CHAPTER 3

APPENDIX – A32.1

Flow Data of Indus River

A32.1 Flow Data of Indus River

For reference, flow data of the Indus River above the Kotri Barrage from 1976 to 1984 (Feasibility Study for future expansion of Karachi Water Supply System, December 1985) is listed in **Table A32.1.1**. **Figure A32.1.1** shows an average flow rate and **Figure A32.1.2** includes a minimum flow rate and Accord 1991 for the Kotri Barrage which is shown in **Table A32.1.2**. **Figure A32.1.3** shows an allocation of Accord 1991 for each feeder canal from the Kotri Barrage. Distribution to the KB Feeder from the Kotri Barrage under the Accord 1991 is shown in **Figure A32.1.4**.

Table A32.1.1 Flow Rate of the Indus River upstream the Kotri Barrage

Month	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	Average	Minimum
April I	12,700	11,700	20,100	49,500	6,100	16,100	7,700	3,900	16,000	3,900
April II	13,800	10,400	5,500	48,200	11,400	37,100	14,900	13,600	19,400	5,500
April III	15,000	16,300	6,200	55,400	9,600	17,700	19,600	95,400	29,400	6,200
May I	27,400	19,700	14,100	54,800	11,900	70,700	17,200	61,200	34,600	11,900
May II	44,300	10,600	18,800	79,300	11,000	134,100	44,300	55,400	49,700	10,600
May III	53,300	12,700	70,200	78,400	18,600	155,500	40,300	70,500	62,400	12,700
June I	56,000	9,800	105,500	40,700	27,900	159,100	20,900	78,000	62,200	9,800
June II	54,600	44,500	128,100	19,000	37,600	107,000	27,500	109,400	66,000	19,000
June III	125,200	34,200	126,700	82,700	81,700	24,700	35,800	78,500	73,700	24,700
July I	48,500	58,700	146,100	160,500	125,500	86,500	39,500	93,200	94,800	39,500
July II	86,700	122,300	293,600	120,800	98,200	117,000	39,800	148,700	128,400	39,800
July III	232,200	237,100	426,800	174,700	135,400	132,200	39,200	99,100	184,600	39,200
Aug I	332,100	276,600	570,700	242,800	196,300	226,800	34,600	125,800	250,700	34,600
Aug II	489,500	314,100	620,800	290,600	251,800	282,500	91,900	207,900	318,600	91,900
Aug III	728,200	203,600	676,200	175,200	143,800	251,400	217,500	335,000	341,400	143,800
Sep I	418,400	158,700	478,000	84,700	52,500	97,700	115,800	331,200	217,100	52,500
Sep II	467,700	107,600	149,600	19,800	66,500	42,600	17,000	448,600	164,900	17,000
Sep III	242,300	52,100	101,500	31,400	38,500	31,200	15,300	187,600	87,500	15,300
Oct I	75,800	51,800	47,900	33,100	26,300	17,700	25,700	35,000	39,200	17,700
Oct II	45,300	22,300	46,000	19,200	20,600	15,100	16,900	20,900	25,800	15,100
Oct III	26,500	24,600	34,100	10,900	14,800	10,600	14,900	12,400	18,600	10,600
Nov I	22,800	17,500	25,600	9,300	8,600	9,300	14,000	12,300	14,900	8,600
Nov II	19,200	9,500	15,900	8,600	7,100	8,100	4,600	10,900	10,500	4,600
Nov III	15,600	8,700	9,000	7,000	3,900	4,800	2,000	10,400	7,700	2,000
Dec I	16,400	7,600	8,700	6,800	2,600	3,400	1,300	7,100	6,700	1,300
Dec II	15,800	6,600	8,000	4,900	4,500	3,100	1,200	9,100	6,700	1,200
Dec III	10,400	3,100	6,000	3,700	6,300	3,900	14,400	12,400	7,500	3,100
Jan I	17,300	2,300	4,100	2,800	4,700	3,400	17,700	2,700	6,900	2,300
Jan II	24,100	12,000	7,600	16,900	17,600	14,000	8,400	16,200	14,600	7,600
Jan III	19,600	7,800	12,200	15,600	27,300	16,100	2,300	16,000	14,600	2,300
Feb I	25,500	3,500	8,000	9,000	27,800	11,700	6,300	6,500	12,300	3,500
Feb II	18,300	3,200	6,700	2,600	20,000	2,200	6,200	3,700	7,900	2,200
Feb III	7,500	4,500	8,300	1,800	14,200	1,300	7,700	3,000	6,000	1,300
Mar I	5,400	4,100	37,000	1,200	6,400	3,500	3,300	3,300	8,000	1,200
Mar II	7,000	3,800	85,900	2,000	3,400	6,600	1,400	1,700	14,000	1,400
Mar III	10,700	14,000	46,000	2,800	6,000	4,900	1,000	1,000	10,800	1,000

Source: Feasibility Study for Future Expansion of Karachi Water Supply System, Dec. 1985

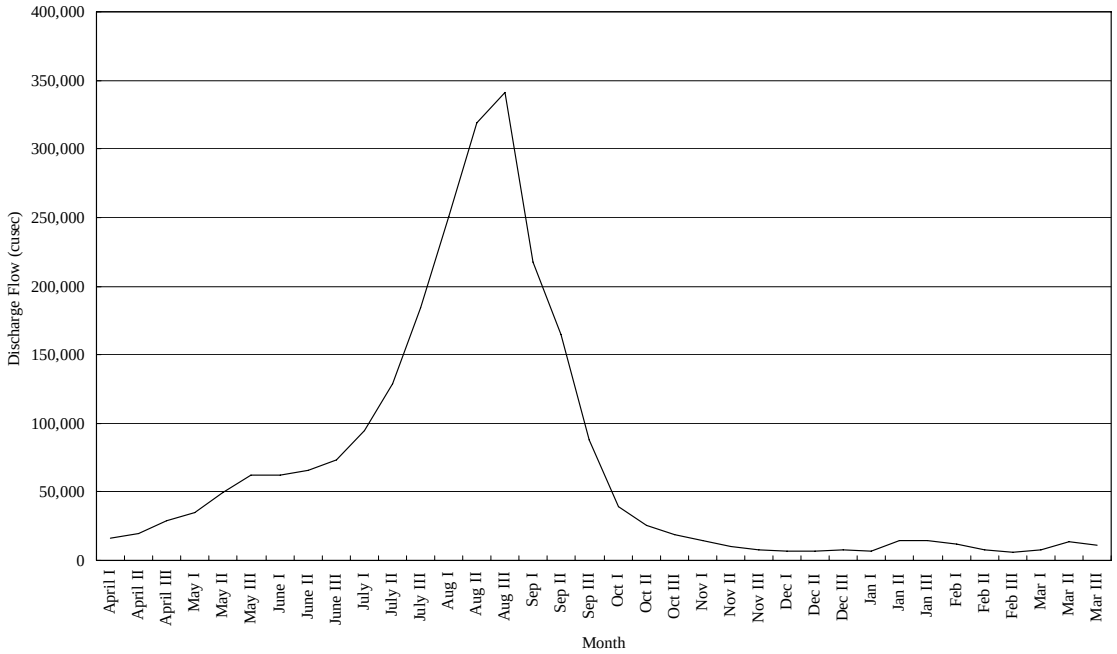


Figure A32.1.1 Average Flow Rate from 1976 to 1984 of the Indus River upstream the Kotri Barrage

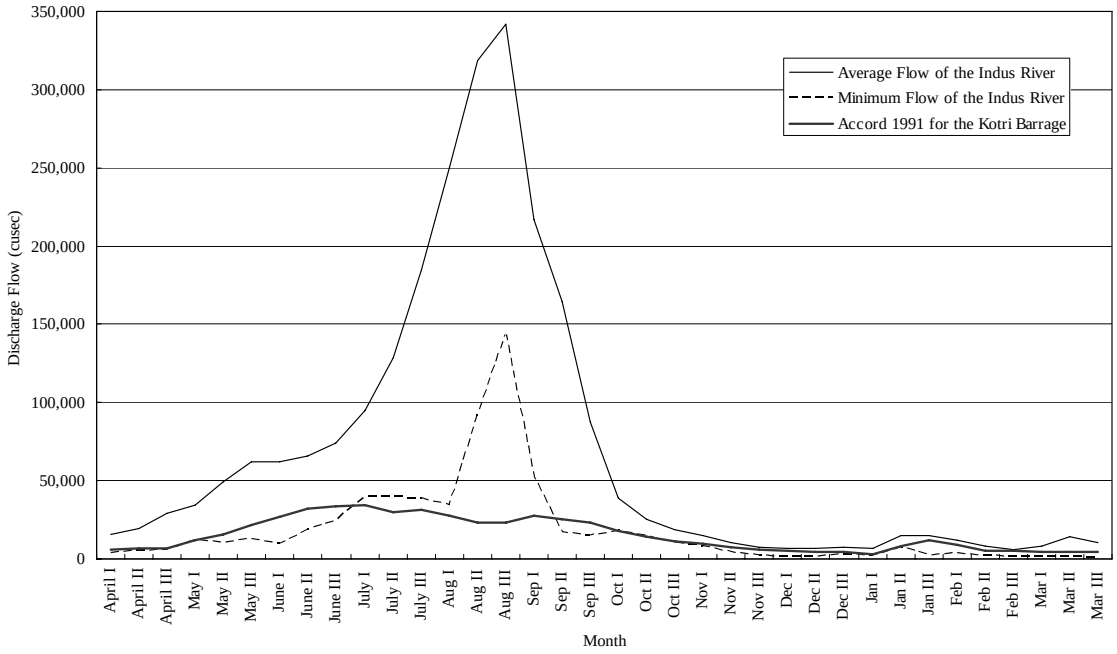


Figure A32.1.2 Average and Minimum Flow Rate from 1976 to 1984 of the Indus River upstream the Kotri Barrage and Accord 1991 of the Kotri Barrage

Table A32.1.2 Allocation of Accord 1991 for the Kotri Barrage

	Accord 91	KBF	AW	OF	NF
April I	6,200	2,150	2,250	560	1,240
April II	6,800	1,640	2,770	760	1,630
April III	6,900	1,380	2,760	800	1,960
May I	12,300	2,200	3,020	2,200	4,880
May II	15,700	1,820	3,410	3,650	6,820
May III	21,700	4,410	3,370	5,220	8,700
June I	26,900	5,630	3,440	6,440	11,390
June II	32,500	6,710	3,770	8,480	13,540
June III	33,800	6,100	3,460	9,910	14,330
July I	34,200	6,920	3,460	10,490	13,330
July II	29,800	6,140	3,200	9,940	10,520
July III	31,300	7,180	3,340	9,770	11,010
Aug I	27,600	5,600	3,230	9,450	9,320
Aug II	23,400	5,540	2,640	7,800	7,420
Aug III	23,300	5,760	2,680	8,300	6,560
Sep I	27,600	6,520	3,140	8,660	9,280
Sep II	25,100	7,900	2,980	6,420	7,800
Sep III	23,300	7,510	3,090	5,520	7,180
Oct I	18,000	5,540	2,510	4,190	5,760
Oct II	14,500	4,200	2,100	3,500	4,700
Oct III	11,300	7,300	4,000	0	0
Nov I	9,600	5,940	3,660	0	0
Nov II	7,500	4,620	2,880	0	0
Nov III	5,700	3,120	2,580	0	0
Dec I	5,000	2,880	2,120	0	0
Dec II	4,700	2,650	2,050	0	0
Dec III	4,500	2,580	1,920	0	0
Jan I	3,100	1,700	1,400	0	0
Jan II	8,600	6,450	2,150	0	0
Jan III	11,700	7,940	3,760	0	0
Feb I	8,800	5,320	3,480	0	0
Feb II	4,900	2,170	2,730	0	0
Feb III	5,200	2,690	2,510	0	0
Mar I	4,400	1,860	2,540	0	0
Mar II	4,200	1,680	2,520	0	0
Mar III	4,700	2,480	2,220	0	0

Source: Irrigation & Power Dept., Government of Sindh

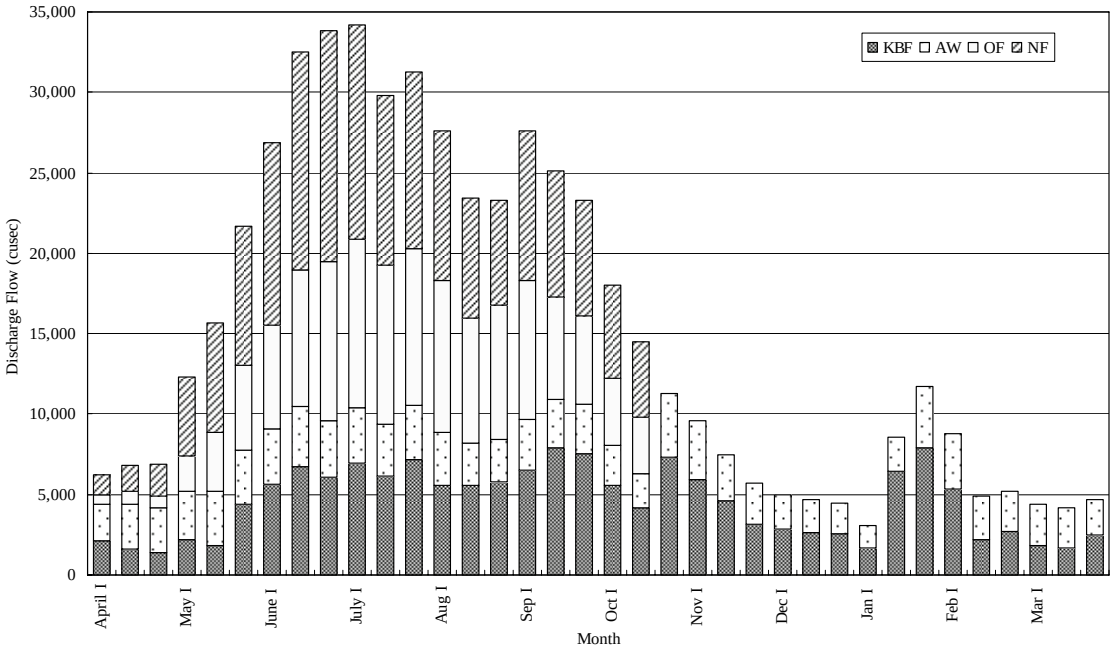


Figure A32.1.3 Allocation of Accord 1991 for the Kotri Barrage

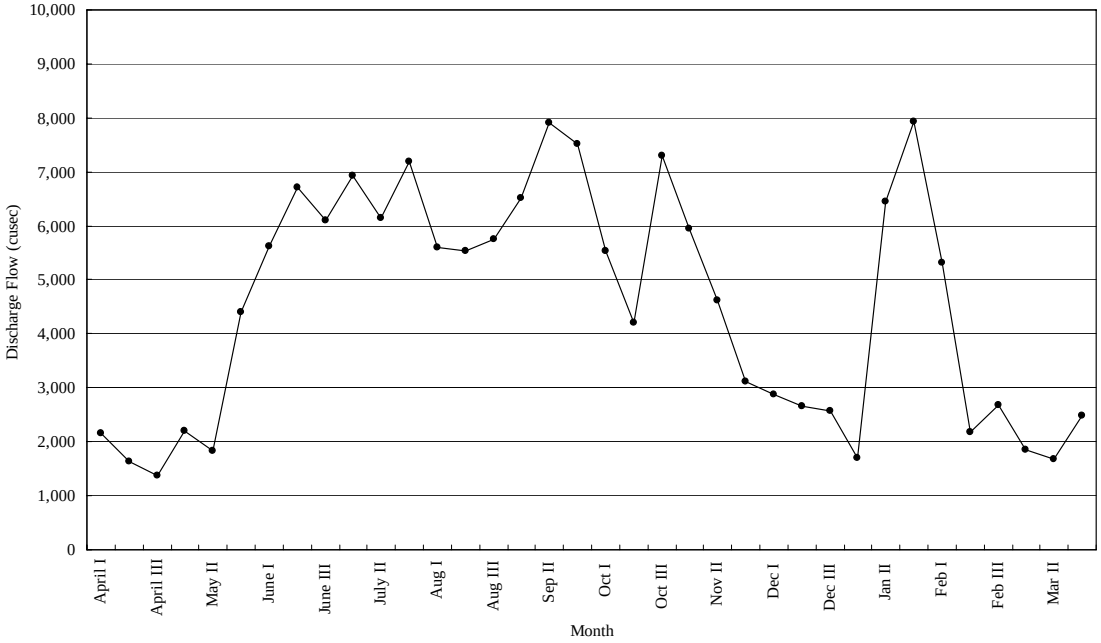


Figure A32.1.4 Distribution to the KB Feeder from the Kotri Barrage under the Accord 1991

APPENDIX – A33.1

Existing Water Supply Facilities

A33.1 Existing Water Supply Facilities

(1) Filtration Plants

1) Summary of Plants' Feature

Table A33.1.1 Summary of Plants' Feature

	Unit	Gharo		COD		Pipri			NEK Old	NEK New	Hub
		Plant 1	Plant 2	Plant 1	Plant 2	Plant 1	Plant 2	Plant 3			
Year of Construction		1943	1953	1962	1971	1971	1978	2006	1978	1998	2006
Rated Production Capacity	mgd	10	10	70	45	25	25	50	25	100	80
	m^3/d	45,460	45,460	318,220	204,570	113,650	113,650	227,300	113,650	454,600	363,680
Inlet (Receiving) Chamber											
Number of Basin	nos.	2	1	1	1	1	1	-	2	1	1
Mixing Chamber											
Number of Basin	nos.	-	-	3	1	1	1	-	1	2	-
Type of Mixer	-	-	-	Flush Mixer	Weir	Flush Mixer	Weir	-	Flush Mixer	Weir	Weir
Flocculation & Sedimentation Basin											
Type of Basin	-	Rectangular Horizontal Flow	Circular Type	Center Feed Circular Type	Pulsation Type	Center Feed Circular Type	Pulsation Type	-	Center Feed Circular Type	-	-
Number of Basin	nos.	1 Floc. Basin 8 Sed. Basin	2 Floc. Basin 2 Sed. Basin	3	2	2	2	-	2	-	-
Size/Area		300 m^2	ϕ 21 m	ϕ 60 m	1,280 m^2	ϕ 43.5 m	710 m^2	-	ϕ 43.5 m	-	-
Surface Loading	$m^3/m^2/d$	19	65	45	80	42	80	-	42	-	-
Withdrawal of Sludge		Manual	Manual	Manual	Air-operated	Manual	Air-operated	-	Manual	-	-
Filter Bed											
Number of Bed	nos.	8	8	24	14	8	8	10	8	20	16
Filtration Area	m^2/bed	55	55	128	99	100	97.5	157	100	157	157
Filtration Rate	$m^3/m^2/d$	104	104	105	148	142	146	145	142	145	145
Type of Backwash	-	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water	Air Scour & Water
Number of Backwash Pump	nos.	1 air blowers 2 bw pumps	2 air blowers 2 bw pumps	2 air blowers 3 bw pumps	2 air blowers 3 bw pumps	3 air blowers 4 bw pumps		3 air blowers 3 bw pumps	2 air blowers 2 bw pumps	3 air blowers 3 bw pumps	3 air blowers 3 bw pumps
Clear Water Reservoir											
Volume	mg	6		10	6	10	6	-	10	10	15
Chemical Feeding Facilities											
Alum	Applied Chemical	-	Solid Alum	Solid Alum	Solid Alum	Solid Alum	Solid Alum	Solid Alum	Solid Alum	Solid Alum	Solid Alum
Chlorine	Applied Chemical	-	Liquid Chlorine	Liquid Chlorine	Liquid Chlorine	Liquid Chlorine		Liquid Chlorine	Liquid Chlorine	Liquid Chlorine	Liquid Chlorine
	Number of Chlorinator	nos.	1	4	4	2		3	7	3	3
	Dosing Point	-	Post	Pre & Post	Pre & Post	Pre & Post	Pre & Post	Pre & Post	Pre & Post	Pre & Post	Pre & Post
Other Chemicals		-	-	-	-	-	-	Sulphuric Acid and Lime for pH control	-	Lime for pH control	Sulphuric Acid and Lime for pH control
Power Substation (not including for P/S)											
Transformer		300 KVA × 2 units		500 KVA × 2 units	500 KVA × 2 units	500 KVA × 2 units		750 KVA × 1 unit	630 KVA × 2 units	750 KVA × 1 unit	800 KVA × 1 unit
Generator		219 KVA × 2 units		630 KVA × 1 unit		-	-	-	660 KVA × 1 unit (out of order)	-	800 KVA × 1 unit

