

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF HYDRAULICS

THE REPUBLIC OF SENEGAL

THE STUDY ON URBAN DRAINAGE
AND
WASTEWATER SYSTEMS
IN
DAKAR CITY AND ITS SURROUNDINGS

DATA BOOK

OCTOBER 1994

PACIFIC CONSULTANTS INTERNATIONAL, TOKYO

in association with

TOKYO ENGINEERING CONSULTANTS CO. LTD., TOKYO

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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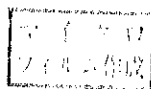
**THE STUDY ON URBAN DRAINAGE
AND
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DAKAR CITY AND ITS SURROUNDINGS**

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DATA BOOK *27415*



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LIST OF DATA BOOK

- DATA 1 RAINFALL RECORD AT DAKAR-YOFF AIRPORT
(1947-1992)**
- DATA 2 SEWERAGE COMPUTATION SHEET**
- DATA 3 COST ESTIMATES**
- DATA 4 FLOOD CONDITION SURVEY**
- DATA 5 WATER QUALITY SURVEY**

DATA 1

**RAINFALL RECORD AT DAKAR-YOFF AIRPORT
(1947-1992)**

RAINDAY

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1947	0	0	0	0	0	1	5	10	12	4	2	0
1948	0	2	0	0	0	4	3	17	8	1	0	0
1949	0	0	0	0	0	1	8	17	8	3	0	1
1950	0	0	0	0	2	2	12	18	19	8	0	0
1951	0	1	0	0	2	2	10	16	13	14	1	0
1952	0	0	0	1	1	1	10	14	15	6	0	0
1953	0	1	0	0	0	4	11	11	14	6	1	0
1954	1	2	0	0	0	5	11	15	12	3	1	0
1955	0	0	0	0	1	2	13	22	14	3	0	0
1956	1	0	0	0	0	1	10	14	14	5	0	7
1957	0	0	0	0	1	7	14	16	10	0	2	0
1958	0	0	0	0	0	1	12	22	11	4	0	0
1959	0	0	0	0	0	3	7	15	10	0	2	0
1960	1	0	0	0	0	2	7	14	15	2	0	0
1961	0	0	0	0	0	4	15	13	15	0	0	0
1962	0	2	0	0	0	3	8	21	10	7	0	0
1963	0	0	0	0	0	2	9	13	12	10	0	0
1964	2	0	0	0	0	1	13	18	13	0	0	0
1965	0	1	0	0	0	3	5	11	12	3	0	0
1966	0	0	0	0	1	3	1	10	16	10	0	0
1967	0	0	0	0	0	3	8	14	15	8	0	0
1968	0	2	0	0	0	2	7	2	12	3	0	0
1969	0	0	0	0	0	0	11	17	11	9	0	1
1970	0	0	0	0	0	0	2	17	9	2	0	0
1971	0	0	0	0	0	2	8	14	12	2	0	0
1972	1	0	0	0	0	4	1	6	5	1	0	0
1973	0	2	0	0	0	1	8	17	7	1	0	0
1974	0	0	0	0	0	0	8	16	9	2	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	1	0	0	0	0	2	10	11	4	1	3
1977	0	0	0	0	0	2	2	5	7	0	0	0
1978	0	0	0	1	0	0	8	15	8	5	3	1
1979	3	0	0	0	0	8	5	8	8	0	0	0
1980	0	2	0	0	0	1	3	9	11	1	0	2
1981	2	0	0	0	0	2	10	13	6	2	0	0
1982	0	0	0	0	1	0	5	13	6	3	0	0
1983	0	0	0	0	0	1	1	8	7	0	0	0
1984	0	0	0	0	0	4	5	5	8	2	0	0
1985	2	0	1	0	0	2	7	10	12	1	0	2
1986	0	2	1	0	0	0	1	10	16	1	0	0
1987	0	0	0	0	0	2	5	9	14	3	0	0
1988	1	2	0	0	0	1	4	18	13	1	0	1
1989	0	0	0	0	0	5	7	12	8	2	2	0
1990	3	0	0	0	0	1	6	12	7	3	0	0
1991	0	0	0	0	0	0	5	10	6	6	0	0
1992	0	4	0	0	1	0	9	10	7	1	1	1
	0.4	0.5	0.0	0.0	0.2	2.0	7.0	12.8	10.6	3.3	0.3	0.4
												37.7

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1947

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1										2.2		
2									36.4			
3								0.3	60.3			
4							0.5		28.3			
5								2.8	2.1			
6								20.5	0.3	0.5		
7								10.8				
8								2.0	16.0	6.0		
9								9.2		0.2		
10												
11									13.8			
12								17.0	38.8			
13												
14							10.8					
15												
16							6.8	21.4				
17												
18									2.1			
19								39.0	3.5			
20						1.8						
21												
22												
23							3.5					
24												
25							1.2		12.1			
26												
27												
28												
29											1.3	
30									6.3		1.4	
31								3.6				
Max.	0.0	0.0	0.0	0.0	0.0	1.8	10.8	39.0	60.3	6.0	1.4	0.0
Total	0.0	0.0	0.0	0.0	0.0	1.8	22.8	126.6	220.0	8.9	2.7	0.0

Max. Rainfall : **60.3**
Total Rainfall : **382.8**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1948

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									3.0			
2									3.1			
3									14.2			
4									3.7	10.6		
5												
6								0.2				
7												
8						2.1		8.1				
9								7.4				
10								94.0				
11								4.5				
12									6.6			
13								3.0	1.4			
14								47.4	20.0			
15								0.3				
16		0.8				10.5		29.1				
17		0.7							2.5			
18												
19								42.8				
20						0.3		31.7				
21						12.4						
22												
23												
24							11.7	16.0				
25								2.0				
26												
27								10.2				
28								4.2				
29							16.3	49.4				
30							2.1					
31								0.5				
Max.	0.0	0.8	0.0	0.0	0.0	12.4	16.3	94.0	20.0	10.6	0.0	0.0
Total	0.0	1.5	0.0	0.0	0.0	25.3	30.1	350.8	54.5	10.6	0.0	0.0

