Sheets																		
Asset	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Fixed Asset																		
Acquisition Cost																		
New Investment	4,890	9,780	22,684	30,698	40,078	57,647	76,951	84,966	92,980	100,994	100,994	100,994	100,994	100,994	100,994	100,994	101,410	101,410
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-460	-1,379	-3,559	-6,540	-10,661	-16,871	-25,319	-34,393	-44,037	-54,274	-63,957	-72,777	-80,126	-86,102	-91,319	-95,306	-97,953	-99,793
Existing Asset	-21,677	-23,655	-25,509	-27,239	-28,846	-30,329	-31,689	-32,925	-34,037	-35,026	-35,891	-36,633	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	21,597	23,591	32,461	35,763	39,415	49,291	58,788	56,492	53,750	60,539	59,990	60,429	62,531	64,554	66,559	68,554	70,511	72,464
Current Asset																		
Cash	1,454	2,467	6,740	10,311	14,242	18,328	22,371	26,627	31,390	34,545	38,385	41,983	38,776	43,831	49,354	55,270	56,978	60,086
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	11,521	11,541	6,712	6,662	6,643	6,737	6,910	7,087	7,268	7,454	7,645	7,873	8,107	8,349	8,598	8,854	9,119	9,391
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	14,082	15,115	14,559	18,081	21,993	26,172	30,388	34,820	39,765	43,106	47,137	50,963	47,991	53,287	59,059	65,232	67,204	70,584
Total Asset	35,679	38,706	47,020	53,844	61,407	75,463	89,176	91,312	93,515	103,645	107,127	111,392	110,522	117,841	125,618	133,788	137,715	143,048
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-132	-448	-1,067	-1,955	-3,205	-5,932	-10,777	-15,910	-20,979	-28,124	-33,903	-38,920	-48,673	-47,840	-45,304	-40,542	-37,541	-32,623
Total Equity	26,032	25,716	25,097	24,209	22,959	20,232	15,387	10,254	5,185	-1,960	-7,739	-12,756	-22,509	-21,676	-19,140	-14,378	-11,377	-6,459
Liabilities																		
Current Liabilities	6,314	6,324	3,909	3,885	3,875	3,922	4,008	4,097	4,188	4,281	4,376	4,490	4,607	4,728	4,853	4,981	5,113	5,249
Loan	3,333	6,666	18,013	25,750	34,574	51,309	69,780	76,962	84,143	91,324	90,491	89,657	88,424	86,789	84,685	81,981	78,589	75,074
Total Liabilities	9,647	12,990	21,923	29,634	38,449	55,232	73,789	81,059	88,330	95,605	94,867	94,147	93,031	91,517	89,538	86,962	83,702	80,323
Total Equity & Liabilities	35,679	38,706	47,020	53,844	61,407	75,463	89,176	91,312	93,515	103,645	107,127	111,392	110,522	117,841	125,618	133,788	137,715	143,048

Table S 11.1.4 Results of Simulation under Slow Tariff Increase Scenario and 5% Interest Rate (Tariff Increase by 2025 = 1.8 fold)

Real Tariff Level	170%	175%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%
Unit: Thousand US\$																		
Income Statements																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue	36,266	37,348	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463
Expense																		
Operating Expense other	22,279	21,252	21,266	28,560	28,575	22,351	19,247	20,304	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017
Loss on Write off	2,418	2,490	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Depreciation (Investment)	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
Depreciation (Existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	3,656	3,450	3,234	3,018	2,803	2,587	2,371	2,155	1,939	1,724	1,508	1,292	1,076	860	655	469	305	174
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	29,391	27,429	27,243	34,731	34,919	28,437	26,118	25,959	25,456	25,085	24,402	23,873	23,657	23,441	23,235	23,049	22,885	22,755
Net Income	6,874	9,919	11,220	3,732	3,544	10,026	13,345	12,503	13,007	13,377	14,061	14,590	14,806	15,022	15,227	15,413	15,577	15,707
Balance Sheets																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	101,410	101,410	101,410	104,530	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-100,832	-101,069	-101,248	-101,836	-102,814	-103,749	-104,685	-105,620	-106,556	-107,337	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650
Existing Asset	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	2,241	2,004	1,824	4,356	6,499	5,563	4,628	3,692	2,757	1,975	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Current Asset																		
Cash	63,944	69,639	76,573	73,457	70,542	77,186	87,151	96,273	105,899	115,742	125,799	136,073	146,563	157,268	168,580	180,478	193,009	206,549
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounts Receivable	9,671	9,959	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257	10,257
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	74,722	80,706	87,937	84,821	81,905	88,550	98,514	107,637	117,263	127,105	137,163	147,437	157,926	168,632	179,943	191,842	204,373	217,913
Total Asset	76,963	82,709	89,761	89,177	88,404	94,113	103,142	111,329	120,020	129,081	138,825	149,099	159,588	170,294	181,605	193,504	206,035	219,575
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retained Earnings	-25,749	-15,830	-4,611	-879	2,665	12,690	26,035	38,538	51,545	64,922	78,983	93,573	108,379	123,400	138,628	154,041	169,618	185,325
Total Equity	415	10,334	21,553	25,285	28,829	38,854	52,199	64,702	77,709	91,086	105,147	119,737	134,543	149,564	164,792	180,205	195,782	211,489
Liabilities																		
Current Liabilities	5,389	5,533	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682	5,682
Loan	71,159	66,843	62,526	58,210	53,894	49,578	45,261	40,945	36,629	32,313	27,997	23,680	19,364	15,048	11,132	7,618	4,572	2,404
Total Liabilities	76,548	72,376	68,208	63,892	59,576	55,259	50,943	46,627	42,311	37,995	33,678	29,362	25,046	20,730	16,814	13,299	10,254	8,086
Total Equity & Liabilities	76,963	82,710	89,762	89,177	88,404	94,114	103,142	111,329	120,020	129,081	138,826	149,099	159,589	170,294	181,606	193,504	206,035	219,575

Table S 11.1.4 Results of Simulation under Slow Tariff Increase Scenario and 5% Interest Rate (Tariff Increase by 2025 = 1.8 fold)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Overall Cash Flow Projection																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operating activity																		
Net Income	-844	-317	-619	-887	-1,251	-2,727	-4,845	-5,133	-5,068	-7,145	-5,779	-5,017	-9,753	833	2,535	4,762	3,001	4,919
+ Depreciation	2,561	2,897	4,034	4,712	5,728	7,693	9,807	10,311	10,756	11,226	10,548	9,562	7,898	5,976	5,217	3,987	2,647	1,840
- Increase in receivables	-1,298	-20	4,830	49	19	-94	-173	-177	-181	-186	-191	-228	-235	-242	-249	-256	-264	-272
+ Increase in current liabilities	649	10	-2,415	-25	-9	47	86	89	91	93	95	114	117	121	124	128	132	136
Cash from operating activity	1,067	2,570	5,830	3,849	4,486	4,919	4,876	5,089	5,597	3,988	4,674	4,431	-1,973	6,689	7,627	8,620	5,516	6,623
Investment activity																		
Investment	4,890	4,890	12,904	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	416	0
Cash used for investment activity	-4,890	-4,890	-12,904	-8,014	-9,379	-17,569	-19,304	-8,014	-8,014	-8,014	0	0	0	0	0	0	-416	0
Financial activity																		
Loan borrowed	3,333	3,333	11,347	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	0	0
Principal repayment	0	0	0	278	556	833	833	833	833	833	833	833	1,234	1,635	2,104	2,704	3,392	3,515
Cash from (used for) financial activity	3,333	3,333	11,347	7,736	8,824	16,736	18,471	7,181	7,181	7,181	-833	-833	-1,234	-1,635	-2,104	-2,704	-3,392	-3,515
Increase (decrease) in cash during the year	-490	1,013	4,273	3,571	3,931	4,086	4,043	4,255	4,763	3,155	3,841	3,598	-3,207	5,054	5,524	5,916	1,708	3,108
Cash at beginning of the year	1,944	1,454	2,467	6,740	10,311	14,242	18,328	22,371	26,627	31,390	34,545	38,385	41,983	38,776	43,831	49,354	55,270	56,978
Cash at end of the year	1,454	2,467	6,740	10,311	14,242	18,328	22,371	26,627	31,390	34,545	38,385	41,983	38,776	43,831	49,354	55,270	56,978	60,086
Cash Flow Projection for Water Supply																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash from operating activity	1,067	2,570	5,830	3,849	4,486	4,919	4,876	5,089	5,597	3,988	4,674	4,431	-1,973	6,689	7,627	8,620	5,516	6,623
+Interest expense	58	175	492	946	1,366	2,016	2,909	3,562	3,934	4,305	4,477	4,447	4,408	4,349	4,268	4,158	4,012	3,842
+Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	50	74	99	124	174	199	199	149	99	2,179	2,179	3,228	3,237	3,247	3,257	3,267	7,439	7,450
①Cash from operating activity before interest, F/S, repair	1,176	2,819	6,421	4,919	6,027	7,134	7,984	8,800	9,630	10,473	11,329	12,106	5,672	14,285	15,152	16,046	16,967	17,915
②Cash from Water supply operation(①X75%)	882	2,114	4,816	3,689	4,520	5,351	5,988	6,600	7,222	7,854	8,497	9,080	4,254	10,713	11,364	12,035	12,725	13,436
③Repayment	0	0	0	278	556	833	833	833	833	833	833	833	1,234	1,635	2,104	2,704	3,392	3,515
④Interest payment	58	175	492	946	1,366	2,016	2,909	3,562	3,934	4,305	4,477	4,447	4,408	4,349	4,268	4,158	4,012	3,842
⑤Cash used for F/S	4,890	4,890	12,904	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	416	0
⑥Cash used for repair	50	74	99	124	174	199	199	149	99	2,179	2,179	3,228	3,237	3,247	3,257	3,267	7,439	7,450
⑦Loan Borrowed	3,333	3,333	11,347	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	0	0
⑧Balance(⑩/(last year) +②-③-④-⑤-⑥+⑦)	305	613	3,281	5,623	8,047	10,349	12,396	14,452	16,808	17,345	18,353	18,924	14,299	15,782	17,518	19,422	16,889	15,518
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	305	613	3,281	5,623	8,047	10,349	12,396	14,452	16,808	17,345	18,353	18,924	14,299	15,782	17,518	19,422	16,889	15,518

Table S 11.1.4 Results of Simulation under Slow Tariff Increase Scenario and 5% Interest Rate (Tariff Increase by 2025 = 1.8 fold)

Real Tariff Level	170%	175%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%
Overall Cash Flow Projection																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Operating activity																		
Net Income	6,874	9,919	11,220	3,732	3,544	10,026	13,345	12,503	13,007	13,377	14,061	14,590	14,806	15,022	15,227	15,413	15,577	15,707
+ Depreciation	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
- Increase in receivables	-280	-289	-297	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+ Increase in current liabilities	140	144	149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash from operating activity	7,773	10,012	11,250	4,320	4,521	10,961	14,280	13,439	13,942	14,158	14,374	14,590	14,806	15,022	15,227	15,413	15,577	15,707
Investment activity																		
Investment	0	0	0	3,120	3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash used for investment activity	0	0	0	-3,120	-3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial activity																		
Loan borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Principal repayment	3,916	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	3,916	3,515	3,046	2,167
Cash from (used for) financial activity	-3,916	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-3,916	-3,515	-3,046	-2,167
Increase (decrease) in cash during the year	3,857	5,695	6,934	-3,116	-2,915	6,645	9,964	9,123	9,626	9,842	10,058	10,274	10,490	10,705	11,312	11,898	12,531	13,540
Cash at beginning of the year	60,086	63,944	69,639	76,573	73,457	70,542	77,186	87,151	96,273	105,899	115,742	125,799	136,073	146,563	157,268	168,580	180,478	193,009
Cash at end of the year	63,944	69,639	76,573	73,457	70,542	77,186	87,151	96,273	105,899	115,742	125,799	136,073	146,563	157,268	168,580	180,478	193,009	206,549
Cash Flow Projection for Water Supply																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Cash from operating activity	7,773	10,012	11,250	4,320	4,521	10,961	14,280	13,439	13,942	14,158	14,374	14,590	14,806	15,022	15,227	15,413	15,577	15,707
+Interest expense	3,656	3,450	3,234	3,018	2,803	2,587	2,371	2,155	1,939	1,724	1,508	1,292	1,076	860	655	469	305	174
+Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
①Cash from operating activity before interest, F/S, repair	18,891	19,897	20,933	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082	21,082
②Cash from Water supply operation (①X75%)	14,168	14,923	15,700	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811	15,811
③Repayment	3,916	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	3,916	3,515	3,046	2,167
④Interest payment	3,656	3,450	3,234	3,018	2,803	2,587	2,371	2,155	1,939	1,724	1,508	1,292	1,076	860	655	469	305	174
⑤Cash used for F/S	0	0	0	3,120	3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
⑥Cash used for repair	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
⑦Loan Borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑧Balance(⑩'(last year) +②-③-④-⑤-⑥+⑦)	14,653	15,374	17,074	8,688	502	1,876	6,570	10,422	14,778	19,350	24,137	29,140	34,359	39,794	45,836	52,463	59,724	67,994
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	14,653	15,374	17,074	8,688	502	1,876	6,570	10,422	14,778	19,350	24,137	29,140	34,359	39,794	45,836	52,463	59,724	67,994

Table S 11.1.5 Details of Revenue and Expenses for Table S 11.1.4

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Unit: Thousand US\$																		
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	6,024	6,205	6,391	6,582	6,780	6,983
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,358	3,458	3,562	3,669	3,779	3,892
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	9,087	9,359	9,640	9,929	10,227	10,534
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,631	11,156	11,491	11,836	12,191	12,557	12,933
Others	191	191	628	641	655	669	683	698	713	729	745	761	778	796	814	833	852	872
Total	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Materials (imported)	429	397	372	348	323	290	718	698	678	658	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	217	201	188	176	164	147	363	353	343	333	323	323	323	323	323	323	323	323
Elect.power	9,812	8,799	7,828	6,913	6,055	5,211	4,510	4,341	4,175	4,011	3,850	3,851	3,851	3,851	3,851	3,851	3,851	3,851
Salary (all employees)	4,170	4,257	4,300	4,150	4,237	4,009	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Capital repairs	568	592	617	642	692	717	717	667	617	2,697	2,697	3,746	11,007	3,247	3,257	3,267	7,439	7,450
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	919	2,180	2,982	4,121	6,210	8,448	9,075	9,643	10,237	9,683	8,820	7,349	5,976	5,217	3,987	2,647	1,840
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	58	175	492	946	1,366	2,016	2,909	3,562	3,934	4,305	4,477	4,447	4,408	4,349	4,268	4,158	4,012	3,842
Loss on write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	25,666	25,214	25,788	25,871	26,164	27,991	30,757	31,709	32,325	35,098	34,448	34,540	40,156	30,476	29,708	28,442	31,194	30,296

Table S 11.1.5 Details of Revenue and Expenses for Table S 11.1.4

Rea Tariff Level	170%	175%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
	Unit: Thousand US\$																	
Revenue																		
Apartment	7,193	7,409	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631	7,631
Detached House	4,009	4,129	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253	4,253
Enterprise	10,850	11,175	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511	11,511
Communal Service Group	13,321	13,721	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133	14,133
Others	892	913	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935	935
Total	36,266	37,348	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463	38,463
Expense																		
Materials (imported)	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
Elect.power	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851
Salary (all employees)	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Capital repairs	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	3,656	3,450	3,234	3,018	2,803	2,587	2,371	2,155	1,939	1,724	1,508	1,292	1,076	860	655	469	305	174
Loss on write off	2,418	2,490	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564	2,564
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	29,391	27,429	27,243	34,731	34,919	28,437	25,118	25,959	25,456	25,085	24,402	23,873	23,657	23,441	23,235	23,049	22,885	22,755

Table S 11.1.6 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Unit: Thousand US\$																		
Income Statements																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Revenue	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Operating Expense other	21,392	20,483	19,584	18,548	17,409	16,598	16,313	16,064	15,818	17,703	17,512	18,562	25,823	18,063	18,073	18,084	22,255	22,267
Loss on Write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Depreciation (Investment)	460	919	2,180	2,982	4,121	6,210	8,448	9,075	9,643	10,237	9,683	8,820	7,349	5,976	5,217	3,987	2,647	1,840
Depreciation (Existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Interest Cost	58	175	692	1,547	2,402	3,725	5,540	6,877	7,649	8,421	8,793	8,764	8,714	8,625	8,492	8,297	8,019	7,683
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	25,666	25,214	25,988	26,472	27,200	29,701	33,388	35,023	36,040	39,214	38,764	38,856	44,463	34,752	33,932	32,581	35,201	34,138
Net Income	-844	-317	-819	-1,489	-2,287	-4,436	-7,476	-8,448	-8,784	-11,261	-10,096	-9,333	-14,060	-3,443	-1,689	623	-1,006	1,077
Balance Sheets																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	4,890	9,780	22,684	30,698	40,078	57,647	76,951	84,966	92,980	100,994	100,994	100,994	100,994	100,994	100,994	100,994	101,410	101,410
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-460	-1,379	-3,559	-6,540	-10,661	-16,871	-25,319	-34,393	-44,037	-54,274	-63,957	-72,777	-80,126	-86,102	-91,319	-95,306	-97,953	-99,793
Existing Asset	-21,677	-23,655	-25,509	-27,239	-28,846	-30,329	-31,689	-32,925	-34,037	-35,026	-35,891	-36,633	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	21,597	23,591	32,461	35,763	39,415	49,291	58,788	56,492	53,750	50,539	39,990	30,429	22,531	16,554	11,338	7,351	5,120	3,280
Current Asset																		
Cash	1,454	2,467	6,540	9,510	12,405	14,781	16,193	17,134	18,182	17,221	16,745	16,027	8,514	9,292	10,591	12,368	10,069	9,336
Government Subsidy	0	0	0	0	0	0	0	0	0	0	3,287	7,032	15,964	18,757	21,245	23,480	30,020	35,233
Accounts Receivable	11,521	11,541	6,712	6,662	6,643	6,737	6,910	7,087	7,268	7,454	7,645	7,873	8,107	8,349	8,598	8,854	9,119	9,391
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	14,082	15,115	14,358	17,279	20,155	22,625	24,209	25,328	26,557	25,782	28,784	32,039	33,692	37,505	41,541	45,810	50,315	55,066
Total Asset	35,679	38,706	46,819	53,042	59,570	71,916	82,997	81,819	80,308	76,321	68,775	62,467	56,223	54,059	52,879	53,161	55,435	58,346
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	0	0	0	0	0	0	0	0	0	0	3,287	7,032	15,964	18,757	21,245	23,480	30,020	35,233
Retained Earnings	-132	-448	-1,267	-2,756	-5,043	-9,479	-16,955	-25,403	-34,187	-45,447	-55,543	-64,876	-78,936	-82,378	-84,067	-83,444	-84,451	-83,374
Total Equity	26,032	25,716	24,897	23,408	21,121	16,685	9,209	761	-8,023	-19,283	-26,092	-31,680	-36,808	-37,457	-36,658	-33,800	-28,267	-21,977
Liabilities																		
Current Liabilities	6,314	6,324	3,909	3,885	3,875	3,922	4,008	4,097	4,188	4,281	4,376	4,490	4,607	4,728	4,853	4,981	5,113	5,249
Loan	3,333	6,666	18,013	25,750	34,574	51,309	69,780	76,962	84,143	91,324	90,491	89,657	88,424	86,789	84,685	81,981	78,589	75,074
Total Liabilities	9,647	12,990	21,923	29,634	38,449	55,232	73,789	81,059	88,330	95,605	94,867	94,147	93,031	91,517	89,538	86,962	83,702	80,323
Total Equity & Liabilities	35,679	38,706	46,819	53,042	59,570	71,916	82,997	81,819	80,308	76,321	68,775	62,467	56,223	54,060	52,879	53,161	55,435	58,346