2) Gharo Filtration Plant

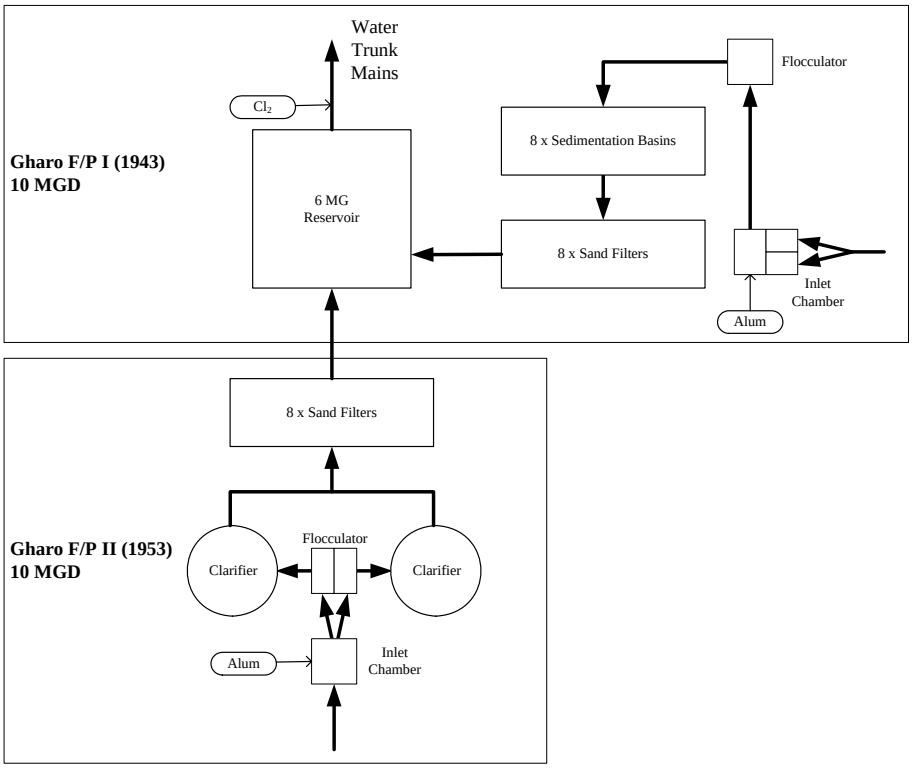


Figure A33.1.1 Schematic Flow Diagram of Gharo F/P

Figure A33.1.2 Satellite Image of Gharo F/P

	
1. Inlet Chamber, Plant I	2. Sedimentation Basin, Plant I
	
3. Filter Gallery, Plant I	4. Inlet Chamber, Plant II
	
5. Clarifier, Plant II	6. Filter Gallery, Plant II

Photo A33.1.1 Photographs of Gharo F/P

3) COD Filtration Plant

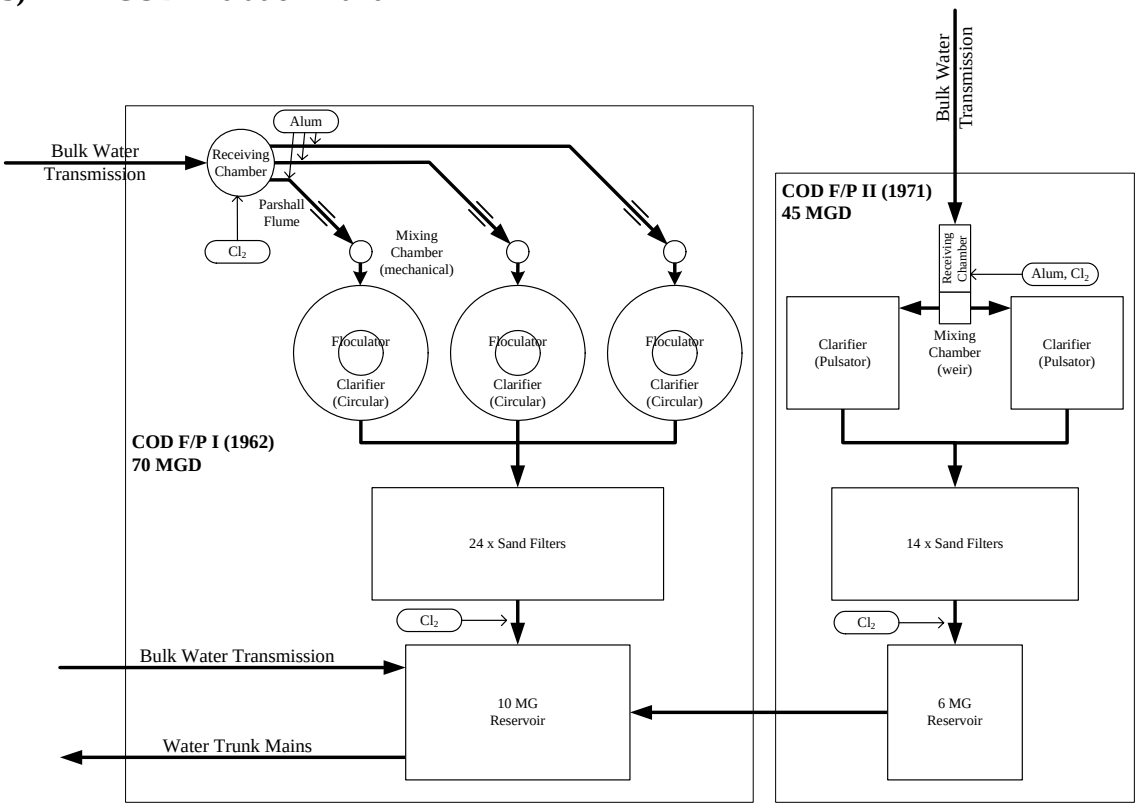


Figure A33.1.3 Schematic Flow Diagram of COD F/P

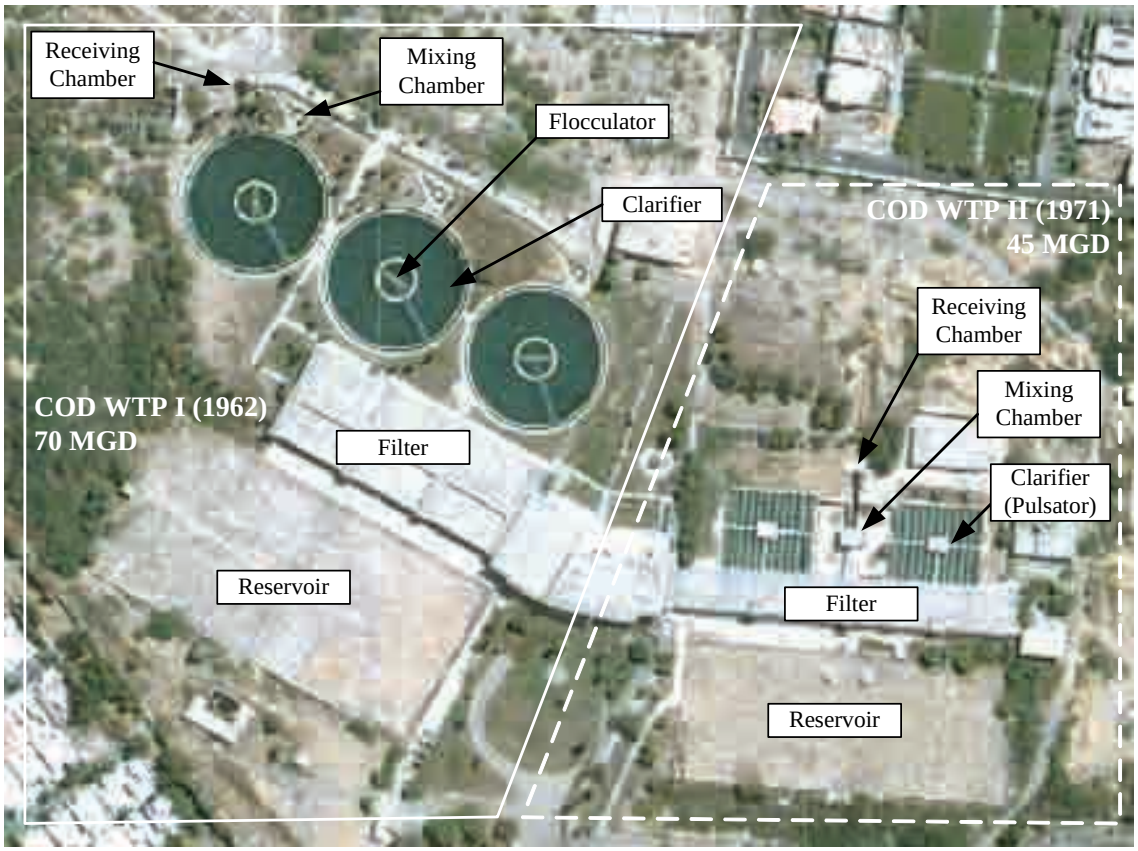


Figure A33.1.4 Satellite Image of COD F/P

	
1. Mixing Chamber, Plant I	2. Clarifier, Plant I
	
3. Sand Filter, Plant I	4. Inlet Chamber, Plant II
	
5. Clarifier (Pulsator), Plant II	6. Filter Gallery, Plant II

Photo A33.1.2 Photographs of COD F/P

4) Pipri Filtration Plant

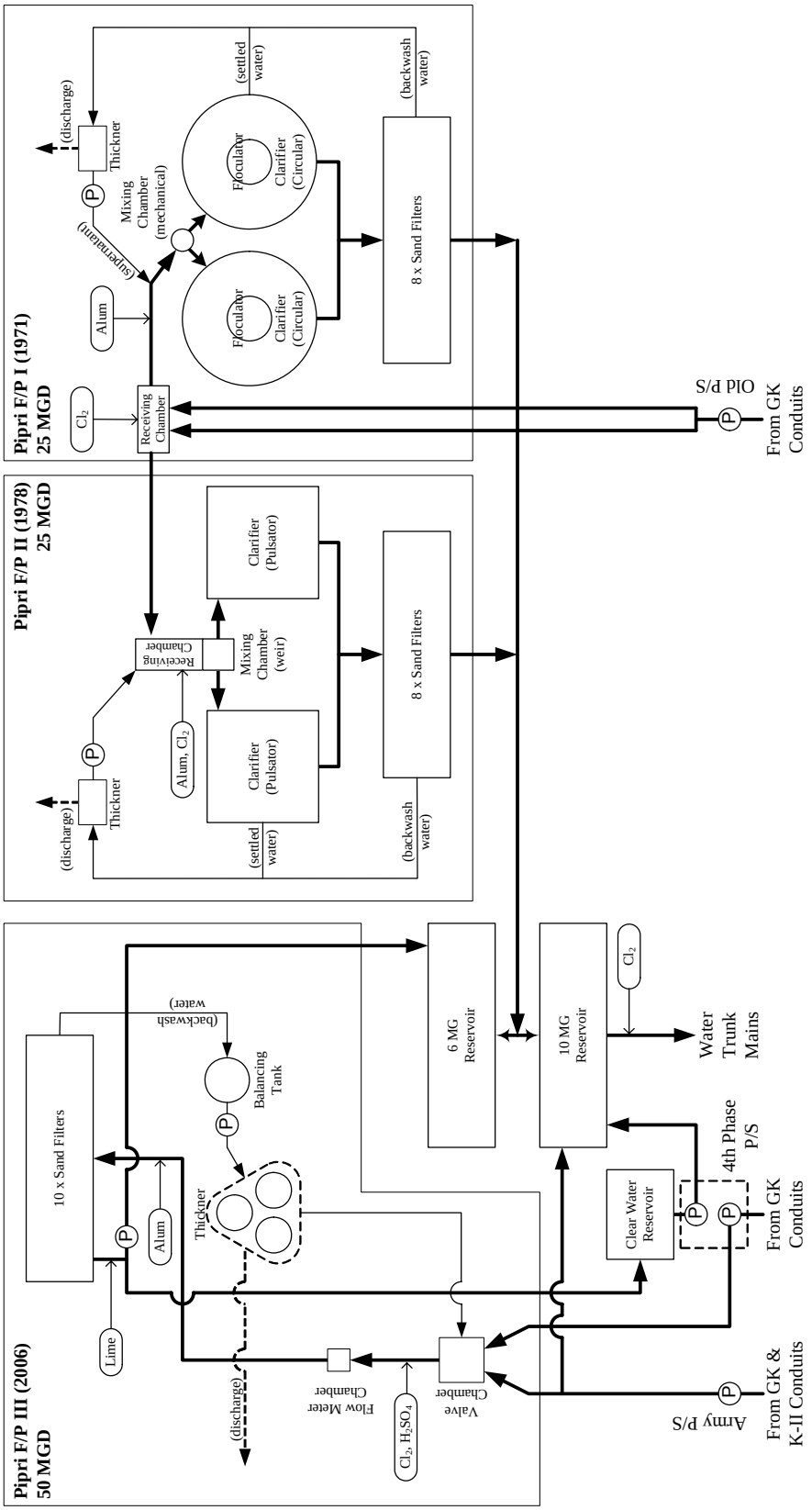


Figure A33.1.5 Schematic Flow Diagram of Pipri F/P

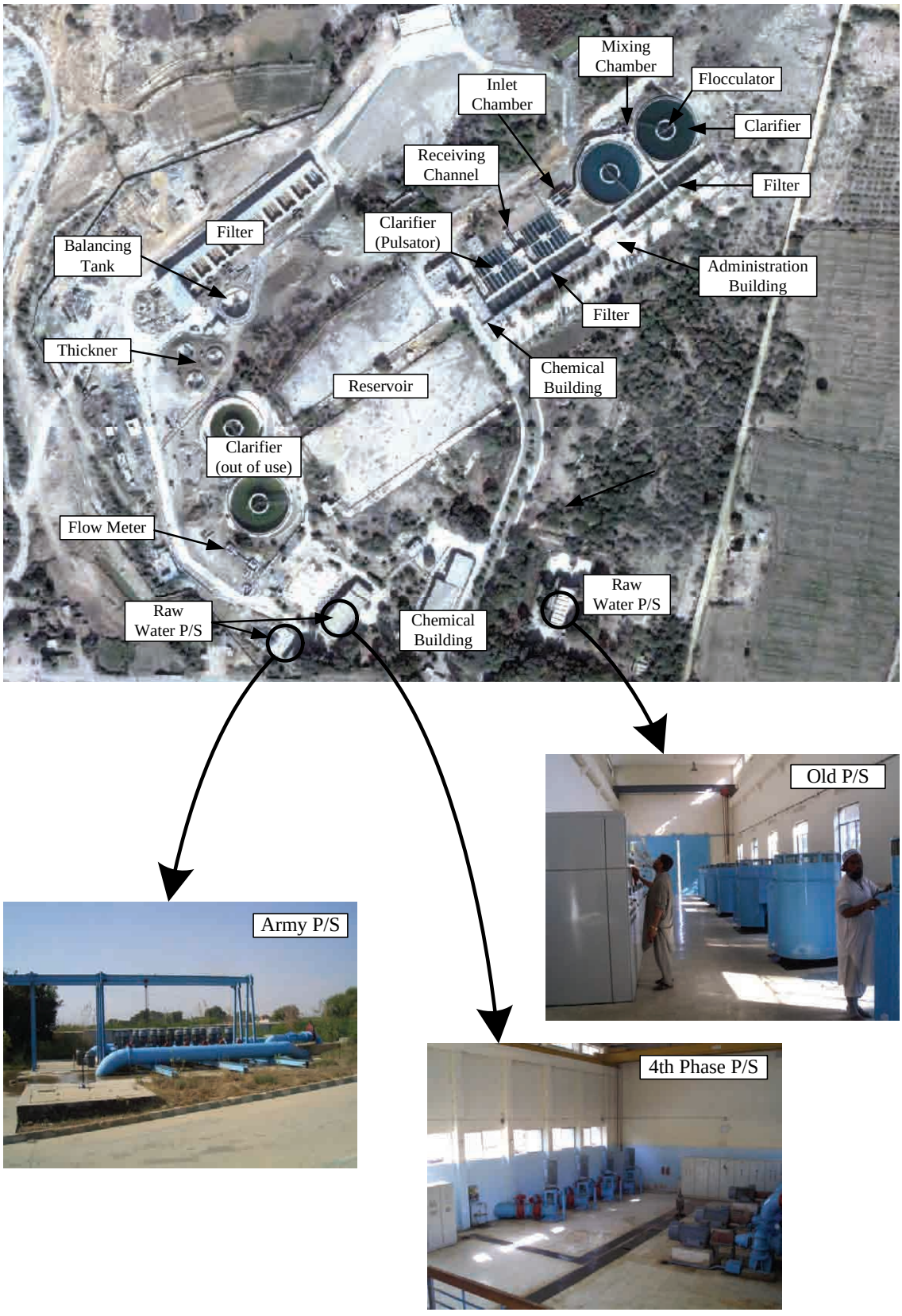


Figure A33.1.6 Satellite Image of Pipri F/P

	
1. Receiving Chamber, Plant I	2. Clarifier, Plant I
	
3. Filter, Plant II	4. Receiving Chamber, Plant II
	
5. Clarifier (Pulsator), Plant II	6. Filter, Plant III

Photo A33.1.3 Photographs of Pipri F/P

5) NEK Old Filtration Plant

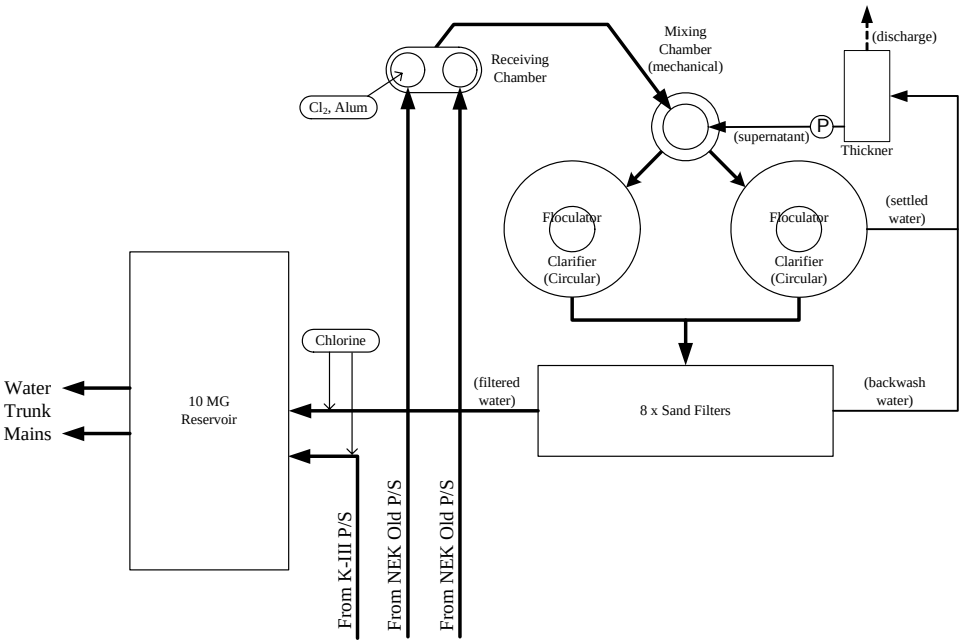


Figure A33.1.7 Schematic Flow Diagram of NEK Old F/P

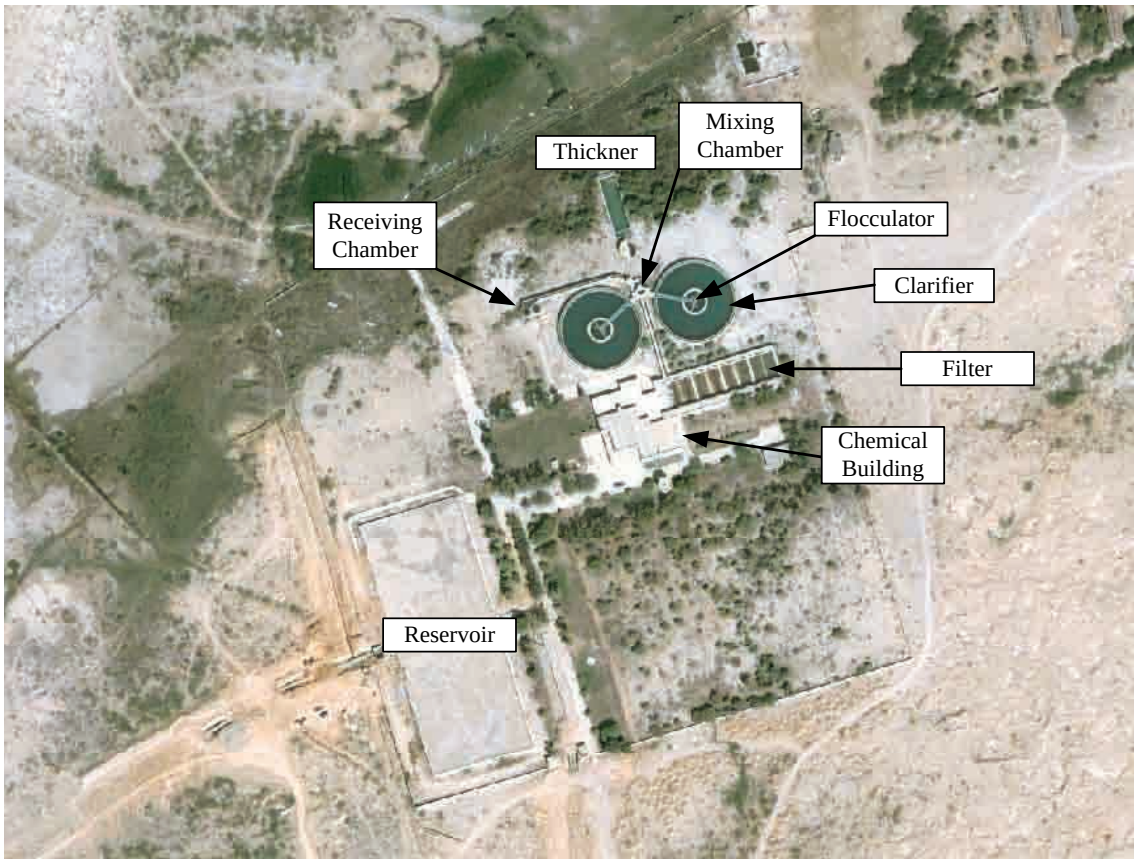


Figure A33.1.8 Satellite Image of NEK Old F/P

	
1. Receiving Chamber	2. Flocculator (under repair)
	
3. Clarifier	4. Sand Filter
	
5. Chlorinator	6. Pipeline from K-III P/S

Photo A33.1.4 Photographs of NEK Old F/P

6) NEK New Filtration Plant

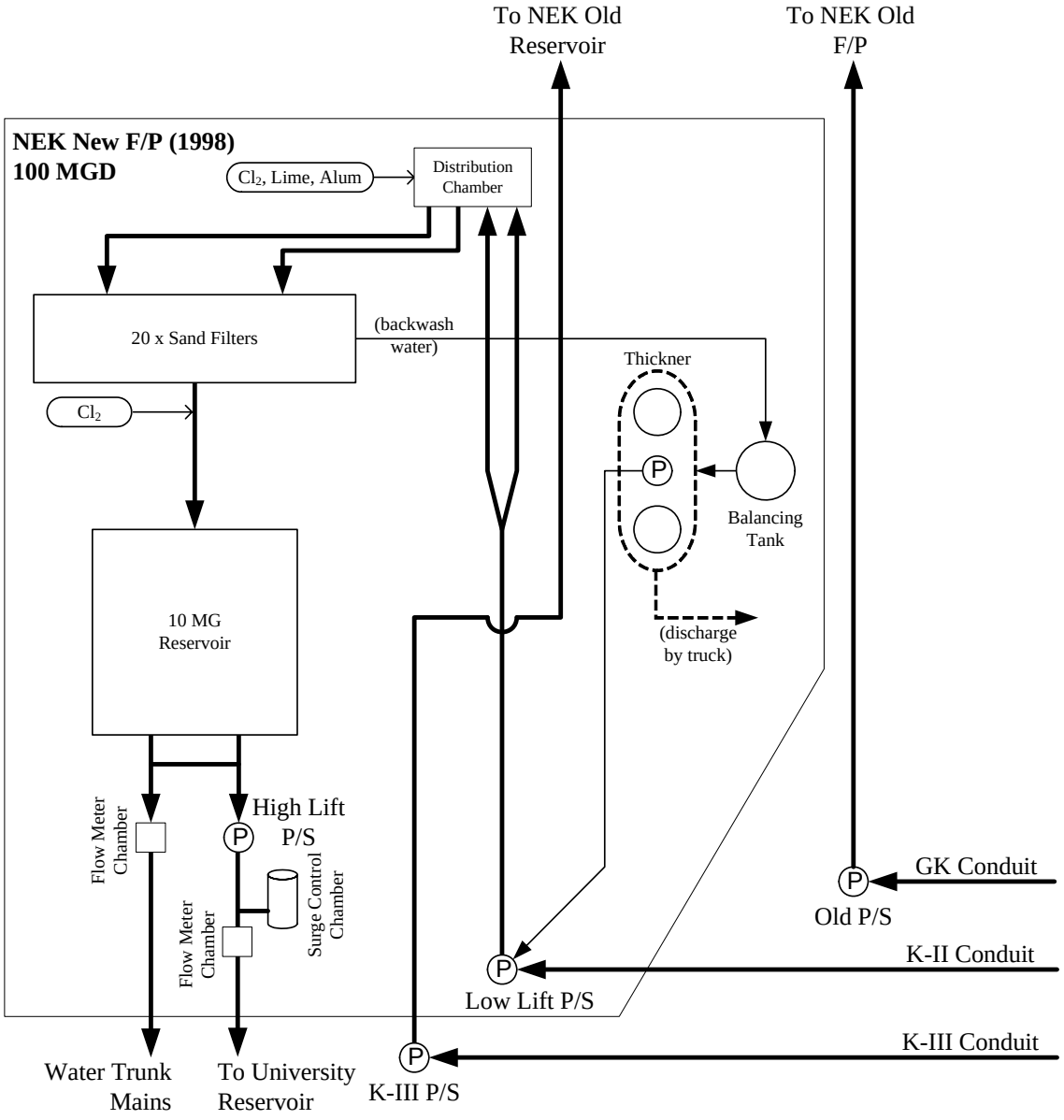


Figure A33.1.9 Schematic Flow Diagram of NEK New F/P

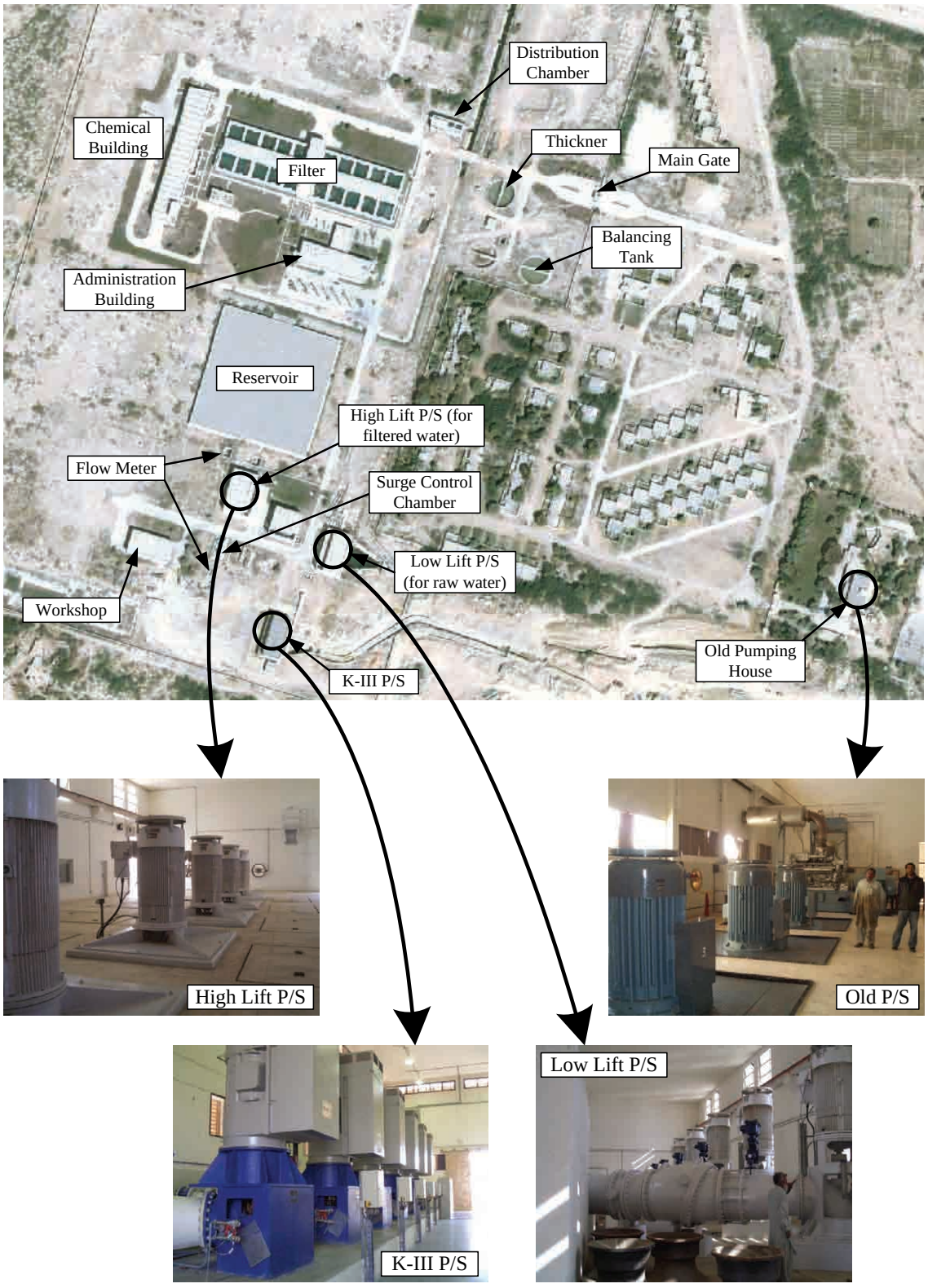


Figure A33.1.10 Satellite Image of NEK New F/P

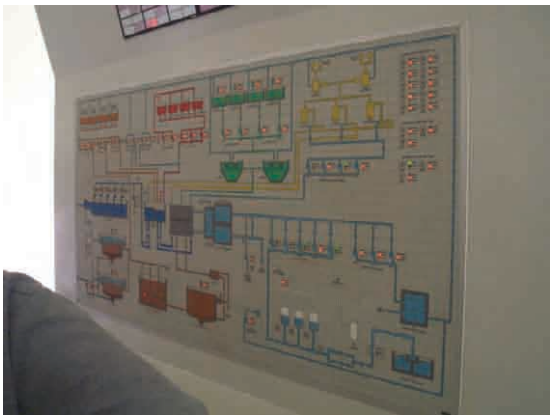
	
1. Mixing of Chemicals	2. View of Filter Basins
	
3. Back-wash Pump	4. Surge Control Chamber
	
5. Chlorinators	6. Control Panel

Photo A33.1.5 Photographs of NEK New F/P

7) Hub Filtration Plant

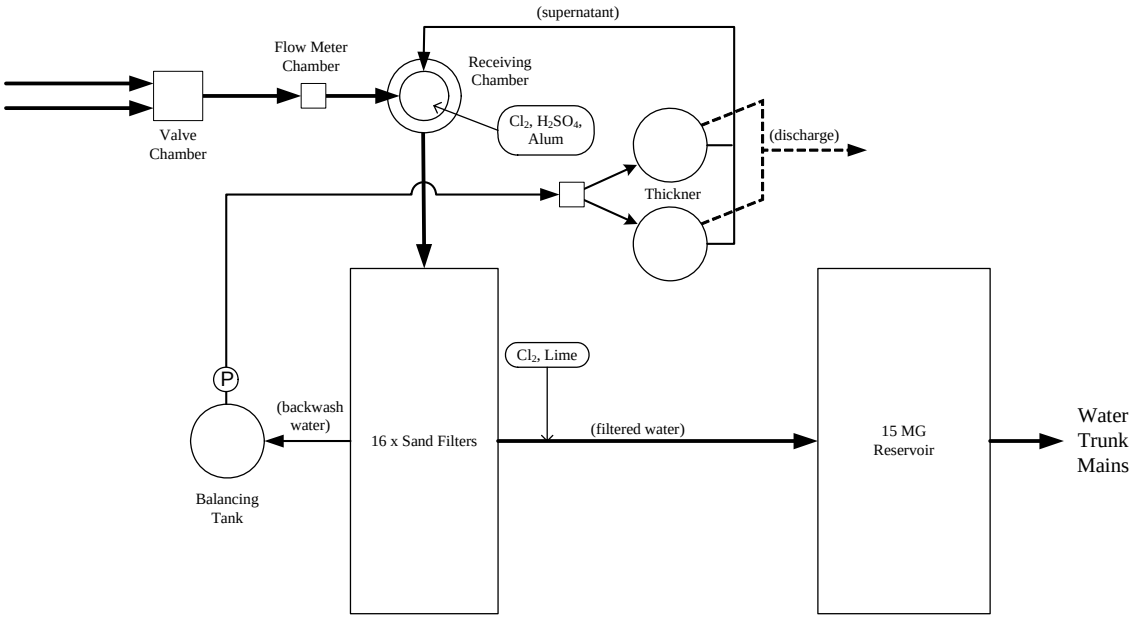


Figure A33.1.11 Schematic Flow Diagram of Hub F/P

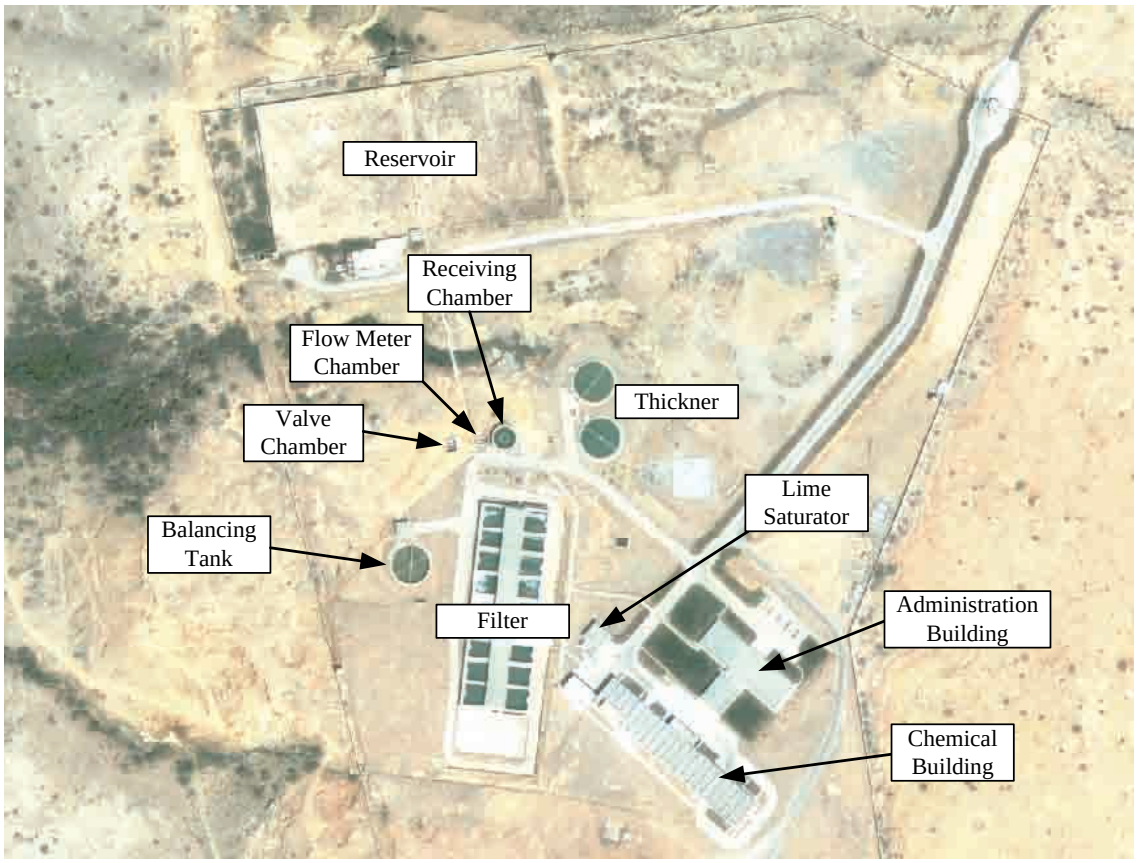


Figure A33.1.12 Satellite Image of Hub F/P

	
1. Flow Meter Chamber	2. Receiving Chamber
	
3. Filter (during Back-washing)	4. Filtered Water Reservoir
	
5. Back-Wash Pumps	6. Chlorinator

Photo A33.1.6 Photographs of Hub F/P

(2) Existing Distribution Pipeline

Table A33.1.2 List of the Existing Distribution Pipeline (1/4)

Name of Zone	Name of Town	Diameter (Inchs)	Pipeline Length (km)				Total Length (km)
			CIP	MS	AC	PRCC	
Zone-1	**Landhi**	3	59.80		67.10		126.90
		4	33.70		41.01		74.71
		6	17.00		11.30		28.30
		8	10.56		0.55		11.11
		10	8.18		0.55		8.73
		12	3.96		9.00		12.96
		15				24.00	24.00
		18	1.50			4.75	6.25
		24				1.85	1.85
		33				7.40	7.40
	Total Length (km)		134.70	0.00	129.51	38.00	302.21
	Korangi	3	70.00		68.90		138.90
		4	34.00		42.60		76.60
		6	15.84		10.50		26.34
		8	30.00		23.00		53.00
		10	10.37				10.37
		12	4.00		3.00		7.00
		15				23.00	23.00
		18				6.30	6.30
		24				7.10	7.10
		33				12.08	12.08
	Total Length (km)		164.21	0.00	148.00	48.48	360.69
	Malir	3			116.70		116.70
		6	3.00		54.00		57.00
		8			7.50		7.50
		10			10.00		10.00
		12			18.00		18.00
		18				3.00	3.00
		24				8.40	8.40
	Total Length (km)		3.00	0.00	206.20	11.40	220.60
	Bin Qasim	3			2.28		2.28
		4			8.46		8.46
		6		0.15	1.54	8.52	10.21
		12	2.40		0.39		2.79
		18		0.06			0.06
	Total Length (km)		2.40	0.21	12.67	8.52	23.80
	Shah Faisal	3			150.00		150.00
		4			5.00		5.00
		5			60.00		60.00
		8			10.00		10.00
		9				5.00	5.00
		10			20.00		20.00
		12			2.00		2.00
		15				2.00	2.00
		18				3.00	3.00
	Total Length (km)		0.00	0.00	247.00	10.00	257.00

Source: Water Distribution Wing, KW&SB

Table A33.1.2 List of the Existing Distribution Pipeline (2/4)

Name of Zone	Name of Town	Diameter (Inchs)	Pipeline Length (km)				Total Length (km)
			CIP	MS	AC	PRCC	
Zone-2	**Keamari**	4			10.60		10.60
		6			12.12		12.12
		8			3.43		3.43