Max. Rainfall : **94.0**
Total Rainfall : **472.8**

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1949

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								0.4				
2									14.4	2.5		
3							0.7					
4								1.3				
5												
6									30.0			
7									3.7			
8							27.0					
9							21.2					
10								25.5				
11								4.8				
12								14.0				
13								0.5				
14												
15								27.8	10.6			1.5
16								3.6				
17								23.7				
18						0.5		5.6				
19							22.5					
20												
21									0.3			
22								7.8				
23							0.8	0.6	34.2			
24								6.9	30.2			
25							22.6		1.5			
26							6.3	11.7				
27								0.9				
28												
29												
30								35.4		13.0		
31							9.7	25.6		6.7		
Max.	0.0	0.0	0.0	0.0	0.0	0.5	27.0	35.4	34.2	13.0	0.0	1.5
Total	0.0	0.0	0.0	0.0	0.0	0.5	110.8	196.1	124.9	22.2	0.0	1.5

Max. Rainfall : **35.4**
Total Rainfall : **456.0**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1950

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								5.4	1.5	0.2		
2								36.5				
3								2.7	16.7	11.3		
4								38.8	46.8			
5								2.9	7.8	2.9		
6												
7									12.6	2.0		
8												
9							1.5		1.6	2.5		
10					0.7		0.2					
11					0.3		7.4	21.7	23.1	0.1		
12												
13												
14						0.3						
15							8.3	0.3		12.4		
16												
17							14.9	1.6	22.1	18.9		
18							8.6		2.2			
19							9.7	26.8	0.1			
20								61.1	19.1			
21									2.4			
22							8.7	2.4	34.3			
23							13.4		34.0			
24									13.7			
25								31.9	2.5			
26							1.1	81.6				
27								6.4	10.7			
28						4.7		39.0				
29							0.6	29.0	3.2			
30								5.8	5.3			
31							0.6	17.3				
Max.	0.0	0.0	0.0	0.0	0.7	4.7	14.9	81.6	46.8	18.9	0.0	0.0
Total	0.0	0.0	0.0	0.0	1.0	5.0	75.0	411.2	259.7	50.3	0.0	0.0

Max. Rainfall : 81.6
Total Rainfall : 802.2

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1951

Lat. 14 - 44 - N

Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								13.1	62.3	3.4		
2								0.2	4.8	3.6		
3								3.5	7.6	3.9	18.6	
4									28.3	45.8		
5		0.1						7.1		23.5		
6										15.1		
7										33.3		
8								0.5	0.7			
9								3.4	2.7			
10							3.0		3.4			
11								2.2				
12							21.2		11.7	35.3		
13							7.5					
14							2.7	13.6		33.0		
15							19.5			10.3		
16							2.2		3.9	0.7		
17							5.3		144.0			
18									19.2	37.7		
19								3.1				
20							2.0	29.8				
21							25.9					
22						4.3						
23								31.1				
24								13.0				
25								10.6		1.9		
26					0.6			0.8		2.5		
27					14.9	0.6						
28												
29									9.9			
30							0.3	36.9	5.9			
31								49.0				
Max.	0.0	0.1	0.0	0.0	14.9	4.3	25.9	49.0	144.0	45.8	18.6	0.0
Total	0.0	0.1	0.0	0.0	15.5	4.9	89.6	217.9	304.4	250.0	18.6	0.0

Max. Rainfall : **144.0**

Total Rainfall : **901.0**

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1952

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1							0.1	4.1		1.8		
2												
3										4.4		
4												
5												
6										5.6		
7									0.1			
8									0.2			
9							0.3	18.6	70.4	0.4		
10								0.6	44.3			
11									76.6			
12							13.5	3.6	23.3			
13								5.2				
14								3.0				
15								47.0	1.7			
16							21.1	17.7		9.8		
17							0.1		30.9	7.8		
18								0.1	21.0			
19								23.2				
20							1.1	0.9				
21								0.7				
22									28.6			
23									1.3			
24				1.3					2.0			
25									0.4			
26							23.6		24.9			
27							0.4					
28							6.1					
29												
30					9.4	1.5		31.6	4.2			
31							0.7	18.4				
Max.	0.0	0.0	0.0	1.3	9.4	1.5	23.6	47.0	76.6	9.8	0.0	0.0
Total	0.0	0.0	0.0	1.3	9.4	1.5	67.0	174.7	329.9	29.8	0.0	0.0

Max. Rainfall : 76.6
Total Rainfall : 613.6

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1953

Lat. 14 - 44 - N

Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1										0.8		
2							11.1		2.4			
3								2.3	29.8	4.8		
4										13.2		
5							6.3	0.3				
6												
7									5.1			
8		0.1										
9												
10						3.7	3.4		3.4	7.7		
11						1.0						
12								12.0	7.2			
13							1.9		14.6			
14								0.6				
15							30.0		0.5			
16												
17							0.1					
18									12.6			
19										0.1		
20							13.2	1.4		4.1		
21							1.6		0.7			
22								3.5	0.3			
23								26.4				
24						3.5	2.5	7.8				
25						2.8	62.8		0.9		0.4	
26							5.6					
27									29.5			
28								0.1				
29								0.5	17.0			
30									33.1			
31								16.4				
Max.	0.0	0.1	0.0	0.0	0.0	3.7	62.8	26.4	33.1	13.2	0.4	0.0
Total	0.0	0.1	0.0	0.0	0.0	11.0	138.5	71.3	157.1	30.7	0.4	0.0