Table S 11.1.6 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	170%	175%	181%	186%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%
Unit: Thousand US\$																		
Income Statements																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue	36,266	37,348	38,463	39,611	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793
Expense																		
Operating Expense other	22,279	21,252	21,266	28,560	28,575	22,351	19,247	20,304	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017	20,017
Loss on Write off	2,418	2,490	2,564	2,641	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720
Depreciation (Investment)	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
Depreciation (Existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	7,312	6,900	6,468	6,037	5,605	5,174	4,742	4,310	3,879	3,447	3,015	2,584	2,152	1,721	1,309	937	609	349
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Expense	33,047	30,879	30,477	37,826	37,877	31,179	27,644	28,270	27,550	26,964	26,065	25,320	24,888	24,457	24,045	23,674	23,346	23,085
Net Income	3,218	6,469	7,985	1,785	2,916	9,614	13,149	12,524	13,243	13,829	14,728	15,473	15,905	16,337	16,748	17,120	17,448	17,708
Balance Sheets																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Asset																		
Fixed Asset																		
Acquisition Cost																		
New Investment	101,410	101,410	101,410	104,530	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650	107,650
Existing Asset	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182	37,182
Less: Accumulated Depreciation																		
New Investment	-100,832	-101,069	-101,248	-101,836	-102,814	-103,749	-104,685	-105,620	-106,556	-107,337	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650	-107,650
Existing Asset	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182	-37,182
Other long term assets	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Total Fixed Asset	2,241	2,004	1,824	4,356	6,499	5,563	4,628	3,692	2,757	1,975	1,662	1,662	1,662	1,662	1,662	1,662	1,662	1,662
Current Asset																		
Cash	9,537	11,783	15,482	10,266	6,566	12,799	22,568	31,711	41,573	51,867	62,592	73,749	85,338	97,359	110,191	123,796	138,198	153,739
Government Subsidy	39,754	42,483	44,017	54,733	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208
Accounts Receivable	9,671	9,959	10,257	10,563	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878	10,878
Other Current Asset	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107	1,107
Total Current Asset	60,069	65,332	70,863	76,669	82,759	88,993	98,761	107,904	117,766	128,060	138,786	149,943	161,531	173,552	186,384	199,989	214,391	229,932
Total Asset	62,310	67,336	72,687	81,025	89,258	94,556	103,389	111,596	120,523	130,035	140,448	151,605	163,193	175,214	188,046	201,651	216,053	231,594
Equity and Liabilities																		
Equity																		
Capital	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164	26,164
Government Subsidy	39,754	42,483	44,017	54,733	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208	64,208
Retained Earnings	-80,155	-73,687	-65,701	-63,917	-61,000	-51,386	-38,237	-25,713	-12,470	1,359	16,087	31,560	47,465	63,802	80,550	97,670	115,117	132,826
Total Equity	-14,237	-5,040	4,480	16,980	29,372	38,986	52,135	64,659	77,902	91,731	106,459	121,932	137,837	154,174	170,922	188,042	205,489	223,198
Liabilities																		
Current Liabilities	5,389	5,533	5,682	5,835	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993	5,993
Loan	71,159	66,843	62,526	58,210	53,894	49,578	45,261	40,945	36,629	32,313	27,997	23,680	19,364	15,048	11,132	7,618	4,572	2,404
Total Liabilities	76,548	72,376	68,208	64,045	59,886	55,570	51,254	46,938	42,622	38,305	33,989	29,673	25,357	21,040	17,125	13,610	10,564	8,397
Total Equity & Liabilities	62,310	67,336	72,688	81,025	89,258	94,556	103,389	111,596	120,523	130,036	140,448	151,605	163,194	175,214	188,047	201,652	216,054	231,595

Table S 11.1.6 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
Overall Cash Flow Projection																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operating activity																		
Net Income	-844	-317	-819	-1,489	-2,287	-4,436	-7,476	-8,448	-8,784	-11,261	-10,096	-9,333	-14,060	-3,443	-1,689	623	-1,006	1,077
+ Depreciation	2,561	2,897	4,034	4,712	5,728	7,693	9,807	10,311	10,756	11,226	10,548	9,562	7,898	5,976	5,217	3,987	2,647	1,840
- Increase in receivables	-1,298	-20	4,830	49	19	-94	-173	-177	-181	-186	-191	-228	-235	-242	-249	-256	-264	-272
+ Increase in current liabilities	649	10	-2,415	-25	-9	47	86	89	91	93	95	114	117	121	124	128	132	136
Cash from operating activity	1,067	2,570	5,630	3,248	3,450	3,210	2,245	1,774	1,882	-128	358	115	-6,279	2,413	3,403	4,481	1,509	2,781
Investment activity																		
Investment	4,890	4,890	12,904	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	416	0
Cash used for investment activity	-4,890	-4,890	-12,904	-8,014	-9,379	-17,569	-19,304	-8,014	-8,014	-8,014	0	0	0	0	0	0	-416	0
Financial activity																		
Loan borrowed	3,333	3,333	11,347	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	0	0
Principal repayment	0	0	0	278	556	833	833	833	833	833	833	833	1,234	1,635	2,104	2,704	3,392	3,515
Cash from (used for) financial activity	3,333	3,333	11,347	7,736	8,824	16,736	18,471	7,181	7,181	7,181	-833	-833	-1,234	-1,635	-2,104	-2,704	-3,392	-3,515
Increase (decrease) in cash during the year	-490	1,013	4,073	2,970	2,895	2,376	1,411	941	1,048	-961	-476	-718	-7,513	778	1,299	1,777	-2,299	-734
Cash at beginning of the year	1,944	1,454	2,467	6,540	9,510	12,405	14,781	16,193	17,134	18,182	17,221	16,745	16,027	8,514	9,292	10,591	12,368	10,069
Cash at end of the year	1,454	2,467	6,540	9,510	12,405	14,781	16,193	17,134	18,182	17,221	16,745	16,027	8,514	9,292	10,591	12,368	10,069	9,336
Cash Flow Projection for Water Supply																		
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Cash from operating activity	1,067	2,570	5,630	3,248	3,450	3,210	2,245	1,774	1,882	-128	358	115	-6,279	2,413	3,403	4,481	1,509	2,781
+Interest expense	58	175	692	1,547	2,402	3,725	5,540	6,877	7,649	8,421	8,793	8,764	8,714	8,625	8,492	8,297	8,019	7,683
+Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	50	74	99	124	174	199	199	149	99	2,179	2,179	3,228	3,237	3,247	3,257	3,267	7,439	7,450
①Cash from operating activity before interest, F/S, repair	1,176	2,819	6,421	4,919	6,027	7,134	7,984	8,800	9,630	10,473	11,329	12,106	5,672	14,285	15,152	16,046	16,967	17,915
②Cash from Water supply operation (①X75%)	882	2,114	4,816	3,689	4,520	5,351	5,988	6,600	7,222	7,854	8,497	9,080	4,254	10,713	11,364	12,035	12,725	13,436
③Repayment	0	0	0	278	556	833	833	833	833	833	833	833	1,234	1,635	2,104	2,704	3,392	3,515
④Interest payment	58	175	692	1,547	2,402	3,725	5,540	6,877	7,649	8,421	8,793	8,764	8,714	8,625	8,492	8,297	8,019	7,683
⑤Cash used for F/S	4,890	4,890	12,904	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	416	0
⑥Cash used for repair	50	74	99	124	174	199	199	149	99	2,179	2,179	3,228	3,237	3,247	3,257	3,267	7,439	7,450
⑦Loan Borrowed	3,333	3,333	11,347	8,014	9,379	17,569	19,304	8,014	8,014	8,014	0	0	0	0	0	0	0	0
⑧Balance(⑩)(last year) +②-③-④-⑤-⑥+⑦)	305	613	3,081	4,821	6,210	6,802	6,218	4,959	3,600	21	-3,287	-3,745	-8,932	-2,793	-2,488	-2,235	-6,540	-5,213
⑨Government Subsidy	0	0	0	0	0	0	0	0	0	0	3,287	3,745	8,932	2,793	2,488	2,235	6,540	5,213
⑩Ending Balance(⑧+⑨)	305	613	3,081	4,821	6,210	6,802	6,218	4,959	3,600	21	-0	-0	0	0	-0	0	-0	0

Table S 11.1.6 Results of Simulation under Slow Tariff Increase Scenario with Subsidy (Interest Rate 10%)

Real Tariff Level	170%	175%	181%	186%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%
Overall Cash Flow Projection																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Operating activity																		
Net Income	3,218	6,469	7,985	1,785	2,916	9,614	13,149	12,524	13,243	13,829	14,728	15,473	15,905	16,337	16,748	17,120	17,448	17,708
+ Depreciation	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
- Increase in receivables	-280	-289	-297	-306	-315	0	0	0	0	0	0	0	0	0	0	0	0	0
+ Increase in current liabilities	140	144	149	153	158	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash from operating activity	4,117	6,562	8,016	2,220	3,736	10,550	14,085	13,459	14,178	14,610	15,042	15,473	15,905	16,337	16,748	17,120	17,448	17,708
Investment activity																		
Investment	0	0	0	3,120	3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash used for investment activity	0	0	0	-3,120	-3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial activity																		
Loan borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Principal repayment	3,916	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	3,916	3,515	3,046	2,167
Cash from (used for) financial activity	-3,916	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-4,316	-3,916	-3,515	-3,046	-2,167
Increase (decrease) in cash during the year	202	2,245	3,699	-5,216	-3,700	6,233	9,769	9,143	9,862	10,294	10,726	11,157	11,589	12,020	12,833	13,605	14,402	15,541
Cash at beginning of the year	9,336	9,537	11,783	15,482	10,266	6,566	12,799	22,568	31,711	41,573	51,867	62,592	73,749	85,338	97,359	110,191	123,796	138,198
Cash at end of the year	9,537	11,783	15,482	10,266	6,566	12,799	22,568	31,711	41,573	51,867	62,592	73,749	85,338	97,359	110,191	123,796	138,198	153,739
Cash Flow Projection for Water Supply																		
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Cash from operating activity	4,117	6,562	8,016	2,220	3,736	10,550	14,085	13,459	14,178	14,610	15,042	15,473	15,905	16,337	16,748	17,120	17,448	17,708
+Interest expense	7,312	6,900	6,468	6,037	5,605	5,174	4,742	4,310	3,879	3,447	3,015	2,584	2,152	1,721	1,309	937	609	349
+Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+Capital Repair for Water supply	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
①Cash from operating activity before interest, F/S, repair	18,891	19,897	20,933	22,000	23,100	23,257	23,257	23,257	23,257	23,257	23,257	23,257	23,257	23,257	23,257	23,257	23,257	23,257
②Cash from Water supply operation(①X75%)	14,168	14,923	15,700	16,500	17,325	17,443	17,443	17,443	17,443	17,443	17,443	17,443	17,443	17,443	17,443	17,443	17,443	17,443
③Repayment	3,916	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	4,316	3,916	3,515	3,046	2,167
④Interest payment	7,312	6,900	6,468	6,037	5,605	5,174	4,742	4,310	3,879	3,447	3,015	2,584	2,152	1,721	1,309	937	609	349
⑤Cash used for F/S	0	0	0	3,120	3,120	0	0	0	0	0	0	0	0	0	0	0	0	0
⑥Cash used for repair	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
⑦Loan Borrowed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⑧Balance(⑩)(last year) +②-③-④-⑤-⑥+⑦)	-4,521	-2,729	-1,534	-10,716	-9,475	419	4,374	7,702	11,750	16,230	21,141	26,484	32,258	38,464	45,483	53,273	61,861	71,588
⑨Government Subsidy	4,521	2,729	1,534	10,716	9,475	0	0	0	0	0	0	0	0	0	0	0	0	0
⑩Ending Balance(⑧+⑨)	0	0	0	0	0	419	4,374	7,702	11,750	16,230	21,141	26,484	32,258	38,464	45,483	53,273	61,861	71,588

Table S 11.1.7 Details of Revenue and Expenses for Table S 11.1.6

Rea Tariff Level	100%	103%	106%	109%	113%	116%	119%	123%	127%	130%	134%	138%	143%	147%	151%	156%	160%	165%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Unit: Thousand US\$																		
Revenue																		
Apartment	6,993	6,678	6,116	5,513	5,011	4,891	5,039	5,192	5,349	5,511	5,678	5,848	6,024	6,205	6,391	6,582	6,780	6,983
Detached House	2,475	2,520	2,564	2,607	2,657	2,726	2,808	2,893	2,981	3,072	3,165	3,260	3,358	3,458	3,562	3,669	3,779	3,892
Enterprise	5,988	6,198	6,415	6,640	6,872	7,127	7,394	7,672	7,959	8,257	8,565	8,822	9,087	9,359	9,640	9,929	10,227	10,534
Communal Service Group	9,174	9,311	9,447	9,582	9,718	9,853	9,987	10,121	10,254	10,386	10,516	10,631	11,156	11,491	11,836	12,191	12,557	12,933
Others	191	191	628	641	655	669	683	698	713	729	745	761	778	796	814	833	852	872
Total	24,822	24,898	25,169	24,984	24,913	25,264	25,912	26,576	27,256	27,954	28,669	29,523	30,403	31,309	32,243	33,204	34,195	35,215
Expense																		
Materials (imported)	429	397	372	348	323	290	718	698	678	658	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	217	201	188	176	164	147	363	353	343	333	323	323	323	323	323	323	323	323
Elect.power	9,812	8,799	7,828	6,913	6,055	5,211	4,510	4,341	4,175	4,011	3,850	3,851	3,851	3,851	3,851	3,851	3,851	3,851
Salary (all employees)	4,170	4,257	4,300	4,150	4,237	4,009	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Capital repairs	568	592	617	642	692	717	717	667	617	2,697	2,697	3,746	11,007	3,247	3,257	3,267	7,439	7,450
Depreciation (existing)	2,101	1,978	1,854	1,730	1,607	1,483	1,360	1,236	1,112	989	865	742	549	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	460	919	2,180	2,982	4,121	6,210	8,448	9,075	9,643	10,237	9,683	8,820	7,349	5,976	5,217	3,987	2,647	1,840
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	58	175	692	1,547	2,402	3,725	5,540	6,877	7,649	8,421	8,793	8,764	8,714	8,625	8,492	8,297	8,019	7,683
Loss on write off	1,655	1,660	1,678	1,666	1,661	1,684	1,727	1,772	1,817	1,864	1,911	1,968	2,027	2,087	2,150	2,214	2,280	2,348
Watermeter installation expenses (apartments)	304	304	304	304	198	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	861	861	861	861	560	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	109	150	191	232	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	25,666	25,214	25,988	26,472	27,200	29,701	33,388	35,023	36,040	39,214	38,764	38,856	44,463	34,752	33,932	32,581	35,201	34,138

Table S 11.1.7 Details of Revenue and Expenses for Table S 11.1.6

Rea Tariff Level	170%	175%	181%	186%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%	192%
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Unit: Thousand US\$																		
Revenue																		
Apartment	7,193	7,409	7,631	7,860	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096	8,096
Detached House	4,009	4,129	4,253	4,381	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512	4,512
Enterprise	10,850	11,175	11,511	11,856	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212	12,212
Communal Service Group	13,321	13,721	14,133	14,557	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993	14,993
Others	892	913	935	957	980	980	980	980	980	980	980	980	980	980	980	980	980	980
Total	36,266	37,348	38,463	39,611	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793	40,793
Expense																		
Materials (imported)	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
Materials (made in Uzbek)	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323	323
Elect.power	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851	3,851
Salary (all employees)	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Capital repairs	7,463	6,435	6,449	13,743	13,758	7,534	4,430	5,488	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200	5,200
Depreciation (existing)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638	638
In-house expenses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial expenses & Expenses for the period	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640	2,640
Other	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643	1,643
Depreciation(Investment)	1,039	237	179	588	977	936	936	936	936	781	313	0	0	0	0	0	0	0
Expense for F/S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Cost	7,312	6,900	6,468	6,037	5,605	5,174	4,742	4,310	3,879	3,447	3,015	2,584	2,152	1,721	1,309	937	609	349
Loss on write off	2,418	2,490	2,564	2,641	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720	2,720
Watermeter installation expenses (apartments)	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325	325
Watermeter installation expenses (detached houses)	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Watermeter maintenance cost	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259	259
Total	33,047	30,879	30,477	37,826	37,877	31,179	27,644	28,270	27,550	26,964	26,065	25,320	24,888	24,457	24,045	23,674	23,346	23,085

A. Pilot Project

A.1 Pilot Project on Repair of Water Service Equipment for Apartment Flats

A.1.1 Contents of Pilot Project

(1) Purpose of Pilot Project

Repair of leakage in apartments was carried out to examine the real situation of the leakage, assess the repair costs and measure the effect of repair. Additionally, the possibility of introduction of commodity system using bulk meters for apartment buildings was investigated, because meter installation for apartment flats is costly due to need of several pipe connections, and meter reading at these flats are difficult due to installation of meters inside of the rooms.

Water consumption of apartment residents with a meter is 150 lpcd, that without a meter is around 600 lpcd, and the norm is 330 lpcd . If water consumption after project completion is lower than the norm, introduction of commodity system using bulk meter may be applicable.

(2) Method

The criteria of selecting the target apartments, survey contents and items for analysis are shown in Table A.1.1.