		10			3.63		3.63
		12			5.75		5.75
		24				3.10	3.10
	Total Length (km)		0.00	0.00	35.53	3.10	38.63
	Lyari	4			80.63		80.63
		6			37.87		37.87
		8			13.30		13.30
		9	6.06				6.06
		10			7.30		7.30
		12		1.80	11.45		13.25
		15	1.20				1.20
		16			2.13		2.13
		18	2.60		4.80		7.40
		24				5.04	5.04
	Total Length (km)		9.86	1.80	157.48	5.04	174.18
	Saddar	3			2.40		2.40
		4	5.57	0.54	77.27		83.38
		6	15.45		22.72		38.17
		8	6.00		7.27		13.27
		9	9.39				9.39
		10			0.45		0.45
		12	19.39		9.70	1.21	30.30
		15	7.36			5.00	12.36
		18	6.00	0.50		6.00	12.50
		21	1.00				1.00
		24		1.60		7.00	8.60
		27				5.15	5.15
		48	0.36				0.36
	Total Length (km)		70.52	2.64	119.81	24.36	217.33
	Jamshed	3	4.00		83.90		87.90
		4	4.50		37.90		42.40
		6	8.65		33.20		41.85
		9	1.50		11.60		13.10
		10	1.00		4.35		5.35
		12	2.50		32.80		35.30
		15	3.00		4.50		7.50
		18	10.00			17.10	27.10
		24	3.50				3.50
		36	3.00				3.00
		48		5.00			5.00
		54				3.00	3.00
		60	2.00				2.00
	Total Length (km)		43.65	5.00	208.25	20.10	277.00

Source: Water Distribution Wing, KW&SB

Table A33.1.2 List of the Existing Distribution Pipeline (3/4)

Name of Zone	Name of Town	Diameter (Inchs)	Pipeline Length (km)				Total Length (km)
			CIP	MS	AC	PRCC	
Zone-2	**Gulshan-e-Iqbal**	3	1.20		91.30		92.50
		4	37.87		131.39		169.26
		6	33.33	0.75	63.32		97.40
		8	7.87		2.13		10.00
		10	1.39		5.02		6.41
		12	0.42			4.84	5.26
		15	0.75			5.05	5.80
		18	1.51	1.78		1.45	4.74
		24				3.48	3.48
		33				0.90	0.90
	Total Length (km)		84.34	2.53	293.16	15.72	395.75
	Liaquat Abad	3	200.00		512.60		712.60
		6	16.00		14.00		30.00
		8			1.80		1.80
		9			1.00		1.00
		10			5.90		5.90
		12	6.60	0.40	0.40		7.40
		15				2.50	2.50
		18	1.40				1.40
	Total Length (km)		224.00	0.40	535.70	2.50	762.60
Zone-3	**SITE**	3	0.10	0.45	24.23		24.78
		4	1.20	1.90	42.80		45.90
		6	1.11	3.81	29.16		34.08
		8		1.99	10.20		12.19
		10	0.75	2.91	6.72		10.38
		12		6.19	31.92	5.98	44.09
		15				4.12	4.12
		18				0.15	0.15
		24		0.90		1.49	2.39
	Total Length (km)		3.16	18.15	145.03	11.74	178.08
	Baldia	3			23.80		23.80
		4			18.70		18.70
		6	3.80		5.49		9.29
		8	0.60		15.06		15.66
		10			7.60		7.60
		12			15.63	0.45	16.08
		15				1.56	1.56
		16			5.76		5.76
		18				5.55	5.55
		30		2.49			2.49
	Total Length (km)		4.40	2.49	92.04	7.56	106.49
	Orangi	3	0.50	1.50	68.00		70.00
		4	2.00	5.00	73.00		80.00
		6		10.00	72.00		82.00
		8			5.00		5.00
		10	0.45		1.50		1.95
		12	2.40	2.57	7.27	19.19	31.43
		15			5.30	8.93	14.23
		18		0.45	1.80	3.80	6.05
		24				5.00	5.00
		33				1.43	1.43
		36				3.25	3.25
		48				3.50	3.50
	Total Length (km)		5.35	19.52	233.87	45.10	303.84

Source: Water Distribution Wing, KW&SB

Table A33.1.2 List of the Existing Distribution Pipeline (4/4)

Name of Zone	Name of Town	Diameter (Inchs)	Pipeline Length (km)				Total Length (km)
			CIP	MS	AC	PRCC	
	North Nazimabad	3 & 4	51.00		222.00		273.00
		6	7.34	0.12	22.65		30.11
		8 & 10	7.71		13.00		20.71
		12	7.50	0.11	1.62	9.84	19.07
		15 & 16			2.13	3.13	5.26
		18			1.23	3.91	5.14
	Total Length (km)		73.55	0.23	262.63	16.88	353.29
	New Karachi	4	322.81		161.40		484.21
		6	11.26		5.63		16.89
		8	9.19		9.19		18.38
		10	3.30				3.30
		12	23.60		7.86		31.46
		18				2.61	2.61
		24				2.24	2.24
	Total Length (km)		370.16	0.00	184.08	4.85	559.09
	Gulberg	3	36.79		7.14		43.93
		4	36.79		0.84		37.63
		6	9.55	0.95	38.37		48.87
		8		0.36	4.43		4.79
		10	3.56	0.47	4.53		8.56
		12	12.38	0.51	13.73		26.62
		15	1.98				1.98
		16	2.13	0.09	1.93		4.15
		18				4.30	4.30
		24				5.91	5.91
	Total Length (km)		103.18	2.38	70.97	10.21	186.74
	Gadap	3		35.20	8.33		43.53
		4		17.50	23.90		41.40
		6		0.90	7.60		8.50
		8		17.74	1.80		19.54
		12		2.21		6.00	8.21
		15				6.87	6.87
		16			2.84		2.84
		18				1.22	1.22
		24				1.53	1.53
		33				3.42	3.42
	Total Length (km)		0.00	73.55	44.47	19.04	137.06
	Ground Total (km)		**1,296.48**	**128.90**	**3,126.40**	**302.60**	**4,854.38**

Source: Water Distribution Wing, KW&SB

(3) Existing Distribution Pumping Stations

Table A33.1.3 List of Existing Distribution Pumping Stations (1/2)