Max. Rainfall : 62.8

Total Rainfall : 409.1

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1954

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								79.4	37.5			
2								11.5			22.4	
3								1.2				
4						1.2			0.3			
5						6.4						
6		8.9										
7		11.4							3.4			
8								36.2		1.8		
9												
10												
11									2.8			
12						24.1	16.7		14.9			
13							3.4		28.1			
14							0.7	22.8		3.6		
15								51.0	5.0			
16									4.3			
17												
18												
19								15.4				
20							15.3	1.8				
21							1.3					
22						0.3	0.6	30.2	1.2			
23						1.4		12.0		3.9		
24							2.9	0.7				
25							45.5		16.2			
26							43.3	13.7	39.7			
27							0.1					
28	0.4						8.2	67.2				
29								2.5				
30									0.7			
31								37.1				
Max.	0.4	11.4	0.0	0.0	0.0	24.1	45.5	79.4	39.7	3.9	22.4	0.0
Total	0.4	20.3	0.0	0.0	0.0	33.4	138.0	382.7	154.1	9.3	22.4	0.0

Max. Rainfall : 79.4
Total Rainfall : 760.6

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1955

Lat. 14 - 44 - N

Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1							6.2	9.5	4.0	11.9		
2								1.0				
3								5.3				
4								39.5		1.9		
5								0.2				
6									10.7			
7							38.3					
8							46.1	3.0	20.0			
9								2.1	0.2			
10								3.5	12.8			
11							0.2	8.9	0.9			
12							9.7	0.3				
13								1.6				
14								0.2				
15							0.1					
16								0.8				
17							15.3		3.4			
18							64.4	79.3	0.5			
19									5.6			
20								41.8				
21								2.8	19.1			
22							2.7		51.7			
23								12.6	0.4			
24								4.2				
25												
26							24.1	14.9	1.6			
27						15.8	30.7					
28					0.6		25.9					
29							8.8	1.0	3.3			
30						2.1		1.2				
31								0.9		0.1		
Max.	0.0	0.0	0.0	0.0	0.6	15.8	64.4	79.3	51.7	11.9	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.6	17.9	272.5	234.6	134.2	13.9	0.0	0.0

Max. Rainfall : **79.3**
Total Rainfall : **673.7**

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1956

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									0.2			
2							6.0		2.0			
3									0.4			
4								6.7	17.8			
5										12.5		
6										0.3		
7								1.5	27.3			
8										3.9		
9								3.8	3.2	1.0		
10								0.6	14.8			
11							0.2	0.6	0.7	6.0		
12	0.3						27.6					0.4
13							59.8					9.4
14								7.1				22.8
15								4.2				1.4
16								0.6				23.0
17												
18							1.5					
19							0.6		0.3			1.0
20						2.1	1.1					0.1
21									0.1			
22									13.0			
23									0.2			
24									2.0			
25								1.0				
26								0.3				
27							0.7					
28							68.5	7.1				
29								26.7	15.4			
30							17.6	22.0				
31								29.8				
Max.	0.3	0.0	0.0	0.0	0.0	2.1	68.5	29.8	27.3	12.5	0.0	23.0
Total	0.3	0.0	0.0	0.0	0.0	2.1	183.6	112.0	97.4	23.7	0.0	58.1

Max. Rainfall : **68.5**
Total Rainfall : **477.2**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1957

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									5.9	3.6		
2									15.1	24.6		
3	4.2								4.0	1.3		
4						4.6			0.8	27.1		
5	2.1							0.1	0.6	7.1		
6	0.2							1.0	0.9	6.0		0.2
7							2.2	10.6		94.2		8.6
8										26.9		
9								0.1	75.3			
10									75.5	0.9		
11							6.1		2.9			
12								4.1				
13								34.4	7.5			
14									10.6			
15									0.1			
16							15.9		14.4			
17												
18												
19									5.8			
20												
21								11.4				
22								4.7				
23							5.1	6.0				
24							2.7	0.6				
25										4.6		
26								9.7				
27												
28								2.8				
29							0.3	37.4	1.6			
30							0.4		3.6			
31								18.9				
Max.	4.2	0.0	0.0	0.0	0.0	4.6	15.9	37.4	75.5	94.2	0.0	8.6
Total	6.5	0.0	0.0	0.0	0.0	4.6	32.7	141.8	224.6	196.3	0.0	8.8

Max. Rainfall : **94.2**
Total Rainfall : **615.3**

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1958

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1							0.2	7.7		58.4		
2							10.2	2.6		18.4		
3							30.4	47.2	16.8	2.6		
4							1.2	1.0	6.3			
5								8.8				
6								60.6		6.7		
7								43.2				
8								1.6				
9								22.5	3.5			
10								40.0				
11												
12								13.1				
13								13.8	0.4			
14								22.2				
15									23.2			
16									2.2			
17									26.0			
18									31.9			
19							0.2	0.8				
20						4.0		36.9	39.9			
21							0.3	59.4				
22							10.0	0.6				
23							2.4	88.3	8.8			
24							14.1	6.8	0.9			
25												
26												
27							1.0	1.5				
28							5.1	1.7				
29												
30								12.8				
31							0.2					
Max.	0.0	0.0	0.0	0.0	0.0	4.0	30.4	88.3	39.9	58.4	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	4.0	75.3	493.1	159.9	86.1	0.0	0.0

Max. Rainfall : **88.3**
Total Rainfall : **818.4**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1959

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									7.9			
2												
3												
4								0.1	3.6		3.0	
5							2.2		10.9		1.0	
6								1.8				
7								14.2	0.8			
8							22.0	26.7				
9							12.5					
10							2.9					
11								11.6				
12									11.7			
13								0.5				
14							2.2	0.1				
15												
16									1.1			
17									19.2			
18								0.9	1.6			
19								0.2				
20						4.0						
21						0.5	2.2					
22								28.8				
23								5.9				
24									17.1			
25						1.4						
26									3.5			
27							19.3					
28								18.2				
29								8.1				
30								5.0				
31								0.4				
Max.	0.0	0.0	0.0	0.0	0.0	4.0	22.0	28.8	19.2	0.0	3.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	5.9	63.3	122.5	77.4	0.0	4.0	0.0