Table A.1.1 Contents of Pilot Project

Items	Survey Items	
Selection Criteria	1.Total target for repair: Around 200 flats	
	2. With bulk meter	
	3. Average consumption, over 600 lpcd	
Survey Contents	Condition of apartment	Water service equipment, construction year, and others
	Family	Family number of each flat, area of each flats
	Water consumption condition	Water consumption before repair and after repair
	Condition of Water service equipment	Leaking equipment of each flat, Leaking condition, necessary parts for repair
	Repair cost	Parts lists and price, labor quantity and cost for repair work,
	Hot water consumption	Hot water consumption for flats
Analysis Items	Condition of water service equipment	To list up and sort out necessary repair contents, points and cost
	Contents of repair	Quality of parts for repair, Difficulty in acquisition of parts, Difficulty in acquiring tools for repair, level of skill of plumber, Necessary duration of repair
	Repair costs	Cost of parts, tools, temporary construction, labor
	Change of water consumption	Per capita water leakage and water wastage in apartment

A.1.2 Condition before Repair

(1) Information of Apartments

Five apartment buildings were surveyed and information on survey results is shown in

Table A.1.2

Table A.1.2 Information of Target Apartments

Apartment No.	14	11	12	9	15	Total
Address	Sergeli 16					
Flat Number	36	36	36	36	50	194
Construction Year	1988					
Stories	9	9	9	9	4	
Declared Residents Number	145	107	89	110	131	582
Actual Residents Number	137	134	127	137	174	709
Average Floor Area (m ²)	64.42	64.42	64.42	64.42	55.82	

Water meters were not installed for flats, while bulk meters were installed for all apartments.

Information of each flat is shown in Table A.1.3(1) to (5).

Table A.1.3 (1) Information of flats at Apartment No. 14

Flat No.	Residents Number	Flat type			Flat No.	Residents Number	Flat type		
		Number of rooms	Floor area (m ²)	Number of Taps			Number of rooms	Floor area (m ²)	Number of Taps
1	8	4	81.00	3	20	5	4	80.90	3
2	3	2	47.87	3	21	3	2	47.91	3
3	1	4	81.00	3	22	5	4	80.90	3
4	3	2	47.87	3	23	1	2	47.91	3
5	4	4	81.00	3	24	4	4	80.90	3
6	3	2	47.87	3	25	1	2	47.91	3
7	6	4	81.00	3	26	5	4	80.90	3
8	3	2	47.87	3	27	5	2	47.91	3
9	12	4	81.00	3	28	6	4	80.90	3
10	3	2	47.87	3	29	6	2	47.91	3
11	5	4	81.00	3	30	5	4	80.90	3
12	3	2	47.87	3	31	2	2	47.91	3
13	3	4	81.00	3	32	2	4	80.90	3
14	4	2	47.87	3	33	1	2	47.91	3
15	7	4	81.00	3	34	3	4	80.90	3
16	1	2	47.87	3	35	1	2	47.91	3
17	4	4	81.00	3	36	8	4	80.90	3
18	4	2	47.87	3	Total /Ave.	145		64.42	3
19	5	2	47.91	3	Actual total	137			

Table A.1.3 (2) Information of flats at Apartment No. 11

Flat No.	Residents Number	Flat type			Flat No.	Residents Number	Flat type		
		Number of rooms	Floor area (m ²)	Number of Taps			Number of rooms	Floor area (m ²)	Number of Taps
1	4	4	81.00	3	20	6	4	80.90	3
2	3	2	47.87	3	21	1	2	47.91	3
3	4	4	81.00	3	22	2	4	80.90	3
4	1	2	47.87	3	23	3	2	47.91	3
5	2	4	81.00	3	24	3	4	80.90	3
6	3	2	47.87	3	25	1	2	47.91	3
7	4	4	81.00	3	26	4	4	80.90	3
8	1	2	47.87	3	27	2	2	47.91	3
9	3	4	81.00	3	28	1	4	80.90	3
10	2	2	47.87	3	29	7	2	47.91	3
11	1	4	81.00	3	30	1	4	80.90	3
12	3	2	47.87	3	31	2	2	47.91	3
13	5	4	81.00	3	32	3	4	80.90	3
14	1	2	47.87	3	33	1	2	47.91	3
15	5	4	81.00	3	34	3	4	80.90	3
16	4	2	47.87	3	35	3	2	47.91	3
17	6	4	81.00	3	36	5	4	80.90	3
18	2	2	47.87	3	Total /Ave.	107		64.42	3
19	5	2	47.91	3	Actual total	134			

Table A.1.3 (3) Information of flats at Apartment No. 12

Flat No.	Residents Number	Flat type			Flat No.	Residents Number	Flat type		
		Number of rooms	Floor area (m ²)	Number of Taps			Number of rooms	Floor area (m ²)	Number of Taps
1	4	4	81.00	3	20	2	4	80.90	3
2	2	2	47.87	3	21	1	2	47.91	3
3	3	4	81.00	3	22	6	4	80.90	3
4	3	2	47.87	3	23	3	2	47.91	3
5	2	4	81.00	3	24	3	4	80.90	3
6	2	2	47.87	3	25	2	2	47.91	3
7	1	4	81.00	3	26	4	4	80.90	3
8	1	2	47.87	3	27	3	2	47.91	3
9	1	4	81.00	3	28	4	4	80.90	3
10	2	2	47.87	3	29	3	2	47.91	3
11	1	4	81.00	3	30	1	4	80.90	3
12	2	2	47.87	3	31	3	2	47.91	3
13	3	4	81.00	3	32	2	4	80.90	3
14	2	2	47.87	3	33	1	2	47.91	3
15	5	4	81.00	3	34	1	4	80.90	3
16	3	2	47.87	3	35	4	2	47.91	3
17	5	4	81.00	3	36	2	4	80.90	3
18	1	2	47.87	3	Total /Ave.	89		64.42	3
19	1	2	47.91	3	Actual total	127			

Table A.1.3 (4) Information of Flats at Apartment No. 9

Flat No.	Residents Number	Flat type			Flat No.	Residents Number	Flat type		
		Number of rooms	Floor area (m ²)	Number of Taps			Number of rooms	Floor area (m ²)	Number of Taps
1	3	4	81.00	3	20	6	4	80.90	3
2	2	2	47.87	3	21	1	2	47.91	3
3	3	4	81.00	3	22	4	4	80.90	3
4	1	2	47.87	3	23	2	2	47.91	3
5	4	4	81.00	3	24	4	4	80.90	3
6	3	2	47.87	3	25	1	2	47.91	3
7	4	4	81.00	3	26	5	4	80.90	3
8	3	2	47.87	3	27	4	2	47.91	3
9	1	4	81.00	3	28	4	4	80.90	3
10	4	2	47.87	3	29	4	2	47.91	3
11	3	4	81.00	3	30	1	4	80.90	3
12	2	2	47.87	3	31	1	2	47.91	3
13	1	4	81.00	3	32	3	4	80.90	3
14	4	2	47.87	3	33	4	2	47.91	3
15	5	4	81.00	3	34	4	4	80.90	3
16	2	2	47.87	3	35	5	2	47.91	3
17	7	4	81.00	3	36	2	4	80.90	3
18	3	2	47.87	3	Total /Ave.	110		64.42	3
19		2	47.91	3	Actual total	137			

Table A.1.3 (5) Information of flats at Apartment No. 15

Flat No.	Residents Number	Flat type			Flat No.	Residents Number	Flat type		
		Number of rooms	Floor area (m ²)	Number of Taps			Number of rooms	Floor area (m ²)	Number of Taps
1	1	1	31.82	3	27	2	3	63.91	3
2	1	2	44.24	3	28	2	4	76.44	3
3	3	3	69.97	3	29	2	3	63.91	3
4	2	1	31.82	3	30	1	4	76.44	3
5	3	2	44.24	3	31	2	3	63.91	3
6	3	3	63.97	3	32	5	4	76.44	3
7	1	1	31.82	3	33	5	3	63.91	3
8	1	2	44.24	3	34	1	4	76.44	3
9	1	3	63.97	3	35	1	3	63.91	3
10	1	1	31.82	3	36	1	3	63.88	3
11	1	2	44.24	3	37	2	2	44.54	3
12	5	3	63.97	3	38	1	1	31.86	3
13	1	1	31.82	3	39	3	3	63.88	3
14	5	2	44.24	3	40	1	2	44.54	3
15	2	3	63.97	3	41	1	1	31.86	3
16	4	3	64.08	3	42	1	3	63.88	3
17	4	4	76.54	3	43	3	2	44.54	3
18	4	3	64.08	3	44	1	1	31.86	3
19	3	4	76.54	3	45	3	3	63.88	3
20	3	3	64.08	3	46	3	2	44.54	3
21	2	4	76.54	3	47	2	1	31.86	3
22	9	3	64.08	3	48	5	3	63.88	3

(Cont'd)

23	5	4	76.54	3	49	3	2	44.54	3
24	4	3	64.08	3	50	4	1	31.86	3
25	1	4	76.54	3	Total /Ave.	131		55.82	3
26	6	4	76.44	3	Actual total	174			

The number of residents in flats is usually under declared to save water tariff because tariff is calculated by number of residents per flat. Therefore the difference of resident number between declared ones and actual ones for these five apartment buildings is 22% as shown in Table A.1.4.

Table A.1.4 Difference between declared Residents Number and Actual Number

Apart No.	Declared Number	Actual Number	Difference	Difference Rate (%)
14	145	137	-8	-5.5
11	107	134	27	25.2
12	89	127	38	42.7
9	110	137	27	24.5
15	131	174	43	32.8
Total	582	709	127	21.8

(2) Leaking Water Service Equipment of Target Apartments

Water service equipment such as faucet, shower and toilet was inspected for all flats. The results are summarized in Table A.1.5, and the research sheets are shown in Table A.1.6 (1) to (5).

Table A.1.5 Summarized Sheet of Leaking Equipment

Apartment No.		14	11	12	9	15	Total
Flat number		36	36	36	36	50	194
Target flat		12	7	13	15	28	75
Rate (%)		33.3	19.4	36.1	41.7	56.0	38.7
Leaking equipment number	Kitchen	10	7	14	11	22	64
	Shower	12	10	15	20	33	90
	Toilet	16	10	24	14	45	109
	Total	38	27	53	45	100	263

Table A.1.6 (1) Reserch Sheet of Leaking Equipment at Apartment No.14

Apartment No.14: target flat 12				
Flat No.	Leaking equipment			Leaking Number
	Kitchen	Shower room	Toilet	
1		Shower hose	Valve, ball cock	3
6			Valve	1
7	Valve, mixer	Valve, shower hose	Valve, canister	6
10	Mixer	Mixer		2
14	Part of faucet		Valve, ball cock	3
15	Part of faucet - 2	Valve, mixer	Valve, ball cock	6
18			Ball cock	1
19	Mixer	Mixer	Ball cock	3
22		Valve, mixer	Valve, hose	4
24	Part of faucet - 2	Shower hose	Valve -2	5
28	Part of faucet	Mixer	Ball cock	3
29		Mixer		1
Total	10	12	16	38

Mixer is equipment to mix cold water and hot water

Table A.1.6 (2) Research Sheet of Leaking Equipment at Apartment No.11

Apartment No.11; target flat 7				
Flat No.	Leaking equipment			Leaking Number
	Kitchen	Shower room	Toilet	
19	Part of faucet - 2		Ball cock	3
22	Part of faucet	Mixer	Valve	3
24		Part of faucet - 2	Valve, ball cock	4
29	Part of faucet	Part of faucet		2
30		Valve, part of faucet - 2	Valve, canister	4
35	Mixer	Valve, mixer	Valve, ball cock	5
36	Valve, mixer	Valve, mixer	Valve, ball cock	6
Number	7	10	10	27

Table A.1.6 (3) Research Sheet of Leaking Equipment at Apartment No.12

Apartment No.12: target flat 13				
Flat No.	Leaking equipment			Leaking Number
	Kitchen	Shower room	Toilet	
1		Valve, mixer	Hose, faucet	4
3			Valve, canister, hose	3
4	Valve, sleeve, mixer	Valve, mixer	Valve, sleeve	7
12	Part of faucet - 2	Valve, sleeve, mixer	Canister, hose	7
17	Part of faucet		Canister, hose	3
19		Valve, mixer		2
22	Valve, part of faucet		Valve, canister, hose	5
25	Valve, mixer			2
28			Valve, ball cock	2
29		Part of faucet - 2	Valve, ball cock	4
31			Valve, canister	2
34	Valve, part of faucet	Valve, hose	Valve, ball cock	6
35	Part of faucet - 2	Part of faucet - 2	Valve, ball cock	6
Number	14	15	24	53

Table A.1.6 (4) Research Sheet of Leaking Equipment at Apartment No.9

Apartment No.9: target flat 15				
Flat No.	Leaking equipment			Leaking Number
	Kitchen	Shower room	Toilet	
4	Part of faucet	Valve, faucet - 2	Valve, ball cock	6
6	Part of faucet - 2	Valve, mixer	Valve, canister	6
7	Mixer	Valve, hose	Float	4
8	Valve, mixer	Part of faucet - 2	Valve, ball cock	6
10	Valve, mixer	Part of faucet - 2	Valve, ball cock	6
11		Valve, mixer	Ball cock	3
14	Mixer	Valve, mixer	Valve, ball cock	5
15			Valve, canister	2
19	Mixer	Valve, mixer	Valve, canister	5
20	Valve, mixer	Valve, hose	Canister	5
24		Part of faucet - 2	Valve	3
25		Part of faucet - 2	Valve, ball cock	4
32		Valve, faucet - 2	Valve, ball cock	5
34	Part of faucet - 2	Part of faucet - 2	Valve, ball cock	6
35			Valve, ball cock	2
Number	11	20	14	68

Table A.1.6 (5) Research Sheet of Leaking Equipment at Apartment No.15

Apartment No.15: target flat 28				
Flat No.	Leaking equipment			Leaking Number
	Kitchen	Shower room	Toilet	
4	Valve, faucet	Mixer, valve	Valve, ball cock	6
5	Packing	Mixer	Valve, hose	4
7			Valve, ball cock	2
8	Mixer	Part of faucet	Valve, hose	4
9	Mixer	Valve		2
12		Mixer, packing	Valve, ball cock	4
13		Hose, part of faucet	Valve	3
14			Valve, ball cock	2
17		Hose, part of faucet		2
18			Bracket, valve, hose	3
19			Bracket	1
20			Valve, hose	2
22	Part of faucet	Mixer, valve	Valve, hose	5
23	Part of faucet - 2	Mixer, valve	Valve, ball cock	6
24			Valve, ball cock	2
28	Mixer	Mixer, valve	Ball cock	4
29	Mixer	Hose, valve	Valve, ball cock	5
31	Mixer	Part of faucet	Valve, ball cock	4
32	Mixer	Valve-2, faucet	Canister-compact	4
37	Mixer	Hose	Valve, ball cock	4
38	Part of faucet	Part of faucet, hose		3
40	Valve	Valve	Valve, hose	4
42	Part of faucet			1
44	Mixer, valve	Mixer	Valve-2, hose	6
46			Valve, hose	2
47	Mixer, valve	Valve, part of faucet	Valve, ball cock	6
49	Part of faucet	Part of faucet, hose	Valve, ball cock	5
50	Part of faucet	Part of faucet	Valve, ball cock	4
Number	22	33	45	100

(3) Water Consumption before Repair

Table A.1.7 shows water consumption of each apartment before repair work. As shown in the table, water consumption per capita of each apartment based on actual resident number is between 398 and 808 lpcd, and 518 lpcd on the average.

The difference of the values is very large between the value calculated by declared resident number and another value calculated by actual number.

Table A.1.7 Water Consumption before Repair Work

No.	Apartment No.	Residents Number		Unit	Measured result		
		Declared (1)	Actual (2)	Date	20 Nov	1 Dec.	3. Dec.
				Week day	Tuesday	Monday	Friday
1	14	145	137	Time	11:00	11:00	11:00
				Value (m ³)	72,441	73,165	73,292
				Difference (m ³)		723.72	850.83
				lpcd (1)		454	451
				lpcd (2)		480	478
2	11	107	134	Time	11:40	11:40	11:40
				Value (m ³)	58,929	59,512	59,619
				Difference (m ³)		583	690
				lpcd (1)		495	496
				lpcd (2)		396	396
4	12	89	127	Time	11:40	11:40	11:40
				Value (m ³)	51,611	52,280	52,403
				Difference (m ³)		669	792
				lpcd (1)		683	684
				lpcd (2)		479	480
5	9	110	137	Time	11:00	11:00	11:00
				Value (m ³)	70,449	71,662	71,883
				Difference (m ³)		1,213	1,434
				lpcd (1)		1002	1003
				lpcd (2)		805	805
3	15	131	174	Time	11:50	11:50	11:50
				Value (m ³)	137	955	1,142
				Difference (m ³)		818	1,005
				lpcd (1)		568	590
				lpcd (2)		427	444
Total		582	709	Difference (m ³)		4,006	4,771
				lpcd (1)		626	631
				lpcd (2)		514	518

: Actual consumption

The actual consumption of residents is the value calculated by using actual resident number. However, if this result is used to make comparison with other survey results, the value calculated using declared number should be adopted because results of other researches were calculated based on declared resident number.

A.1.3 Repair Works and Evaluation

(1) Repair Work

Repair work for leaking equipment was carried out from December 1st to 20th in 2003 as shown in Figure A.1.1. Equipment and parts shown in Table A.1.6 (1) to (5) were purchased and they were installed in repair work.

Figure A.1.1 Schedule of Repair Work

Week	1	2	3	4	5	6	7	8	9	10	11	12
Monday	6 Dec.	13Dec.	20Dec.	27Dec.	5Jan.	12Jan.	19Jan.	26Jan.	2Feb.	9Feb.	16Feb.	23Feb.
Repair work	Repair work				Re-repair work							
Measurement			1 st measurement				2 nd measurement					

After completion of the work, it was found that leaking from faucets, mixers, valves and hoses were stopped, however ball cock of toilet continued leaking during inspection work. The leak from toilet low tank could not be stopped because the ball cocks did not fit properly due to bad quality of the parts.

The consumption measurement was started from December 23rd, 2003. While the measurement was carrying out, the residents of these apartments complained about repair work, and almost all complaints were about the toilet leaks. Therefore, new rounds of inspections were conducted by the team members was conducted again. The results are described as follows:

- Repaired toilet kept leaking, and the leaking quantity was 1 to 5 L/min. Such large flow of leakage could not be neglected;
- The reason for the leak was that the replaced rubber ball cock as shown in Figure A.1.2 cannot seal the discharge mouth completely. Therefore lead weights shown in the figure were prepared and they were installed on the cock.

- When the weights were installed on the cock, the leakage was completely stopped;
- In some case, leakage could not be stopped completely, but the quantity decreased to less than 0.2 L/cap./min= 288L/day
- Some flats could not be entered for repair while the residents were not around and these flats could only be repaired by January 19th, 2004.

