SUPPORTING REPORT FOR

CHAPTER 2

Wadi Zarqa Treatment Plant Construction

Supporting Report for Chapter 2
"Wadi Zarqa Treatment Plant Construction"

ANNEX to 2.2.4

Treatment Facilities

BASIC DATA OF TREATMENT PLANT: As-Samra

(Data of 1999, if not another year indicated) 3

Town:	Amman
Governorate:	Amman
Treatment plant:	As-Samra
Date of visit:	9.3.2000
Responsible engineer:	Mohamed Saleh
Contacted person:	Mohamed Saleh
Telephone:	37/3811936

Population			
	Tot.population living in towns with sewerage:	inhabitants	2.170.000
	Population growth	%	3,6
Wastewater disposal			
	Public system	%	90
	Cesspools	%	10
	Others	%	0
Wastewater collection			
	Towns/villages connected (the most important)	-	Amman (part belonging to Wadi Zarqa Basin), Zarqa, Russeifa, Hashimiyya
	Population connected (as coverage treatment)	c	1.951.000
	Coverage	%	90
	Important industries	-	37 industries (slaughterhouse etc.)
	Number of stormwater overflows works	no.	-
	Length of sewers	km	1.500,0
	Length per connected capita	m/c	0,8
	House connections	h.c.	105.883
	Capita per house connection	c/h.c.	18,4
	Return factor (acc. to Design Report)	-	0,87
	Monthly peak factor	-	1,10
	Employees for wastewater collection	E	133
	Factor: Sewer length per connected capita/coverage		0,9

BASIC DATA OF TREATMENT PLANT:

As-Samra
3

Wastewater treatment

Wastewater treatment technology		WSP
Wastewater treatment technology		Wastewater stabilisation ponds
In operation since		1985
Composed of treatment facilities		
Facility		Screen (in Ain Ghazal)
Number of units	-	2 (autom.)
Total dimension		-
Facility		Aerated grit cham. (in Ain Ghazal)
Number of units	-	2
Total dimension		
Facility		Anaerobic ponds
Number of units	-	3 x 2
Total dimension		
Facility		Facultative ponds
Number of units	-	3 x 4
Total dimension		
Facility		Maturation ponds
Number of units	-	3 x 4
Total dimension		
Facility		Chlorination unit
Number of units	-	1
Total dimension		-
Facility		-
Number of units	-	-
Total dimension		-
Facility		-
Number of units	-	-
Total dimension		-
Facility		-
Number of units	-	-
Total dimension		-
Facility		-
Number of units	-	-
Total dimension		-
Remarks:		Total ponds' area: 181ha
		-
		-

Installed capacity	m^3/d	68.000
Population served (assuming 65 g/c/d)	c	1.951.000
Coverage (assuming 65 g/c/d)	%	90
Inflow treatment plant (average)	m^3/d	166.855
	MCM/a	60,902
Estimated losses by seepage/evaporation	%	25
Estimated effluent of the treatment plant	m^3/d	125.141
	MCM/a	45,677
BOD_5-load influent (according to WAJ data)	mg/l	760
	kg/d	126.810
	t/a	46.286
BOD_5-load effluent (according to WAJ data)	mg/l	118
	kg/d	14.767
	t/a	5.390
Fecal coliforms at effluent (acc.to WAJ data)	1/100 ml	140,000
Helminth eggs	eggs/l	0
Spec.wastewater generation	l/c/d	86
Spec.BOD_5-load	g/c/d	65
Total dissolved solids (TDS) at effluent	mg/l	1.258

Sludge management -

BASIC DATA OF TREATMENT PLANT:

As-Samra 3

Cost of wastewater treatment		
Operation and maintenance cost	JD/a	629.620
Operation/maintenance cost related to influent	JD/m³	0,010
Performance of wastewater collection		
Employees for wastewater collection	E	133
Number of employees per 1,000 house conn.	E/1000 h.c.	1,3
Recommended number of employees	E/1000 h.c.	2 - 4
Number of employees per km sewer	E/10km	0,9
Average number of complaints per month	1/month	
Average number of complaints per km sewer	1/month/km	0,0
Performance of wastewater treatment		
Treatment efficiency (BOD_5 acc.to WAJ data)	%	84
Expected efficiency (acc.to experience)	%	80 - 90
Used treatment capacity (hydraulic)	%	245
Odor problems	-	yes
Specific treatment problems		overloading of plant
Power-cuts		no problem
Operation/maintenance arrangement available		?
Employees for wastewater treatment	E	50
Recommended number of employees (WWTP)	E	57
Environmental impacts of effluent		
Discharge of effluent into		Wadi Dhuleil to Wadi Zarqa to King Talal Reservoi
Requirements acc. to JS 893/1995		not respected
(according to WAJ data)		-
		-
Reuse of effluent for agricultural irrigation		
Possible reuse (acc. to JS 893/1995)		restricted irrigation only
Practice of restricted irrigation		at plant site and upstream of King Talal Reservoir
Practice of unrestricted irrigation		downstream of King Talal Reservoir (after dilution)
Irrigation near treatment plant	donums	3.300

ANNEX to 2.5.4

Sewerage System

Table 1a: Tariq System Expansion Required in Different Years

Area	Existing Diameter	Required Diameter by Years						Construction Year	Length	Dia-meter
		2000	2005	2010	2015	2020	2025			
Tariq	200	200	300	300	400	400	400	2005	320	400
Tariq	200	200	300	300	400	400	400	2005	50	400
Tariq	200	200	400	400	400	400	500	2025	59	500
Tariq	200	200	200	300	300	300	400	2010	35	400
Tariq	300	300	300	300	400	400	500	2015	102	500
Tariq	300	300	300	300	300	300	400	2025	51	400
Tariq	300	300	300	300	300	400	400	2020	103	400
Tariq	300	300	300	300	300	300	400	2025	229	400
Tariq	300	300	300	300	300	300	400	2025	573	400
Tariq	300	300	300	300	400	400	500	2015	70	500
Tariq	300	300	300	400	400	500	500	2010	70	500
Tariq	300	300	300	300	300	300	400	2025	148	400
Tariq	300	300	300	300	300	400	400	2020	210	400
Tariq	300	300	400	400	500	500	600	2025	204	600
Tariq	300	300	300	300	300	300	400	2025	210	400
Tariq	300	300	300	300	300	300	400	2025	259	400
Tariq	300	300	300	300	300	300	400	2025	395	400
Tariq	300	300	300	300	300	400	400	2020	40	400
Tariq	300	300	400	400	500	500	600	2025	49	600
Tariq	300	300	300	300	300	300	400	2025	108	400
Tariq	300	300	300	300	400	400	500	2015	384	500
Tariq	300	300	300	300	300	400	400	2020	270	400
Tariq	300	300	300	300	300	300	400	2025	310	400
Tariq	300	300	300	300	300	300	400	2025	111	400
Tariq	300	300	300	400	400	500	500	2010	123	500
Tariq	300	300	300	300	300	300	400	2025	75	400
Tariq	300	300	300	300	300	300	400	2020	463	400
Tariq	300	300	300	300	300	300	400	2025	245	400
Tariq	300	300	300	300	300	400	400	2020	1356	400
Tariq	300	300	300	300	300	300	400	2025	490	400