Max. Rainfall : **28.8**
Total Rainfall : **273.1**

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1960

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								2.2				
2									6.6			
3								15.8	10.4			
4								1.4				
5												
6												
7									37.0	37.7		
8	0.3								27.3	14.6		
9												
10												
11												
12								68.7				
13							37.6	0.6				
14								12.3				
15								25.9				
16							4.4		4.6			
17							2.0		9.5			
18									4.0			
19									0.7			
20							26.3					
21							7.2		0.5			
22									1.2			
23								2.6	6.5			
24								16.1	0.2			
25							0.1	46.2	3.8			
26								0.5				
27						0.8		1.6				
28						1.6		4.5				
29								100.2	6.3			
30									12.7			
31							20.1					
Max.	0.3	0.0	0.0	0.0	0.0	1.6	37.6	100.2	37.0	37.7	0.0	0.0
Total	0.3	0.0	0.0	0.0	0.0	2.4	97.7	298.6	131.3	52.3	0.0	0.0

Max. Rainfall : 100.2
Total Rianfall : 582.6

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1961

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								3.6	2.2			
2								7.5	16.1			
3						0.1						
4								24.4	1.8			
5									35.3			
6												
7									1.7			
8												
9												
10								5.8				
11							49.7	1.3				
12							0.5	3.0	0.6			
13							20.3	6.0	8.6			
14												
15												
16									7.4			
17							17.6	7.1	9.8			
18							17.2	1.6	17.1			
19							35.6	12.5				
20												
21							18.3					
22							9.8					
23						4.7		28.6				
24						3.0	32.1					
25							0.3		5.2			
26							1.1		14.0			
27						26.1	0.5	33.7	49.3			
28							0.2	2.4	34.8			
29									15.9			
30							18.4					
31							1.5					
Max.	0.0	0.0	0.0	0.0	0.0	26.1	49.7	33.7	49.3	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	33.9	223.1	137.5	219.8	0.0	0.0	0.0

Max. Rainfall : 49.7
Total Rainfall : 614.3

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1962

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									23.0			
2		0.4						1.8	0.3			
3		0.2					1.0	64.4	2.0			
4												
5							1.8					
6								3.4	6.2			
7								2.7				
8								0.8		25.8		
9									0.4			
10								1.0	4.8	50.8		
11								12.3				
12						0.8				2.6		
13								0.1		2.5		
14								0.1	12.5	87.6		
15												
16								6.1				
17							0.4	6.8				
18							3.2					
19								7.3				
20								1.1		2.3		
21						0.2						
22								3.1		0.2		
23								16.2	4.0			
24						12.9		7.4				
25								31.1				
26								153.1				
27								82.0				
28							1.5	1.7	0.1			
29							8.5					
30							36.0		2.6			
31							0.9	10.9				
Max.	0.0	0.4	0.0	0.0	0.0	12.9	36.0	153.1	23.0	87.6	0.0	0.0
Total	0.0	0.6	0.0	0.0	0.0	13.9	53.3	413.4	55.9	171.8	0.0	0.0

Max. Rainfall : 153.1
Total Rainfall : 708.9

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1963

Lat. 14 - 44 - N

Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2							3.1		2.1	0.7		
3								14.3	10.5	0.4		
4							0.1	0.3	6.0			
5									6.8	0.9		
6								9.1	4.2	34.1		
7							1.9	0.9		7.9		
8							0.5	7.3				
9								36.9				
10								104.2	26.6	8.2		
11									28.6	28.0		
12									18.6	0.9		
13								1.6	0.9	17.0		
14									8.1	1.4		
15												
16								1.2	1.2			
17												
18												
19							9.1					
20									0.5			
21												
22								2.3				
23							10.0					
24							3.4	10.5				
25								8.9				
26						1.7	2.9					
27												
28												
29							2.6					
30						1.8						
31								3.3				
Max.	0.0	0.0	0.0	0.0	0.0	1.8	10.0	104.2	28.6	34.1	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	3.5	33.6	200.8	114.1	99.5	0.0	0.0

Max. Rainfall : 104.2

Total Rainfall : 451.5

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1964

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2.6								12.5			
2	1.3											
3									10.6			
4								1.7	39.8			
5								0.3	18.1			
6												
7												
8								14.4				
9								2.7	12.9			
10							0.3	24.8	0.9			
11												
12												
13							22.0					
14							22.4					
15						4.0		6.4	12.4			
16								0.4				
17									0.1			
18									1.1			
19									8.5			
20							23.4	3.8				
21							2.4	0.3	1.8			
22							3.1	1.5	16.6			
23							18.7	1.2				
24							24.5	7.4				
25							8.9	157.7				
26							0.7	7.3				
27							6.7	2.1				
28							8.6	32.5				
29												
30							0.7	7.6	7.5			
31								4.9				
Max.	2.6	0.0	0.0	0.0	0.0	4.0	24.5	157.7	39.8	0.0	0.0	0.0
Total	3.9	0.0	0.0	0.0	0.0	4.0	142.4	277.0	142.8	0.0	0.0	0.0

Max. Rainfall : **157.7**
Total Rainfall : **570.1**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1965

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1		4.0								10.5		
2									4.9			
3												
4												
5												
6												
7								2.7				
8												
9												
10									0.3			
11								2.3	14.3	0.1		
12									0.5			
13								56.1	0.4			
14								45.2				
15								2.7	27.0			
16							5.3	36.7				
17							7.9					
18								4.3				
19							0.5	29.3	70.7			
20						2.0			6.3			
21						2.9	0.1					
22									4.0			
23									1.0			
24												
25												
26									38.5			
27								0.7	2.9			
28						0.5		6.4				
29												
30								18.5		1.2		
31							1.0					
Max.	0.0	4.0	0.0	0.0	0.0	2.9	7.9	56.1	70.7	10.5	0.0	0.0
Total	0.0	4.0	0.0	0.0	0.0	5.4	14.8	204.9	170.8	11.8	0.0	0.0