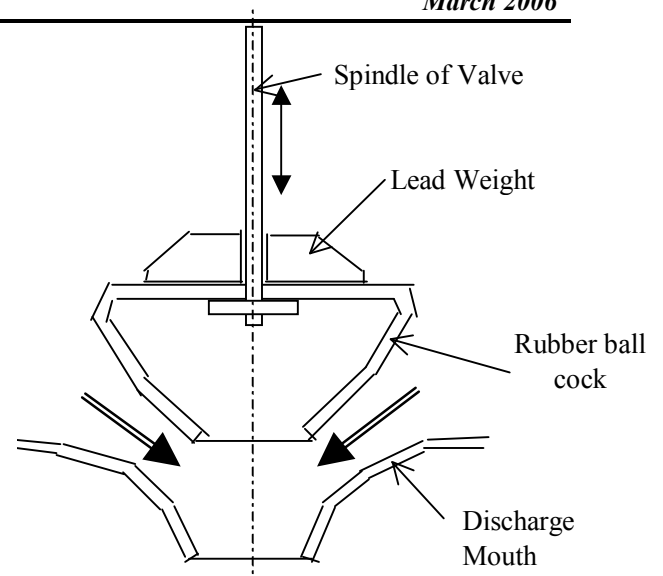


Figure A.1.2 Mechanism of Discharge Mouth

Midnight and daytime measurement was carried out after completion of re-repair work.

Table A.1.8 shows the results of 30 minutes measurement in midnight and daytime, and midnight measurement was carried out from 3.30 to 4:30 a.m. on January 19th and daytime was from 2:00 to 3:00 p.m. on January 20th. As shown the table, the flow in midnight was mainly considered as leakage, however, the quantities were not so large.

Table A.1.8 Results of 30 minutes Measurement

Apartment No.	Actual Resident	Daytime Consumption			Midnight Consumption		
		0.5hr(m ³)	1day(m ³)	lpcd	0.5hr(m ³)	1day(m ³)	lpcd
14	137	0.811	38.93	284	0.025	1.20	9
11	134	0.642	30.82	230	0.056	2.69	20
12	127	0.724	34.75	274	0.058	2.78	22
9	137	0.620	29.76	217	0.050	2.40	18
15	174	1.080	51.84	298	0.260	12.48	72
Total	709	3.877	186.10	262	0.449	21.55	30

(2) Evaluation of Repair Work

1) Reduction of water consumption

Consumption measurement results after repair work are shown in Table A.1.9.

As shown in the table, the effect by first repair work shows 29% of reduction of consumption and that by re-repair work was 49% in first measurement or 44% in second one. In the second measurement, the reduction rate was decreased.

It is assumed that this was caused by increased water wastage of residents as the people became used to the tension brought about by repair work and began to waste water as usual. The previous consumption survey for individuals revealed that actual demand for apartment residents is around 150L/cap/d based on declared residents number. The composition of consumption of these apartment residents is assumed as shown in Table A.1.10.

Table A.1.9 Consumption Measurement Results after Repair Work

No.	Apartment No.	Residents Number		Unit Date	Before repair	Before Re-repair					After completion			
		Declared	Actual			Dec.23	Jan.6	Jan.9	Jan.20	Reduction rate (%)	Jan.27	Reduction rate (%)	Feb.23	Reduction rate (%)
		(1)	(2)											
1	14	145	137	Time		11:00	12:35	3:55	4:05		10:00		14:40	
				Value (m ³)		74,332	74,952	75,075	75,543		75,834		77,074	
				Difference (m ³)		0	620	743	1,211		291		1239.84	
				lpcd (1)	451	0	305	309	314	30	277	39	317	30
				lpcd (2)	478	0	323	327	332	30	293	39	335	30
2	11	107	134	Time		12:55	12:40	3:45	3:55		10:15		14:55	
				Value (m ³)		60,608	61,109	61,198	61,609		61,874		62,856	
				Difference (m ³)		0	502	591	1,002		265		982.19	
				lpcd (1)	496	0	335	333	352	29	342	31	340	31
				lpcd (2)	396	0	268	266	281	29	273	31	271	31
3	12	89	127	Time		12:40	12:40	3:50	4:00		10:20		14:50	
				Value (m ³)		53,416	54,101	54,351	54,939		55,162		56281.8	
				Difference (m ³)		0	685	935	1,524		223		1119.43	
				lpcd (1)	684	0	550	633	644	6	345	50	466	32
				lpcd (2)	480	0	385	444	451	6	242	50	326	32
4	9	110	137	Time		12:45	12:45	3:30	3:50		10:10		16:30	
				Value (m ³)		73,784	74,918	75,120	75,770		76,022		76917.0	
				Difference (m ³)		0	1,134	1,336	1,986		252		894.55	
				lpcd (1)	1003	0	736	732	679	32	316	68	301	70
				lpcd (2)	805	0	591	587	545	32	254	68	242	70
5	15	131	174	Time		12:50	12:50	4:00	4:10		10:05		14:45	
				Value (m ³)		2,454	3,034	3,161	3,651		3,990		5339.5	
				Difference (m ³)		0	580	707	1,198		339		1349.47	
				lpcd (1)	590	0	316	325	344	42	356	40	382	35
				lpcd (2)	444	0	238	245	259	42	268	40	287	35
Total		582	709	Difference (m ³)		0	3,521	4,313	6,920		1,370		5,585	
				lpcd (1)	631	0	432	446	447	29	325	49	352	44
				lpcd (2)	518	0	355	366	367	29	267	49	289	44

Table A.1.10 Assumption for Composition of Water Consumption

Item	Value (lpcd)	Rate (%)
Real Demand	150	23.8
Leakage	279	44.2
Wastage	202	32.0
Total	631	100.0

The per capita consumption in the table is calculated based on declared resident number as mentioned previously. As shown in the table, actual demand of residents is only 24%, and wastage of people accounts for 32%, which is larger than the real demand. It means meter installation for each flat will be necessary to reduce water consumption till real demand.

2) Cost

Table A.1.11 shows the repair costs for target apartment.

Table A.1.11 Repair Cost for Target Apartment

Item	Value	
(1) Total target flat number	194	
(2) Repaired flat number	75	
Cost (US\$)	Parts	5,140
	Labor cost	2,100
	Total	7,240

Table A.1.12 shows calculated average repair cost for each flat divided into (1) total target flat number and (2) repaired flat number as shown in Table A.1.11. The repair cost for each repaired flat was around 100 US \$. This repair work was carried out thoroughly for water service equipment, and if the repair was limited to stop leakage, the cost could be reduced to half.

Table A.1.12 Average Repair Cost for each Flat

Division	Item	Costs (US\$)
Case (1) Average Cost (US\$)	Parts	26.5
	Labor Cost	10.8
	Total	37.3
Case (2) Average Cost (US\$)	Parts	68.5
	Labor Cost	28.0
	Total	96.5

(3) Conclusions

- 1) The actual number of the residents was more than the declared number by 20%.
- 2) Though carrying out leakage repair work, per capita consumption of 631 L/cap/day was reduced to 352 L/cap/day by 44%. There was a distinct difference in water consumption before and after repairing.
- 3) Reduction of water consumption to less than 330 L/cap/day of Norm, which was one of the purposes of this pilot project, was not achieved.
- 4) The cost was about US\$ 37 per flat, which is the average number of flats targeted. For the flat in which repair work was carried out, cost went up to US\$ 97 per flat. It is possible that cost can go down depending on the skill of the labors.
- 5) Since the quality of the parts used for repair work was poor, water leakage could not be stopped completely by applying the usual working method. Thus, standardization of the materials will be required.

A.2.1 Pilot Project on Introduction of the Tariff System using Bulk Meter for Apartment Building

(1) Purpose

To evaluate the possibility of introducing the tariff system using bulk meters for apartment buildings as an alternative way of installing meter inside of each flat in apartment buildings.

(2) Methodology

Questionnaire survey, which is shown in the next page, was carried out from January 12 to 16, 2004. 20 apartments randomly selected from the 200 apartments (located in 5 apartment buildings) where indoor equipment was repaired through the "Repair of Water Service Equipment for Apartment Flats" Pilot Project.

(3) Result

- All respondents replied that they were satisfied with the quality of the water supply upon the Pilot Project completion, with the majority being not satisfied before the Pilot Project started. Water leakage decrease was mentioned by the majority of the respondents as a result of the Pilot Project, while only a few mentioned the water pressure improvement.
- The absolute majority of respondents are strongly opposed to the bulk water meter system, explained by the perception that their own water consumption is very small compared to their neighbors due to full-time employment and other reasons. Some of the respondents replied that they did not care about using the bulk meter system in their apartment building, as long as individual meters are installed in their own flats. An assumption about an increase of the existing norms did not affect the negative attitude of the respondents towards this issue.
- Many respondents expressed, as a comment, their desire for an individual water meter installed. Generally, the respondents should have been aware about the fact that the water meter costs should be eventually paid by the customers, possibly in installments.

- None of the respondents would agree to the repair similar to the Pilot Project, if it was necessary for them to pay for it, even in a smaller amount and in installments. Lack of funds for such repair was named as the most common reason.

(4) Conclusion

The tariff system using bulk meters for apartment buildings as an alternative way of installing a meter inside each flat in an apartment building is theoretically applicable; however, it would not be practically applicable if it were introduced after Vodokanal repairs inside water leakage for free. The reason is that domestic customers disagree with the allocation methodology based on the reading of bulk meters.

Note:

The Questionnaire sample was not representative from a statistics point of view (nor the sample taken for the Pilot Project itself). Therefore, the Questionnaire results cannot be extrapolated to the whole population; however, these results might indicate the most common opinion of domestic customers regarding the questions raised in this Questionnaire.

Questionnaire for the residents living in apartments repaired from the funds of Japan International Cooperation Agency

1. *Were you satisfied with the service of water supply before the repair?*

- Yes No

What was the reason(s) if you replied "No", other than tariffs? (please select whatever applicable)

- | | |
|---|--|
| <input type="checkbox"/> A. Water is colored | <input type="checkbox"/> B. Water pressure is too low |
| <input type="checkbox"/> C. Water availability is too low | <input type="checkbox"/> D. Water temperature not cold enough |
| <input type="checkbox"/> E. Water taste is not good enough | <input type="checkbox"/> F. Water is not safe enough |
| <input type="checkbox"/> G. Attitude of Inspector is not good | <input type="checkbox"/> H. Availability of maintenance staff is low |
| <input type="checkbox"/> I. Other _____ | |

2. *Are you satisfied with the service of water supply after the repair?*

- Yes No

3. *After the repair, what has improved? (please specify whatever applicable)*

- Water pressure has improved Other _____

4. *If the tariff system is changed to a metered system that the total consumption volume in a building is read at a bulk meter and then this volume is allocated to each flat according to the number of residents, would you agree with this idea?*

- Yes Yes, if _____
(Please state the conditions, e.g. using another method of allocation)

- Never _____
(Please state the reasons)

5. *If Vodokanal significantly increases the water fees paid according to the norms, would you agree with the bulk meter system as it was described in Q 4 above?*

- Yes Yes, if _____
(Please state the conditions)

- Never _____
(Please state the reasons)

6. *The repair in your flat was made free of charge for you. Would you agree for this repair if you had to pay for it (the actual repair cost was on average about 36,000 soums per flat)?*

- Yes, if the maximum cost is _____ soums and it has to be paid back within _____ years

- Never _____
(Please state the reasons)

If you have any additional comments, please write them below or on the back side of this sheet:

A.3.1 Public Relations and Awareness Activities

(1) Purpose

Since increasing water-saving awareness among users is essential to prevent wasteful use of water resources, a pilot project was conducted in order to evaluate the effectiveness of various public relations and awareness activities by comparing differences in monthly water consumption per capita before and after these activities.

(2) Methodology

- 1) The following public relations activities to increase water-saving awareness were conducted on residents living in apartments with water meters.

Description of the program	Participants
a) Show a video of the TV program and commercial created by Vodokanal (explanations about Vodokanal's activities and the need to save water)	7 households
b) Seminar (presentations on the need to save water, how to save water and how to deal with water leakage)	9 households
c) Distribute leaflets (explanations on the need to save water, how to save water and how to deal with water leakage)	10 households
d) Direct visits by inspectors to each household (explanations on the need to save water, how to save water and how to deal with water leakage)	10 households

- 2) Measure the volume of water consumed for the first month (December 2003) and second month (January 2004) after the implementation of public relations activities and compare it with the average monthly volume of water consumed during the three months (September to November 2003) prior to the implementation of public relations activities, to monitor if there are any significant differences in the consumption volume.
- 3) Conduct a questionnaire survey to investigate whether there are any changes in their water-saving awareness after the implementation of the public relations activities.

(3) Result

- 1) Monthly water consumption per capita before and after the implementation of public relations activities are as follows:

Table A.3.1 Water consumption per capita before and after PR activities

(Unit: m³)

	Before PR activities (a)	1 month after PR activities (b)	2 months after PR activities (c)	Average of 2 months after PR activities (d)	Rate of change (%) [(d)/(a)]-1
a) TV	6.38	4.99	5.96	5.47	-14%
b) Seminar	4.08	3.22	3.60	3.41	-16%
c) Leaflet	3.50	3.11	2.85	2.98	-15%
d) Inspector	3.79	2.72	2.89	2.82	-26%

The monthly average water consumption per capita for 20 households in which public relations activities were not carried out decreased by 8% from 4.8m³ during the 3 months (September to November 2003), to 4.4m³ for the following two months (December 2003 to January 2004). Even though seasonal factors were taken into consideration, water consumption decreased for all the programs after public relations activities were conducted. Under the activity in which inspectors visit and instruct directly to householders, the volume of water consumption per capita decreased most significantly.

- 2) The following changes in water-saving awareness after public relation activities were observed through the questionnaire survey.

Result 1. Was there any change in water-saving awareness after Vodokanal conducted public relations activities to promote water saving?

- a) Yes, I try to save water more than before – 67%
b) No, there is no significant change – 33%

100% of participants in program (a), 56% of participants in program (b), 60% of participants in program (c) and 60% of participants in program (d) answered that their water saving awareness has increased after they participated in those programs.

Result 2. (For those who answered “Yes” in Result 1), how did you save water?

- | |
|--|
| <ol style="list-style-type: none">1. I hand-washed the laundry if the amount was small – 30%2. I became sensitive to closing the tap more often– 25%3. I repaired water leakages – 23%4. I washed vegetables and dishes in a container– 18%5. I decreased the frequency and time to take shower or bath – 4%6. I used water other than tap water – 0%7. I used buckets filled with water when I wash cars – 0% |
|--|

The most popular methods to save water are “hand-wash the laundry if the amount is small”(30%), “close the tap more often” (25%) and “repair water leakage ” (23%).

Result 3. (For those who answered “No” in Result 1), why did you not save water?

- | |
|---|
| <ol style="list-style-type: none">1. Because water saving is not hygienic – 46%2. Because water is cheap – 36%3. Because it is troublesome to save water – 18%4. Because there is plenty of water – 0% |
|---|

The main reason for not saving water is “Because it is not hygienic”(46%). However, 36% of the participants who did not save water answered, “Because water is cheap”.

Result 4. Do you want to participate in Vodokanal’s public relations activities again?

- a) Yes – 44%
- b) No –56%

43% of participants in program (a), 56% of participants in program (b), 50% of participants in program (c) and 30% of participants in program (d) answered that they wanted to participate in Vodokanal's public relations activities again.

Result 5. How would you like to obtain information about water supply services?

- | |
|--|
| <ol style="list-style-type: none">1. TV and radio – 45%2. Vodokanal staff (directly, by phone or at the counter) – 33%3. Periodical meetings – 7%4. Leaflets – 7%5. Public relation magazines of the City or Vodokanal – 5%6. Internet – 3% |
|--|

The most popular methods are “TV and Radio”(45%) and “Vodokanal staff (directly, by phone or at the counter)” (33%).

(4) Conclusion

As a result of the pilot program, water consumption has decreased for each type of program after public relations activities were conducted, which leads to the conclusion that these activities do have a certain effect on increasing water-saving awareness among users. In so far as the activities conducted in the pilot project, direct visit by inspectors turned out to be the most effective way to increase water-saving awareness among users.

B. Questionnaires Survey

B.1 Domestic Customers Awareness

B.1.1 Outline of the Survey

(1) Purpose of the Survey

The main purpose of this survey is:

- 1) To investigate domestic customers' satisfaction with water supply services, their needs, their life styles related to water consumption, and their awareness about environmental issues; and
- 2) To reflect their opinion in the Study and to make improvements in the future water supply services.

(2) Areas covered in the Survey

- 1) Evaluation of the water supply services
- 2) Water saving awareness
- 3) Current water tariff
- 4) Water tariff system
- 5) Public relations for the water supply services

(3) Methodology

- 1) Preliminary survey: A preliminary survey was conducted with a sample of 40 households to test the design of the questionnaire. The results were analyzed and necessary adjustments were made in order to obtain the final version of the questionnaire that was applied in the full-scale survey.
- 2) Survey Area: The respondents were selected from 11 districts in Tashkent City proportionally.
- 3) Sample size: The respondents were selected from four categories according to the type of residence and availability of water meters at their residence.

Water meter	Preliminary Survey		Full-scale Survey	
	Detached houses	Apartments	Detached houses	Apartments
Installed	10	10	110	110
Not Installed	10	10	110	110

- 4) Sampling method: Random sampling
- 5) Date of implementation: October 2003 for the preliminary survey and December 2003 for the full-scale survey
- 6) The quantity of work: 8days (4 persons × 2day) for the preliminary survey and 90 days (10 persons × 9days) for the full-scale survey

B.1.2 Summary of the Results

(1) Evaluation of the water supply services

21% of the respondents answered “Dissatisfied” with the current water supply services, which together with those who answered “Neither satisfied nor dissatisfied”, accounted for 63% of the total. On the other hand, those who answered “Satisfied” accounted for 37%. The respondents were asked to evaluate each of the following conditions of the water supply services, which are ordered from the most frequent to the least for each satisfaction level (“Satisfied” and “Dissatisfied”):

Table B.1.1 Domestic Customers Satisfaction Level

Satisfied		Dissatisfied	
Smell	62%	Repair service	43%
Taste	55%	Pressure	22%
Color	53%	Safety	20%
Stability	43%	Stability	18%
Pressure	40%	Color	12%
Safety	32%	Taste	11%
Repair service	15%	Smell	6%

There is some dissatisfaction concerning repair services. 43% of the respondents answered that they were dissatisfied with the current repair services. In regard to the quality of water

supply, the domestic customers are relatively positive toward it. However, water safety, water pressure, and supply stability are evaluated comparatively poor, compared with the quality of water in terms of smell, taste and color. In addition, the results of the survey made clear that the improvement of “Quality of water”, “Repair service”, “Water pressure” and “Supply stability” were on top of the wish list of a bigger proportion of respondents than the improvement of “Water tariff and tariff system”. 64% of the respondents answered that they were satisfied with the current level of water tariff and quality of water supply services. 24% of them answered that the quality of water supply services should be improved, even though water tariff will be increased. Only 12% of them answered that water tariff should be lowered, even though the quality of water supply services will be worsened. Most of the domestic customers want to keep the charges and quality of water supply services at the same level as now. Generally, they would not accept lower prices with lower services. This could indicate that there is still some willingness to pay to improve water supply services, and for some aspects, an even higher willingness to pay to avoid its worsening.