Table 1b: Marka System Expansion Required in Different Years

Area	Existing Diameter	Required Diameter by Years						Construct. Year	Length	Dia-meter
		2000	2005	2010	2015	2020	2025			
Marka	300	300	300	300	400	400	400	2015	45	400
Marka	300	300	400	400	500	500	600	2015	45	600
Marka	300	300	400	400	500	500	600	2025	114	600
Marka	300	300	300	400	400	500	500	2010	55	500
Marka	300	300	300	300	400	400	400	2015	13	400
Marka	300	300	300	300	300	400	400	2020	330	400
Marka	300	300	300	300	400	400	400	2015	560	400
Marka	300	300	300	400	400	500	500	2010	816	500
Marka	300	300	400	400	500	500	600	2025	860	600
Marka	300	300	400	500	500	500	600	2025	788	600
Marka	300	300	300	400	400	500	500	2010	810	500
Marka	300	300	300	300	300	300	400	2025	201	400
Marka	300	300	300	300	300	400	400	2020	615	400
Marka	300	300	400	400	500	500	500	2005	221	500
Marka	300	300	400	400	500	500	500	2005	274	500
Marka	300	300	300	300	300	300	400	2025	496	400
Marka	300	300	300	400	400	400	500	2010	250	500
Marka	400	400	400	400	500	600	600	2015	60	600
Marka	400	400	600	600	700	700	700	2010	337	700
Marka	400	400	500	600	700	700	700	2010	260	700
Marka	400	400	400	400	500	600	600	2015	592	600
Marka	400	400	400	400	400	500	600	2015	805	600
Marka	400	600	700	700	800	800	900	2015	564	900
Marka	500	500	700	700	700	800	900	2020	1260	900
Marka	500	500	500	500	500	500	700	2025	220	700
Marka	1200	1200	1300	1300	1300	1300	1400	2005	70	1400
Marka	1200	1200	1200	1300	1300	1300	1300	2010	562	1300
Marka	1200	1200	1200	1300	1300	1300	1300	2010	595	1300
Marka	1200	1200	1200	1300	1300	1300	1300	2010	284	1300

Table 2: Zarqa System Expansion Required in Different Years

Area	Existing Diameter	Required Diameter by Years						Construction Year	Length	Diameter
		2000	**2005**	**2010**	**2015**	**2020**	**2025**			
Zarqa	800	800	800	800	800	1000	1100	2020	260.6	1100
Zarqa	800	800	800	800	800	800	1000	2025	605.1	1000
Zarqa	800	800	800	800	800	800	1000	2025	483.4	1000
Zarqa	400	400	400	400	400	400	600	2025	244.3	600
Zarqa	500	500	500	500	600	600	700	2010	210.0	700
Zarqa	300	300	300	400	400	400	500	2010	400.4	500
Zarqa	500	700	700	800	900	900	1000	2000	1225.6	1000
Zarqa	400	400	400	400	400	400	600	2025	166.6	600
Zarqa	400	400	400	400	400	400	500	2025	184.4	500
Zarqa	300	300	300	300	300	300	400	2025	135.6	400
Zarqa	300	300	300	300	300	300	400	2025	377.5	400
Zarqa	800	800	800	800	800	800	1000	2025	406.8	1000
Zarqa	800	800	800	800	800	800	1000	2025	361.2	1000
Zarqa	1000	1000	1000	1200	1400	1400	1600	2010	327.3	1600
Zarqa	300	300	300	400	400	400	500	2010	156.9	500
Zarqa	1000	1000	1000	1000	1200	1300	1400	2015	110.0	1400
Zarqa	300	300	300	300	400	400	400	2015	210.1	400
Zarqa	400	400	400	400	500	500	600	2015	195.0	600
Zarqa	300	300	300	300	300	300	400	2025	126.2	400
Zarqa	300	300	300	300	300	300	400	2025	530.0	400
Zarqa	400	400	400	400	400	400	500	2025	272.6	500
Zarqa	1000	1000	1200	1400	1600	1600	1900	2005	546.7	1900
Zarqa	1000	1000	1000	1200	1400	1400	1600	2010	351.3	1600
Zarqa	800	800	1000	1200	1300	1400	1600	2005	352.5	1600
Zarqa	800	800	800	1000	1000	1100	1300	2010	372.1	1300
Zarqa	500	500	500	500	500	500	700	2025	519.2	700
Zarqa	500	500	500	500	500	600	700	2020	381.4	700
Zarqa	500	500	500	500	500	500	700	2025	386.2	700
Zarqa	600	600	600	600	600	600	700	2025	522.8	700
Zarqa	800	800	800	800	1000	1000	1400	2015	429.6	1400
Zarqa	400	400	400	600	600	700	700	2010	313.4	700
Zarqa	500	500	500	500	700	700	700	2015	251.3	700
Zarqa	800	1000	1100	1200	1400	1400	1600	2000	376.8	1600
Zarqa	800	800	800	800	1000	1100	1200	2015	218.4	1200
Zarqa	800	800	800	800	1000	1000	1200	2015	218.0	1200
Zarqa	300	300	300	400	400	500	500	2010	232.4	500
Zarqa	300	300	300	300	400	400	500	2015	433.9	500
Zarqa	500	700	700	800	900	1000	1000	2000	945.6	1000
Zarqa	300	300	300	300	400	400	400	2015	421.7	400
Zarqa	400	400	400	400	400	500	600	2020	350.4	600
Zarqa	500	500	700	700	700	800	900	2005	573.3	900
Zarqa	500	500	700	700	800	900	1000	2005	633.6	1000
Zarqa	500	500	700	700	700	800	900	2005	611.8	900
Zarqa	500	500	700	700	800	900	1000	2005	970.4	1000
Zarqa	1000	1000	1000	1300	1300	1400	1600	2010	500.0	1600
Zarqa	1000	1000	1000	1200	1400	1400	1600	2010	60.0	1600
Zarqa	500	500	700	700	800	800	900	2005	531.0	900
Zarqa	500	500	500	700	700	800	800	2010	560.0	800
Zarqa	500	500	700	700	700	800	900	2005	574.0	900
Zarqa	500	500	500	500	500	500	700	2025	56.0	700
Zarqa	400	500	500	600	600	600	700	2015	163.0	700
Zarqa	400	400	400	400	400	400	600	2025	526.0	600
Zarqa	300	300	300	400	400	500	500	2010	993.0	500
Zarqa	300	400	400	400	400	400	400	2000	561.0	400