Max. Rainfall : 70.7
Total Rainfall : 411.7

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1966

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2						2.3			4.4	24.1		
3									8.0	14.5		
4									0.6	6.3		
5									0.6			
6									12.2			
7								4.4		4.7		
8									6.0	0.9		
9									22.1	64.1		
10										12.7		
11												
12								0.7	0.3	3.1		
13									41.8			
14									29.3	14.6		
15						29.9				8.2		
16						0.2						
17					0.2			4.6				
18								26.8	17.8			
19								10.9	18.5			
20								23.9	99.9			
21								9.7	2.9			
22								34.8				
23								9.6	1.6			
24												
25									1.3			
26												
27							2.9					
28								13.6				
29												
30												
31												
Max.	0.0	0.0	0.0	0.0	0.2	29.9	2.9	34.8	99.9	64.1	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.2	32.4	2.9	139.0	267.3	153.2	0.0	0.0

Max. Rainfall : **99.9**
Total Rainfall : **595.0**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1967

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									69.9	23.5		
2									36.8	1.1		
3									13.6	5.8		
4							13.9		7.2	95.5		
5							17.9	24.5	0.1	15.3		
6							0.1					
7							11.2					
8												
9									70.4	13.4		
10								1.0	2.3			
11						0.2		9.7				
12								7.2		1.4		
13								0.1				
14								0.2	36.9			
15									10.2			
16									9.0			
17						0.6						
18							14.9		0.5			
19							2.9	53.0				
20							25.5					
21												
22								71.2				
23						1.2		10.9	7.5	27.4		
24								2.3				
25									65.6			
26							0.2	7.7	35.0			
27												
28								0.1				
29												
30								69.7	0.3			
31								0.5				
Max.	0.0	0.0	0.0	0.0	0.0	1.2	25.5	71.2	70.4	95.5	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	2.0	86.6	258.1	365.3	183.4	0.0	0.0

Max. Rainfall : **95.5**
Total Rainfall : **895.4**

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1968

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								14.1	5.8			
2									2.8			
3									5.8	46.7		
4							2.8					
5									1.3			
6												
7									0.2			
8		1.7										
9		10.1							3.2			
10									40.8			
11									11.0			
12												
13										2.1		
14									6.5	7.2		
15									42.2			
16							7.6					
17							6.9					
18												
19												
20												
21							17.3					
22												
23							2.0		10.2			
24									0.1			
25												
26												
27												
28						0.9						
29							1.5	6.3				
30						1.5						
31							1.1					
Max.	0.0	10.1	0.0	0.0	0.0	1.5	17.3	14.1	42.2	46.7	0.0	0.0
Total	0.0	11.8	0.0	0.0	0.0	2.4	39.2	20.4	129.9	56.0	0.0	0.0

Max. Rainfall : **46.7**
Total Rainfall : **259.7**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1969

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2								26.1				
3							0.9					
4									23.6	0.2		
5								0.1	18.2			
6									14.3			
7								10.8	20.8	5.9		
8							20.0			3.1		
9							41.2	4.1		19.2		
10								1.2	22.8	0.1		
11								3.5	16.8	25.7		
12							17.9		42.7	0.6		
13												
14												
15												
16							8.8					
17							8.9					
18								24.0				0.7
19								47.2				
20							0.9	35.4	0.2			
21									36.1			
22							14.9	0.2	32.8			
23								0.4	4.8			
24								29.7		3.9		
25								0.2		3.3		
26								29.8				
27												
28							41.7					
29							9.9	1.8				
30								6.1				
31							11.3	58.5				
Max.	0.0	0.0	0.0	0.0	0.0	0.0	41.7	58.5	42.7	25.7	0.0	0.7
Total	0.0	0.0	0.0	0.0	0.0	0.0	176.4	279.1	233.1	62.0	0.0	0.7

Max. Rainfall : 58.5
Total Rainfall : 751.3

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : **Dakar - Yoff**

1970

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								13.1				
2								2.6				
3								1.8				
4									15.2			
5									8.2	2.1		
6								5.0				
7								13.9				
8												
9								1.1				
10								2.2				
11								0.2		0.4		
12								3.0				
13								32.2				
14												
15												
16							0.1	5.1	0.4			
17								4.5				
18								0.8				
19												
20								16.9	7.9			
21								0.1				
22									2.3			
23									1.7			
24												
25												
26												
27												
28							5.9		8.0			
29								5.9	12.1			
30								1.7	2.6			
31												
Max.	0.0	0.0	0.0	0.0	0.0	0.0	5.9	32.2	15.2	2.1	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	6.0	110.1	58.4	2.5	0.0	0.0

Max. Rainfall : **32.2**
Total Rainfall : **177.0**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1971

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1							1.1					
2												
3								21.8	8.3			
4												
5												
6							0.9	21.4	2.7			
7												
8												
9												
10								3.8	0.5			
11								2.9	5.2			
12									4.6			
13							6.5			18.9		
14									16.2	7.4		
15												
16								21.4	7.7			
17							20.3	3.3	0.6			
18								19.7				
19												
20												
21								32.8				
22							4.9	18.3	16.6			
23							26.5		0.2			
24						11.3	2.9	0.7	5.1			
25								3.7				
26												
27								7.9				
28								26.8				
29									0.7			
30						1.4	0.6					
31								11.1				
Max.	0.0	0.0	0.0	0.0	0.0	11.3	26.5	32.8	16.6	18.9	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	12.7	63.7	195.6	68.4	26.3	0.0	0.0

Max. Rainfall : **32.8**
Total Rainfall : **366.7**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1972

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2												
3												
4												
5						2.7						
6									1.3	6.2		
7						1.7						
8												
9												
10								8.1				
11												
12									3.4			
13									41.4			
14								4.1	0.7			
15								0.2				
16								0.5				
17												
18												
19												
20												
21												
22												
23								14.9	19.2			
24						2.1						
25						2.2		3.7				
26												
27												
28	0.1											
29												
30							0.7					
31												
Max.	0.1	0.0	0.0	0.0	0.0	2.7	0.7	14.9	41.4	6.2	0.0	0.0
Total	0.1	0.0	0.0	0.0	0.0	8.7	0.7	31.5	66.0	6.2	0.0	0.0