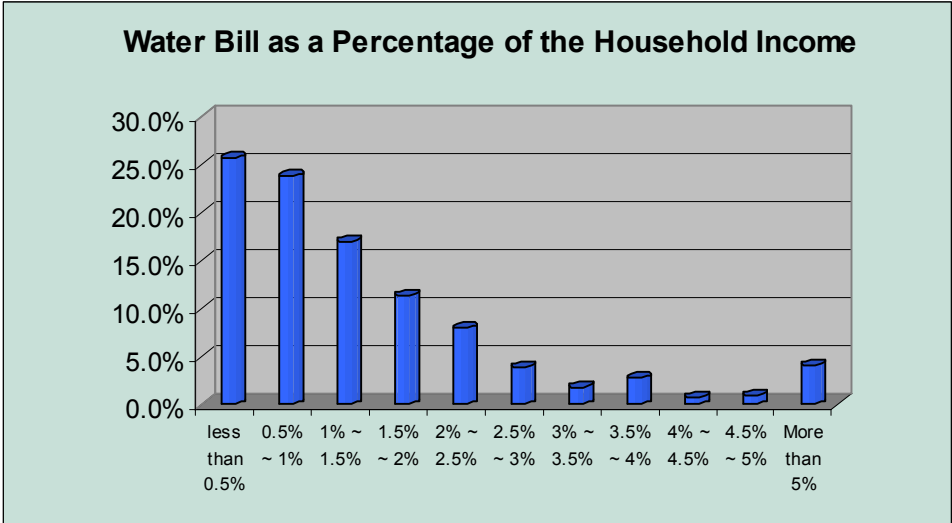
(2) Water Saving Awareness

The result from the questionnaire indicates that the respondents are quite positive towards water saving. Only 8% of them answered negatively. Among those who answered negatively, 85% of them live in residence without a water meter. The main reason for such negativity is “Because water charges does not change whether I save water or not”. As can be seen, although domestic customers are conscious of water saving, under the norm tariff system in which the tariff charged does not change regardless of the amount of water consumed, there are no incentives to save water and thus this consciousness will not be translated into specific water saving activities. In addition, considering the response of 84% of the respondents living in residence with a water meter who answered that water saving awareness had increased after the meters were installed, a significant improvement in water saving can be expected if efforts are concentrated in installing meters for the rest of the customers.

(3) Current Water Tariff

While 53% of the respondents evaluated the current tariff level as “Adequate”, 46% of them replied that it was “Expensive” (including those who answered “Unaffordable”). Only the remaining 1% of them answered that it was “Cheap”. On the other hand, as for the portion of water payment in the household income, on average, about 1.5% of the household income is being spent on cold water and wastewater. About 4% of respondents spend more than 5% of their household income for cold water and wastewater. Assuming the affordability level is 5% of the average household income, the present tariff appears to be affordable for most of the households.

Table B.1.2



(4) Water Tariff System

In regard to the tariff system, 11% of the respondents disagree with the metered tariff system. 36% of them agree with both the metered tariff system and the two-part tariff system. 53% of them agree with the metered tariff system but disagree with the two-part tariff system. The main reason for the 57% of those who answered that they “agree with the metered tariff system but disagree with the two-part tariff system“ is that “it is reasonable to be charged according to water consumed, so, I oppose to the fixed part”. It is expected that domestic customers will oppose to the fixed part of the two-part tariff system, as they consider it as a norm. Therefore, it might be necessary to provide explanations of the

purpose and benefits of the two-part tariff system to them deliberately, when the two-part tariff system is implemented.

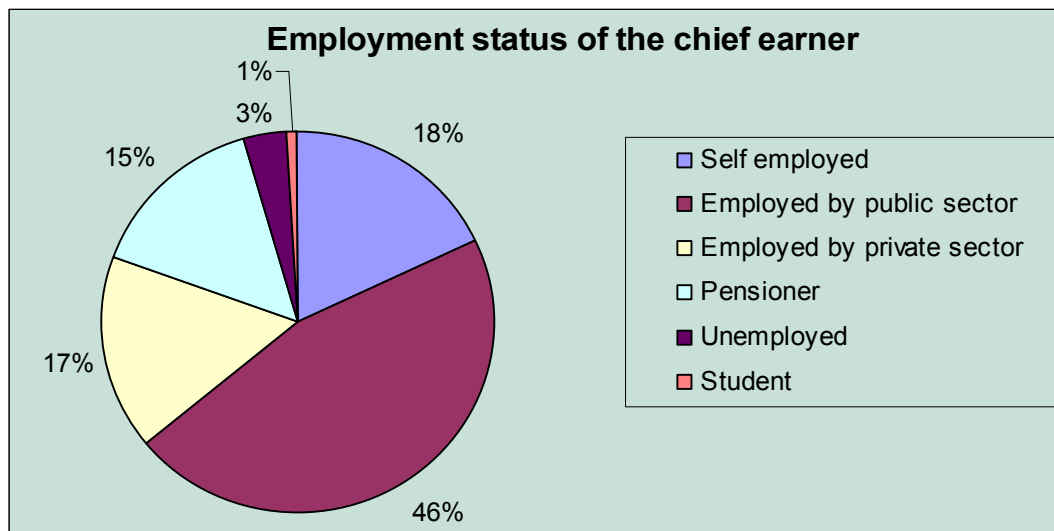
(5) Public Relations for the Water Supply Services

In relation to the public activities on water supply services, 29% of the respondents answered “Dissatisfied”, which together with those who answered “Neither satisfied nor dissatisfied” accounted for 78% of the total. Only 22% of them answered that they were “Satisfied”. The information most wanted by the respondents is about “Water quality” (26%), “Water tariff and tariff system” (23%) and “Contents of the services offered” (12%). Those who have obtained information on water supply services in the past account for 63% of the total. 83% of them acquired the information through indirect communication, such as TV and radio. Only 17% of them obtained the information through direct communication, such as conversations with Vodokanal’s staff and periodic meetings. Since some respondents (24%) also requested direct communication such as information counters and periodic meetings/gatherings with Vodokanal staff, it might be desirable that a Public Relations Department be established and information counters be installed, while continuing with publicity on TV and radio, in order to provide information on water quality, water tariff and any other information which customers may want to know.

B.1.3 Results of the Survey

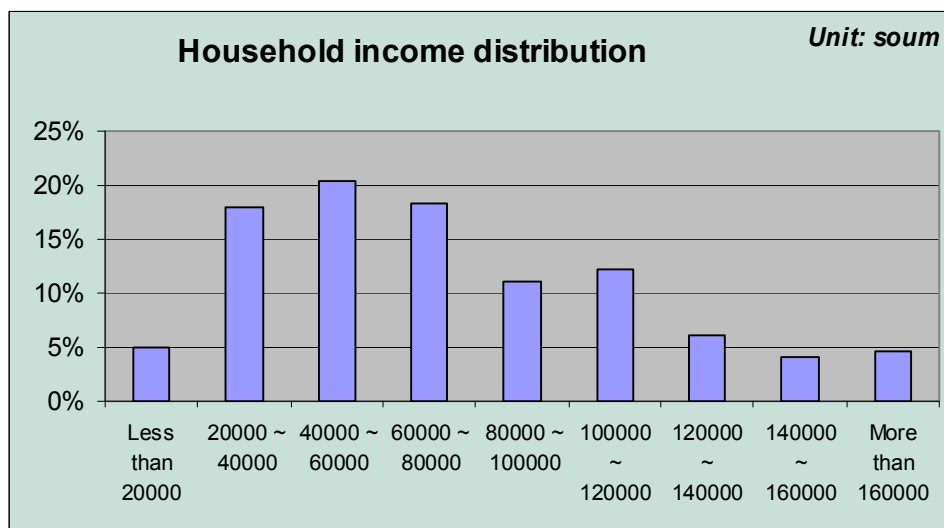
(1) Background

Result 1. What is the employment status of the chief earner of the household?



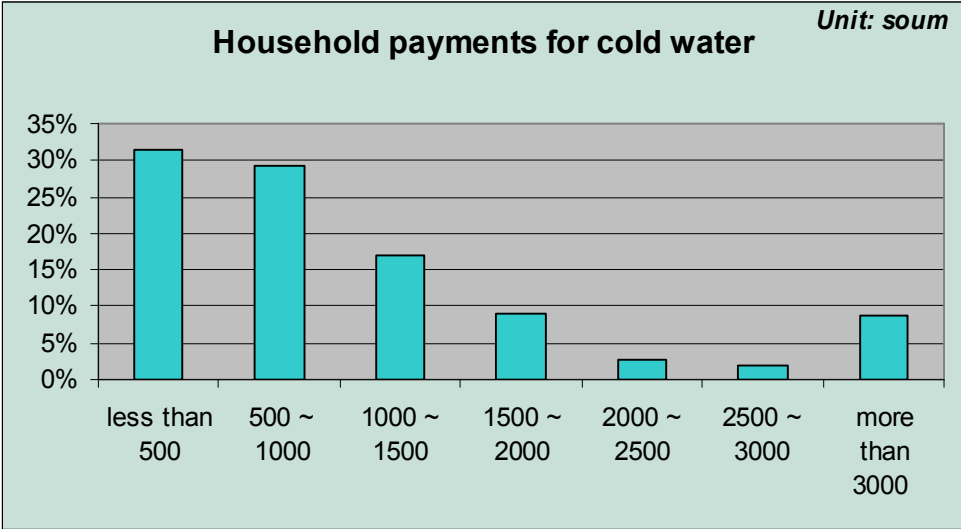
The majority of the respondents are employed. Public employees account for the major share while 15% of the respondents are pensioners.

Result 2. How much is your monthly household income?



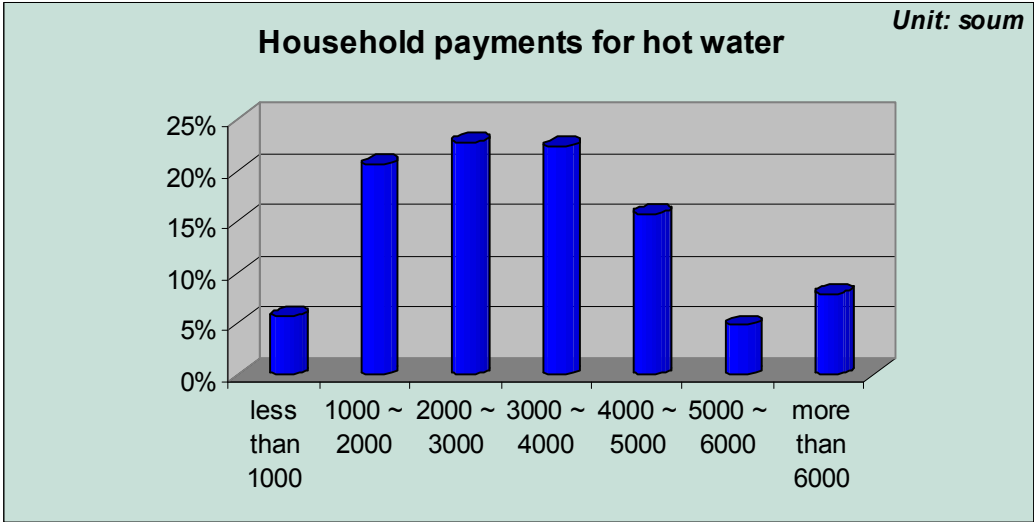
The monthly average income of a household is 75,000 soums. The monthly average income for a household with a pensioner is 32,600 soums.

Result 3. How much do you pay for receiving water supply and sewage service per month?



The average monthly bill for receiving the cold water supply and sewage service is 770 soums. For households with meters installed, the average amount is 600 soums, whereas for households without meters, the average amount is 940 soums. For the norm tariff system, a household consisting of four members pays 871 soums per month ($22 \text{ soums/m}^3 \times 330 \text{ liters} \times 30 \text{ days} \times 4 \text{ persons} / 1000 = 871$) for only receiving the cold water supply. Although the average monthly bill for households with meters (600 soums) includes the payment for both receiving water supply and sewage service, this amount is less than the amount paid under the norm tariff system (871 soums).

Result 4. How much do you pay for your hot water per month?



Most of the households living in apartments and some of the households living in detached houses are supplied with hot water. The average monthly bill for hot water is 3,200 soums.

(2) Evaluation of the water supply services

Result 5. Are you satisfied with the current water supply services?

- 1) Very satisfied — 1%
- 2) Satisfied — 36%
- 3) Neither satisfied nor dissatisfied — 42%
- 4) Dissatisfied — 18%
- 5) Very dissatisfied — 3%

Those who answered “Dissatisfied” accounted for 21% of the respondents, which together with those who answered “Neither satisfied nor dissatisfied” accounted for 63% of the total. Those who answered “Satisfied” accounted for 37%.

Result 5.1. (For those who answered “Dissatisfied” or “Very dissatisfied” in Result 5)
Which areas do you think need to be improved?

- 1) Quality of water — 25%
- 2) Repair services to fix water leakages and other problems — 20%
- 3) Stability of water supply — 17%
- 4) Water pressure — 17%
- 5) Public relations and information disclosure such as financial statements — 8%
- 6) Water tariff and water tariff system — 7%
- 7) Water tariff payment systems — 6%

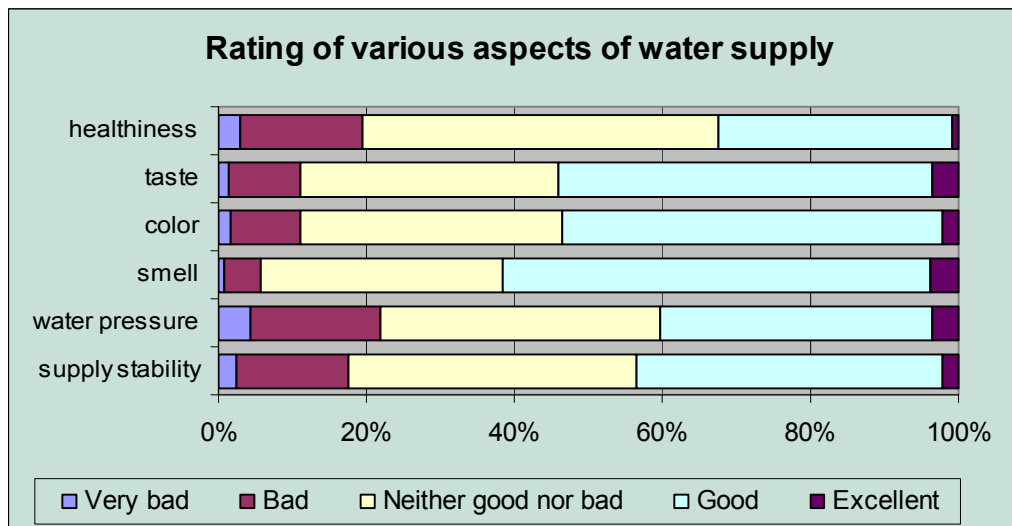
The most frequent answer is the improvement of “Quality of water (25%)”. Only 7% of the respondents answered that the water tariff and tariff system should be improved.

Result 6. How do you think water supply services should be in the future?

- 1) I am satisfied with the current level of water tariff and quality of cold water services. — 64%
- 2) The quality of water supply services should be improved, even though water tariff will be increased. — 24%
- 3) Water tariff should be reduced, even though the quality of water supply services will be worsened. — 12%

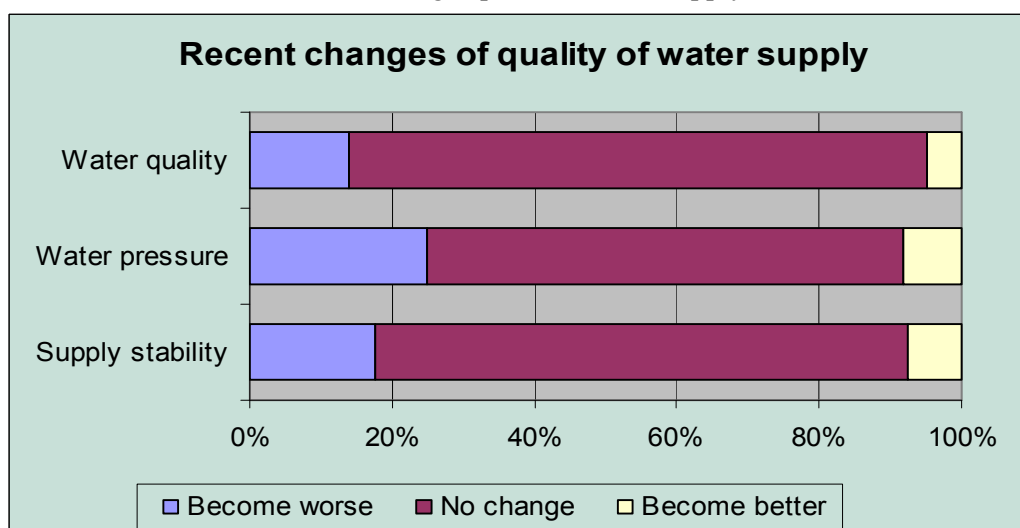
Whereas 46% of the respondents answered that the current water tariff was “Expensive” or “Unaffordable” in Result 17, only 12% of them answered that “Water tariff should be reduced, even though the quality of cold water services will be worsened”.

Result 7. How do you evaluate the following aspects of water supply?



Many respondents are satisfied with the quality of water in terms of taste, color and smell. Compared with taste, color and smell, safety, water pressure and supply stability are relatively rated poorly.

Result 8. Have you noticed any changes in the last few years regarding the following aspects of water supply?



Most of the respondents have not noticed changes in the water quality within the last few years. However, 25% of the respondents answered that water pressure had worsened. And also, 18% of them answered that the supply stability had worsened.

Result 9. Do you drink water directly from the tap?

- | |
|--------------|
| 1) Yes — 54% |
| 2) No — 46% |

Result 9.1. (For those who answered “No” in Result 9)

What is the most important reason for not drinking water directly from the tap?

- | |
|-----------------------|
| 1) Water safety — 48% |
| 2) Habit — 35% |
| 3) Color — 13% |
| 4) Taste — 2% |
| 5) Smell — 2% |

46% of the respondents do not drink water directly from the tap. There is a large proportion that indicated safety as the reason for not drinking water directly from the tap. It can be assumed that some domestic customers worry about water safety.

Result 10. How is the condition of water in your house?

- | |
|---|
| 1) It is almost always clear. — 61% |
| 2) It is sometimes turbid when opening the tap, but after a few minutes it turns clear. — 37% |
| 3) It remains turbid if I don't leave the tap open. — 2% |

Whereas 69% of the respondents living in detached houses answered that water was “Almost always clear”, 52% of them living in apartments replied that water was “Almost always clear”.

Result 11. How often do you experience interruptions?