ANNEX to 2.7.2

Investment Costs

Investment cost for sewerage network (Wadi Zarqa System)

Area	**2005**																
	DN400	DN500	DN600	DN700	DN800	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1500	DN1600	DN1700	DN1800	DN1900	Total
Marka & Tariq	370	495									70		353			547	
Zarqa						2290	1604										
Ruseifa						811						2568	839				
Hashimiyya																	
Total	370	495	0	0	0	3101	1604	0	0	0	70	2568	1192	0	0	547	
Unit Cost JD/ m)	70	75	85	89	98	115	132	138	150	160	195	265	310	338	355	445	
Total Cost	25900	37125	0	0	0	356581	212241	0	0	0	13650	680414	369458	0	0	243282	**1938650**
Area	**2010**																
	DN400	DN500	DN600	DN700	DN800	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1500	DN1600	DN1700	DN1800	DN1900	
Marka & Tariq	35	2124		597						1441							
Zarqa		1783		523	560					372			1239				
Ruseifa					663				509			558					
Hashimiyya																	
Total	35	3907	0	1120	1223	0	0	0	509	1813	0	558	1239	0	0	0	
Unit Cost	70	75	85	89	98	115	132	138	150	160	195	265	310	338	355	445	
Total Cost	2450	293003	0	99716	119834	0	0	0	76335	290096	0	147817	383966	0	0	0	**1413217**
Area	**2015**																
	DN400	DN500	DN600	DN700	DN800	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1500	DN1600	DN1700	DN1800	DN1900	
Marka & Tariq	618	556	1502			564											
Zarqa	632	434	195	414					436		540						
Ruseifa				4286					510			194					
Hashimiyya									380								
Total	1250	990	1697	4700	0	564	0	0	1326	0	540	194	0	0	0	0	
Unit Cost	70	75	85	89	98	115	132	138	150	160	195	265	310	338	355	445	
Total Cost	87486	74243	144245	418282	0	64860	0	0	198885	0	105222	51304	0	0	0	0	**1144527**