Max. Rainfall : 41.4
Total Rainfall : 113.2

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1973

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1							9.6	9.4				
2							9.2	2.1				
3							14.1	22.3	6.7			
4									0.2	0.1		
5								8.5	14.3			
6								16.4				
7												
8		0.4						7.0				
9		0.3					21.1	0.2				
10												
11												
12												
13								0.1	1.2			
14								0.2	3.3			
15								0.8				
16												
17								18.8				
18								47.9	14.9			
19												
20								1.1				
21												
22							0.1		12.3			
23								4.9				
24								14.6				
25								9.1				
26												
27												
28						4.5	2.7					
29												
30							1.7					
31							0.6	6.3				
Max.	0.0	0.4	0.0	0.0	0.0	4.5	21.1	47.9	14.9	0.1	0.0	0.0
Total	0.0	0.7	0.0	0.0	0.0	4.5	59.1	169.7	52.9	0.1	0.0	0.0

Max. Rainfall : **47.9**
Total Rianfall : **287.0**

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1974

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2									3.2			
3										18.8		
4												
5									41.5			
6												
7								32.7				
8								3.7	63.4			
9								4.2				
10												
11												
12										12.2		
13							0.7	0.3	6.7			
14							5.3	1.6				
15							3.1		0.3			
16												
17												
18												
19												
20								0.5	0.7			
21								3.7				
22								23.3	1.8			
23							0.1	1.6	1.8			
24								22.3				
25								0.2				
26							1.0	14.5				
27							13.3	1.2				
28							27.1	2.3	29.4			
29								1.7				
30												
31							0.1	22.0				
Max.	0.0	0.0	0.0	0.0	0.0	0.0	27.1	32.7	63.4	18.8	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	50.7	135.8	148.8	31.0	0.0	0.0

Max. Rainfall : 63.4
Total Rainfall : 366.3

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1975

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2									5.7			
3									83.8			
4									0.1			
5												
6									6.9			
7							4.6			2.8		
8												
9								14.0				
10								40.3				
11							10.6	4.4				
12												
13							0.3		25.7	15.1		
14									11.0			
15							7.6	2.1				
16									18.1			
17									0.3			
18												
19							6.5					
20								2.1				
21								3.6	1.3			
22								8.2				
23							14.6					
24							3.8	7.7				
25							14.5	13.7	6.9			
26							0.2		1.4			
27							41.7					
28							62.3	39.3				
29							5.0	43.3				
30							33.9					
31							0.3	0.3				
Max.	0.0	0.0	0.0	0.0	0.0	0.0	62.3	43.3	83.8	15.1	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	205.9	179.0	161.2	17.9	0.0	0.0

Max. Rainfall : **83.8**
Total Rainfall : **564.0**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1976

Lat. 14 - 44 - N

Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									8.2			
2									0.1	0.8	7.6	
3										3.0		
4										23.9		
5												
6												
7												
8								1.4				
9								5.7				
10								0.1				
11								1.5				
12												
13		0.5										
14									0.3			
15								69.6	7.6			
16												
17								0.4	53.3			
18							8.6		28.6			7.4
19												1.1
20												
21								8.4	1.2			
22								0.5				
23												
24								24.0	52.8			
25								7.5	38.5	15.8		0.1
26												
27												
28									0.1			
29							8.5		0.7			
30												
31												
Max.	0.0	0.5	0.0	0.0	0.0	0.0	8.6	69.6	53.3	23.9	7.6	7.4
Total	0.0	0.5	0.0	0.0	0.0	0.0	17.1	119.1	191.4	43.5	7.6	8.6

Max. Rainfall : 69.6
Total Rainfall : 387.8

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1977

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2						0.1						
3									9.8			
4									2.8			
5									1.3			
6												
7							5.1					
8												
9												
10									2.3			
11												
12												
13								5.0				
14						1.8						
15												
16								36.7				
17								0.4				
18									92.4			
19									3.2			
20												
21												
22												
23												
24												
25												
26												
27							3.3		0.4			
28												
29								0.1				
30												
31								6.5				
Max.	0.0	0.0	0.0	0.0	0.0	1.8	5.1	36.7	92.4	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	1.9	8.4	48.7	112.2	0.0	0.0	0.0

Max. Rainfall : **92.4**
Total Rainfall : **171.2**

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1978

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								10.1				
2				0.2				2.3	23.5			
3								38.8				
4								5.3	2.7			
5							2.7	0.1		2.4		
6												
7								0.3				
8								10.3				
9								8.5	20.6			
10												
11										1.6		
12												
13										9.1		
14								7.1				
15												
16									8.3			
17							1.5					
18							2.3					
19												
20							12.9					
21												1.3
22								0.2		0.5		
23									1.7	5.9		
24							0.2	18.7	5.8			
25							0.3	40.2	3.7			
26									9.8			
27								7.0				
28											1.4	
29											1.3	
30							0.1	0.2			17.0	
31							37.0	0.5				
Max.	0.0	0.0	0.0	0.2	0.0	0.0	37.0	40.2	23.5	9.1	17.0	1.3
Total	0.0	0.0	0.0	0.2	0.0	0.0	57.0	149.6	76.1	19.5	19.7	1.3

Max. Rainfall : 40.2
Total Rainfall : 323.4

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1979

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									2.8			
2												
3									1.7			
4									4.2			
5						4.7						
6						0.8						
7						8.2						
8						9.3						
9												
10							24.6	14.9	2.2			
11												
12									0.1			
13									0.1			
14	34.9					17.3						
15	12.4					1.3			4.3			
16												
17						0.9						
18	3.2						1.6					
19						33.4	51.8		36.4			
20							1.7					
21												
22								21.0				
23												
24								5.4				
25								5.3				
26							1.5	0.7				
27								1.0				
28												
29												
30								1.2				
31								32.2				
Max.	34.9	0.0	0.0	0.0	0.0	33.4	51.8	32.2	36.4	0.0	0.0	0.0
Total	50.5	0.0	0.0	0.0	0.0	75.9	81.2	81.7	51.8	0.0	0.0	0.0