S.No.	Name of the Pumping Station	Name of the town	Name of the Union Council	
1	Shah Faisal Colony No.3 pumping station	Shah Faisal	UC No.4	Rita Plot
2	Shah Faisal Colony No.4 pumping station	Shah Faisal	UC No.1	Nath Khan Goth
3	Shah Faisal Colony No.5 pumping station	Shah Faisal	UC No.2	Pak Sadat Colony
4	Grand tank pumping station	Shah Faisal	UC No.7	Al Falah Society
5	Juma Goth pumping station	Shah Faisal	UC No.7	Al Falah Society
6	Korangi 2 1/2 pumping station	Korangi	UC No.3	Chakra goth
7	Korangi 5 1/2 pumping station	Korangi	UC No.5	100 quarters
8	Bilal Colony pumping station	Korangi	UC No.1	Bilal colony
9	Ibrahim Hyderi pumping station	Bin Qasim	UC No.1	Ibrahim hyderi
10	Kamela pumping station	Keamari	UC No.1	Gulshan-e-Ghazi
11	Liaquat square pumping station	Malir	UC No.3	Saudabad
12	Muhammadi school pumping station	Shah Faisal	UC No.7	Al Falah Society
13	Shaheed chowk pumping station	Malir	UC No.1	Model Colony
14	A Area pumping station	Malir	UC.No.4	khokhrapar
15	Model Colony pumping station	Malir	UC No.1	Model Colony
16	Jinnah Avenue pumping station	Malir	UC No.1	Model Colony
17	Aabshar Park pumping station	Malir	UC No.2	Kala board
18	Saudabad pumping station	Malir	UC No.3	Saudabad
19	Malir cantt. Pumping station	Malir	UC No.3	Saudabad
20	Rahim khan goth pumping station	Malir	UC No.7	Ghazi Brohi
21	Ramzan Lasi goth pumping station	Malir	UC No.6	Ghareebabad
22	Saleh Mohd goth pumping station	Malir	UC No.4	Kokhrapar
23	9th mile pumping station	Gulshan-e-Iqbal	UC No.1	Delhi Marcantile Society
24	Future colony pumping station	Landhi	UC No.6	Bhutto Nagar
25	Landhi Industrial Area pumping station	Landhi	UC No.3	Dawood Chorangi
26	Babar Market pumping station	Landhi	UC No.7	Khwaja Ajmer Colony
27	Red cross pumping station	Landhi	UC No.1	Muzafarabad Colony
28	Cattle colony No.1 pumping station	Bin Qasim	UC No.3	Cattle Colony
29	Cattle colony No.2 pumping station	Bin Qasim	UC No.3	Cattle Colony
30	Labour square pumping station	Bin Qasim	UC No.3	Cattle Colony
31	Bawani Challi pumping station	S.I.T.E	UC No.5	Pathan Colony
32	A.B.C. pumping station	Landhi	UC No.1	Muzafarabad Colony
33	L.S.R.Old pumping station	Gulshan-e-Iqbal	UC No.5	Gulshan-e-Iqbal-1
34	L.S.R. New pumping station	Gulshan-e-Iqbal	UC No.5	Gulshan-e-Iqbal-1
35	NIPA pumping station	Gulshan-e-Iqbal	UC No.10	Pahlwan Goth
36	Maskan pumping station	Gulshan-e-Iqbal	UC No.9	Gulshan-e-Iqbal-2
37	Block No.6 pumping station	Gulshan-e-Iqbal	UC No.9	Gulshan-e-Iqbal-2
38	KDA I A pumping station	Gulshan-e-Iqbal	Cantt.	Gillani Railway Station
39	KDA pumping station	Gulshan-e-Iqbal	UC No.1	Delhi Marcantile Society
40	COD pumping station	Gulshan-e-Iqbal	UC No.6	Gillani Railway Station
41	Block No. 17 pumping station	Gulshan-e-Iqbal	UC No.6	Gillani Railway Station
42	Amber Arcade pumping station	Jamshed	UC No.7	PECHS-II
43	Café D Khan pumping station	Jamshed	UC No.6	PECHS-I
44	Sir Syed pumping station	Jamshed	UC No.7	PECHS-II
45	Bhadurabad No.7 pumping station	Gulshan-e-Iqbal	UC No.2	Civic Center
46	Gulistan Club No.8 pumping station	Gulshan-e-Iqbal	UC No.9	Guslhan-e-Iqbal-2
47	Farhan society No.9 pumping station	Gulshan-e-Iqbal	UC No.1	Delhi Marcantile Society
48	Cardiac hospital No.10 pumping station	Gulshan-e-Iqbal	UC No.1	Delhi Marcantile Society
49	Shaheed Millat No.12 pumping station	Gulshan-e-Iqbal	UC No.1	Delhi Marcantile Society
50	Two sword pumping station	Saddar	UC No.1	Clifton
51	Kamal park pumping station	Gulshan-e-Iqbal	UC No.1	Delhi Marcantile Society
52	Wali chowk pumping station	Saddar	UC No.10	Clifton
53	Gulshan-e-Faisal bath island pumping station	Saddar	UC No.10	Clifton
54	Clifton Block No.1 pumping station	Saddar	UC No.10	Clifton
55	Clifton Block No.7 pumping station	Saddar	UC No.10	Clifton
56	Clifton Block No.4 pumping station	Saddar	UC No.10	Clifton
57	Gizri village pumping station	Saddar	UC No.10	Clifton
58	Frere town pumping station	Saddar	UC No.8	Saddar
59	Bhutta village Keamari pumping station	Keamari	UC No.1	Bhutta Village
60	Baba Island pumping station	Keamari	UC No.4	Baba Bhit
61	Bhit Island pumping station	Keamari	UC No.4	Baba Bhit
62	Shireen Jinnah pumping station	Keamari	UC No.8	Gabo Pat
63	Salehabad pumping station	Keamari	UC No.4	Baba Bhit
64	Muslimabad pumping station	Landhi	UC No.2	Muslimabad
65	Awami flats pumping station	Jamshed	UC No.9	Central jacoblines
66	Tayaba Masjid pumping station	Jamshed	UC No.7	PECHS-II
67	KDA compound pumping station	Jamshed	UC No.10	Jamshed Quarters
68	Shara-e-Quaideen pumping station	Jamshed	UC No.5	Mehmoodabad
69	Mehmoodabad corp gate pumping station	Jamshed	UC No.5	Mahmoodabad

Source: KW&SB

Table A33.1.3 List of Existing Distribution Pumping Stations (2/2)

S.No.	Name of the Pumping Station	Name of the town	Name of the Union Council	
70	Mehmmodabad gali pumping station	Jamshed	UC No.5	Mahmoodabad
71	PECHS Block-6 Chanesar hlatpumping station	Jamshed	UC No.6	PECHS
72	Manzoor colony pumping station	Jamshed	UC No.2	Manzoor Colony
73	Noor ground pumping station	Jamshed	UC No.6	Manzoor Colony
74	Green belt PECHS pumping station	Jamshed	UC No.6	PECHS
75	GAO Gali pumping station	Saddar	UC No.3	Kharadar
76	Bombay Bazar pumping station	Saddar	UC No.8	Saddar
77	Jaffer fudoo pumping station	Saddar	UC No.3	Kharadar
78	Khajoor bazar pumping station	Saddar	UC No.3	Kharadar
79	Hijrat colony No.1 pumping station	Saddar	UC No.9	Civil Lines
80	Hijrat Colony No.2 pumping station	Saddar	UC No.9	Civil Lines
81	Peoples play ground pumping station	Lyari	UC No.4	Khada Memon society
82	Bihar colony pumping station	Lyari	UC No.7	Bihar colony
83	Al hilal society pumping station	Gulshan-e-Iqbal	UC No.12	Gulzar Hijri
84	P.I.B.Colony pumping station	Gulshan-e-Iqbal	UC No.3	PIB colony
85	Jigar Muradabi pumping station	Jamshed	UC No.10	Jamshed Quarters
86	KDA scheme No.7 pumping station	Gulshan-e-Iqbal	UC No.6	Gillani Railway Station
87	Dhobi ghat pumping station	Saddar	UC No.2	Garden
88	LEA Market pumping station	Lyari	UC No.5	Baghdadi
89	Shah Waliullah pumping station	Lyari	UC No.4	Khada Memon society
90	Aatmaram pumping station	Lyari	UC No.10	Chakiwara
91	5-c pumping station	N. Karachi	UC No.4	Godhra
92	Sindhi Hotel Pumping station	N. Karachi	UC No.7	Madina colony
93	Saba cinema pumping station	N. Karachi	UC No.7	Madina Colony
94	Nagan chowrangi pumping station	N. Karachi	UC No.3	Fatima Jinnah Colony
95	Khwaja Ajmer Nagri pumping station	N. Karachi	UC No.3	Fatima Jinnah Colony
96	7-C, 7-D disco more pumping station	N. Karachi	UC No.1	Kalyana
97	Sakhi Hassan pumping station	N. Nazimabad	UC No.9	Buffer zone
98	Boosting station No.II pumping station	Gadap	UC No.4	Gadap
99	Azizabad pumping station	Gulberg	UC No.1	Azizabad
100	Azam Nagar pumping station (Liaquatabad)	Jamshed	UC No.3	Azam Basti
101	Boosting station No.1 North Nazimabad	N. Nazimabad	UC No.3	Khandu Goth
102	Boosting station No.2 North Nazimabad.	N. Nazimabad	UC No.4	Hyderi abad
103	Pahar Ganj pumping station	N. Nazimabad	UC No.2	Pahar Gunj
104	Mustafabad Pumping station	N.Nazimabad	UC No.7	Nusrat Bhutto Colony
105	Shipowner college pumping station	N. Nazimabad	UC No.2	Pahar Gunj
106	Orangabad pumping station	Liaquatabad	UC No.9	Mujahid Colony
107	Abdullah college pumping station	N. Nazimabad	UC No.1	Paposh Nagar
108	Board office pumping station	N. Nazimabad	UC No.1	Paposh Nagar
109	C-Road pumping station	Liquatabad	UC No.9	Mujahid Colony
110	Paposh Nagar pumping station	N. Nazimabad	UC No.1	Paposh Nagar
111	Chandni Chowk pumping station	N. Nazimabad	UC No.1	Paposh Nagar
112	Qasba colony pumping station	S.I.T.E	UC No.8	Qasba Colony
113	Banaras pumping station	S.I.T.E	UC No.7	Banaras
114	Bewa quarters pumping station	Orangi	UC No.5	Madina Colony
115	Shah waliullah Nagar pumping station	Orangi	UC No.7	Chashti Nagar
116	Gabol colony pumping station	Orangi	UC No.11	Dada Nagar
117	Pathan colony pumping station	S.I.T.E	UC No.5	Pathan Colony
118	Frontier colony pumping station	S.I.T.E	UC No.6 & 7	Frontier & Banaras
119	Gulshan-e-Bihar pumping station	Orangi	UC No.2	Gulshan-e-Bihar,Haryana Colony
120	German pumping station	Orangi	UC No.6	Ghaziabad
121	Metroville site-1 pumping station	S.I.T.E	UC No.4	Metroville
122	Orangi 4/10-A pumping station	Orangi	UC No.2	Haryana Colony
123	Shershah round about pumping station	Keamari	UC No.6	Jahanabad
124	Firdous Re-rolling mills pumping station	S.I.T.E	UC No.3	Jahanabad
125	Baldia pumping station	Baldia	UC No.7	Muslim Mujahid Colony
126	Rasheedabad pumping station	Baldia	UC No.8	Rasheedabad
127	Mauripur pumping station	Keamari	UC No.6	Mauripur
128	Grex village pumping station	Keamari	UC No.6	Mauripur
129	Pak colony pumping station	S.I.T.E	UC No.1	Pak Colony
130	Hawksbay pumping station	Keamari	UC No.6	Mauripur
131	Gul bai old pumping station	Keamari	UC No.6	Mauripur
132	Gul bai new pumping station	Keamari	UC No.6	Mauripur
133	Mauch goth pumping station	Keamari	UC No.6	Mauripur
134	Nasir Colony pumping station	Korangi	UC No.2	Nasir Colony
135	Yousuf Goth pumping station	Gadap	UC No.4	Gadap
136	Moosa Lane pumping station	Lyari	UC No.5	Baghdadi
137	PIC Tower pumping station	Saddar	UC No.4	City Railway station
138	Old clifton water pumping station	Saddar	UC No.10	Clifton
139	Boating basin pumping station	Saddar	UC No.10	Clifton

Source: KW&SB

(4) Existing Service Connections

Table A33.1.4 Number of Service Connections - Category Wise

No.	Categories	Range	Number of Service Connections					
			2001 - 2002	2002 - 2003	2003 - 2004	2004 - 2005	2005 - 2006	2006 - 2007
1.	Residential	60	98,515	99,227	102,113	106,304	109,212	110,001
	(SQ. Yard)	61 - 120	339,941	341,857	350,646	359,196	366,622	369,605
		121 - 200	50,817	50,986	51,750	53,316	53,879	54,260
		201 - 300	25,799	25,977	26,532	27,539	28,257	28,654
		301 - 400	11,215	11,291	11,429	11,713	11,934	12,237
		401 - 600	11,074	11,118	11,178	11,283	11,429	11,434
		601 - 1000	5,678	5,679	5,701	5,729	5,755	5,635
		1001 - 1500	1,649	1,642	1,639	1,622	1,595	1,540
		1501 - 2000	893	880	879	862	855	827
		2001 - 2500	283	274	269	271	273	264
		2501 - 3000	88	88	85	84	86	84
		3001 - 3500	43	42	42	42	41	37
		3501 - 4000	56	56	55	53	51	48
		4001 - 4500	23	21	22	22	21	19
		4501 - 5000	33	31	31	29	27	28
		5001 & Above	97	95	93	110	141	141
	Additional Stories	-	224,934	230,849	243,801	262,835	274,693	288,373
	Sub-Total		771,138	780,113	806,265	841,010	864,871	883,187
2.	Flats	Upto 500	100,163	101,096	104,567	106,830	108,484	110,561
	(SQ. Yard)	501 - 800	84,487	86,588	91,417	95,257	97,810	100,122
		801 - 1000	39,146	39,987	43,105	44,655	46,110	47,227
		1001 - 1200	21,562	22,095	25,161	26,556	27,060	27,620
		1201 - 1500	16,642	16,815	18,128	19,198	19,879	20,343
		1501 - 1800	4,489	4,531	4,968	5,321	5,597	5,726
		1801 - 2000	1,930	1,931	2,077	2,103	2,199	2,236
		2001 - 2500	1,082	1,086	1,285	1,295	1,392	1,468
		2501 - 3000	199	200	203	211	219	231
		3001 - 3500	210	209	210	210	211	211
		3501 - 4000	16	17	19	19	20	21
		4001 - 5000	52	37	33	33	37	48
		5001 & Above	77	75	73	72	74	81
	Sub-Total		270,055	274,667	291,246	301,760	309,092	315,895
3.	Residencial / Commercial		302	303	300	300	297	156
4.	Industrial		2,028	2,048	2,089	2,150	2,206	2,618
5.	Commercial		17,319	17,325	18,083	18,586	19,158	9,954
6.	Agroculture		37	37	35	37	39	23
7.	Garden / Nursery		42	34	38	46	50	44
8.	Colleges		37	37	37	40	42	57
9.	Schools		1,186	1,251	1,495	1,732	1,899	2,506
10.	Hospitals		308	331	361	397	417	486
11.	Clinics		276	278	300	325	339	441
12.	Mosques		821	822	828	849	913	919
13.	Imam Barghas		66	66	67	70	72	76
14.	Marriage Halls		191	186	181	209	218	282
15.	Clubs		35	40	41	42	44	43
16.	Under Construction		2,144	2,136	2,135	2,341	2,009	1,516
17.	Shops		190,102	192,738	201,439	213,358	220,178	236,886
18.	Vacant Plots / Others		1,352	1,345	1,338	1,337	1,394	1,425
19.	Thallas		92	101	144	169	215	261
20.	Offices		9,435	10,075	11,356	12,811	13,689	23,027
21.	Dhobi Ghats		17	18	24	39	39	44
22.	Restaurants		410	422	457	493	530	793
23.	Hammamas		50	52	55	60	70	106
24.	Commercial / Highrise		299	303	302	297	296	161
25.	Cattle Ponds		89	98	109	145	184	224
	Sub-Total		226,638	230,046	241,214	255,833	264,298	282,048
26.	Bulk Consumer		820	840	870	875	1,160	872
27.	Cattle Coliny		650	651	695	832	850	855
28.	Korangi Industrial Area		1,125	1,150	1,160	1,184	1,247	1,247
29.	Landhi Industrial Area.		140	142	143	149	159	163
30.	F.B Area		890	881	912	912	915	915
31.	Govt. Property Sect.		488	488	488	488	709	1,097
	Sub-Total		4,113	4,152	4,268	4,440	5,040	5,149
	Grand Total		**1,271,944**	**1,288,978**	**1,342,993**	**1,403,043**	**1,443,301**	**1,486,279**

Source: Revenue Data 2001 - 2007, KW&SB

Table A33.1.5 Number of Service Connections - Town Wise

Supply Zone	No.	Town Name	Number of Service Connections					
			2001 - 2002	2002 - 2003	2003 - 2004	2004 - 2005	2005 - 2006	2006 - 2007
Zone-1	1.	Landhi	47,294	47,823	48,215	49,846	50,709	63,711
	2.	Korangi	57,873	57,595	59,494	62,332	63,223	50,576
	3.	Malir	58,492	58,768	60,238	61,352	62,223	62,706
	4.	Bin Qasim	8,449	8,620	9,963	9,876	10,856	10,938
	5.	Shah Faisal	48,738	49,722	51,196	52,437	54,078	54,329
		Sub-Total	220,846	222,528	229,106	235,843	241,089	242,260
Zone-2	6.	Keamari	28,530	29,142	31,321	33,057	34,651	35,785
	7.	Lyari	81,695	86,152	89,260	90,327	91,502	91,806
	8.	Saddar	177,690	177,506	185,092	195,940	219,393	230,121
	9.	Jamshed	101,539	107,578	112,606	116,217	113,423	115,028
	10.	Gulshan-e-Iqbal	101,439	100,793	110,441	126,010	131,545	137,192
	11.	Liaquat Abad	93,971	97,662	99,162	104,536	106,003	107,380
		Sub-Total	584,864	598,833	627,882	666,087	696,517	717,312
Zone-3	12.	SITE	39,494	40,116	42,977	44,440	46,404	46,549
	13.	Baldia	31,657	31,824	32,354	32,625	33,190	33,319
	14.	Orangi	88,874	89,287	90,886	92,724	94,905	96,398
	15.	North Nazimabad	78,667	79,106	82,739	84,345	86,872	88,274
	16.	New Karachi	79,670	80,827	85,108	88,943	92,534	93,545
	17.	Gulberg	87,738	86,776	88,695	89,679	93,460	94,023
	18.	Gadap	18,503	18,293	19,975	20,608	21,338	21,509
		Sub-Total	424,603	426,229	442,734	453,364	468,703	473,617
		Total	1,230,313	1,247,590	1,299,722	1,355,294	1,406,309	1,433,189
City (Cantonment)			37,518	37,236	39,003	43,309	31,952	47,941
Bulk Consumer			820	840	870	875	1,160	872
Cattle Coliny			650	651	695	832	850	855
Korangi Industrial Area			1,125	1,150	1,160	1,184	1,247	1,247
Landhi Industrial Area.			140	142	143	149	159	163
F.B Area			890	881	912	912	915	915
Govt. Property Sect.			488	488	488	488	709	1,097
		Sub-Total	41,631	41,388	43,271	47,749	36,992	53,090
		Grand Total	**1,271,944**	**1,288,978**	**1,342,993**	**1,403,043**	**1,443,301**	**1,486,279**

Source: Revenue Data 2001 - 2007, KW&SB

APPENDIX – A34.1

National Drinking Water Policy

A34.1 National Drinking Water Policy

A. Preamble

1. The National Drinking Water Policy provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people. Drinking water is the constitutional responsibility of the provincial governments and the specific provision function has been devolved to specially created agencies in cities and Town and Tehsil Municipal Administrations under the Local Government Ordinance 2001. Therefore, this policy framework is intended to guide and support the provincial and district governments in discharging their responsibility in this regard. It is expected that the Federal, Provincial, Azad Jammu and Kashmir and Northern Areas Governments will devise their own strategies, plans and programmes in pursuit of this policy.

B. Goal

2. The overall goal of the national drinking water policy is the following;

a) To ensure safe drinking water to the entire population at an affordable cost in an equitable, efficient and sustainable manner.

b) To ensure reduction in the incidence of mortality and morbidity caused by water borne diseases.

C. Objectives of the Policy

3. The overall objectives of the policy are outlined below;

a) To provide a supportive policy and legal framework that facilitates access of all citizens to safe drinking water on a sustainable basis.

b) To provide guidelines that will allow consistency and conformity between the drinking water policy and the overall water sector policy, environmental policy, health policy and drinking water quality standards that will facilitate the provision of safe water to all.

c) To define an institutional framework within which the sector institutions can more effectively address the challenges they face in the provision of drinking water in all areas of the country.

d) To provide a financial framework within which the provision of water supply can be undertaken in a cost-effective, equitable and sustainable manner.

e) To identity and facilitate the implementation of a set of key strategies that will help in enhancing access to safe drinking water supply.

f) To provide a framework within which local communities, women and vulnerable groups can be facilitated to enhance their access to safe drinking water.

D. Policy Principles

4. The key policy principles that will be pursued are the following;

a) To recognize that access to safe drinking water is the basic human right of every citizen and that it is the responsibility of the state to ensure its provision to all citizens.

b) The right to water for drinking takes precedence over rights for water for all other uses such as environment, agriculture, industry etc.

c) To recognize the role of the broad range of providers in the sector and provide a supportive policy framework that encourages alternate options through private provision, public-private partnerships, the role of NGOs and community organizations.

d) To fashion the role of the state in a manner which allows balance between its functions as a service provider and the authority it must exercise as a regulator.

e) To ensure that the existing inequities in the provision of safe drinking water are removed and the needs of the more vulnerable and poor are effectively addressed through adequate financial allocations and provisions of suitable technological options.

f) To recognize the key role that women play in the drinking water sector and ensure their participation in decision-making for the sector at all levels.

g) To recognize the provision of safe water should be undertaken through a community centered demand driven approach in which the community members are given a key role.

h) To introduce financial sustainability in the drinking water sector through levying appropriate user charges, cost recovery and cross-subsidization for different segments of the population.

i) Water treatment will be an integral part of all drinking water supply schemes.

E. Key Targets

5. While each provincial government and district government will pursue its own targets, the overall aim of the Government will be to facilitate the attainment of the targets specified in the Medium Term Framework and the Millennium Development Goals for the country as a whole. The specific targets entail the following;

a) To provide safe drinking water to 93% of the population by 2015 thereby raising the current coverage by almost 30% for the existing population and ensuring that the additional population is also provided access.

b) The technical specification of schemes will be based on the provision of a minimum of 20 liters per capita per day for rural households and 40 liters per capita per day for urban areas.

c) To provide at least one hand pump or spot source for every 250 persons.

d) To establish district and tehsil level water filtration plants by 2007.

e) To establish water treatment plants in all urban areas by the year 2015

f) To ensure that water quality standards are approved and a system of surveillance, testing, monitoring and disseminating information regarding water quality is in place by 2007.

F. Key Policy Instruments and Strategies

6. A host of policy instruments and strategies will be used to achieve the objectives of the drinking water policy. The key strategic thrusts of the policy will be as follows;

6.1 Targeting Strategy

All municipalities will adopt a demand led approach in providing access to safe water to ensure that scarce resources are properly utilized and ownership and sustainability of schemes is ensured over the long-term.

Priority will be accorded to un-served and under-served areas, disadvantaged areas, brackish water zones and those areas where there is shortage of sweet water in the underground aquifers.

Those areas will be especially targeted where women have to walk more than 0.5 kilometres to acquire access to safe drinking water.

The responsibility for provision of water to urban slums and katchi abadis will be undertaken by the municipal authorities in whose jurisdiction these areas are located.

The Federal Government will develop special action plans on an emergency basis with special allocations for areas which are hit by a natural calamity such as floods, droughts and earthquakes, etc.

6.2 Legislative Strategy

The constitutional roles and responsibilities for the water sector will be respected and followed and institutional roles and responsibilities will be consistent with the provisions of the Local Government Ordinance 2001 and the devolution framework in ensuring access to safe drinking water.

To frame a broad policy frame work at the national level which encourages and supports provincial and district governments to design and implement policies which are in-keeping with the existing capacities and strengths of institutions.

To develop a framework which allows the participation of the private sector, encourages public-private partnerships and the role of NGOs in the sector.

To develop a realistic framework for community participation in the sector and ensure that their inclusion helps to build more effective scheme identification, implementation, operations and maintenance systems.

A Safe Drinking Water Act will be enacted to ensure adherence to technical and supply standards for municipal water supply and hold municipal bodies accountable to the general public. The Act will also declare “Safe drinking water” a fundamental human right.

Appropriate legislation will be enacted to ensure compliance with the Pakistan Drinking Water Quality Standards and to affix appropriate penalties for any institution or individual not adhering to the standards.

The Drinking Water Quality Standards should be formally adopted by the provincial governments through appropriate legislation and proper measures undertaken to ensure its enforcement.

There will be a regular review and updating of the drinking water policy after every five years by a committee constituted specially for the purpose of reviewing the implementation of its guidelines, their efficacy and continued relevance to the changing situation in the country.

6.3 Protection of Water Sources

Regular monitoring of water sources to ensure the protection of water sources in the country.

Preserve and protect surface and groundwater resources which offer sustainable sources of supply for local communities in both urban and rural areas.