Area	**2020**																
	DN400	DN500	DN600	DN700	DN800	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1500	DN1600	DN1700	DN1800	DN1900	
Marka & Tariq	3387					1260											
Zarqa			350	381					261								
Ruseifa	972																
Hashimiyya									266								
Total	4359	0	350	381	0	1260	0	0	527	0	0	0	0	0	0	0	
Unit Cost	70	75	85	89	98	115	132	138	150	160	195	265	310	338	355	445	
Total Cost	305116	0	29784	33945	0	144900	0	0	79050	0	0	0	0	0	0	0	**592795**
Area	**2025**																
	DN400	DN500	DN600	DN700	DN800	DN900	DN1000	DN1100	DN1200	DN1300	DN1400	DN1500	DN1600	DN1700	DN1800	DN1900	
Marka & Tariq	3901	59	2015	220													
Zarqa	1169	457	937	1484			1857										
Ruseifa	1153																
Hashimiyya	1205						1503										
Total	7428	516	2952	1704	0	0	3359	0	0	0	0	0	0	0	0	0	
Unit Cost	70	75	85	89	98	115	132	138	150	160	195	265	310	338	355	445	
Total Cost	519981	38700	250912	151674	0	0	444516	0	0	0	0	0	0	0	0	0	**1405782**
																	6494970