Max. Rainfall : 51.8
Total Rainfall : 341.1

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1980

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									3.7			
2									76.9			
3									25.1			
4												
5									10.9			
6						0.2		22.8				
7								43.4		13.8		
8								0.8	0.4			
9								5.2				
10								19.9				
11								3.7	31.4			
12									0.3			
13												0.1
14												0.6
15												
16									15.5			
17								0.2				
18							0.4					
19							1.4					
20												
21												
22												
23												
24								13.0	5.6			
25												
26												
27							23.9	0.9				
28		0.5										
29		0.3										
30									8.6			
31									48.3			
Max.	0.0	0.5	0.0	0.0	0.0	0.2	23.9	43.4	76.9	13.8	0.0	0.6
Total	0.0	0.8	0.0	0.0	0.0	0.2	25.7	109.9	226.7	13.8	0.0	0.7

Max. Rainfall : **76.9**
Total Rainfall : **377.8**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1981

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								43.6	7.2			
2								8.4				
3							6.2					
4							2.3	11.0				
5							22.4					
6								0.5				
7								0.1	17.5			
8							0.8					
9												
10								1.9	4.4	6.7		
11												
12								13.8	8.9			
13												
14							16.3					
15	3.0									3.9		
16	0.5							0.3				
17									10.0			
18												
19									5.1			
20												
21							0.7					
22						0.1		1.8				
23												
24						23.4	0.3					
25							2.1					
26							19.7					
27								30.2				
28								14.9				
29												
30							1.3	30.4				
31								18.5				
Max.	3.0	0.0	0.0	0.0	0.0	23.4	22.4	43.6	17.5	6.7	0.0	0.0
Total	3.5	0.0	0.0	0.0	0.0	23.5	72.1	175.4	53.1	10.6	0.0	0.0

Max. Rainfall : 43.6
Total Rainfall : 338.2

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1982

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2												
3												
4									0.2			
5										4.7		
6												
7								6.0				
8									25.0			
9												
10												
11							8.1	0.5				
12												
13					0.3					33.6		
14							31.9	31.5	4.2	4.9		
15												
16							0.5		17.0			
17								1.8				
18												
19												
20												
21								10.0				
22								15.3				
23								12.6				
24							26.1	2.1				
25									0.3			
26								8.0	0.1			
27								5.9				
28							38.1	5.3				
29								4.9				
30												
31								10.6				
Max.	0.0	0.0	0.0	0.0	0.3	0.0	38.1	31.5	25.0	33.6	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.3	0.0	104.7	114.5	46.8	43.2	0.0	0.0

Max. Rainfall : 38.1
Total Rainfall : 309.5

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1983

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									3.1			
2												
3												
4												
5												
6												
7												
8								3.5				
9								4.7				
10												
11							0.4	0.6	20.8			
12									2.1			
13												
14												
15												
16												
17												
18												
19												
20						10.0		1.0				
21								12.3				
22									0.9			
23								11.2				
24								18.2	2.6			
25									1.6			
26												
27												
28												
29												
30									31.8			
31								30.1				
Max.	0.0	0.0	0.0	0.0	0.0	10.0	0.4	30.1	31.8	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	10.0	0.4	81.6	62.9	0.0	0.0	0.0

Max. Rainfall : **31.8**
Total Rainfall : **154.9**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1984

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1								26.6				
2								0.3				
3												
4									3.4			
5										4.2		
6										0.3		
7												
8												
9									20.5			
10							0.2					
11												
12												
13									0.4			
14							0.9		8.3			
15												
16							0.3					
17								38.2				
18												
19						4.2						
20									54.7			
21									25.2			
22									1.8			
23												
24								3.3				
25								1.5	19.2			
26						0.7						
27						1.5	15.1					
28												
29						1.3						
30							2.3					
31												
Max.	0.0	0.0	0.0	0.0	0.0	4.2	15.1	38.2	54.7	4.2	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	7.7	18.8	69.9	133.5	4.5	0.0	0.0

Max. Rainfall : **54.7**
Total Rainfall : **234.4**

DAILY RAINFALL RECORD

Name of Station : **Dakar - Yoff**

1985

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									0.3			
2									0.7			
3												
4	0.4											
5	0.2								29.5			
6									43.3	15.5		
7												
8									0.9			
9								28.3				
10												
11								21.0				
12									7.4			
13			0.2									
14								19.3	1.6			
15							2.3	30.6	20.6			
16								49.1	2.4			
17												
18								17.8				
19							24.6	87.3				
20							1.5		24.2			0.3
21												0.2
22												
23						0.4		0.4				
24												
25												
26							0.1					
27						13.5	37.3	5.2	1.9			
28							1.1	1.1	11.1			
29												
30												
31							5.5					
Max.	0.4	0.0	0.2	0.0	0.0	13.5	37.3	87.3	43.3	15.5	0.0	0.3
Total	0.6	0.0	0.2	0.0	0.0	13.9	72.4	260.1	143.9	15.5	0.0	0.5

Max. Rainfall : **87.3**
Total Rainfall : **507.1**

DAILY RAINFALL RECORD

Lat. 14 - 44 - N
Long. 17 - 30 - W

Name of Station : Dakar - Yoff

1986

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1		0.2						15.4	2.8	8.4		
2		1.7										
3			0.4					60.6				
4								3.6	78.5			
5								1.2	0.6			
6												
7								2.3				
8								1.4	1.5			
9									20.2			
10							23.5		6.3			
11									51.2			
12									16.3			
13									0.2			
14												
15									12.0			
16												
17												
18									6.9			
19									9.8			
20								0.8				
21												
22								5.2				
23												
24									21.7			
25									1.2			
26								1.7	1.5			
27									29.9			
28												
29												
30								2.8				
31												
Max.	0.0	1.7	0.4	0.0	0.0	0.0	23.5	60.6	78.5	8.4	0.0	0.0
Total	0.0	1.9	0.4	0.0	0.0	0.0	23.5	95.0	260.6	8.4	0.0	0.0