Encourage and support rainfall harvesting schemes for augmenting municipal water supply.

6.4 Institutional Strategy

The Federal Government will be responsible for establishing overall guiding policy and legislative frameworks for the drinking water sector at the national level and be responsible for special initiatives and allocation of special funds to ensure coverage in underserved and disadvantaged areas.

To focus on the role of the state as both a service provider and regulator to ensure that water quality standards are properly articulated, maintained and enforced.

The Provincial and Area Governments will be responsible for establishing policy guidelines and legislation for the drinking water sector at the provincial level and be responsible for special initiatives and allocation of special funds to ensure overage in underserved and disadvantaged areas.

The Provincial Government will be responsible for determining the institutional responsibilities at the provincial level for the water sector. The institutional roles and responsibilities for water supply will be clearly stated and assigned in keeping with the human, financial and technical capacity of those institutions.

All Provincial and Area Governments will develop medium term plans for the drinking water sector in keeping with the Medium-Term Development Framework and the Millennium Development Goals in conjunction with relevant municipal authorities to guide and steer the future developments in the sector.

The Public Health Engineering Department will be strengthened in provinces and areas where the responsibility for drinking water still rests with them.

The TMAs will be encouraged to make use of the LGO provision that allows for a variety of “contracting in” and “contracting out” arrangements for more effective service provision through the civil society and private sector organizations using performance-based contracts. These arrangements can potentially be used for design and implementation, water testing, operation and maintenance, collection of water charges, awareness building, etc.

The TMAs will be encouraged to adopt a service provider orientation to its clientele. It will develop an approach which integrates community engagement, demand assessment and service provision and marketing in order to effectively enhance its professional credibility and meet the needs of the people within its jurisdiction.

Capacity Building programmes will be designed to strength institutions which are lacking in capacity such as the Town and Tehsil Municipal Administrations, the Provincial Environmental

Protection Agencies, the Local Government and Rural Development Departments, etc. In order to strengthen their capacity further, the Public Health Engineering Department will be merged with the TMAs in all provinces except Balochistan by 2010.

The planning, design, implementation and operations of water systems will ensure a decision making role of the intended beneficiaries, who should be treated as partners rather than passive recipients of development;

To ensure that community organizations the planning, implementation technological choices and supply specifications are determined through close participation with the users, especially in rural areas where the participation of women is critical to ensure effective use and sustainability of water supply systems.

High performing municipalities will be given special acknowledgement by instituting a system of performance grants and rewards for the institutions and the individuals.

6.5 Technical Strategy

Promote effective rehabilitation and efficiency improvements in existing water supply systems, through justifiable investments, significant reductions in non-revenue water, increased water metering and other initiatives.

Technical assistance will be provided to the provincial and area governments for the preparation of appropriate technical guidelines which can be subsequently disseminated to all TMAs and other water sector agencies.

Standard operating procedures (SOPs) will be developed for planning, design, implementation and operations and maintenance for the various categories of water supply schemes. This will ensure adherence to technical standards and eliminate the huge concerns with regards to poor and inadequate water supply networks.

The drinking water system will not be separated from the existing system which provides domestic water supply. The quality of water supplied through the domestic system will adhere to drinking water quality standards.

Appropriate and cost-effective technology will be used to ensure that the local government resources are used optimally and that the systems are easy to design and build and easy to maintain by the local communities and/or the concerned local governments.

Special care should be taken to use materials and parts of good quality in constructing drinking water schemes. Special attention will be made to ensure that pipes with standard specification will be used and rusted pipes will be replaced.

A survey will be undertaken of all existing functioning and non-functioning schemes to determine which of the schemes can be rehabilitated. Priority will be given to those schemes which can be rehabilitated.

A minimum distance will be ensured to separate water mains and sewerage lines to avoid contamination of drinking water supply.

Water filtration plants will be established by the government in a phased programme beginning with installation at the district and Tehsil head quarters in phase I and in each Union Council in phase II.

Low cost technological options will be provided to ensure water treatment options in both urban and rural areas.

6.6 Operation and Maintenance Strategy

The responsibility for the operations and maintenance of all drinking water schemes in urban areas will be given to the Water and Sanitation Agencies and Town Municipal Administrations.

The responsibility for the operations and maintenance of mechanized schemes in rural areas will rest with the TMA or the provincial government. However, the community will be given responsibility for monitoring and surveillance of the scheme.

The responsibility for the operations and maintenance of small un-mechanized schemes in rural areas will be devolved to the intended beneficiaries. These communities will be responsible for routine maintenance and operations. However, in case of a major breakdown of the scheme, the TMA will be responsible for scheme rehabilitation.
Women will be especially consulted when determining the operations and management arrangements for un-mechanized schemes in rural areas.
Capacity building programs for community organizations will be implemented in collaboration with NGOs for improving the local level capacity for operation and maintenance of schemes.

6.7 Drinking Water Quality Standards

Drinking water quality standards will be developed for Pakistan by the Ministry of Health using the World Health Organization's drinking water quality guidelines.
The Pakistan Drinking Water Quality Standards will be approved by the Cabinet and enforced through an act of Parliament before 2007.
The Drinking Water Quality Standards will come into immediate force in both urban and rural areas and the agencies responsible for the provision of water supply will ensure that the quality of water supplied through government financed schemes does not fall below the standards at any given time.
Appropriate action will be undertaken to penalize any vendor or supplier found to be providing water quality lower than the standard prescribed in accordance with the existing legislation.

6.8 Water Quality Monitoring and Surveillance

The provincial government will establish a monitoring and surveillance framework and system guidelines to ensure that drinking water quality conforms with required standards.
The responsibility for monitoring and surveillance of water quality will rest primarily with the Ministry of Environment for water at the source.
The sector agencies responsible for drinking water supply like the WASA's and Town Municipal Administration in urban areas and Tehsil Municipal Administrations in rural areas will be responsible for ensuring that the water quality adheres to the prescribed standards.
The Pakistan Quality Control Authority and PCRWR will be responsible for ensuring that the bottled water marketed in Pakistan adheres to the required standards.
Any private vendor of water will be responsible for ensuring that the water supplied for drinking purposes adheres to the approved water quality standards.
Random testing and surveillance of water quality will be undertaken of water from different sources including government schemes in urban areas, wells, hand pumps in rural areas, bottled water, private vendors, etc by the PCRWR, Ministry of Environment and PQCA to determine the quality of water from different sources.
Water testing laboratories will be established at the District level.
Community activists will be involved in water surveillance and monitoring and will be trained in the use of water testing kits and will be provided kits for each scheme.

6.9 Gender Strategy

Special efforts will be made by all provider agencies particularly the TMAs in rural areas to ensure that both men and women are consulted in scheme identification, implementation and operation and maintenance.
Special focus will be placed on gender training programs for all tiers of local government staff, TMAs, Local Government Staff and EPA so that they are able to respond in a sensitive manner to the gender differentiated needs in the drinking water sector.
Special efforts will be made to recruit and induct women in TMAs, EPA and other relevant agencies to ensure that the needs of women clients are addressed.
To ensure the representation of female councilors in all review and decision making forums regarding drinking water supply at the district, Tehsil and Union Council tiers.

6.10 Communication and Dissemination Strategy

The Ministry of Environment will be responsible for disseminating information on drinking water quality standards through articles in the national press, leaflets, newsletters and dissemination of information to schools, through NGOs, civil society organizations, Community Citizens Boards and community organizations, etc.

At the Federal Level the PCRWR and PQCA will periodically publish reports in the national press and provide information on the quality of bottled water and also inform the relevant enforcing authority for appropriate action.

At the provincial level, the approved drinking water policy will be widely disseminated to municipal institutions, civil society, community organizations and users. In order to undertake this effective, the province may consider putting in place a coordinating and steering mechanism with the participation of key stakeholders.

Regular policy dialogue will be facilitated between all tiers of government and key stakeholders on key issues and challenges, awareness building, experience sharing and dissemination of good practices.

A proper system of dissemination of the information of the water quality of all sources will be developed by the providing agency. The provincial government and EPA will be responsible for coordinating and developing a system of information dissemination.

Each water source and water facility from which people are drawing water for drinking purposes will be marked to indicate whether its water quality conforms to the physical, chemical and bacteriological standards prescribed for drinking.

A system of colour coding will be devised and indicating clearly through a colour code if it is fit for human or animal consumption or not. The green code will indicate water which is fit for drinking and the red code will indicate its unfitness for human consumption. Different shades of red will indicate the level of danger for human and animal health.

Civil society organizations and community activists will participate in information dissemination and raising awareness about water sector issues, water testing and quality issues.

Best Practices regarding successful initiatives in the drinking water sector will be widely disseminated and shared and will be used to enhance the performance in the sector.

6.11 Financial Strategy

Target achievement of full financial sustainability in urban water supply development. The charging system should ensure appropriate subsidies to poorer communities.

Provide rural water supply and sanitation services at affordable rates.

There will be no charge for drinking water only the cost of delivering it to the consumer.

The Federal Government will provide additional financial resources and create special funds to ensure the provision of water to the un-served and under-served areas.

All Provincial Governments, AJK and Northern Areas Government will identify the resource allocation required for achieving full coverage in the provision of safe drinking water to the entire population.

Donor financing for the sector will be undertaken in a proactive and coordinated manner in which the government is in the lead in defining the types of investments that are required in each province in keeping with the MTDF and the MDGs. For this purpose, each provincial government will develop a financing strategy which will clearly identify its resource needs and financing plan.

The Provincial Governments will provide adequate financial allocations to the Tehsil Municipal Administration to ensure that the specified targets for coverage can be addressed.

The current system of tying provincial transfers to the Tehsils/TMAs to district population and on the state of development n the district will be revised in light of the MDG commitments.

The Districts Governments will ensure that drinking water schemes will be given the highest priority in the allocation of funds to the Citizen Community Boards at the local level.

The provision of urban water supply will be provided on the basis of full cost recovery for operation and maintenance.

The government will follow an approach of full cost recovery in the sector as a whole but will consider a differentiation approach which will include full cost recovery, partial cost recovery, subsidization and cross-subsidization to achieve financial sustainability in the sector.
The TMAs will introduce a system for operations and maintenance on full-cost recovery to maintain the water supply system in a sustainable way. However the cost for major breakdown will be paid by the providing public sector authority.
The current tariff for both residential and commercial users will be revised to ensure that the operational costs of the municipal entities are fully met.
The providers will be encouraged to promote metering of water consumption to discourage the indiscriminate use of water.
The implementation of professional system for billing and collection will be encouraged through a host of options such as through strengthening the TMAs, outsourcing to the private sector, community-based system of collection, etc.
Systems of performance grants will be encouraged to reward those institutions and individuals who have been able to meet performance milestones and achieve the specified targets.
The capacity of service providers in the area of financial management, budgeting, audit and accounting, revenue collections will be strengthened.

6.12 Monitoring and Evaluation Strategy

At the Federal Level, the Ministry of Environment will be responsible for monitoring the overall coverage in the drinking water sector at the national level. It will obtain figures from the Planning and Development Departments at the provincial level on the basis of which it will produce an annual report on the "State of Drinking Water in Pakistan".
At the provincial level, the Local Government Department will be responsible for monitoring the coverage of drinking water supply in rural areas and the WASAs will be responsible for the urban areas. The overall coordinating responsibility will be given to the provincial Planning and Development Department.
The TMAs will initiate the establishment of internal as well as external systems for monitoring and evaluations. They will follow professional protocols for annual work planning, identify key progress indicators and conduct effective monitoring and evaluation functions on a regular basis.
The specific targets and achievements of TMAs will be displayed on bulletin boards outside their offices to inform the public of proposed plans and achievements. In addition, the TMAs will encourage forums in which citizens and community members can participate to provide regular feedback on TMA performance.
The Federal Government will ensure that annual surveys are conducted to assess the progress in the achievement of the overall national goals and targets in the drinking water sector. The Pakistan Integrated household Survey will be the main instrument for assessing performance at the national level.
The provincial governments will conduct third party surveys with provincial and district level resolution to assess the coverage to safe water, conduct water quality surveys and assess the extent to which treatment facilities have been provided.

Research Strategy

Special efforts will be undertaken to pilot test new approaches and innovative ideas and arrangements in the drinking water sector, especially those which help to improve access, efficiency, effectiveness and sustainability.
Where these experiments are successful they will be widely disseminated and plans will be made to up scale and replicate them at the national level.

APPENDIX – A34.2

1. **Sindh Water Supply Policy**
2. **Solid Waste and Sanitation Policy**
   May 2006
   Local Government Department
   Government of Sindh

A34.2 1. Sindh Water Supply Policy
2. Solid Waste and Sanitation Policy May 2006
Local Government Department Government of Sindh

1. SINDH WATER SUPPLY POLICY
2. SOLID WASTE & SANITATION POLICY

MAY 2006

LOCAL GOVERNMENT DEPARTMENT
GOVERNMNET OF SINDH

Invitation of Public Opinion

Pursuing the resolve of the Government of Sindh for eradicating poverty, improving living conditions and providing basic facilities in water supply, sanitation and solid waste management sectors, the Local Government Department (LGD), Government of Sindh with the assistance of Asian Development Bank (TA 4432 – PAK: Capacity Building for Environmental management) has undertaken the process of preparation of two policies for Sindh: 1) Water Supply Policy and 2) Solid Waste & Sanitation Policy through international consultants Halcrow Pakistan (Pvt.) Limited. The policies have been framed in consultation with all stakeholders. These policies are posted at website www.sdssp.gov.pk. Through publication in newspapers and to achieve the objectives of transparency and public participation, the public opinion / suggestions are invited to further improve these policies before their approval and implementation. Any comments may be addressed to WSS Section, Sindh Devolved Social Services Program, 3rd floor State Life Building No. 3, Dr. Ziauddin Ahmad Road, Karachi, or policies@sdssp.gov.pk within 10 days of this publication.

DRAFT DOMESTIC WATER SUPPLY POLICY FOR SINDH

PREAMBLE

1. The Sindh Domestic[1] Water Supply Policy is intended to support and guide the Sindh City District Government and Taluka Municipal Administrations (TMA) to frame their own domestic water strategies, plans and programmes and is the result of stakeholder consultations held at the Taluka and provincial levels.
2. The Government of Pakistan has recently finalized, after stakeholder consultations held at the provincial level and in Azad Jammu and Kashmir and the Northern Areas, the draft National Drinking Water Policy to guide and support the provincial and district governments in framing their own drinking water strategies, plans and programmes. The draft Policy for Sindh, while reflecting the ground realities in Sindh, has been drawn up within the broad framework of the draft National Policy.
3. The Sindh Policy has been prepared after extensive consultations, detailed technical assessment in selected urban and rural areas and a process of consensus building The objective of the process was to ensure participation of stakeholder groups both in (i) identification of issues, and (ii) together with the technical, fiscal and financial assessment carried out by the TA Team, build a consensus on policy response to the identified issues. (See Annex 10 of interim report for further details of the process)

[1] Domestic Water refers to the provision of water to households, offices and commercial establishments primarily for the use of and by people in and for their everyday activities. Also referred to as "municipal" water supply, it excludes the supply of water used as inputs for manufacturing or production (such as large-scale, commercial, agricultural and industrial) processes. "Drinking Water", which forms an important component of domestic water supply refers to water, treated or untreated, which is intended for human use and consumption and considered to be free of harmful chemicals and disease-causing bacteria, cysts, viruses, or other microorganisms.

4. The first stage of the process involved three principal activities: (1) Consultation meetings with stakeholders in 41 Taluka Municipal Administrations (TMAs); (2) Issues assessment in 6 TMAs; and (3) Meetings at the provincial government level. The outputs of these consultations were analysed in the background of the detailed technical, fiscal, financial and WSS tariff assessments in the 6 selected TMAs. The issues highlighted in the Consultation process, together with reports from the technical and financial assessment conducted by the TA Team, formed the basis for preparing the first draft of the Policy which was included in the Interim Report.

5. The second stage of the process involved consensus building on the first draft of the Policy and was carried out after the submission of the Interim Report. This included: (1) Circulation of the summary issues statement and first draft of the Policy included in the interim report to a stakeholder group invited to a Consensus Building Meeting held on April 20, 2006. (2) Presentation of the issues assessment carried out in Sindh, the framework of the draft national policy, and the first draft of the Sindh Domestic Water Policy. Discussions were held by the group, which included high-level Provincial Government officials, invited representatives from selected local governments who could make commitments on behalf of their organizations, and civic and civil society groups, on the draft of the Policy.

6. The feedback from the meeting of April 20, 2006 on the first draft of the Policy provided the basis for the review and revision and the revised draft contained in this document.

1 CONTEXT

7. The water realities related to demographic change, coverage, social issues, the resource dimension, NGO and private sector involvement, capacity and capability of planning agencies and local government departments, are given below and has formed the basis for the development of the provisions of the Sindh Domestic Water Supply Policy.

- Sindh's population according to the 1998 Census is 30.44 million. The annual population growth rate is 2.80 per cent which means that the population will double in the next twenty-five years. Urban growth is 3.5 per cent and 48.8 per cent of Sindhis live in urban areas[2]. This trend is likely to continue.
- There is a scarcity of drinking water and coverage is poor. According to one survey[3], sixty seven percent of households has access to water inside their houses i.e., 26% have taps, 6% have motorized pumps and 35% have hand pumps In rural areas 57% of the households has access to water inside their houses i.e. 3% have taps, 3% have motorized pumps and 51% have hand-pumps, In urban areas 80% of the households has access to water inside their houses i.e. 59% have taps, 9% have motorized pumps and 12%

[2] Urban Areas are defined by the Census of Pakistan as "all localities which were either metropolitan corporation, municipal corporation, municipal committee, town committee or cantonment". In this document the term urban areas and cities are used interchangeably. The term "settlements" is used to extend the definition to include smaller agglomerations in "rural" areas.

[3] Pakistan Integrated Household Survey, Water and Drinking water in the last Decade. July 2003. Commissioned by DfID, UK

have hand-pumps. Between 1996 and 2002, there has been a decrease in the percentage of houses with access to water inside their house through tap water from 39% to 26%. In urban areas the tap water decreased from 71% to 59%. However there has been an increase in hand-pumps usage from 26% to 35%.

- Overall 50% of the households are paying for tap water. In rural areas 58% and in urban areas 49% are paying for tap water. However, there is virtually no data regarding water quality.
- Most cities have invested in piped water systems. The old systems have collapsed due to a lack of maintenance and poor design.
- The water is supplied intermittently. As the water lines are laid adjacent to the sewers/ drains the wastewater is sucked into the water lines. Often water lines have been tapped informally using poor joints and connections, again leading to contamination by sewage.
- The main source of water for many settlements is the irrigation canal and during canal closures or supply shortages, there is no water available in the canal. The canals are also used as the outflow for untreated sewage. Thus the dumping of sewage by one settlement contaminates the water of others downstream who undertake little or no treatment before supplying it to the households.
- Household Surveys show that the majority of the population do not have a clear understanding of the relationship between unsafe water and health. As a result, water-borne diseases impoverish them.
- Government spending for the water and drinking water sector has been poor (0.08 per cent of the GDP for the year 2002-03, and 0.09 and 0.10 per cent for the years 2003-04 and 2004-05 respectively). These allocations are insufficient to meet the Millennium Development Goals and other targets for the sector and most of them are utilised for the water sector rather than drinking water.
- Vertical programmes (such as the Khushal Pakistan Programme) are organised and implemented in ways that adversely effect the autonomy of the Taluka Municipal Administration (TMA) in preparing the development budget and also undermine local government accountability and operational efficiency.
- There is considerable evidence to show that in the absence of government and/or NGO support and investments, communities organise to build their drinking water systems on self-help. If this process is supported then the huge investments communities make into this effort would be better utilised and would help to overcome resource constraints.
- There are a number of Pakistani NGO and government agency programmes and projects that have successfully supported communities in financing and managing the construction of their neighbourhood drinking water infrastructure through self-help. Government-NGO/CBO partnerships have emerged as a result where local government has complimented this work by providing bulk water.

- In most urban areas and in all rural areas drinking water is not priced and as such O&M cost for drinking water have to be subsidised from other sources.
- Land-use and topographic Maps and development plans of existing settlements and the infrastructure that they contain do not exist for the urban and/or rural areas of Sindh. Institutional capacity and capability for such documentation is almost non-existent. In the absence of such documentation, realistic and cost effective planning cannot take place.
- There is also inadequate technical capacity and capability in government agencies to plan and implement and an absence of management information systems.
- Engineering standards followed in Sindh create systems that are expensive to build, operate and maintain. Standards developed by NGO and innovative government programmes have overcome these constraints and are being increasingly applied as solutions.
- So far there has been an absence of a drinking water policy and an absence of a clear definition of drinking water itself. In addition, roles of the different government agencies responsible for planning and implementation are not clearly defined. There are also a large number of actors involved in drinking water provision and a large number of parallel drinking water related investments and programmes between which there is no coordination and many of which do not come under the preview of local government institutions. Local government and development agencies also lack managerial, administrative and monitoring capacity due to which a lot of ad-hoc decisions and programmes take place.

2 OBJECTIVES

8. The primary objective of the Sindh Domestic Water Supply Policy is to improve the quality of life of the people of Sindh. To achieve this, the policy has the following sub objectives:
   - To ensure access to safe drinking water, and the promotion of health and hygiene practices to compliment the primary objectives.
   - To develop guidelines for the evolution of an effective institutional and financial framework to implement the primary objectives.
   - To link drinking water programmes with environment, housing, sanitation and city and regional planning policies and programmes.

3 POLICY PRINCIPLES

9. The following key policy principles will be pursued:
   - To recognize that access to safe drinking water is the basic human right of every citizen and that it is the responsibility of the state to ensure its provision to all citizens.
   - The right to water for drinking takes precedence over rights for water for all other uses such as environment, agriculture, industry etc.

- To recognize the role of the broad range of providers in the sector and provide a supportive policy framework that encourages alternate options through private provision, public-private partnerships, the role of NGOs and community organizations.
- To fashion the role of the state in a manner which allows balance between its functions as a service provider and the authority it must exercise as a regulator.
- To ensure that the existing inequities in the provision of safe drinking water are removed and the needs of the more vulnerable and poor are effectively addressed through adequate financial allocations and provisions of suitable technological options.
- To recognize the key role that women play in the drinking water sector and ensure their participation in decision-making for the sector at all levels.
- To recognize the provision of safe water should be undertaken through a community-centred, demand-driven approach in which the community members are given a key role.

4 MINIMUM ACCEPTABLE DRINKING/DOMESTIC WATER OPTIONS

10. The definition of minimum acceptable drinking water in the context of this policy is given below.
    - In urban areas and/or rural settlements: communal water points will be established within a radius of 0.5 km where safe drinking water will be made available. Water should be provided 2 litres per person per day for the settlement. The water quality will be as per the WHO Guidelines.
11. The definition of minimum acceptable domestic water in the context of this policy is given below.
    - In urban areas and/or rural settlements: water will be provided inside the house, through piped system, to meet the minimum requirement of 50 litres per person per day.
    - In rural settlements: water will be provided through communal points to meet the minimum requirement of 25 litres per person per day.