ANNEX to 2.8.2

Economic and Financial Analysis

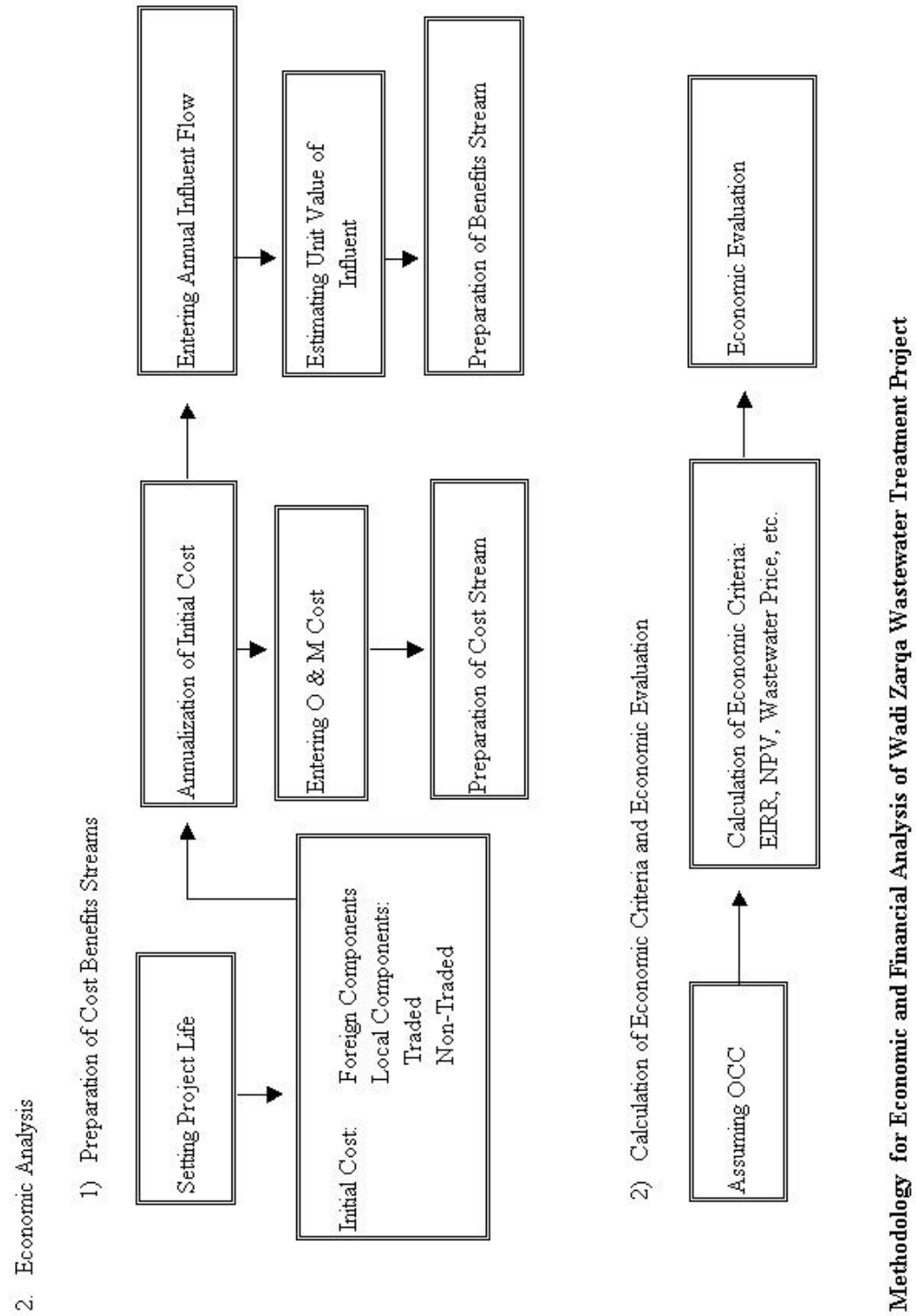
Economic and Financial Analysis

1. Financial Analysis

1) Preparation of Cost Benefits Streams

2) Calculation of Financial Criteria and Financial Evaluation

Methodology for Economic and Financial Analysis of Wadi Zarqa Wastewater Treatment Project



Methodology for Economic and Financial Analysis of Wadi Zarqa Wastewater Treatment Project

Table 2.6.2-1 Financial/Economic Analysis of Wadi Zarqa Wastewater Treatment Project

Hydraulic Analysis (m^3/yr)

Item	Allocation	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Water Produced				0	34,304,956	35,955,689	37,685,875	39,499,387	41,400,000	43,331,222	45,352,532	47,468,132	49,682,420	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000
Industrial Water	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physical Losses (%)		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Physical Losses		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Administrative/Managerial Losses (%)		0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Administrative/Managerial Losses		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quantity Delivered		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quantity Whose Bills are Collected		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irrigation Water	1.00	0	0	0	34,304,956	35,955,689	37,685,875	39,498,387	41,400,000	43,331,222	45,352,532	47,468,132	49,682,420	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000
Physical Losses (%)		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Physical Losses		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative/Managerial Losses (%)		0.14	0.12	0.10	0.09	0.08	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Administrative/Managerial Losses		0	0	0	3,087,446	2,876,456	2,638,011	2,369,951	2,070,000	2,166,561	2,267,627	2,373,407	2,484,121	2,600,000	2,600,000	2,600,000	2,600,000	2,600,000	2,600,000
Quantity Delivered		0	0	0	34,304,956	35,955,689	37,685,875	39,498,387	41,400,000	43,331,222	45,352,532	47,468,132	49,682,420	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000
Quantity Whose Bills are Collected		0	0	0	31,217,510	33,079,243	35,047,864	37,128,348	39,330,000	41,164,661	43,084,906	45,094,726	47,198,299	49,400,000	49,400,000	49,400,000	49,400,000	49,400,000	49,400,000

Financial Analysis (JD at 2001 Prices)