- | |
|--------------------|
| 1) Very often – 7% |
| 2) Sometimes – 40% |
| 3) Rarely – 45% |
| 4) Never – 8% |

92% of the respondents have experienced interruptions in water supply, but only 7% of them answered “Very often”. While 3% of the respondents living in detached houses answered that interruptions occurred “Very often”, the number increased to 10% for respondents living in apartments.

Result 12. Are you usually supplied with cold water 24 hours a day?

- | |
|--------------|
| 1) Yes – 94% |
| 2) No – 6% |

While 4% of the respondents living in detached houses answered that “Water is not supplied 24 hours a day”, the number increased to 9% for respondents living in apartments.

Result 13. Do you have water leakages in your house?

- | |
|--------------|
| 1) Yes – 16% |
| 2) No – 84% |

While 15% of the respondents living in detached houses have water leakages, 17% of them living in apartments have water leakages. Even among households with meters, 15% of them have water leakages. Moreover, 65% of the respondents who have water leakages answered that they were dissatisfied with the repair services.

Result 14. Are you satisfied with the repair services?

- | |
|---|
| 1) Very satisfied — 0% |
| 2) Satisfied — 15% |
| 3) Neither satisfied nor dissatisfied — 42% |
| 4) Dissatisfied — 29% |
| 5) Very dissatisfied — 14% |

43% of the respondents answered “dissatisfied” with the repair services, which together with those who answered “Neither satisfied nor dissatisfied”, accounted for 85% of the total. The respondents living in apartments are especially dissatisfied, judging from 51% of those who responded so. They might be dissatisfied with the TSZh, which are responsible for repair and maintenance of the apartments.

Result 14.1 (For those who answered “Dissatisfied” or “Very dissatisfied” in Result 14)

What is the main reason why you feel dissatisfied with the repair services?

- | |
|---|
| 1) Because it is too expensive. — 51% |
| 2) Because it takes too long for a repairman to come. — 29% |
| 3) Because it breaks down again right after repairs. — 20% |

The main reason for dissatisfaction is “Repair cost is too expensive”, which accounts for 51% of the total.

(3) Water saving awareness

Result 15. Can you make efforts to save water?

- | |
|--------------|
| 1) Yes — 92% |
| 2) No — 8% |

Result 15.1 (For those who answered “No” in Result 15)

What is the main reason for not making efforts to save water?

- 1) Because water tariff will not change whether I save water or not. — 45%
- 2) Because saving water is not hygienic. — 29%
- 3) Because there is plenty of water. — 10%
- 4) Because saving water is troublesome. — 10%
- 5) Because water tariff is cheap. — 3%
- 6) Because I don't know how to save water. — 3%

Most of the respondents are quite positive towards water saving. Among respondents who answered negatively, 85% of them live in residences without meters. The frequent reasons for not making an effort are “Because there is plenty of water” and “Because water saving is not hygienic” in households with meters, while for households without meters, the main reason is “Because water charges will not change whether I save water or not”.

Result 16. Was there any change in water saving awareness after the water meter was installed?

- 1) I try to save water more than before. — 84%
- 2) There was almost no change. — 16%

84% of the respondents living in residences with meters answered that water saving awareness had increased after the meters were installed.

(4) Current water tariff

Result 17. What do you think about the current water tariff?

- 1) Cheap — 1%
- 2) Appropriate — 53%
- 3) Expensive — 45%
- 4) Can not afford to pay — 1%

While 53% of the respondents answered that the current tariff was “Appropriate”, 46% of them responded that it was “Expensive” (including those who answered “Unaffordable”). Only 1% of them replied that the current water tariff was “Cheap”.

Result 18. How has your water bill changed after the water meter was installed?

- 1) It became cheaper. — 78%
- 2) There is almost no change. — 14%
- 3) It became more expensive. — 8%

78% of respondents living in residences with meters answered that their water bill had decreased after the meter was installed.

(5) Water tariff system

Result 19. Do you agree with the metered tariff system?

- 1) Yes — 89%
- 2) No — 11%

Result 19.1 (For those who answered “No” in Result 19)

What is the main reason why you do not agree?

- 1) Because water tariff will increase. — 28%
- 2) Because water tariff will change every month. — 26%
- 3) Because I do not want an inspector to come home and read the meter. — 23%
- 4) Because it is expensive to install a water meter. — 23%

89% of the respondents agree with the metered tariff system. For those who do not agree, the main reason is “because water tariffs will increase”.

Result 20. (For those who answered “Yes” in Result 19)

Do you agree with the progressive tariff system?

- 1) Yes — 50%
- 2) No — 50%

50% of the respondents who agree with the metered tariff system do not agree with the progressive tariff system.

Result 21. (For those who answered “Yes” in Result 19)

Do you agree with the two-part tariff system?

- 1) Yes – 40%
- 2) No – 60%

Result 21.1 (For those who answered “No” in Result 21)

What is the main reason why you do not agree?

- 1) It is reasonable to pay based on water consumed. So, I oppose to the fixed part.
– 57%
- 2) Because water charges will be increased. – 37%
- 3) Because I don’t understand it. – 6%

Regarding the two-part tariff system, 60% of the respondents who agree with the metered tariff system do not agree with it. The main reason for disagreement is because “It is reasonable to pay based on water consumed. So, I oppose to the fixed part”.

Result 22. How would you like to pay the water bill?

- 1) Pay directly to the inspectors – 44%
- 2) Pay at the bank or the post office – 33%
- 3) Pay at Vodokanal – 18%
- 4) Withdraw from bank account – 5%

The most frequent answer is “To pay directly to the inspectors”, which accounts for 44% of the total. Only 5% of the respondents prefer that the payment be withdrawn directly from their bank accounts.

Result 23. How would you like your water bill to be calculated if a bulk meter for the whole apartment complex is installed?

- 1) According to the number of occupants – 85%
- 2) According to the number of taps in your apartment – 10%
- 3) According to the area of your apartment – 4%
- 4) According to the number of rooms in your apartment – 1%

85% of the respondents consider that the water bill should be charged according to the number of occupants if a bulk meter is installed.

Result 24. Do you agree to imposing penalty on a payment defaulter?

- | |
|--------------|
| 1) Yes – 60% |
| 2) No – 40% |

60% of the respondents agree with penalty measures.

(6) Public relations for the water supply services

Result 25. Have you ever obtained information about water supply services?

- | |
|--------------|
| 1) Yes – 63% |
| 2) No – 37% |

Result 25.1 (For those who answered “Yes” in Result 25)

How did you get such information?

- | |
|---|
| 1) TV and radio – 73% |
| 2) Vodokanal staff (directly or by phone) – 13% |
| 3) Newspaper – 10% |
| 4) Meetings – 4% |

63% of the respondents have received information about water supply services. 83% of them obtained information through the local media. Hardly any respondents received information directly from Vodokanal.

Result 26. Are you satisfied with Vodokanal’s public relations?

- | |
|---|
| 1) Very satisfied – 0% |
| 2) Satisfied – 22% |
| 3) Neither satisfied nor dissatisfied – 49% |
| 4) Dissatisfied – 24% |
| 5) Very dissatisfied – 5% |

There is some dissatisfaction concerning information provided by Vodokanal. 29% of the respondents answered “Dissatisfied”, which together with those who answered “Neither satisfied nor dissatisfied” accounted for 78% of the total. Only 22% of them answered that they were “Satisfied”.

Result 26.1 (For those who answered “Dissatisfied” or “Very dissatisfied” in Result 26)
What kind of information do you want to know about?

- 1) Quality of water— 26%
- 2) Water tariff and water tariff system— 23%
- 3) Contents of services offered by Vodokanal— 12%
- 4) Water saving method— 8%
- 5) Repairing method for water leakage— 8%
- 6) Notice of interruption and schedule of construction of waterworks— 8%
- 7) Financial and management condition of Vodokanal— 8%
- 8) Conditions of water supply sources at the time of water shortage— 7%

26% of respondents consider that information on “Water quality” is lacking, followed by “Water tariff and water tariff system” (23%) and “Contents of services offered” (12%). The domestic customers are interested about the quality of water and water tariff.

Result 27. Where would you like to obtain information?

- 1) TV and radio — 52%
- 2) Vodokanal staff (directly, by phone or at the counter)— 17%
- 3) Pamphlets — 12%
- 4) Public magazines — 9%
- 5) Periodic meetings/gatherings — 7%
- 6) Internet — 3%

The most popular means is “TV and radio”. “Vodokanal staff (directly, by phone or at the information counter)” is also a frequent answer.

B.2 Officers/Staff awareness

B.2.1 Outline of the Survey

(1) Purpose of the Survey

The main purpose of this survey is:

- 1) To elucidate employee's opinion, awareness and social attitudes toward water supply services; and
- 2) To reflect their opinion in the "Study" and to make improvements in the future organizational and institutional reform plans.

(2) Areas covered in the Survey

The survey covers employee's opinion about the following issues:

- 1) Water supply services
- 2) Privatization
- 3) Current water tariff and tariff system
- 4) Public relations of the water supply services
- 5) Working conditions

(3) Methodology

- 1) Preliminary survey: The preliminary survey was used to test the design of the questionnaire and to identify necessary changes. The results were analyzed and necessary adjustments were made in order to obtain the final version of the questionnaire that was applied in the full-scale survey.
- 2) Number of respondents: The respondents were selected from executive officers and staffs of Vodokanal and Tashkent Municipal Utilities Operation Association (hereinafter referred to "TKEO"), which consisted of employees from administrative and technical department proportionally.

Officer/staff Level	Preliminary survey		Full-scale survey	
	TKEO	Vodokanal	TKEO	Vodokanal
Executives	3	10	2	40
Other staff	-	10	3	40

3) Methods: Interviewing method

4) Date of implementation: November 2003 for the preliminary survey and December 2003 for the full-scale survey

B.2.2 Summary of the Results

(1) Water supply services

As can be seen from the answer of 96% of respondents who consider that the current water supply service is not sufficient, most of the employees think that, if the current conditions do not improve, a stable water supply will not be possible in the future. However, many employees regarded that the deteriorated facilities and lack of funds as critical issues. 55% of respondents answered that the current condition of facilities was “very bad” or “bad”. Many employees pointed out that the replacement of deteriorated facilities was necessary but there were not enough funds for investment. Among employees, “Repair of water leakage” and “Enlightenment activities on water saving” are considered as the most important tasks. They think that an excessive amount of water is being supplied due to water leakage and wasteful use of water by the users. They consider that the most important issue is to reduce excessive water wastage. The most popular answers for a solution, which employees suggested, were “Rehabilitate distribution pipe line”, “Install water meters at every residence”, “Increase water tariff” and “Enhance public activities on water saving”.

(2) Privatization

Although 63% of respondents agree to privatization, most of them do not think Vodokanal can be privatized under the current conditions. Among employees, the deteriorated facilities and restricted profit regulated by law are considered as critical issues for privatization. They agree in the sense that the privatization procedures should be implemented gradually and deliberately. In addition, although management reforms such as improve-

ment of business efficiency and enhancement of customer services is important for successful privatization, such awareness is still not widespread among employees.

(3) Current water tariff and tariff system

In regard to the current water tariff, while 60% of respondents consider that the current tariff is cheap, 7% of respondents think it is expensive. The remaining 33% of respondents consider that the current tariff is adequate. Many executives think that the current water tariff cannot cover the total cost, so the increase of water tariff cannot be avoided. As for the water tariff system, since employees focused on preventing wasteful use of water, 89% of respondents agree with the introduction of the progressive tariff system. However, when it comes to the two-part tariff system, 56% of respondents are against it mainly because users would not approve of a tariff system in which water will be charged even if it is not used.

(4) Public relations of the water supply services

As can be seen in the answer of 82% of respondents who consider that the current public relations with users is insufficient, many employees understand the necessity of strengthening public activities. Because employees consider avoiding wasteful use of water as necessary, their suggestions are focused primarily on enhancing activities to promote water saving awareness. However, some employees also noted the need to disclose information about water supply services such as water quality and financial conditions to users. Although many employees understand the importance of public relation activities, they pointed out the lack of funds and personnel.

(5) Working environment

81% of respondents are satisfied with their current job. On the other hand, 86% of them are dissatisfied with their current salary. In addition, 94% of them agree with the implementation of performance-based salary. Most of the employees are dissatisfied with their current salary mainly because it's not enough to maintain a decent standard of living and sometimes payments are delayed. In regard to the training system, 69% of respondents answered that it was not sufficient. Many employees do feel the need to reform and im-

prove the training system, and there are a lot of employees who are proactive toward a training program, especially for modern technology and the use of computers. As for the capacity to operate personal computers, 57% of respondents answered that they couldn't operate one. The majority of them do not use a personal computer for their work. There are many employees who requested for an improvement of computer hardware and the introduction of a LAN networking system.

B.2.3 Results of the Survey

(1) Water supply services

Result 1. Do you think that the current water supply service is sufficient?

- | |
|-------------|
| 1) Yes — 4% |
| 2) No — 96% |

97% of executives and 95% of staffs consider that the current water supply service is not sufficient.

Result 2. Can you prioritize the three most important improvements to be applied to the water supply services?

	Priority
1) Repair water leakages indoors and outdoors	1
2) Increase publicity on water saving	2
3) Eradicate deficiency in water pressure	3
4) Improve payment collection systems	4
5) Reform the water tariff system	5
6) Supply high quality water	6
7) Information disclosure such as financial statements and water tariff system	7
8) Reduce the number of water interruptions	8

For executives, the three most important improvements are “Repair water leakages”, “Increase publicity on water saving” and “Reform the tariff system”. For staffs, the three most important improvements are “Repair water leakages”, “Increase publicity on water saving”

and “Eradicate deficiency in water pressure”. None of the employees answered that improvements were not necessary.

Result 3. (For those who work in the technical department)
How do you evaluate the water supply facilities of Vodokanal?

- | |
|-------------------------------|
| 1) Very good – 0% |
| 2) Good – 5% |
| 3) Neither good nor bad – 40% |
| 4) Bad – 45% |
| 5) Very Bad – 10% |

45% of executives and 65% of staffs consider the current condition of facilities as “very bad” or “bad”. The employees raised the following issues regarding the operation and maintenance of the facilities:

- Low efficiency and wasteful use of energy due to deteriorated facilities
- Chronic lack of technology and parts for repair
- Delay of automation and modernization of facilities
- Necessity to replace the plastic pipes
- Insufficient training program
- High employment turnover rate, and lack of highly skilled experts and young specialists

(2) Privatization

Result 4. According to the decision of the Cabinet of Ministers, some of the governmental organizations were proposed on a list as candidates for privatization. Do you know that Vodokanal is on this list?

- | |
|--------------|
| 1) Yes – 78% |
| 2) No – 22% |

86% of executives and 70% of staffs know that Vodokanal is among the candidates for privatization. However, at the staff level, the concept of privatization is not fully understood. Many staffs answered that they didn’t know how privatization might change their

working environment. In addition, although management reforms, such as improvement of business efficiency and enhancement of customer services, are important for successful privatization, such awareness is still not widespread among employees.

Result 5. Do you agree to privatization?

- | |
|--------------|
| 1) Yes — 63% |
| 2) No — 37% |

76% of executives and 50% of staffs agree to privatization. Although many executives agree to privatization, nobody thinks that immediate privatization is possible under the current condition. Employees raised the following issues in regard to carrying out privatization:

- Financial problems
- Deteriorated facilities
- Restricted profit regulated by law
- Threaten their sense of belonging to the organization due to the absence of participation in the management

Result 6. Do you think your working condition will improve after privatization?

- | |
|--------------|
| 1) Yes — 66% |
| 2) No — 34% |

75% of executives and 56% of staffs think that the working condition will improve after privatization.

(3) Current Water Tariff and Tariff System

Result 7. (For those who work in the administrative department)
What do you think about the current water tariff?

1) Expensive — 7%
2) Appropriate — 33%
3) Cheap — 60%

While 68% of executives consider the current water tariff to be cheap, 52% of staffs consider it as cheap. Many executives think that the current tariff cannot cover the total cost, so the increase of tariff cannot be avoided.

Result 8. (For those who work in the administrative department)
Do you agree with the progressive water tariff system?

1) Yes — 89%
2) No — 11%

95% of executives and 83% of staffs agree with the progressive tariff system. Most of the employees, especially among the executives, are very positive about the introduction of the progressive tariff system because they think that it can prevent wasteful use of water by customers.

Result 9. (For those who work in the administrative department)
Do you agree with the two-part water tariff system?

1) Yes — 44%
2) No — 56%

In regard to the two-part tariff system, 50% of executives and 61% of staffs disagree with it. However, at the staff level, the concept of the two-part tariff system is not fully understood. The main reason for disagreement is because customers will not approve of a tariff system in which water will be charged even if it is not used. Regarding the introduction of the two-part tariff system, employees raised the following problems that they had encountered in introducing the metered tariff system:

- Increase of illegal connection to pipelines
- High installation cost of water meters
- Frequent breakdown of water meters

- Ineffective tariff collection method and shortage of inspectors
- Incomplete customer data

(4) Public Relations of the water supply services

Result 10. (For those who work in the administrative department)

Do you think the current level of public relations is enough?

1) Yes – 18%

2) No – 82%

In respect to public relations, 91% of executives and 74% of staffs answered that the current level of activities was insufficient. From the activities that are lacking, most of the employees consider that promoting water saving is the most important. Employees suggested that the following activities are necessary to improve public relations:

- Advertisement through the media for saving water
- Enlightenment activity by inspectors about methods for saving water
- Seminars on water saving in cooperation with the Mahalla Committees
- School seminars to teach the importance of water saving to children
- Explanation about how water is supplied and how much it costs
- Explanation about water quality
- Disclosure of information such as financial statements

(5) Working Conditions

Result 11. Are you satisfied with your current job?

1) Yes – 81%

2) No – 19%

78% of executives and 85% of staffs answered that they were satisfied with their current job.

Result 12. Are you satisfied with your current salary?

- | |
|-------------|
| 1) Yes— 14% |
| 2) No— 86% |

83% of executives and 90% of staffs are not satisfied with their current salary. The fact that current salaries are not enough to maintain a decent standard of living and the delay in salary payments are the main reasons for their dissatisfaction.

Result 13. Do you agree to a performance-based salary?

- | |
|-------------|
| 1) Yes— 94% |
| 2) No— 6% |

94% of executives and 93% of staffs agree to a performance-based salary.

Result 14. Do you think the current Vodokanal training program is sufficient?