5 TARGETS

12. While each city district government and TMA will pursue its own targets, the overall aim of the Sindh Provincial Government is to facilitate the attainment of the targets specified in the Medium Term Framework and the Millennium Development Goals for the country as a whole. The specific targets entail the following;
    - To provide safe drinking water to 93% of the population by 2015 thereby raising the current coverage by almost 30% (from 67% at present to 93% in 2015) for the existing population and ensuring that the additional population is also provided access.
    - To provide at least one hand pump or spot source for every 250 persons.

- To establish water treatment plants in all urban areas by the year 2015
- To ensure that water quality standards are approved and a system of surveillance, testing, monitoring and disseminating information regarding water quality is in place by 2007.

6 KEY POLICY INSTRUMENTS AND STRATEGIES

13. A host of policy instruments and strategies will be used to achieve the objectives of the Domestic Water Supply Policy. The key strategic thrusts of the policy will be as follows;

Targeting Strategy

- All municipalities will adopt a demand led approach in providing access to safe water to ensure that scarce resources are properly utilized and ownership and sustainability of schemes is ensured over the long-term.
- Priority will be accorded to un-served and under-served areas, disadvantaged areas, brackish water zones, coastal zones and those areas where there is shortage of sweet water in the underground aquifers.
- Those areas will be especially targeted where women have to walk more than 0.5 kilometres to acquire access to safe drinking water.
- The responsibility for provision of water to urban slums and katchi abadis will be undertaken by the municipal authorities in whose jurisdiction these areas are located.

Legislative Strategy

- The constitutional roles and responsibilities for the water sector will be respected and followed and institutional roles and responsibilities will be consistent with the provisions of the Local Government Ordinance 2001 and the devolution framework in ensuring access to safe drinking water.
- To frame a broad policy framework at the provincial level which encourages and supports city district and Taluka governments to design and implement policies which are in-keeping with the existing capacities and strengths of institutions.
- To develop a framework which allows the participation of the private sector, encourages public-private partnerships, and the role of NGOs in the sector.
- To develop a realistic framework for community participation in the sector and ensure that their inclusion helps to build more effective scheme identification, implementation, operations and maintenance systems.
- Appropriate legislation will be enacted to ensure compliance with the Pakistan Drinking Water Quality Standards and to affix appropriate penalties for any institution or individual not adhering to the standards.
- There will be a regular review and updating of the legislative framework after every five years or when required by a committee constituted specially for the purpose of reviewing the implementation of its guidelines, their efficacy and continued relevance to the changing situation in the country.

Protection of Water Sources

- Regular monitoring of water sources to ensure the protection of water sources Sindh.
- Preserve and protect surface (rivers, lakes, wetlands) and groundwater resources which offer sustainable sources of supply for local communities in both urban and rural areas.
- Encourage and support rainfall harvesting schemes (including 'tanka', Veer dams) for augmenting municipal water supply.

Institutional Strategy

- To focus on the role of the Government as both a service provider and regulator to ensure that water quality standards are properly articulated, maintained and enforced.
- The Sindh Provincial and Local Governments will be responsible for establishing policy guidelines and legislation for the drinking water sector at the provincial level and be responsible for special initiatives and allocation of special funds to ensure overage in underserved and disadvantaged areas.
- Sindh Provincial and Local Governments will develop medium term plans for the drinking water sector in keeping with the Medium-Term Development Framework and the Millennium Development Goals in conjunction with relevant municipal authorities to guide and steer the future developments in the sector.
- The TMAs will be encouraged to make use of the SLGO (2001) provision that allows for a variety of "contracting in" and "contracting out" arrangements for more effective service provision through the civil society and private sector organizations using performance-based contracts. These arrangements can potentially be used for design and implementation, water testing, operation and maintenance, collection of water charges, awareness building, etc.
- The TMAs will be encouraged to adopt a service provider orientation to its clientele. It will develop an approach which integrates community engagement, demand assessment and service provision and marketing in order to effectively enhance its professional credibility and meet the needs of the people within its jurisdiction.
- Capacity Building programmes will be designed to strengthen institutions which are lacking in capacity such as the Town and Taluka Municipal Administrations, the Sindh Environmental Protection Agency, the Local Government and Rural Development Departments, etc.
- The planning, design, implementation and operations of water systems will ensure a decision making role of the intended beneficiaries, who should be treated as partners rather than passive recipients of development;
- To ensure that community organizations the planning, implementation technological choices and supply specifications are determined through close participation with the users, especially in rural areas where the participation of women is critical to ensure effective use and sustainability of water supply systems.

- High performing municipalities will be given special acknowledgement by instituting a system of performance grants and rewards for the institutions and the individuals.

Technical Strategy

- Promote effective rehabilitation and efficiency improvements in existing water supply systems, through justifiable investments, significant reductions in non-revenue water, increased water metering and other initiatives.
- Technical assistance will be provided to the provincial and area governments for the preparation of appropriate technical guidelines which can be subsequently disseminated to all TMAs and other water sector agencies.
- Standard operating procedures (SOPs) will be developed for planning, design, implementation and operations and maintenance for the various categories of water supply schemes. This will ensure adherence to technical standards and eliminate the huge concerns with regards to poor and inadequate water supply networks.
- Appropriate and cost-effective technology will be used to ensure that the local government resources are used optimally and that the systems are easy to design and build and easy to maintain by the local communities and/or the concerned local governments.
- Special care should be taken to use materials and parts of good quality in constructing drinking water schemes. Special attention will be made to ensure that pipes with standard specification will be used and rusted pipes will be replaced.
- Wherever possible, preference should be given to rehabilitate existing schemes (functioning or not) over the construction of new schemes, unless there are special reasons to justify otherwise.
- The design and layout of water supply pipes, storage tanks etc should ensure that there is no contamination by sewerage systems, for example by maintaining a minimum distance between the two systems..
- Low cost technological options should be developed and promoted to provide affordable water treatment options, in both urban and rural areas.

Operation and Maintenance Strategy

- The responsibility for the operations and maintenance of all drinking water schemes will be with the Taluka Municipal Administrations except in the case of large urban areas, where a specialised Water and Sanitation Agency may be established.
- However, the community should be given responsibility for monitoring and surveillance of the schemes, especially in the rural areas and small settlements.. Where appropriate, the responsibility for the operations and maintenance of small schemes may be devolved to the intended beneficiaries. These communities will be responsible for routine maintenance and operations. However, in case of a major breakdown of the scheme, the TMA will be responsible for scheme rehabilitation.
- Women will be especially consulted when determining the operations and management arrangements for schemes..

- Capacity building programs for community organizations will be implemented (in collaboration with NGOs where appropriate) for improving the local level capacity for operation and maintenance of schemes.

Drinking Water Quality Standards

- The Pakistan Drinking Water Quality Standards will come into immediate force in both urban and rural areas and the agencies responsible for the provision of water supply will ensure that the quality of water supplied through government financed schemes does not fall below the standards at any given time.
- Appropriate action will be undertaken to penalize any vendor or supplier found to be providing water quality lower than the standard prescribed in accordance with the existing legislation.

Water Quality Monitoring and Surveillance

- The responsibility for monitoring and surveillance of water quality for water at the source will rest primarily with the Sindh Environmental Protection Agency. The Government of Sindh will establish a monitoring and surveillance framework and system guidelines to ensure that drinking water quality conforms with required standards.
- The specialised agencies responsible for drinking water supply like the WASA's and the Taluka Municipal Administrations will be responsible for ensuring that the water quality adheres to the prescribed standards.
- Any private vendor of water, including bottled, will be responsible for ensuring that the water supplied for drinking purposes adheres to the approved water quality standards.
- Random testing and surveillance of water quality will be undertaken of water from different sources including government schemes in urban areas, wells, hand pumps in rural areas, bottled water, private vendors, etc to determine the quality of water from different sources.
- Water-testing laboratories will be established at the District level.
- Community activists will be involved in water surveillance and monitoring and will be trained in the use of water testing kits and will be provided kits for each scheme.

Gender Strategy

- Special efforts will be made by all provider agencies particularly the TMAs in rural areas to ensure that both men and women are consulted in scheme identification, implementation and operation and maintenance.
- Special focus will be placed on gender training programs for all tiers of local government staff, TMAs, Local Government Staff and EPA so that they are able to respond in a sensitive manner to the gender differentiated needs in the drinking water sector.
- Special efforts will be made to recruit and induct women in TMAs, EPA and other relevant agencies to ensure that the needs of women clients are addressed.
- To ensure the representation of female councillors in all review and decision making forums regarding drinking water supply at the district, Taluka and tiers.

Communication and Dissemination Strategy

- The Environment Protection Agency will be responsible for disseminating information on drinking water quality standards through articles in the press, leaflets, newsletters and dissemination of information to schools, through NGOs, civil society organizations, Community Citizens Boards and community organizations, etc.
- The approved Domestic Water Supply Policy will be widely disseminated to municipal institutions, civil society, community organizations and users. In order to undertake this effective, consider may be given to putting in place a coordinating and steering mechanism with the participation of key stakeholders.
- Regular policy dialogue will be facilitated between all tiers of government and key stakeholders on key issues and challenges, awareness building, experience sharing and dissemination of good practices.
- A proper system of dissemination of the information of the water quality of all sources will be developed by the providing agency. The provincial government and EPA will be responsible for coordinating and developing a system of information dissemination.
- Each water source and water facility from which people are drawing water for drinking purposes will be marked to indicate whether its water quality conforms to the physical, chemical and bacteriological standards prescribed for drinking.
- A system of colour coding will be devised and indicating clearly through a colour code if it is fit for human or animal consumption or not. The green code will indicate water which is fit for drinking and the red code will indicate its unfitness for human consumption.
- Civil society organizations and community activists will participate in information dissemination and raising awareness about water sector issues, water testing and quality issues.
- Best Practices regarding successful initiatives in the drinking water sector will be widely disseminated and shared and will be used to enhance the performance in the sector.

Financial Strategy

- The government will follow an approach of full cost recovery in the sector as a whole but will consider a differentiation approach which will include full cost recovery, partial cost recovery, subsidization and cross-subsidization to achieve financial sustainability in the sector. The tariff system should ensure appropriate subsidies to poorer communities.
- The TMAs will ensure that drinking water schemes will be given the highest priority in the allocation of funds to the Citizen Community Boards at the local level.
- The TMAs will introduce a system for operations and maintenance on full-cost recovery to maintain the water supply system in a sustainable way. However the cost for major breakdown will be paid by the providing public sector authority. The current tariff for both residential and commercial users will be revised to ensure that the operational costs of the municipal entities are fully met.
- The providers will be encouraged to promote metering of water consumption to discourage the indiscriminate use of water.

- The implementation of professional system for billing and collection will be encouraged through a options such as through strengthening the TMAs, outsourcing to the private sector, community-based system of collection, etc.
- Systems of performance grants will be encouraged to reward those institutions and individuals who have been able to meet performance milestones and achieve the specified targets.
- The capacity of service providers in the area of financial management, budgeting, audit and accounting, revenue collections will be strengthened.

Monitoring and Evaluation Strategy

- The Local Government Department will be responsible for monitoring the coverage of drinking water supply.
- The TMAs will initiate the establishment of internal as well as external systems for monitoring and evaluations. They will follow professional protocols for annual work planning, identify key progress indicators and conduct effective monitoring and evaluation functions on a regular basis.
- The coverage and specific targets and achievements of TMAs will be displayed on bulletin boards outside their offices to inform the public of proposed plans and achievements. In addition, the TMAs will encourage forums in which citizens and community members can participate to provide regular feedback on TMA performance.
- The Government of Sindh will conduct third party surveys with provincial and district level resolution to assess the coverage to safe water, conduct water quality surveys and assess the extent to which treatment facilities have been provided.

Research Strategy

- Special efforts will be undertaken to pilot test new approaches and innovative ideas and arrangements in the drinking water sector, especially those which help to improve access, efficiency, effectiveness and sustainability.
- Where these experiments are successful they will be widely disseminated and plans will be made to up scale and replicate them at the national level.

7 ROLES AND RESPONSIBILITIES OF STAKEHOLDERS

Government Institutions

7.1.1 Roles and Responsibilities as per Sindh Local Government Ordinance 2001

- All provincial, district, Taluka and UC level legislative bodies and government departments and agencies will fulfil their roles strictly in keeping with the provisions of the Sindh Local Government Ordinance 2001.
- The Government of Sindh, in coordination with the district governments, will remove all anomalies, lack of regulations and procedures, conflict of

interests between government institutions, to make it possible for different tiers of government and agencies to fulfil their assigned roles.

- The Government of Sindh will take steps to increase the capacity and capability of all drinking water related agencies and departments in accordance with the measures spelt out in Section 4, 5 and 6 of this document.

7.1.2 Additional Roles

- Provincial, district, Taluka (town) and UC elected representatives and administration will identify NGOs and CBOs and private sector (formal and informal) good practices and convert them into training centres for their staff with the help of NGOs, CBOs and/or private sector/entrepreneurs and replicate these practices in other locations within their jurisdiction through the formation of stakeholder partnerships.
- A system planning and feedback, consultation and coordination will be established at the provincial, district and TMA level between all agencies (such as Environment Protection Agency, Health and Education Department and Urban and Regional Planning Departments and institutions) dealing with drinking water issues.
- The process for the establishment of a management information system will be initiated at the provincial, district and TMA level, in order to enable the planning and development of drinking water; consolidation of information and data from all monitoring and research agencies; and make it freely available to the public through a policy of data sharing (through IT technology) within and amongst all drinking water related organisations.
- Each city government and TMA will prepare a comprehensive mapping and Taluka database which will be linked to the proposed management information system. On the basis of this the TMA will prepare spatial and medium term plans which will guide and steer the future development in the sector and on the basis of which appropriate drinking water investment plans can be prepared at the federal, provincial, Taluka and UC level.
- The TMA will provide technical support to NGOs and CBOs working on drinking water related issues on the self-help component sharing model or other community initiatives.

NGOs and CBOs

- NGOs and CBOs will be encouraged to assist communities in mobilising for drinking water related programmes and projects and will assist the district city government/TMAs/UCs in the planning, funding and development of community based drinking water infrastructure and for the safe disposal of liquid and solid wastes.
- NGOs and CBOs will be encouraged to help in the formation of Citizen Community Boards (CCBs) and to guide them in formulating drinking water projects.

Community Responsibilities

14. Through the process of mobilisation of communities envisaged in this policy and through public consultation and media programmes, communities will be encouraged to maintain a safe and pleasant physical environment in their settlement, participate in the provision of drinking

water infrastructure and its management and manage the disposal of solid waste at the neighbourhood level.

Individual Households

15. Through the process of mobilisation and media programmes, individual households will be encouraged to cooperate with the UC administration and with their neighbours to form community organisations that can promote drinking water related programmes and projects.

8 MECHANISMS FOR IMPLEMENTATION AND MONITORING

Implementation Strategy

- The policy will be implemented by the Government of Sindh and local governments, government agencies in accordance with the guidelines, principles and measures spelt out in this document.
- Communities, NGOs and the private sector will be supported and their involvement encouraged in accordance with the provisions of the Domestic Water Supply Policy.

Monitoring

- Monitoring of programmes and projects in the TMA will be done by the Taluka Monitoring Committees. They will also provide the necessary feedback, as required, to the provincial level on the implementation of the policy.
- The Sindh Government will monitor the implementation of the policy and programmes within the province and provide necessary feedback and liaise with federal government on the wider issues related to drinking water.

DRAFT SOLID WASTE AND SANITATION POLICY FOR SINDH

1. PREAMBLE

1. The Sindh Sanitation[4] Policy is intended to support and guide the Sindh City District Government and Taluka Municipal Administrations (TMA) to frame their own sanitation strategies, plans and programmes and is the result of stakeholder consultations held at the Taluka and provincial levels.

2. The Government of Pakistan has recently finalized, after stakeholder consultations held at the provincial level and in Azad Jammu and Kashmir and the Northern Areas, the draft National Sanitation Policy to guide and support the provincial and district governments in framing their own sanitation strategies, plans and programmes. The draft Policy for Sindh, while reflecting the ground realities in Sindh, has been drawn up within the broad framework of the draft National Policy.

3. The Sindh Policy has been prepared after extensive consultations, detailed technical assessment in selected urban and rural areas and a process of consensus building The objective of the process was to ensure participation of stakeholder groups both in (i) identification of issues, and (ii) together with the technical, fiscal and financial assessment carried out by the TA Team, build a consensus on policy response to the identified issues. (See Annex 10 of interim report for further details of the process)

4. The first stage of the process involved three principal activities: (1) Consultation meetings with stakeholders in 41 Taluka Municipal Administrations (TMAs); (2) Issues assessment in 6 TMAs; and (3) Meetings at the provincial government level. The outputs of these consultations were analysed in the background of the detailed technical, fiscal, financial and WSS tariff assessments in the 6 selected TMAs. The issues highlighted in the Consultation process, together with reports from the technical and financial assessment conducted by the TA Team, formed the basis for preparing the first draft of the Policy which was included in the Interim Report.

5. The second stage of the process involved consensus building on the first draft of the Policy and was carried out after the submission of the Interim Report. This included: (1) Circulation of the summary issues statement and first draft of the Policy included in the interim report to a stakeholder group invited to a Consensus Building Meeting held on April 20, 2006. (2) Presentation of the issues assessment carried out in Sindh, the framework of the draft national policy, and the first draft of the Sindh Sanitation Policy. Discussions were held by the group, which included high-level Provincial Government officials, invited representatives from selected local governments who could make commitments on behalf of their organizations, and civic and civil society groups, on the draft of the Policy.

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[4] Sanitation is defined by the World Bank as 'Interventions to reduce people's exposure to diseases by providing a clean environment in which to live; with measures to break the cycle of disease. This usually includes disposing of or hygienic management of human and animal excreta, refuse and wastewater, the control of disease vectors and the provision of washing facilities for personal and domestic hygiene. Sanitation involves both behaviors and facilities which work together to form a hygienic environment.' http://www.worldbank.org/html/fpd/water/topics/hsp/hsp_definitions.html and is used here to include open drains, covered drains and underground sewerage systems used to collect and dispose of human wastes.

6. The feedback from the meeting of April 20, 2006 on the first draft of the Policy provided the basis for the review and revision and the revised draft contained in this document.

2. SANITATION CONTEXT

7. The sanitation-related ground realities related to demographic change, coverage, social issues, the resource dimension, NGO and private sector involvement, capacity and capability of planning agencies and local government departments, are given below and has formed the basis for the development of the provisions of the Sindh Sanitation Policy.

- Sindh's population according to the 1998 Census is 30.44 million. The annual population growth rate is 2.80 per cent which means that the population will double in the next twenty-five years. Urban growth is 3.5 per cent and 48.8 per cent of Sindhis live in urban areas[5]. This trend is likely to continue.
- Sanitation coverage is poor. According to one survey[6], thirty per cent of Sindh's population has access to sanitation latrines, 69 per cent in the urban areas and only 2 per cent in the rural areas. Between 1996 and 2002, there has been no increase in the percentage of houses with toilets in urban areas. In the case of rural areas there has been a decline from 64 per cent in 1996 to 51 per cent in 2002.
- In the urban areas in Sindh, underground drains serve only 69 per cent of households and in the rural areas 85 per cent of households have no system at all.[7]
- Most cities have invested in underground sewerage systems. The old systems have collapsed due to a lack of maintenance and poor design and almost all systems dispose untreated sewage into the storm water drains and water bodies. As a result, there is sewage-contaminated stagnant water in streets and lanes, and the heavily contaminated natural water bodies has made their water and fish life unsafe for food and is a major environmental health hazard, since the water in the canals is used untreated by settlements downstream for drinking and for agricultural purposes. In addition, over 50 per cent of Sindh's urban population lives in *katchi abadis* and/or informal settlements and their sanitation plans have not been integrated into the larger city sanitation plans. Treatment plants for the cities do not exist and where they do, they are inappropriately located and hence receive little or no sewage.
- The vast majority of small towns do not have an underground sewerage system. Most neighbourhoods have open drains installed by the Public Health Engineering Department (PHED) which are

[5] Urban Areas are defined by the Census of Pakistan as "all localities which were either metropolitan corporation, municipal corporation, municipal committee, town committee or cantonment". In this document the term urban areas and cities are used interchangeably. The term "settlements" is used to extend the definition to include smaller agglomerations in "rural" areas.

[6] Pakistan Integrated Household Survey, Water and Sanitation in the last Decade. July 2003. Commissioned by DfID, UK

[7] *ibid*

often and easily blocked, and the stagnant water becomes a health hazard and a danger to the housing stock.

- Solid waste management systems exist only in the large cities and a few intermediate ones. In those urban areas served, as little as 50 per cent of the garbage generated by the major cities is lifted and taken to informal dumping sites since formal sites have not been adequately developed. It is estimated that only 5 per cent households in Sindh have access to a municipal garbage collection system. A system of incineration does exist in Karachi but it is not environmentally-friendly and caters to only a small fraction of the generated hospital waste in these cities.

Solid waste management:

- TMAs are now responsible for solid waste management, but their ability to deliver services to an acceptable quality across their areas of jurisdiction is limited by lack of resources, organizational capacity and information. There is also a lack of strategic planning within the administrations.
- The solid waste management problems in urban areas are compounded by the behaviour of waste generators. In many areas, householders and shopkeepers throw their waste directly onto streets. Door-to-door collection systems are not prevalent. This is likely to be because of a lack of awareness of the link between public health and solid waste management, and because of a lack of alternatives, such as conveniently placed sanitary community bins.
- Prevailing waste management activities present a number of health and safety issues for the public and workers. Hand loading and unloading of vehicles is commonplace. Waste is often scattered on streets or left rotting in piles, and is the most common cause of blocked drains. Hospital and other hazardous wastes are rarely separated from other waste, and there are few provisions for treatment or controlled disposal.
- The public sector has not been widely involved in solid waste management activities to date. The informal sector is active in collection and recycling activities, but its contribution remains unacknowledged and undervalued.
- National Rules have been developed for healthcare waste, and a recent Ordinance bans the manufacture and use of plastic bags under 30 microns thickness. Awareness of rules and Ordinances is not widespread, and systems of implementation and enforcement need to be further developed.
- Household Surveys show that the majority of the population of Sindh do not have a clear understanding of the relationship between unsafe excreta disposal and diarrhoea. They also do not know the costs and techniques of installing sanitary latrines. As a result, sanitation related diseases impoverish them.
- There is an almost total absence of public toilets in cities, towns and transport terminals and transit areas in Sindh. Functioning toilets do not exist in nearly two-thirds of schools in the Province. In addition, water is not always available in the toilets, students and teachers do not know how to use latrines, and staff for maintaining

them is not always available since maintenance of toilets is considered to be job of the "lower" castes. Women and girls are the worst sufferers as a result of lack of such sanitation facilities.