Item	Percent	Amount	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																				
Local Components	48%	60,053,070	20,017,690	20,017,690	20,017,690	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Components	52%	64,435,580	21,478,527	21,478,527	21,478,527	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duty & Taxes	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		124,488,650	41,496,217	41,496,217	41,496,217	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cumulative Costs			41,496,217	82,992,433	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650	124,488,650
O & M Costs			0	0	0	6,371,703	6,480,223	6,590,592	6,702,840	6,817,000	6,923,989	7,032,656	7,143,030	7,255,135	7,369,000	7,369,000	7,369,000	7,369,000	7,369,000	7,369,000
Total Costs			41,496,217	41,496,217	41,496,217	6,371,703	6,480,223	6,590,592	6,702,840	6,817,000	6,923,989	7,032,656	7,143,030	7,255,135	7,369,000	7,369,000	7,369,000	7,369,000	7,369,000	7,369,000
Revenues																				
Industrial Usage Qty (m^3)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Tariff (JD/m^3)			1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Industrial Revenues (JD)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigation Usage Qty (m^3)			0	0	0	31,217,510	33,079,243	35,047,864	37,128,348	39,330,000	41,164,661	43,084,906	45,094,726	47,198,299	49,400,000	49,400,000	49,400,000	49,400,000	49,400,000	49,400,000
Irrigation Tariff (JD/m^3)			0.147	0.173	0.205	0.242	0.285	0.336	0.397	0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.468
Irrigation Revenues (JD)			0	0	0	7,558,831	9,427,595	11,780,618	14,734,285	18,416,849	19,275,956	20,175,139	21,116,266	22,101,296	23,132,274	23,132,274	23,132,274	23,132,274	23,132,274	23,132,274
Total Revenues (JD)			0	0	0	7,558,831	9,427,595	11,780,618	14,734,285	18,416,849	19,275,956	20,175,139	21,116,266	22,101,296	23,132,274	23,132,274	23,132,274	23,132,274	23,132,274	23,132,274
Net Cash Flow (JD)			-41,496,217	-41,496,217	-41,496,217	1,168,118	2,947,373	5,190,018	8,031,365	11,598,849	12,351,968	13,143,482	13,973,237	14,846,161	15,763,274	15,763,274	15,763,274	15,763,274	15,763,274	15,763,274
Discounting (DR=5%)			0.95238	0.90703	0.86384	0.82270	0.78353	0.74622	0.71068	0.67684	0.64461	0.61391	0.58468	0.55684	0.53032	0.50507	0.48102	0.45811	0.43630	0.41552
Total Qty Whose Bills are Collected (m^3)			0	0	0	31,217,510	33,079,243	35,047,864	37,128,348	39,330,000	41,164,661	43,084,906	45,094,726	47,198,299	49,400,000	49,400,000	49,400,000	49,400,000	49,400,000	49,400,000
FIRR	7.4%																			
NPV (JD)	42,775,788		-39,520,206	-37,638,292	-35,845,992	961,013	2,308,343	3,877,348	5,707,341	7,851,235	7,962,188	8,068,344	8,169,842	8,266,898	8,359,601	7,961,535	7,582,404	7,221,338	6,877,464	6,549,966
PV of Total Costs (JD)	202,582,837		39,520,206	37,638,292	35,845,992	5,242,016	5,077,424	4,918,081	4,763,583	4,614,034	4,463,265	4,317,441	4,176,381	4,039,831	3,907,838	3,721,846	3,544,615	3,375,824	3,215,070	3,061,972
PV of Total Bills Collected Qty (m^3)	557,949,341		0	0	0	25,682,723	25,918,452	26,153,258	26,387,135	26,620,082	26,535,188	26,450,395	26,365,952	26,281,779	26,197,875	24,950,357	23,762,245	22,630,709	21,553,056	20,526,720
Unit Water Price (Fils/m^3)	363																			

Economic Analysis (JD at 2001 Prices)