- | |
|--------------|
| 1) Yes — 31% |
| 2) No — 69% |

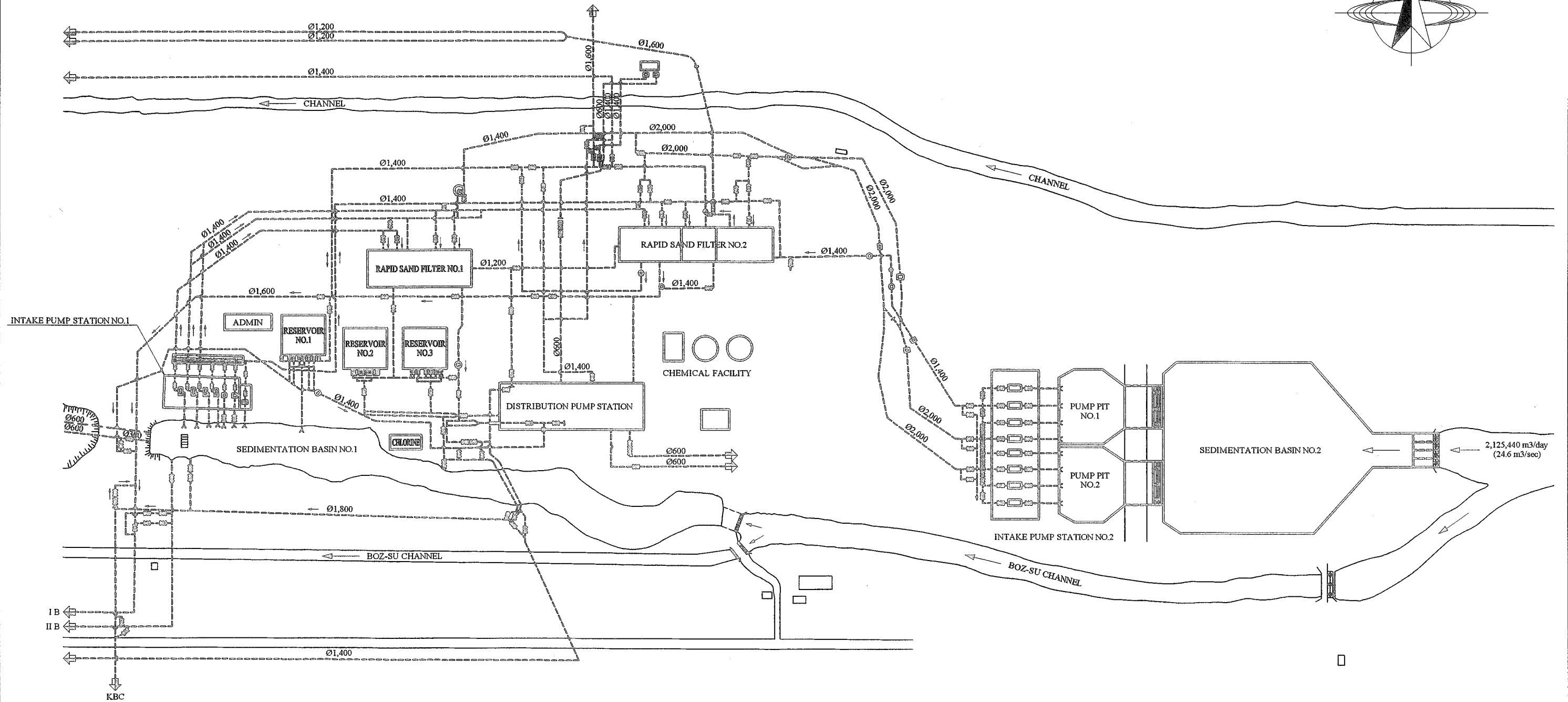
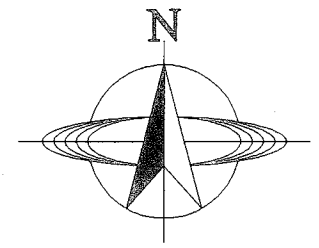
74% of executives and 64 % staffs feel that the current training programs offered by Vodokanal are insufficient. Additionally, many employees answered that they had not received any training at all, and some of them did not even know about the existence of such programs. Even some employees who have attended some training programs pointed out that the content was outdated and impractical. Employees' demand for training is relatively high, especially for those related with modern technology, such as automation, as well as the use of computers.

Result 15. Can you operate a personal computer?

- | |
|--------------|
| 1) Yes — 43% |
| 2) No — 57% |

In regard to the capacity to operate personal computers, 58% of executives and 56% of staffs gave a negative answer. Even among the employees who gave an affirmative answer, many of them said that they could handle only simple operations. Hardly any employees use computers for their daily work.

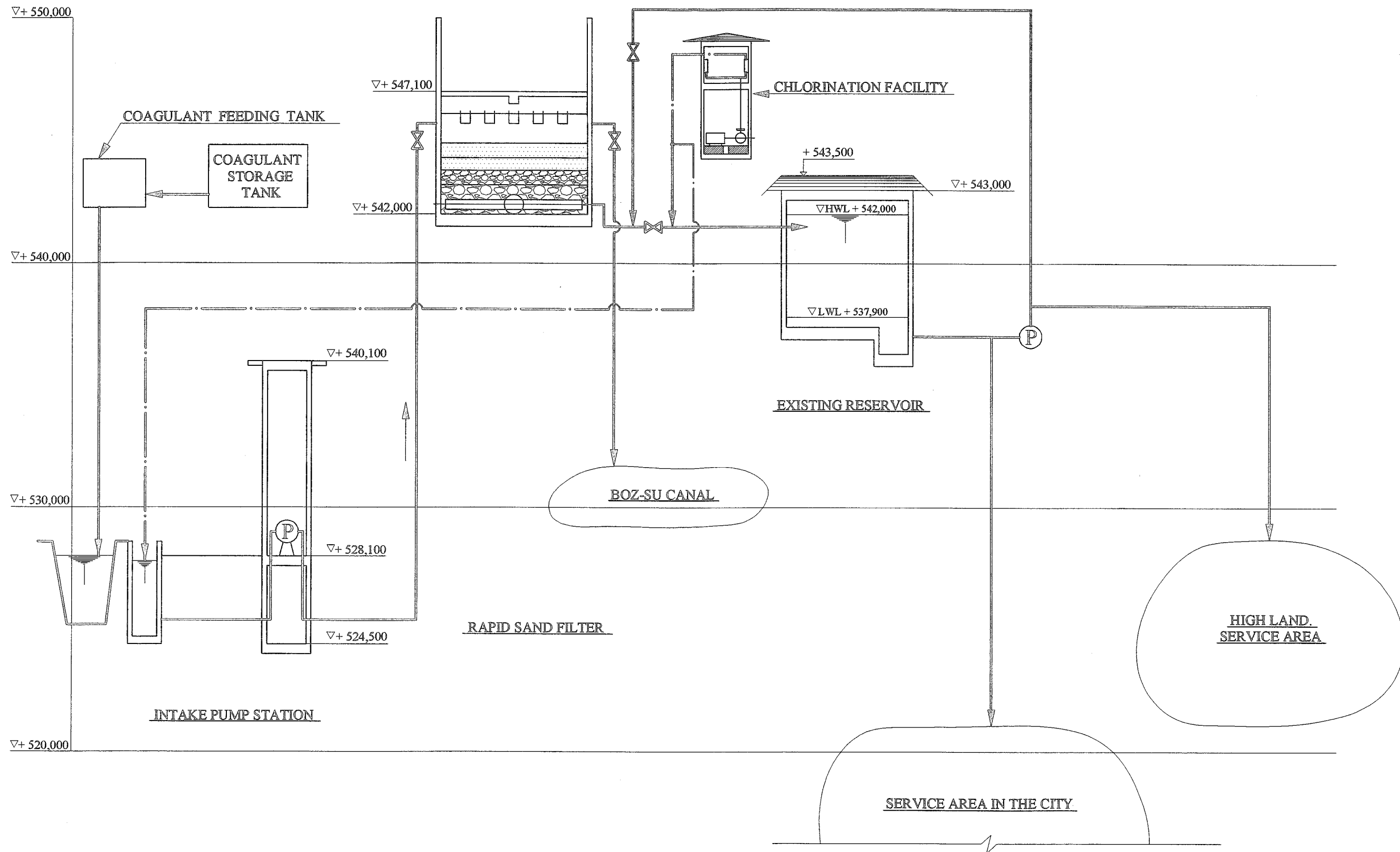
C. Drawings



KADIRYA WTP LAYOUT PLAN

NOT TO SCALE





KADIRYA WTP HYDRAULICS PROFILE

NOT TO SCALE



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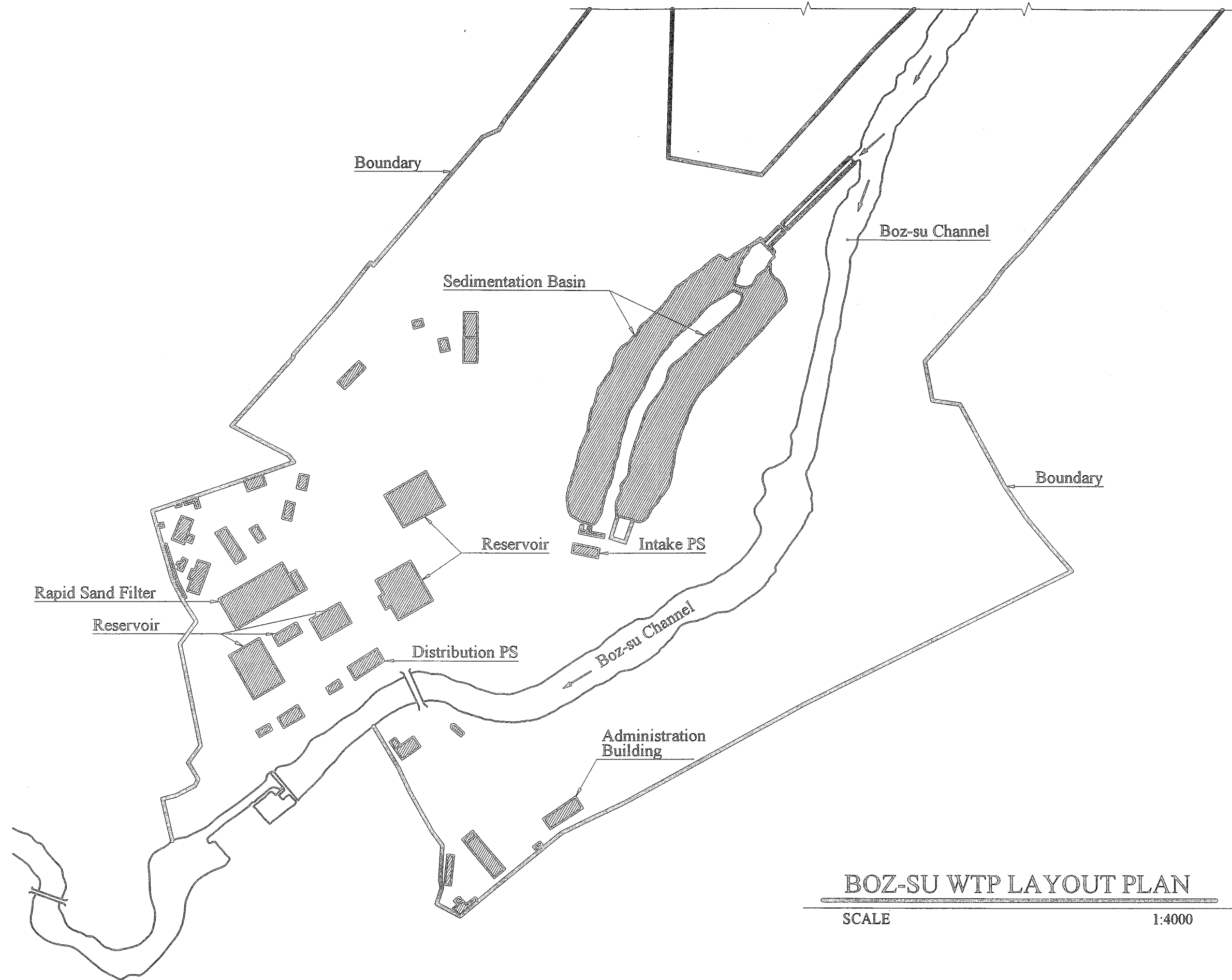


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THE STUDY ON RESTRUCTURING OF
WATER SUPPLY SYSTEM OF TASHKENT CITY

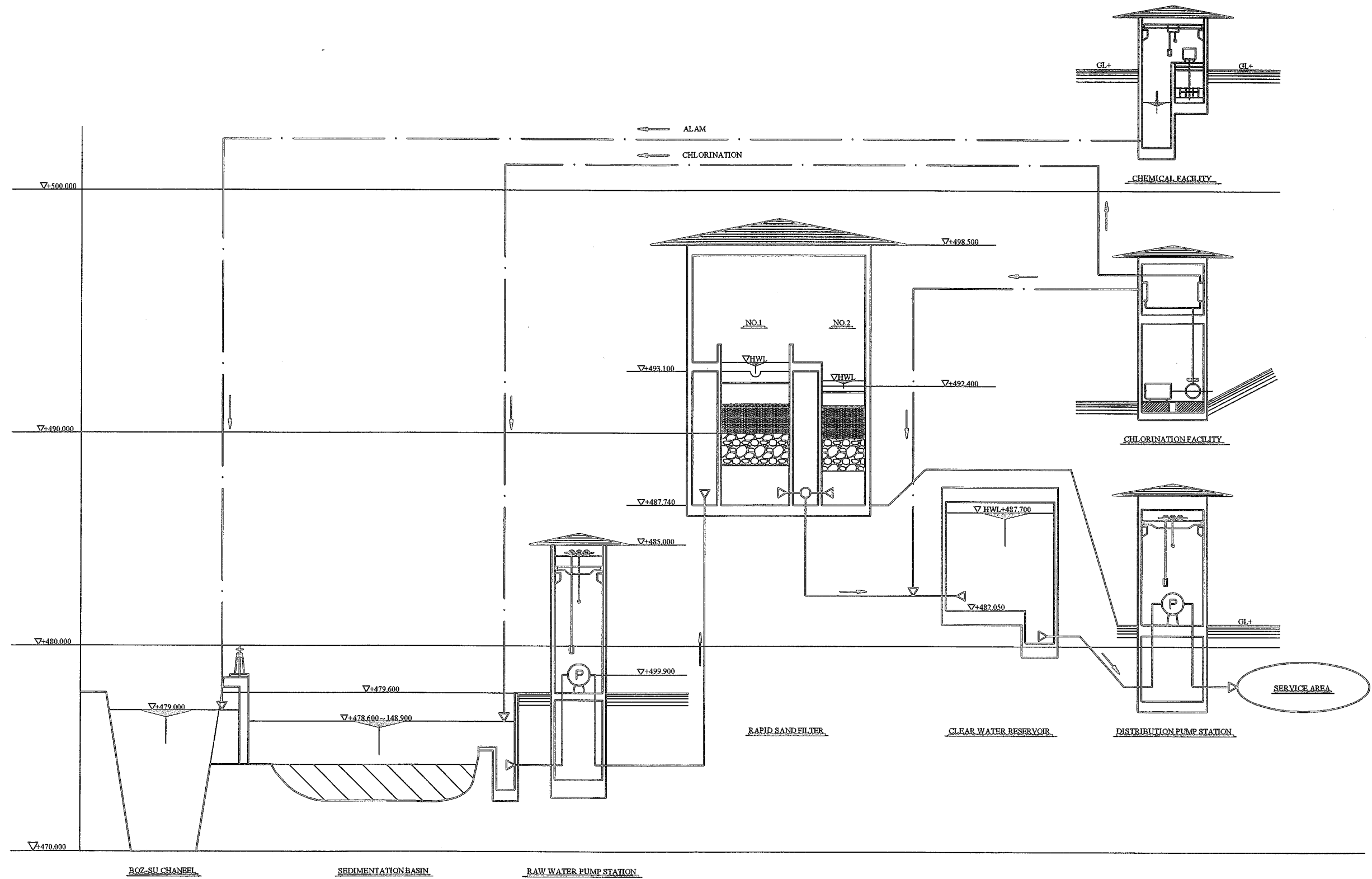
KADIRYA WTP HYDRAULICS PROFILE

DRW. NO.	C-2
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BOZ-SU WTP LAYOUT PLAN

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BOZ-SU WTP HYDRAULICS PROFILE

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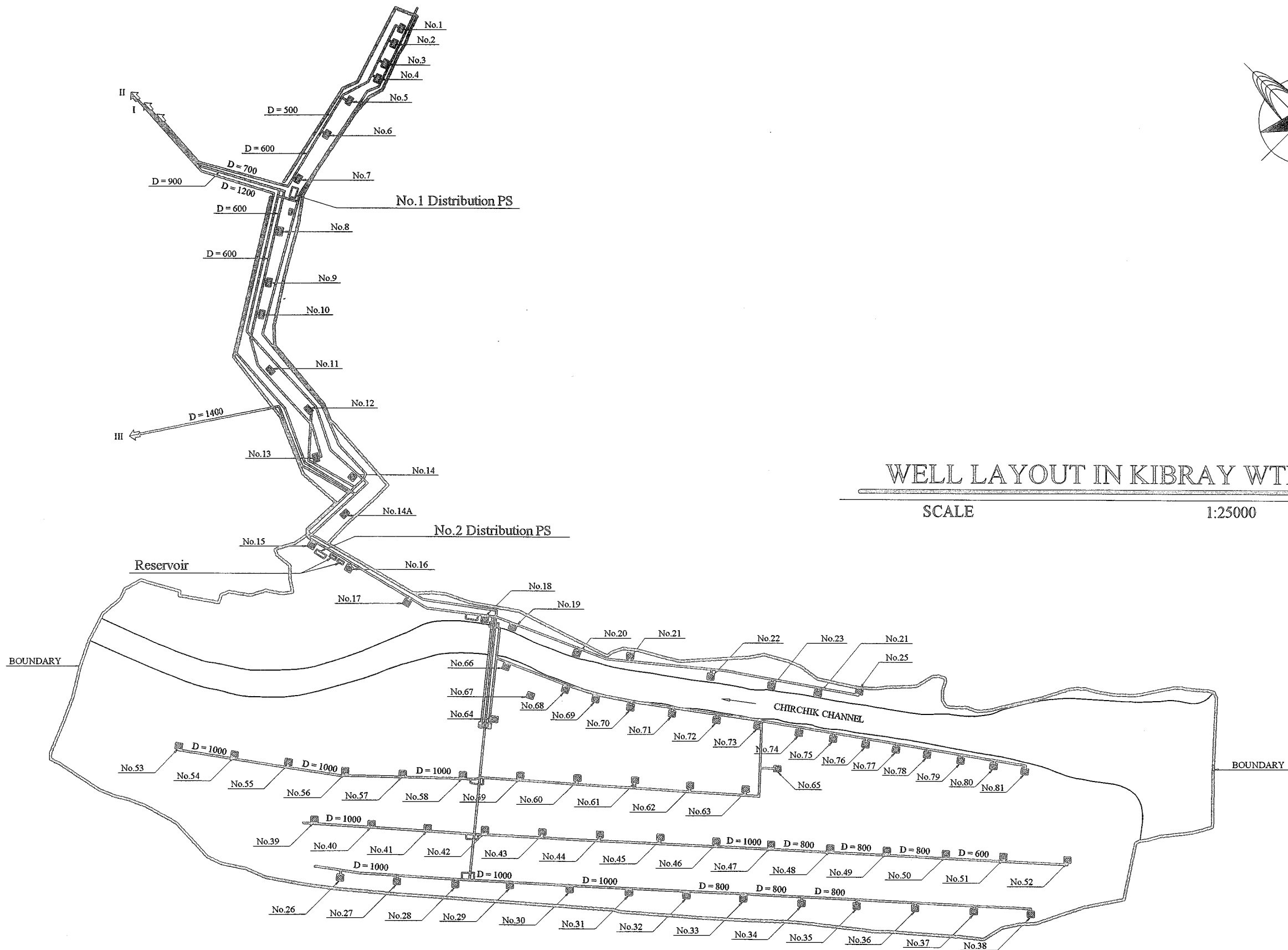