- Government spending for the water and sanitation sector has been poor (0.08 per cent of the GDP for the year 2002-03, and 0.09 and 0.10 per cent for the years 2003-04 and 2004-05 respectively). These allocations are insufficient to meet the Millennium Development Goals and other targets for the sector and most of them are utilised for the water sector rather than sanitation.
- Vertical programmes (such as the Khushal Pakistan Programme) are organised and implemented in ways that adversely effect the autonomy of the Taluka Municipal Administration (TMA) in preparing the development budget and also undermine local government accountability and operational efficiency.
- There is considerable evidence to show that in the absence of government and/or NGO support and investments, communities organise to build their sanitation systems on self-help and dispose them into the natural storm water drains. If this process is supported then the huge investments communities make into this effort would be better utilised and would help to overcome resource constraints.
- There are a number of Pakistani NGO and government agency programmes and projects that have successfully supported communities in financing and managing the construction of their neighbourhood sanitation infrastructure through self-help. Government-NGO/CBO partnerships have emerged as a result where local government has complimented this work by providing trunk sewers and disposals.
- In most urban areas and in all rural areas, sanitation is not priced and as such, O&M cost for sanitation have to be subsidised from other sources.
- Land-use and topographic maps and development plans of existing settlements and the infrastructure that they contain do not exist for the urban and/or rural areas of Sindh. Institutional capacity and capability for such documentation is almost non-existent. In the absence of such documentation, realistic and cost effective planning cannot take place.
- There is also inadequate technical capacity and capability in government agencies to plan and implement and an absence of management information systems.
- Engineering standards followed in Sindh create systems that are expensive to build, operate and maintain. Standards developed by NGO and innovative government programmes have overcome these constraints and are being increasingly applied as solutions.
- So far there has been an absence of a sanitation policy and an absence of a clear definition of sanitation itself. In addition, roles of the different government agencies responsible for planning and implementation are not clearly defined. There are also a large number of actors involved in sanitation provision and a large number of parallel sanitation related investments and programmes between which there is no coordination and many of which do not come

under the preview of local government institutions. Local government and development agencies also lack managerial, administrative and monitoring capacity due to which a lot of ad-hoc decisions and programmes take place.

- There is a powerful formal and informal sector involved in the development of human settlements in Sindh. Sanitation provision is not a priority with these developers. In addition, there are informal schools in the private sector and private clinics in low income settlements. Where this vibrant informal sector has been supported by managerial guidance and/or technical advice, it has contributed to the development of sanitation facilities and hygiene education.

3. OBJECTIVES

8. The primary objective of the sanitation policy is to improve the quality of life of the people of Sindh and the physical environment. To achieve this, the policy has the following sub objectives:

- To ensure an open-defecation free environment; the safe handling and disposal of liquid and solid waste; and the promotion of health and hygiene practices to compliment the primary objectives.
- To develop guidelines for the evolution of an effective institutional and financial framework to implement the primary objectives.
- To link sanitation programmes with environment, housing, water and city and regional planning policies and programmes.

4. POLICY PRINCIPLES

9. The principles of the sanitation policy are given below.

- Development has to be sustainable. To achieve this, it is necessary to:
  - build on what exists, mobilise local resources, minimize foreign loans and develop programmes that are implementable within available resources and enhanced capacities of institutions and communities;
  - understand, accept and support the role that communities, NGOs and the formal and informal sector are playing in sanitation provision;
  - accept the component-sharing model (described in Section 6) for all government programmes and projects so as to ensure financial sustainability and community and private sector involvement in development and subsequent of O&M;
  - develop and use technologies that are low cost, easy and cost-effective to maintain;
- The needs of women and children are to be given priority in all policy, planning and implementation processes.
- The provision of adequate, appropriately and hygienically designed toilets in public spaces and public use buildings will be guaranteed.

- There will be an equitable distribution of resources between the richer and poorer sections of human settlements. However, preference will be given to those areas where the environmental and social impact of investments shall be the maximum.
- PC-1s for projects and programmes will only be prepared after the conceptual technical details and Bills of Quantities have been developed and a stakeholder consultation has been held. The feedback from the stakeholder consultation will be reflected in the modified designs and estimates.
- Recovery of O&M costs will be generated at the local level through a combination of affordable taxes (on a sliding scale) and by assigning O&M responsibilities to community organisations.
- Sanitation programmes and projects will be coordinated with settlement planning, housing, environment, health and education policy guidelines, programmes and projects.
- Health is a fundamental human right and health targets cannot be achieved without sanitation. Therefore, this policy considers sanitation to be a fundamental human right.

5. MINIMUM ACCEPTABLE SANITATION STANDARDS

10. The definition of adequate minimum sanitation in the context of this policy is given below.

Sewerage and drainage

- In urban areas or rural settlements of high densities: Flush latrines and/or pour flush latrines in homes (or privately shared) connected to an underground sewerage system terminating in a sewage treatment facility.
- In un-serviced urban areas and in low-density rural settlements: Ventilated pit privies/pour flush latrines connected to a septic tank linked to a waste water disposal and/or collection system.
- Sewage treatment facilities will be as per EPA standards and guidelines for urban and rural areas or areas which are located in or near waste land or agricultural regions where the effluent can be used for agricultural purposes.
- Disposal of storm water in arid regions can be combined with sewage disposal provided the affluent can bypass the treatment plants during rains.

Solid waste management

- Best possible use of existing staff and equipment, including re-planned beats and shifts where necessary, and improved staff attendance.
- Establish functioning public complaints system.
- Enforce SWM legislation and bylaws, e.g. the ban on manufacture and use of plastic bags < 50 mu.
- Increase public awareness to encourage sanitary storage of waste, waste minimisation, source segregation and composting where appropriate.

- Sweep streets and main roads in urban areas everyday with appropriate tools and wheelbarrows/handcarts for sweepers
- All waste generated to be conveyed to transfer points either by generators or door-to-door collectors.
- Daily removal of all waste from primary-secondary transfer points, and cleaning where necessary.
- Encourage, support and implement recycling and composting activities and link with existing informal- and private-sector sector activities.
- Shops, restaurants, healthcare centres etc. to contribute towards waste management costs.
- Where possible, zero direct human contact with waste from primary collection to disposal, and covering of waste during transportation.
- Final disposal of waste at least 500m from housing to a contained area chosen and designed according to geological conditions, water table, wind etc.
- Zero open-burning of waste.
- Separate collection, treatment and disposal of healthcare and other hazardous wastes.

6 POLICY MEASURES

6.1 Cross-Sectoral Issues

11. Sanitation issues are closely related to larger environment, housing, city and regional planning, health and education, gender, drainage and industrial effluent and solid waste disposal policies, regulations, programmes and projects. A process of coordination at the provincial, district and TMA level will be established between these different sectors.

6.2 Government's Vertical Programmes

12. Funding from government's vertical programmes and from IFIs and bilateral agencies will be a part of a larger investment plan prepared by the provincial government and managed by the city district government and the TMAs

6.3 Adoption of the Component Sharing Model

13. The component sharing model will be adopted for all TMA schemes, whereby different aspects and components are handled by different organisations and entities. There a number of ways that component-sharing could be done, for example communities and/or developers, housing societies etc. are responsible for,

    - Sanitation: financing and building their latrines, lane sewers and collector sewers and local government builds trunk sewers and disposals), and
    - Solid waste management: adopting operation management of door-to-door collection schemes, improving public awareness of solid waste issues and improving the solid waste management practice up to community bins/ transfer points.

14. Sewage and waste water treatment facilities will be provided by the developers for large schemes where connections to local government developed disposal is not

available. For solid waste management, secondary collection, transportation and disposal will be handled by TMAs.

15. Incentives to communities and households will be provided to make the component sharing model alternative such as local government paving lanes where communities have built their sanitation systems.

6.4 Effluent Quality Monitoring

16. TMAs will be responsible to coordinate with the provincial Environmental Protection Agencies to assist them in the monitoring of the effluents of the municipalities in accordance with the NEQS System.

6.5 Capacity Building

- Projects and programmes considered as good practices will be converted into training centres for government officials; TMAs staff; community activists, representatives and technicians; and elected representatives. Training will be provided to groups in which all stakeholders are present together.
- At the union council (UC) level, a team of community technicians will be trained in surveying, mapping, estimating and supervision of construction work so as to provide technical support to the UC. Salaries for this technical team will be provided through an endowment meant exclusively for this purpose. The technical team will also be responsible for training community members in the skills the technical team possesses.
- The capacity of all levels of government will be developed to ensure public consultations and self-monitoring and documentation of their work.
- Professional academic and research institutions will be involved in the capacity building process and as a result build their own capacities through interaction with grass root realities.

6.6 Awareness and Education

- Provincial and local government programmes will be developed to advise and collaborate with the media, especially TV and radio channels, to promote sanitation related messages in their entertainment programmes and to develop special programmes related to sanitation and its relationship between civic responsibility, health and education.
- A sanitation related training/awareness raising programme will be initiated at all educational institutions (schools and colleges), at teachers training institutions and local government department and agencies. The main focus of the programme will be on why toilets are required and how they should be used and maintained.
- Awareness raising and education programmes will be developed focusing on solid waste management, intended to improve public understanding of the links between poor solid waste management practices and public health, and encourage better waste management practices, including source segregation. Healthcare centres will also be targeted with messages relating specifically to Healthcare waste.

6.7 Public Toilets

17. Public toilets will be adequately provided (keeping in view the different requirements of men, women and children) and maintained as a priority for all public-use open spaces (such as markets, parks, playgrounds) and public-use buildings. The toilet requirements and specifications will be built into the byelaws of

all urban areas and TMAs. Where feasible, the construction, maintenance and operation of these toilets can be sublet to the private sector on a BOT basis.

6.8 Public-Private Partnerships

- Formal sector real estate development is creating townships and housing estates all over Sindh. Bye laws will be developed by the provincial government and implemented by the TMAs for developing sewerage systems and sewage treatment facilities for different sizes of developer-promoted schemes. Communities in informally developed housing areas will be provided incentives and disposal points by the TMAs if they build an underground sewerage system.
- The private sector-community-NGO linkages in solid waste management in Sindh are well established. City governments and TMAs will identify these good practices, assign roles and responsibilities through consultations and invest in promoting them.
- For solid waste management, be existing informal sector, community-led groups or small enterprises will be engaged where possible to undertake primary collection, Reliable secondary collection and sanitary transfer points (e.g. community bins) will be provided by the TMAs. Where feasible and economical, the private sector will be engaged for secondary collection. Provision of disposal facilities will remain the responsibility of TMAs.

6.9 Urban Sanitation

- City governments and TMAs will develop their capability and capacity to document existing settlements and for identifying the existing sanitation and drainage related infrastructure and its condition. On the basis of this documentation, a programme for the rehabilitation of damaged infrastructure (as opposed to its rejection and/or duplication) will be developed and implemented.
- An overall sanitation plan will be developed for all urban settlements by city governments and the TMAs (or WASAs which have not been devolved) in coordination with all other agencies involved in sanitation. The plan will focus mainly on the details of the trunk sewers and disposals and secondary collection and disposal of solid waste. All other sanitation related agencies (cantonments boards, railways, etc) will develop their plans in accordance with the overall plan.
- Wherever existing sewerage systems dispose untreated sewage in storm water drains or irrigation canals it should be treated before discharging, and may be used for agricultural purposes or converted into lakes and ponds as part of recreational areas, in accordance with EPA guidelines.
- Gravity flow systems will be used for sewage schemes (unless not feasible) so as to avoid pumping and O&M costs. Where these systems cannot be self-cleansing, a one chamber septic tank will be built between the toilet and the lane sewer so as to avoid solids from entering the system and clogging it.
- Close coordination between agencies responsible for the Katchi Abadi Improvement and Regularisation Programme and the proposed Informal Settlements Improvement Programme (see Item 7) and TMAs and agencies responsible for planning, implementation and O&M of sanitation will be established so as to make their work more integrated and effective.

6.10 Rural Sanitation

- The component sharing model (latrines and lane sewers built by the community with technical advice from NGOs/TMAs and trunk sewers and disposals built by local government) for rural sanitation which is being applied in the villages in southern Punjab will be adopted for all villages of 1,000 and above population.
- A programme for motivation and technical advice will be initiated in TMAs for the construction of latrines and safe disposal of waste water
- The motivation programme for latrines will also educate people on the health problems associated with handling of animal dung and the health hazards of keeping animals within homes. Alternatives to the present conditions will be developed in association with the governments livestock departments.
- The use of waste water for agricultural purposes will be encouraged and designs for its collection and use in accordance with EPA guidelines will be provided to households and communities.
- Generation rates of solid waste in rural areas of Sindh are low, and contain a high proportion of organic material, suitable for composting. Therefore rural solid waste management interventions will focus on treatment of specialist wastes (for example healthcare wastes) and on awareness-raising campaigns relating to waste reduction, recycling and disposal of non-biodegradable wastes.

6.11 Consultations

18. City district government and TMAs will hold public consultations at the conceptual design of the development plan, schemes and projects. Modifications in the designs will be carried out to accommodate the concerns of the stakeholders. The PC-1 will be prepared only after such a process has been carried out. Taluka Council Monitoring Committees will oversee the programme/project/scheme. Accounts of the projects shall be made available to the public and made available to the media as stipulated by the SLGO (2001).

7 POLICY INSTRUMENTS

19. The following policy instruments and procedures will be developed for making the implementing of the sanitation policy possible.
    - Existing sanitation related policies and their regulations and procedures should be reviewed and, where necessary, modified so as to fulfil the requirements of the Sindh Sanitation Policy.
    - A policy and regulatory framework for coordination between the various sectors involved in sanitation related issues will be put in place at the federal, provincial, district and TMA level.
    - The component-sharing model for the provision of sanitation will be adopted and the procedures and regulations for its implementation will be developed.
    - A programme for the upgrading of informal settlements will be instituted on lines similar to that of the katchi abadi improvement and upgrading programmes.

- A legislation regarding the construction of toilets along with their specifications shall be developed by the provincial government and implemented by the city governments and TMAs.
- Local government will raise funds for the O&M of sanitation systems and/or hand over O&M responsibilities to communities and the private sector so as to make O&M sustainable.
- The Higher Education Commission will be requested to make it compulsory to link professional education in medicine, engineering, architecture, planning and social work to grass root realities.
- The Sindh government will support the National government in its efforts to honour its international agreements and obligations which include the Millennium Development Goals, the recommendations of the World Summit on Sustainable Development and the UN Istanbul Declaration.

8 TARGETS

20. The government will follow the targets set under the Medium Term Development Framework (MTDF) (2005-10) and for which it has allocated funds. The implementation of the MTDF for Sindh will result in the extension of sanitation facilities from the present coverage of 46 per cent population to serve an additional 4.41 million population, thus covering 50 per cent of the total population by 2010 along with the development of waste water treatment units, recycling provisions and conservancy measures in the urban centres upto district level. The MTDF rural sanitation programmes will ensure that villages having upto 100 households or 1,000 population and above are served by 2010 with sanitation and drainage schemes.

9 ROLES AND RESPONSIBILITIES OF STAKEHOLDERS

9.1 Government Institutions

9.1.1 Roles and Responsibilities as per Sindh Local Government Ordinance 2001

- All provincial, district, Taluka and UC level legislative bodies and government departments and agencies will fulfil their roles strictly in keeping with the provisions of the Sindh Local Government Ordinance 2001.
- The provincial government, in coordination with the district governments, will remove all anomalies, lack of regulations and procedures, conflict of interests between government institutions, to make it possible for different tiers of government and agencies to fulfil their assigned roles.
- The government will take steps to increase the capacity and capability of all sanitation related agencies and departments in accordance with the measures spelt out in Section 4, 5 and 6 of this document.

9.1.2 Additional Roles

- Provincial, district, Taluka (town) and UC elected representatives and administration will identify NGOs and CBOs and private sector (formal and informal) good practices and convert them into training centres for their staff with the help of NGOs, CBOs and/or private sector/entrepreneurs and replicate these practices in other locations within their jurisdiction through the formation of stakeholder partnerships.

- A system planning and feedback, consultation and coordination will be established at the provincial, district and TMA level between all agencies (such as Environment Protection Agencies, Health and Education Department and Urban and Regional Planning Departments and institutions) dealing with sanitation issues.
- The process for the establishment of a management information system will be initiated at the provincial, district and TMA level, in order to enable the planning and development of sanitation; consolidation of information and data from all monitoring and research agencies; and make it freely available to the public through a policy of data sharing (through IT technology) within and amongst all sanitation related organisations.
- Each city government and TMA will prepare a comprehensive mapping and Taluka database which will be linked to the proposed management information system. On the basis of this the TMA will prepare spatial and medium term plans which will guide and steer the future development in the sector and on the basis of which appropriate sanitation investment plans can be prepared at the federal, provincial, Taluka and UC level.
- The TMA will provide technical support to NGOs and CBOs working on sanitation and solid waste management related issues on the self-help component sharing model or other community initiatives.

NGOs and CBOs

- NGOs and CBOs will be encouraged to assist communities in mobilising for sanitation related programmes and projects and will assist the district city government/TMAs/UCs in the planning, funding and development of community based sanitation infrastructure and for the safe disposal of liquid and solid wastes.
- NGOs and CBOs will be encouraged to help in the formation of Citizen Community Boards (CCBs) and to guide them in formulating sanitation projects.

Community Responsibilities

21. Through the process of mobilisation of communities envisaged in this policy and through public consultation and media programmes, communities will be encouraged to maintain a safe and pleasant physical environment in their settlement, participate in the provision of sanitation infrastructure and its management and manage the disposal of solid waste at the neighbourhood level.

Individual Households

22. Through the process of mobilisation and media programmes, individual households will be encouraged to build latrines, keep the inside and surroundings of their property clean and not to dispose waste in the streets and public spaces. They will also be encouraged to cooperate with the UC administration and with their neighbours to form community organisations that can promote sanitation related programmes and projects.

10 MECHANISMS FOR IMPLEMENTATION AND MONITORING

Implementation Strategy

- The policy will be implemented by the provincial and local governments, government agencies in accordance with the guidelines, principles and measures spelt out in this document.

- Communities, NGOs and the private sector will be supported and their involvement encouraged in accordance with the provisions of the sanitation policy.

Monitoring

- Monitoring of programmes and projects in the TMA will be done by the Taluka Monitoring Committees. They will also provide the necessary feedback, as required, to the provincial level on the implementation of the policy.
- The Sindh Government will monitor the implementation of the policy and programmes within the province and provide necessary feedback and liaise with federal government on the wider issues related to sanitation.

APPENDIX – A35.1

Financial Management

A35.1 Financial Management

Table A35.1.1 Profit and Loss Statement (Final Accounts by Hashmi and Company)

(Unit: Rs. in Million)

Item	2000/01	2001/02	2002/03
Operating Results			
Revenue			
Water Supply			
(1) Water Supply (Bulk)	1,081	1,124	1,035
(2) Water Supply (Retail)	1,237	845	867
Sub-total	2,317	1,969	1,902
Sewerage Service			
(3) Sewerage Charges (Bulk)	265	196	127
(4) Sewerage Charges (Retail)	350	241	243
Sub-total	615	437	370
Total	2,933	2,406	2,272
Expenditure			
Direct Expenditure			
(1) Charges of Raw Water to Sindh Gov.	1	0	1
(2) Compensation (Salaries and Benefits)	609	632	773
(3) Chemicals	15	24	29
(4) P.O.L. for Pumping Stations	64	60	62
(5) Electricity Charges	1,328	1,232	1,339
(6) Arrears of Electricity Charges	-	-	316
(7) Gas Charges	-	-	29
(8) Repair and Maintenance /Improvement	207	134	108
(9) Water Supply through Tankers	18	1	-
(10) Vehicles Running Expenses	34	29	29
(11) Printing and Stationary	5	6	6
(12) Medical	112	54	63
(13) Utilities	4	4	4
(14) Miscellaneous	10	8	8
Sub-total	2,409	2,186	2,767
Indirect Expenditure			
(1) Auditor' Remuneration	1	1	1
(2) Bad Debts Expenses	316	120	114
(3) Depreciation	1,041	989	939
Sub-total	1,358	1,110	1,054
Total	3,766	3,296	3,820
Operating Profit and Loss	-833	-890	-1,549
Non-operating Results			
Non-operating Revenue			
(1) Interest Received from Banks	16	16	10
(2) Other Income	23	35	30
(3) Subsidy from KMC	143	-	-
Sub-total	182	51	39
Non-operating Expenditure			
(1) Financial Charges on Foreign Loans	169	1,191	1,183
Non-operating Expenditure	169	1,191	1,183
Non-operating Profit and Loss	13	-1,140	-1,144
Ordinary Profit and Loss	**-821**	**-2,030**	**-2,693**
Beginning Surplus/Deficit of the Period	3	-818	-2,847
End Surplus/Deficit of the Period	**-818**	**-2,847**	**-5,540**

Source: Refer to Table A35.1.2.