Item	Percent	Amount	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																				
Local Components		50,420,055	16,806,685	16,806,685	16,806,685	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945
Foreign Components		64,435,580	21,478,527	21,478,527	21,478,527	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duty & Taxes		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		114,855,635	38,285,212	38,285,212	38,285,212	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945	91,945
Cumulative Costs			38,285,212	76,570,423	114,855,635	114,947,580	115,039,525	115,131,470	115,223,415	115,315,360	115,407,305	115,499,250	115,591,195	115,683,140	115,775,085	115,867,030	115,958,975	116,050,920	116,142,865	116,234,810
O & M Costs			0	0	0	6,371,703	6,480,223	6,590,592	6,702,840	6,817,000	6,923,989	7,032,656	7,143,030	7,255,135	7,369,000	7,369,000	7,369,000	7,369,000	7,369,000	7,369,000
Total Costs			38,285,212	38,285,212	38,285,212	6,463,648	6,572,168	6,682,537	6,794,785	6,908,945	7,015,934	7,124,601	7,234,975	7,347,080	7,460,945	7,460,945	7,460,945	7,460,945	7,460,945	7,460,945
Benefits																				
Industrial Usage Qty (m^3)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unit Benefit of Industrial Water (JD/m^3)			2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740
Industrial Benefits (JD)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigation Usage Qty (m^3)			0	0	0	34,304,956	35,955,699	37,685,875	39,499,307	41,400,000	43,331,222	45,352,532	47,468,152	49,682,420	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000
Unit Benefits of Irrigation Water (JD/m^3)			0.000	0.000	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368	0.368
Irrigation Benefits (JD)			0	0	0	12,687,871	13,213,719	13,849,559	14,515,895	15,214,500	15,924,224	16,687,856	17,444,539	18,258,289	19,110,000	19,110,000	19,110,000	19,110,000	19,110,000	19,110,000
Total Benefits (JD)			0	0	0	12,687,871	13,213,719	13,849,559	14,515,895	15,214,500	15,924,224	16,687,856	17,444,539	18,258,289	19,110,000	19,110,000	19,110,000	19,110,000	19,110,000	19,110,000
Net Cash Flow (JD)			-38,285,212	-38,285,212	-38,285,212	6,143,433	6,641,551	7,167,023	7,721,210	8,305,555	8,908,291	9,542,454	10,209,564	10,911,209	11,649,055	11,649,055	11,649,055	11,649,055	11,649,055	11,649,055
Discounting (DR=10%)			0.90909	0.82645	0.75131	0.68301	0.62092	0.56447	0.51316	0.46651	0.42410	0.38554	0.35049	0.31863	0.28966	0.26333	0.23939	0.21763	0.19784	0.17986
Total Qty Delivered (m^3)			0	0	0	34,304,956	35,955,689	37,685,875	39,498,387	41,400,000	43,331,222	45,352,532	47,468,132	49,682,420	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000	52,000,000
EIRR	6.5%																			
NPV (JD)	-30,053,708		-34,804,738	-31,640,671	-28,764,246	4,196,091	4,123,881	4,045,587	3,962,282	3,874,683	3,777,985	3,679,839	3,578,390	3,476,648	3,374,316	3,067,560	2,788,691	2,535,174	2,304,703	2,095,185
PV of Total Costs (JD)	144,283,417		34,804,738	31,640,671	28,764,246	4,414,759	4,080,799	3,772,118	3,486,799	3,223,874	2,975,441	2,746,842	2,535,814	2,341,008	2,161,178	1,964,708	1,786,091	1,623,719	1,476,108	1,341,917
PV of Total Qty Delivered (m^3)	310,828,147		0	0	0	23,430,347	22,325,460	21,273,694	20,269,390	19,313,406	18,376,668	17,485,365	16,637,291	15,830,358	15,062,548	13,693,225	12,448,387	11,316,715	10,287,923	9,352,657
Unit Water Price (Fils/m^3)	464																			

ANNEX to 2.8.3

Financial Statements

Preparation of Projected Financial Statements

1. Setting Pre-Conditions

2. Preparation and Evaluation of Projected Financial Statements

Methodology for Preparation of Financial Statements for Wadi Zarqa Wastewater Treatment Project