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BOZ-SU WTP HYDRAULICS PROFILE

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WELL LAYOUT IN KIBRAY WTP

SCALE 1:25000



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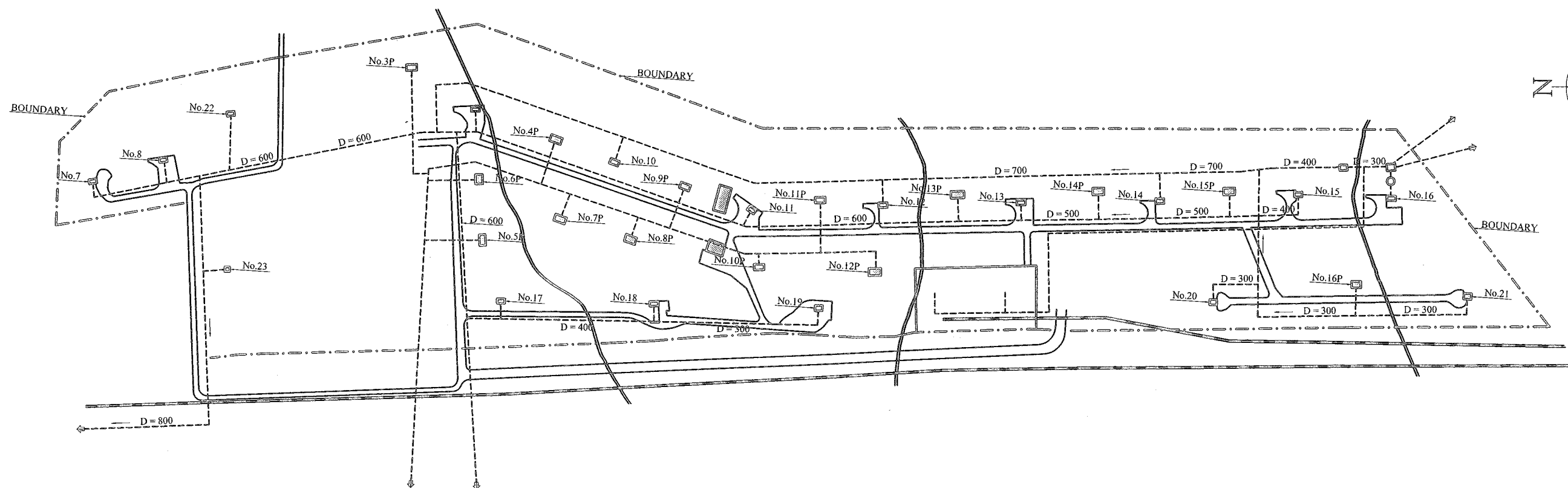


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KIBRAY WTP LAYOUT PLAN

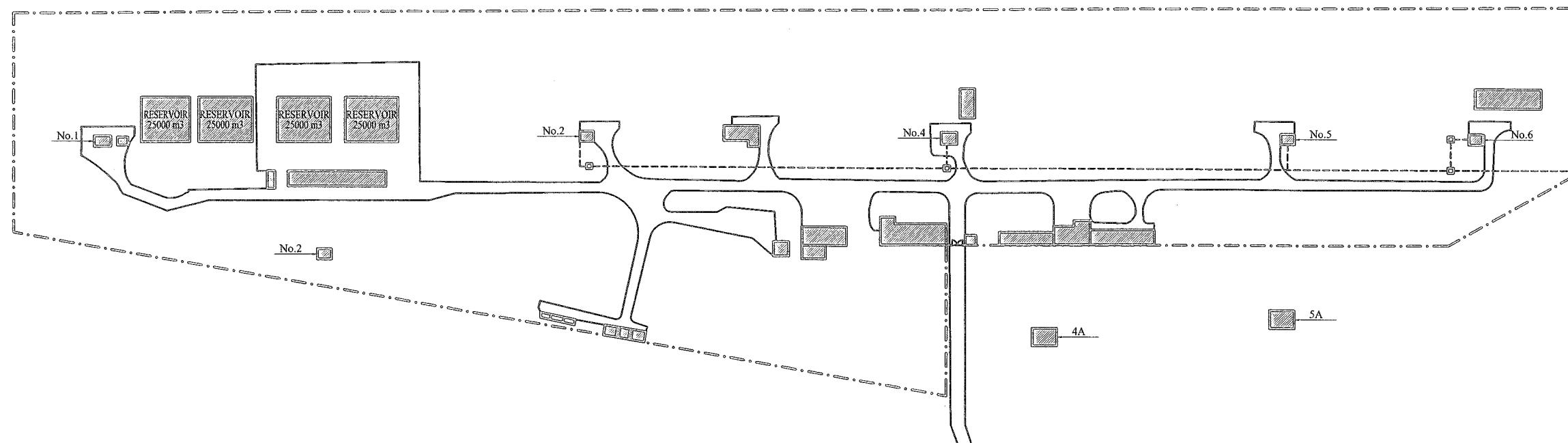
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SOUTH WTP LAYOUT PLAN NO.2

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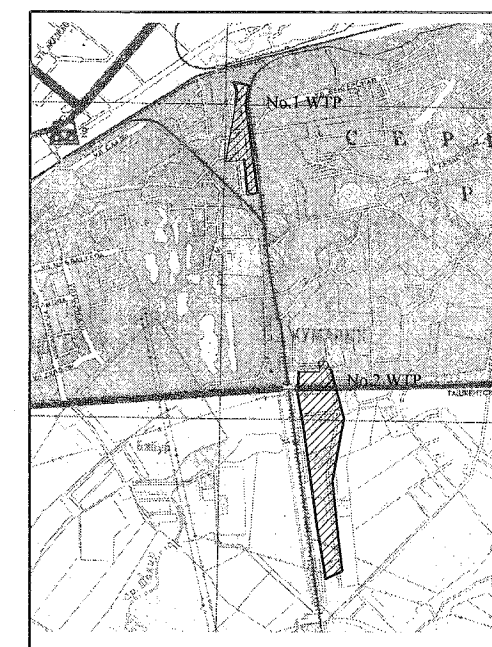


SOUTH WTP LAYOUT PLAN NO.1

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LOCATION MAP



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WATER SUPPLY SYSTEM OF TASHKENT CITY

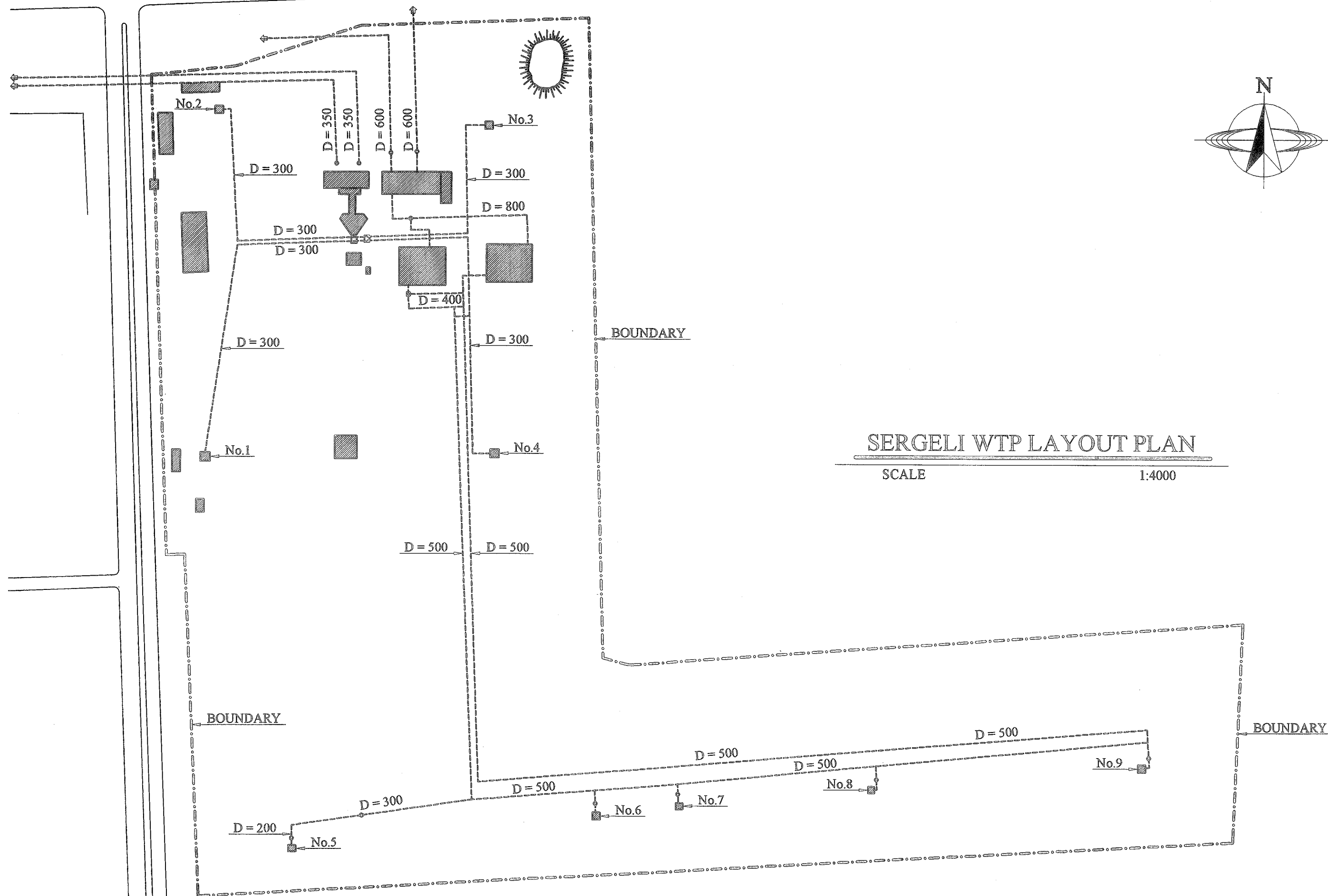
SOUTH WTP LAYOUT PLAN

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SERGELI WTP LAYOUT PLAN

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WATER SUPPLY SYSTEM OF TASHKENT CITY

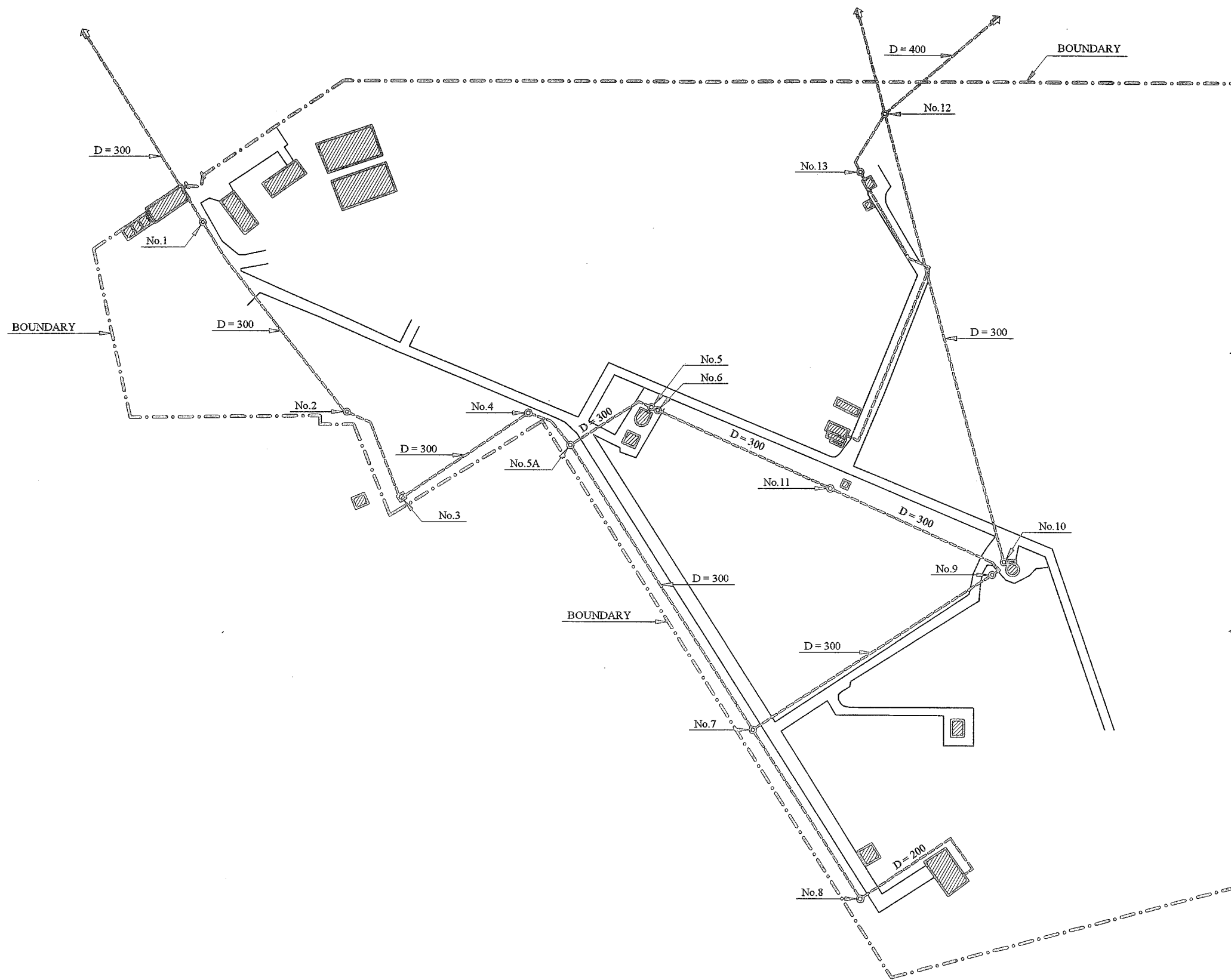
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C-7

SERGELI WTP LAYOUT PLAN

SCALE

1:4000



KARA-SU WTP LAYOUT PLAN

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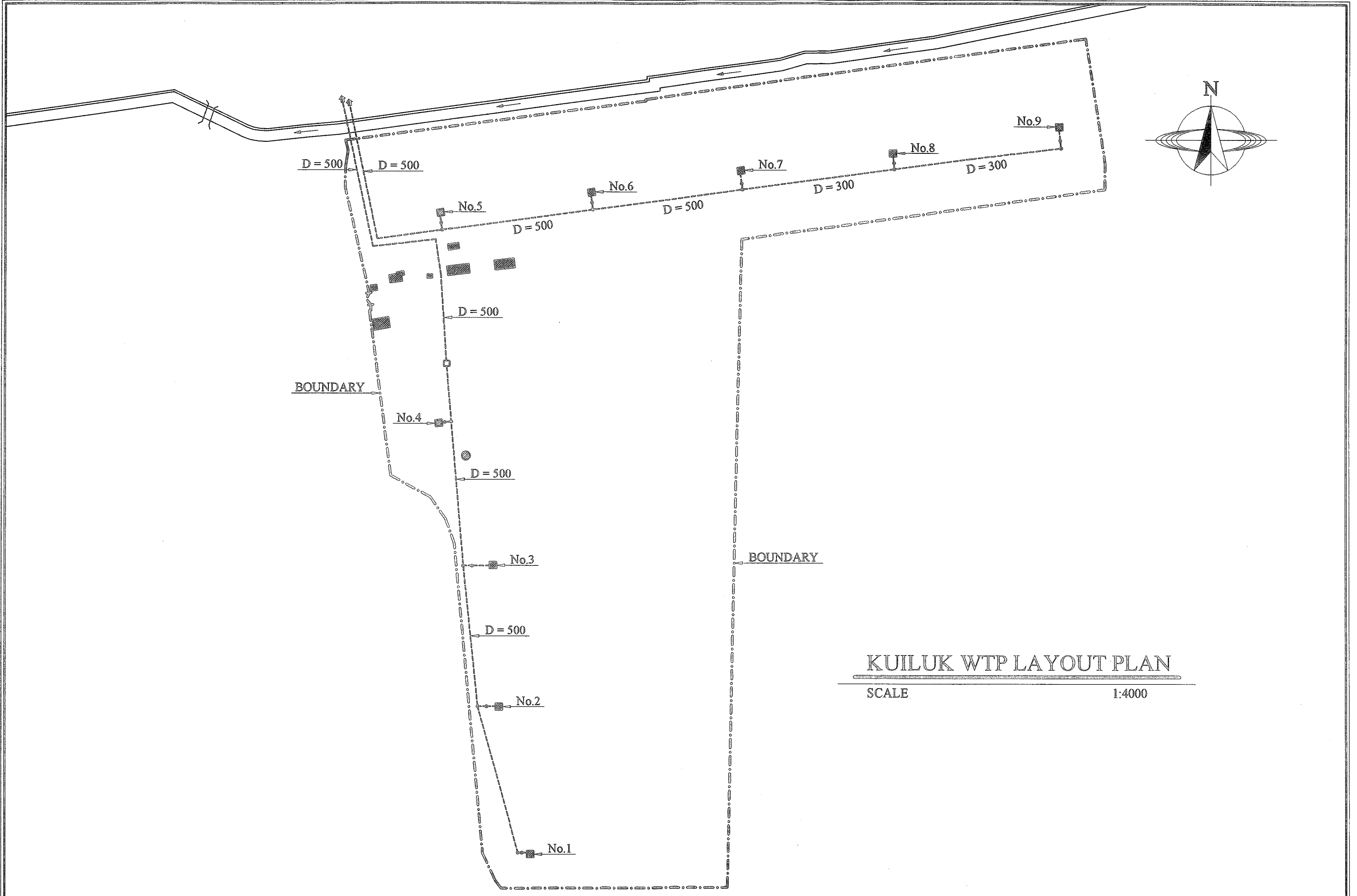
KARA-SU WTP LAYOUT PLAN

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SCALE

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KUILUK WTP LAYOUT PLAN

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