Table A35.1.2 Balance Sheet (Final Accounts by Hashmi and Company)

(Unit: Rs. in Million)

Item	2000/01*1	2001/02*2	2002/03*2
Assets			
1. Fixed Assets			
(1) Operating Fixed Assets	22,240	21,231	20,273
(2) Work in Progress	4,696	5,196	5,971
Sub-total	26,937	26,427	26,243
2. Current Assets			
(1) Inventory	-	-	-
(2) Debtors (Consumers' Balances)	4,779	5,185	5,396
(3) Advances and Prepayments	65	61	13
(4) Receivable from KDA	98	98	98
(5) Receivable from KMC	206	206	206
(6) Cash in Bank	810	954	632
Sub-total	5,959	6,505	6,346
Total of Assets	**32,896**	**32,932**	**32,589**
Liabilities and Equity			
1. Long Term Liabilities			
(1) Consumer Deposits	130	143	157
(2) Long Term Foreign Loans	21,052	22,311	23,602
1) Principal	13,674	13,907	14,107
2) Accrued Financial Charges	7,377	8,404	9,495
(3) Long Term Loan from KDA	108	106	105
(4) Sindh Loan (Government)	58	58	58
Sub-total	21,348	22,618	23,921
2. Current Liabilities			
(1) Current Maturity of Long Term Foreign Loans	674	1,022	1,356
1) Principal	52	230	318
2) Accrued Financial Charges	623	792	1,039
(2) Current Maturity of Long Term Local Loans	24	26	27
(3) Contractor Deposit	399	392	407
(4) Creditors, Accrued & Other Liabilities	465	439	255
Sub-total	1,562	1,879	2,046
Total of Liabiliies	22,909	24,497	25,967
3. Stockholders' Equity			
Capital Reserve	3,771	3,771	3,771
Internal Reserve/Withdrawals	-818	-2,847	-5,540
Grant in Aid (for Capital Works)	7,033	7,512	8,392
Total of Equity	9,986	8,436	6,622
Total of Liabilities and Equity	**32,896**	**32,932**	**32,589**

Source: 1. Chartered Accounts, KWSB Financial Accounts for the Year Ended 30 June 2002, Hashmi & Company
2. Chartered Accounts, KWSB Financial Accounts for the Year Ended 30 June 2003, Hashmi & Company

Table A35.1.3 Profit and Loss Statement (Final Draft by KW&SB)

(Unit: Rs. in Million)

Item	2002/03	2003/04	2004/05
Operating Results			
Revenue			
Water Supply			
(1) Water Supply (Bulk)	1,035	1,161	1,431
(2) Water Supply (Retail)	867	900	801
Sub-total	1,902	2,061	2,232
Sewerage Service			
(3) Sewerage Charges (Bulk)	127	143	176
(4) Sewerage Charges (Retail)	243	250	244
Sub-total	370	393	421
Provision for Doubtful Debts	-114	-123	-133
Total	2,158	2,332	2,520
Expenditure			
Direct Expenditure			
(1) Charges of Raw Water to Sindh Gov.	1	1	1
(2) Compensation (Salaries and Benefits)	773	819	874
(3) Chemicals	29	16	29
(4) P.O.L. for Pumping Stations	62	39	45
(5) Electricity Charges	1,339	1,622	1,641
(6) Arrears of Electricity Charges	316	-	-
(7) Gas Charges	29	28	23
(8) Repair and Maintenance /Improvement	108	185	161
(9) Water Supply through Tankers			
(10) Vehicles Running Expenses	29	24	38
(11) Printing and Stationary	6	7	5
(12) Medical	63	44	61
(13) Utilities	4	5	5
(14) Miscellaneous	8	8	16
Sub-total	2,767	2,797	2,898
Indirect Expenditure			
(1) Auditor' Remuneration	1		
(2) Depreciation	959	911	865
(3) Amortization of Grant	-20	-19	-18
Sub-total	940	892	847
Total	3,707	3,689	3,745
Operating Profit and Loss	-1,549	-1,358	-1,225
Non-operating Results			
Non-operating Revenue			
(1) Interest Received from Banks	10	4	4
(2) Other Income	30	20	64
(3) Subsidy from KMC			
Sub-total	39	24	68
Non-operating Expenditure			
(1) Financial Charges on Foreign Loans	1,183	1,183	1,183
Non-operating Expenditure	1,183	1,183	1,183
Non-operating Profit and Loss	-1,144	-1,160	-1,116
Ordinary Profit and Loss	**-2,693**	**-2,517**	**-2,341**
Beginning Surplus/Deficit of the Period	-2,847	-5,540	-8,058
End Surplus/Deficit of the Period	**-5,540**	**-8,058**	**-10,399**

Source: Refer to Table A35.1.4.

Table A35.1.4 Balance Sheet (Final Draft by KW&SB)

(Unit: Rs. in Million)

Item	2002/03*1	2003/04*2	2004/05*2
Assets			
1. Fixed Assets			
(1) Operating Fixed Assets	20,273	19,633	19,069
(2) Work in Progress	5,971	6,979	10,301
Sub-total	26,243	26,612	29,370
2. Current Assets			
(1) Inventory	-	-	-
(2) Debtors (Consumers' Balances)	8,202	8,720.88	9,163.18
(3) Advances and Prepayments	13	11	9
(4) Receivable from KDA	98	98	98
(5) Receivable from KMC	408	408	408
(6) Cash in Bank	632	531	1,250
Sub-total	9,354	9,770	10,928
Total of Assets	**35,597**	**36,382**	**40,298**
Liabilities and Equity			
1. Long Term Liabilities			
(1) Consumer Deposits	157	172	216
(2) Long Term Foreign Loans	23,602	24,445	24,818
1) Principal	14,107	14,270	14,473
2) Accrued Financial Charges	9,495	10,174	10,344
(3) Long Term Loan from KDA	105	104	103
(4) Sindh Loan (Government)	58	58	58
(5) Employees Pen/Prov. Fund	37	83	109
(6) Deferred Revenue (Provisional)	2,806	2,929	3,061
Sub-total	26,764	27,791	28,365
2. Current Liabilities			
(1) Current Maturity of Long Term Foreign Loans	1,356	2,189	3,509
1) Principal	174	338	595
2) Accrued Financial Charges	1,182	1,851	2,914
(2) Current Maturity of Long Term Local Loans	82	82	83
1) Principal	27	28	29
2) Accrued Financial Charges	54	54	54
(3) Contractor Deposit	407	444	543
(4) Creditors, Accrued & Other Liabilities	365	581	690
Sub-total	2,210	3,296	4,825
Total of Liabiliies	28,975	31,088	33,190
3. Stockholders' Equity			
Capital Reserve	3,771	3,771	3,771
Internal Reserve/Withdrawals	-5,540	-8,058	-10,399
Grant in Aid (for Capital Works)	8,392	9,581	13,736
Total of Equity	6,622	5,294	7,108
Total of Liabilities and Equity	**35,597**	**36,382**	**40,298**

Source: *1. Final Draft, Financial Account 2002/03, KWSB
*2. Final Draft, Financial Account 2003/04-2004/06, KWSB

Table A35.1.5 Monthly Tariff of Water and Sewerage with Effective from July 2001

	Category	Water (Rs.)	Sewerage (Rs.)
1.	Domestic un-metered (yd^2)		
(1)	Upto 60	26.00	8.50
(2)	Upto 61 to 120	34.00	13.00
(3)	Upto 121 to 200	51.00	21.50
(4)	Upto 201 to 300	77.00	30.00
(5)	Upto 301 to 400	111.00	38.50
(6)	Upto 401 to 600	161.00	59.00
(7)	Upto 601 to 1000	229.00	89.00
(8)	Upto 1001 to 1500	482.00	177.50
(9)	Upto 1501 to 2000	618.00	232.50
(10)	Upto 2001 to 2500	787.00	296.00
(11)	Upto 2501 to 3000	997.00	376.50
(12)	Upto 3001 to 3500	1,217.00	456.50
(13)	Upto 3501 to 4000	1,446.00	545.50
(14)	Upto 4001 to 4500	1,690.00	634.00
(15)	Upto 4501 to 5000	1,994.00	748.00
(16)	Above 5000	2,307.00	862.00
2.	Additional Stories (ft^2)		
(1)	Flats upto 500	34.00	8.50
(2)	Flats upto 501 to 800	51.00	13.00
(3)	Flats upto 801 to 1000	60.00	17.00
(4)	Flats upto 1001 to 1200	85.00	30.00
(5)	Flats upto 1201 to 1500	127.00	47.00
(6)	Flats upto 1501 to 1800	220.00	84.50
(7)	Flats upto 1801 to 2000	280.00	106.50
(8)	Flats upto 2001 to 2500	355.00	131.50
(9)	Flats upto 2501 to 3000	432.00	160.50
(10)	Flats upto 3001 to 3500	516.00	194.50
(11)	Flats upto 3501 to 4000	608.00	228.00
(12)	Flats upto 4001 to 5000	888.00	334.00
(13)	Flats above 5000	1,141.00	431.00
3.	Non-domestic users		
(1)	Offices	Same as domestic tariffs of flats depending upon covered area.	25% of water charges
(2)	Shops	25.00	25% of water charges
(3)	DhobI-ghat, restaurant, agriculture, nurseries, marriage halls, clubs, block thallas, cattle ponds, Hammams.	73.00 per 1000 gallons or twice the size of plot tariff if un-metered.	25% of water charges
(4)	Commercial high rises and Hotels (single units).	73.00 per 1000 gallons or twice the size of plot tariff with 50% of ground floor for each additional storey if un-metered.	25% of water charges
(5)	College, School, Clinics, Hospitals.	44.00 per 1000 gallons or domestic tariff of properties depending upon size of plot.	25% of water charges
4.	Bulk Supply		
(1)	Metered Domestic (per 1000 gallons)	44.00	25% of water charges
(2)	Industrial (per 1000 gallons)	73.00	25% of water charges
(3)	Commercial (per 1000 gallons)	73.00	25% of water charges
i.	The sewerage tariff will be applied to all the bulk and retail water consumers, all the constituent bodies, industrial units and agencies under the control of Government irrespective of their location, who are discharging their sewerage either through KW&SB sewerage system or any other system directly or indirectly collectively or individually any where. Conservancy changes to be billed separately corresponding to sewerage charges.		
ii.	A one time recorded sewerage tariff at 10% of water tariff will be allowed to those industrial units who will install their own steerage Pre-Treatment plant.		
iii.	KW&SB may recover arrears accumulated under abolished NARV based on billing category through relief schedule after drawing a schedule of such relief scheme and publishing in the press.		
iv.	There shall be no tariff in the year 2001-2002. From the year 2002-2003 and in subsequent years KWSB may revise the tariff between 8% to 9% annually. Government may direct KW&SB to revise the tariff beyond 9% if the need arises.		

Table A35.1.6 Monthly Tariff of Water and Sewerage with Effective from July 2001 (Converted into Per m^2 or m^3)

	Category	Water (Rs.)	Sewerage (Rs.)
1.	Domestic un-metered (m^2)		
(1)	Upto 50	26.00	8.50
(2)	Upto 51 to 100	34.00	13.00
(3)	Upto 101 to 167	51.00	21.50
(4)	Upto 168 to 251	77.00	30.00
(5)	Upto 252 to 334	111.00	38.50
(6)	Upto 335 to 502	161.00	59.00
(7)	Upto 503 to 836	229.00	89.00
(8)	Upto 837 to 1254	482.00	177.50
(9)	Upto 1255 to 1672	618.00	232.50
(10)	Upto 1673 to 2090	787.00	296.00
(11)	Upto 2091 to 2508	997.00	376.50
(12)	Upto 2509 to 2926	1,217.00	456.50
(13)	Upto 2927 to 3345	1,446.00	545.50
(14)	Upto 3346 to 3763	1,690.00	634.00
(15)	Upto 3764 to 4181	1,994.00	748.00
(16)	Above 4181	2,307.00	862.00
2.	Additional Stories (m^2)		
(1)	Flats upto 46	34.00	8.50
(2)	Flats upto 47 to 74	51.00	13.00
(3)	Flats upto 75 to 93	60.00	17.00
(4)	Flats upto 94 to 111	85.00	30.00
(5)	Flats upto 112 to 139	127.00	47.00
(6)	Flats upto 140 to 167	220.00	84.50
(7)	Flats upto 168 to 186	280.00	106.50
(8)	Flats upto 187 to 232	355.00	131.50
(9)	Flats upto 233 to 279	432.00	160.50
(10)	Flats upto 280 to 325	516.00	194.50
(11)	Flats upto 326 to 372	608.00	228.00
(12)	Flats upto 373 to 465	888.00	334.00
(13)	Flats above 465	1,141.00	431.00
3.	Non-domestic users		
(1)	Offices	Same as domestic tariffs of flats depending upon covered area.	25% of water charges
(2)	Shops	25.00	25% of water charges
(3)	Dhobi-ghat, restaurant, agriculture, nurseries, marriage halls, clubs, block thallas, cattle ponds, Hammams.	Rs.16.06/m3 or twice the size of plot tariff if un-metered.	25% of water charges
(4)	Commercial high rises and Hotels (single units).	Rs.16.06/m^3 or twice the size of plot tariff with 50% of ground floor for each additional storey if un-metered.	25% of water charges
(5)	College, School, Clinics, Hospitals.	Rs.9.68/m^3 or domestic tariff of properties depending upon size of plot.	25% of water charges
4.	Bulk Supply		
(1)	Metered Domestic (per m^3)	9.68	25% of water charges
(2)	Industrial (per m^3)	16.06	25% of water charges
(3)	Commercial (per m^3)	16.06	25% of water charges
i.	The sewerage tariff will be applied to all the bulk and retail water consumers, all the constituent bodies, industrial units and agencies under the control of Government irrespective of their location, who are discharging their sewerage either through KW&SB sewerage system or any other system directly or indirectly collectively or individually any where. Conservancy changes to be billed separately corresponding to sewerage charges.		
ii.	A one time recorded sewerage tariff at 10% of water tariff will be allowed to those industrial units who will install their own steerage Pre-Treatment plant.		
iii.	KW&SB may recover arrears accumulated under abolished NARV based on billing category through relief schedule after drawing a schedule of such relief scheme and publishing in the press.		
iv.	There shall be no tariff in the year 2001-2002. From the year 2002-2003 and in subsequent years KWSB may revise the tariff between 8% to 9% annually. Government may direct KW&SB to revise the tariff beyond 9% if the need arises.		

Table A35.1.7 Management Diagnosis (1/2)

	No.	Item	Unit	Formula		2002/03		2003/04		2004/05		Japan Index	Remark
						Actual Figures	Value	Actual Figures	Value	Actual Figures	Value	2002	
Management	1.	Ratio of Operating Profit to Working Capital	%	Operating Profit / Total Capital	x100	-1,549 32,589	-	-1,377 33,149	-	-1,243 36,889	-	0.73	1
	2	Turnover of Total Capital		Net Sales Amount / Total Capital		2,272 32,589	0.07	2,454 33,149	0.07	2,653 36,889	0.07	0.11	2
	3	Turnover of Stockholders' Equity		Net Sales Amount / Stockholders' Equity		2,272 3,771	0.60	2,454 3,771	0.65	2,653 3,771	0.70	0.22	3
	4	Capital Adequacy Ratio	%	Stockholders' Equity / Total Capital	x100	3,771 32,589	11.6	3,771 33,149	11.4	3,771 36,889	10.2		
	5	Ratio of Operating Profit to Net Sales Amount	%	Operating Profit / Net Sales Amount	x100	-1,549 2,272	-	-1,377 2,454	-	-1,243 2,653	-		
	6	Ratio of Ordinary Profit to Stockholders' Equity	%	Ordinary Profit / Stockholders' Equity	x100	-2,693 3,771	-	-2,536 3,771	-	-2,359 3,771	-		
	7.	Ratio of Net Expense to Net Sales Amount	%	Net Expenses / Net Sales Amount	x100	5,004 2,272	220	5,014 2,454	204	5,079 2,653	191	94	6
Finance	8.	Fixed Assets Ratio	%	Fixed Assets / Stockholders' Equity	x100	20,273 3,771	538	19,633 3,771	521	19,069 3,771	506	176	7
	9.	Ratio of Fixed Assets to Long-Term Capital	%	Fixed Assets / Stockholders' Equity + Long-Term Borrowing	x100	20,273 27,692	73	19,633 28,550	69	19,069 28,965	66	95.3	8
	10.	Current Ratio	%	Current Assets / Current Liability	x100	6,346 2,046	310	6,537 3,095	211	7,519 4,623	163	273	9
	11.	Current Ratio (Actual)	%	Current Assets / Real Current Liability	x100	645 2,046	32	543 3,095	18	1,258 4,623	27		
	12.	Total Capital per Net Worth Ratio	%	Stockholders' Equity / Total Capital	x100	3,771 32,589	12	3,771 33,149	11	3,771 36,889	10		
	13.	Ratio of Interest Expenses to Net Sales Amount (A: in F/L)	%	Interest Expenses / Net Sales Amount	x100	1,174 2,272	52	1,180 2,454	48	1,179 2,653	44		
	14.	Ratio of Real Interest Expenses to Net Sales Amount (B: in F/L+BS)	%	Actual Interest Expenses / Net Sales Amount	x100	2,512 2,272	111	1,492 2,454	61	1,233 2,653	46		
	15.	Turnover of Fixed Assets		Net Sales Amount / Fixed Assets		2,272 20,273	0.11	2,454 19,633	0.13	2,653 19,069	0.14	0.12	11
	16.	Turnover of Account Receivable (A)		Net Sales Amount / Accounts Receivable (Consumers)		2,272 5,396	0.42	2,454 5,690	0.43	2,653 5,956	0.45	7.4	10
	17.	Turnover Ratio of Account Receivable (B)		Net Sales Amount / Accounts Receivable (Cons.+KDA&KMC)		2,272 5,701	0.40	2,454 5,995	0.41	2,653 6,260	0.42		
	18.	Ratio of Depreciation to Fixed Assets	%	Depreciation / Fixed Assets	x100	939 20,273	4.6	911 19,633	4.6	865 19,069	4.5	3.5	12
	19.	Ratio of Depreciation to Net Expenses	%	Depreciation / Net Expenses	x100	939 5,004	18.8	911 5,014	18.2	865 5,079	17.0	28.56	13
	20.	Ratio of Interest to Net Expenses (A: in F/L)	%	Interest Payment / Net Expenses	x100	1,174 5,004	23.5	1,180 5,014	23.5	1,179 5,079	23.2	18.48	14
	21.	Ratio of Interest to Net Expenses (B: in F/L+B/S)		Interest Payment (w/ Accrued Charges) / Net Expenses	x100	2,512 5,004	50.2	1,492 5,014	29.8	1,233 5,079	24.3		

(To be Continued)

Table A35.1.8 Management Diagnosis (2/2)

(Continuation)

	No.	Item		Formula		2002/03		2003/04		2004/05		Japan Index	Remark
						Actual Figures	Value	Actual Figures	Value	Actual Figures	Value	2002	
Production	22.	Annual Production Cost per Employee	Rs. Mil / Person	Annual Production / Number of Employees		2,272 / 8,501	0.27	2,454 / 8,180	0.30	2,653 / 8,180	0.32	¥ 42.5	15
	23.	Annual Value Added per Employee		Annual Value Added / Number of Employees		698 / 8,501	0.08	626 / 8,180	0.08	781 / 781	1.00		
	24.	Value Added Ratio	%	Annual Value Added / Annual Production	x100	698 / 2,272	31	626 / 2,454	25	781 / 2,653	29		
	25.	Ratio of Compensation per Value Added	%	Compensation / Annual Value Added	x100	773 / 698	111	819 / 626	131	874 / 781	112		
	26	Ratio of Value Added to Equipment Investment	%	Annual Value Added / Total of Production Facilities	x100								
	27	Turnover of Raw Materials		Net Sales Amount / Raw Materials		2,272 / 1,574	1.44	2,454 / 1,829	1.34	2,653 / 1,872	1.42	14.1	16
	28	Turnover of Works in Progress		Net Sales Amount / Works in Progress		2,272 / 5,971	0.38	2,454 / 6,979	0.35	2,653 / 10,301	0.26		
	29	Turnover of Fixed Assets		Net Sales Amount / Fixed Assets		2,272 / 20,273	0.11	2,454 / 19,633	0.13	2,653 / 19,069	0.14		
	30	Ratio of Production Cost to Net Sales Amount	%	Production Costs / Net Sales Amount	x100	5,004 / 2,272	220.29	5,014 / 2,454	204.30	5,079 / 2,653	191.48	78.0	17
	31	Unit Price	Rs. / 1000 Gallon	Net Sales Amount / Annual Water Supplied		0 / 0	-	0 / 0	-	2,653 / 351	20.70	165.0	18
	32	Unit Production Cost	Rs. / 1000 Gallon	Production Costs / Annual Water Supplied		0 / 0	-	0 / 0	-	2,653 / 351	20.70	166.4	19
Marketing	33	Ratio of Gross Profit to Sales Amount	%	Gross Profit / Net Sales Amount	x100	-1,549 / 2,272	-	-1,377 / 2,454	-	-1,243 / 2,653	-		
	34	Ratio of Operating Profit to Sales Amount	%	Operating Profit / Net Sales Amount	x100	-1,549 / 2,272	-	-1,377 / 2,454	-	-1,243 / 2,653	-		
	35	Ratio of Ordinary Profit to Sales Amount	%	Recurring Profit / Net Sales Amount	x100	-2,693 / 2,272	-	-2,536 / 2,454	-	-2,359 / 2,653	-		
	36	Ratio of Service Expenses and Administration	%	Service Expenses & Administration / Net Sales Amount	x100								
	37	Ratio of Service Expenses	%	Service Expenses / Net Sales Amount	x100								
	38	Ratio of Advertisement and Public Relation	%	Advertisement & Public Relation / Net Sales Amount	x100								
Labour	39	Monthly Compensation per Employee	Rs. / Person	Annual Compensation / Number of Employees	÷12	773 / 8,501	7,579	819 / 8,180	8,339	874 / 8,180	8,902	379,000	20
	40	Ratio of Compensation to Net Sales Amount	%	Annual Compensation / Net Sales Amount	x100	773 / 2,272	34.0	819 / 2,454	33.4	874 / 2,653	32.9	22.7	21
	41	Ratio of Compensation to Net Expenses	%	Annual Compensation / Net Expenses	x100	773 / 5,004	15.5	819 / 5,014	16.3	874 / 5,079	17.2	22.5	
	42	Number of Employees per Water Supplied	Person / Mil. gal./day	Number of Employees / Daily Water Supplied		8,501 / 0	-	8,180 / 0	-	8,180 / 351	23.3	6.4	22

Table A35.1.9 Water Production Cost: 1992/93 to June 2006

Item	Unit	Receipts					Budget*1
		1992/93	1995/96	1996/97	1998/99	2004/05	2005/06
Revenue							
Water Supply & Sewerage Service	Rs. Million	548.30	1,174.20	1,182.39	1,695.95	2,243.50	3,629.01
Expenditure							
Operational Expenditure							
Salaries & Benefits + Medicals	Rs. Million	461.90	732.28	658.10	745.34	934.77	1,219.39
Chemicals	Rs. Million	9.86	10.75	9.61	12.11	29.23	25.00
POL	Rs. Million	23.82	32.83	44.45	45.77	44.79	46.03
Gas Charges	Rs. Million	13.10	20.27	52.29	26.64	23.33	25.00
Electricity	Rs. Million	311.36	343.55	352.86	487.72	1,640.62	1,780.50
Repair & Maintenance	Rs. Million	116.66	212.89	259.95	498.20	161.73	539.32
Miscelaneous	Rs. Million	13.80	21.68	33.70	48.86	63.41	94.27
Total of Operational Exp.	Rs. Million	950.50	1,374.25	1,410.96	1,864.64	2,897.88	3,729.51
Non-operational Expenditure							
Fiancial Charges	Rs. Million	27.17	103.69	174.66	349.71	1,183.40	1,308.06
Depreciation	Rs. Million	65.86	146.68	208.57	188.60	847.37	805.00
Provision for Doubtful Debts	Rs. Million	35.19	66.93	157.78	272.32	132.63	147.72
total of Non-operational Exp.	Rs. Million	128.22	317.30	541.01	810.63	2,163.40	2,260.78
Total of Expenditure	Rs. Million	1,078.72	1,691.55	1,951.97	2,675.27	5,061.28	5,990.29
Water Supply							
Water Source	mgd	352	352	474	474	540	540
Loss (35%)	mgd	123	123	166	166	189	189
Net Water Supplied	mgd	229	229	308	308	351	351
Annual Net Water Supplied	mgy	83,512	83,512	112,457	112,457	128,115	128,115
Water Production Cost	Rs./1000 gallon	13	20	17	24	40	47
Unit Price for consumer	Rs./1001 gallon	7	14	11	15	18	28
Water Production Cost	Yen/m3	13	14	11	14	16	20
Unit Price for consumer	Yen/m4	7	9	7	9	7	12

Source: IT Department, KW&SB