Max. Rainfall : 78.5
Total Rainfall : 389.8

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1987

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1												
2								0.6	13.9	9.8		
3								4.8	9.3			
4									0.5	0.7		
5												
6								42.2	6.4			
7									1.7			
8								11.7				
9												
10												
11									3.1			
12						3.4			3.7			
13									8.2			
14												
15							0.1					
16												
17										8.9		
18									21.9			
19												
20							20.5					
21						0.3						
22												
23							9.0		0.5			
24								42.7	22.2			
25								2.8	7.7			
26												
27							6.3		5.1			
28								36.9				
29							17.9	92.8				
30								12.8	14.6			
31												
Max.	0.0	0.0	0.0	0.0	0.0	3.4	20.5	92.8	22.2	9.8	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	3.7	53.8	247.3	118.8	19.4	0.0	0.0

Max. Rainfall : 92.8
Total Rainfall : 443.0

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1988

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									34.2			
2								30.4				
3								5.9		22.9		
4								0.3	7.4			
5									0.1			
6									0.6			
7									50.5			
8	0.4								17.4			
9							6.4					
10												
11												
12												
13							0.3		1.9			
14									18.7			
15								5.2				
16								37.1	1.1			
17							0.1	1.5	13.9			0.1
18								13.5	39.0			
19								0.7	17.6			
20												
21								41.4				
22								0.4				
23								0.8				
24						18.9						
25		0.3						0.7				
26		10.2						8.4				
27								13.1				
28								17.2				
29								13.0	2.9			
30							2.3	13.1				
31								2.2				
Max.	0.4	10.2	0.0	0.0	0.0	18.9	6.4	41.4	50.5	22.9	0.0	0.1
Total	0.4	10.5	0.0	0.0	0.0	18.9	9.1	204.9	205.3	22.9	0.0	0.1

Max. Rainfall : 50.5
Total Rainfall : 472.1

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1989

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1							18.3	19.9	27.4			
2								41.8				
3									3.1			
4												
5									0.1			
6										3.6		
7							0.8			0.8		
8												
9									26.6			
10												
11								30.0				
12							1.6	5.5	0.7			
13						0.6		1.9				
14								3.9	32.3			
15							3.7	3.2				
16						3.8	22.1	30.5				
17						3.5					0.4	
18							38.7				0.7	
19												
20												
21							1.0		1.7			
22												
23								0.1				
24						0.2		113.7				
25								55.5				
26								32.9				
27						19.0			0.3			
28												
29												
30												
31												
Max.	0.0	0.0	0.0	0.0	0.0	19.0	38.7	113.7	32.3	3.6	0.7	0.0
Total	0.0	0.0	0.0	0.0	0.0	27.1	86.2	338.9	92.2	4.4	1.1	0.0

Max. Rainfall : **113.7**
Total Rainfall : **549.9**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1990

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									8.6			
2												
3												
4								16.8	0.9	0.9		
5										0.1		
6								11.6		28.0		
7								21.4				
8								5.9				
9												
10									25.5			
11								7.9				
12	2.3							1.7				
13								0.3				
14												
15							0.7					
16							0.8		0.8			
17							0.9	0.3	12.7			
18								27.1				
19												
20								0.8	19.0			
21												
22							1.1	0.6				
23								5.1				
24												
25							3.2					
26												
27									32.2			
28	8.0											
29	2.0											
30						3.4	18.7					
31												
Max.	8.0	0.0	0.0	0.0	0.0	3.4	18.7	27.1	32.2	28.0	0.0	0.0
Total	12.3	0.0	0.0	0.0	0.0	3.4	25.4	99.5	99.7	29.0	0.0	0.0

Max. Rainfall : 32.2
Total Rainfall : 269.3

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1991

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									18.2			
2									21.6			
3												
4												
5									59.3			
6												
7										4.2		
8								1.3	7.9	0.8		
9								0.4		16.2		
10							3.6					
11							0.1		4.2	0.6		
12												
13										0.2		
14												
15												
16								23.2				
17								3.1				
18												
19												
20										1.3		
21												
22							4.6	25.7				
23								0.9				
24								3.4				
25								25.2				
26									7.6			
27												
28												
29							16.2					
30								17.6				
31							1.7	1.4				
Max.	0.0	0.0	0.0	0.0	0.0	0.0	16.2	25.7	59.3	16.2	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	26.2	102.2	118.8	23.3	0.0	0.0

Max. Rainfall : **59.3**
Total Rianfall : **270.5**

DAILY RAINFALL RECORD

Name of Station : Dakar - Yoff

1992

Lat. 14 - 44 - N
Long. 17 - 30 - W

	Jan.	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									11.1			
2									6.4	0.8		
3								0.4	0.2			
4												
5												
6												
7												
8												
9									9.5			
10		0.3					0.9					
11		2.9					0.3				0.3	
12		0.3										
13												
14												1.2
15												
16							25.6					
17							1.5					
18					0.6			24.6	4.6			
19								1.2				
20		0.2						10.0				
21												
22							2.1		10.5			
23							4.5					
24												
25							1.0		6.6			
26							2.8	1.1				
27							0.5	10.7				
28								6.9				
29								0.3				
30								4.3				
31								27.1				
Max.	0.0	2.9	0.0	0.0	0.6	0.0	25.6	27.1	11.1	0.8	0.3	1.2
Total	0.0	3.7	0.0	0.0	0.6	0.0	39.2	86.6	48.9	0.8	0.3	1.2

Max. Rainfall : **27.1**
Total Rainfall : **181.3**

DATA 2

SEWERAGE COMPUTATION SHEET

Table Sewerage Computation Sheet

Parcelles Assainies and Its Surroundings

NO of Sewer	Sewerage Area		Sewer Length		Unit Sewerage Flow Per ha				0.0011117 m ³ /sec/ha				Ground Elevation		Earth Cover		NO of MH	Remark	
	Increment Area	Cumulated Area	Increment Length	Cumulated Length	Design Flow	Designed Sewer		Sewer Invert Elevation		Begin	End	Begin	End	Begin	End	Begin			End
						Sewer Diameter	Slope %	Velocity	Capacity										
ha	ha	ha	m	m	m ³ /s	mm	%	m/s	m ³ /s	m	m	m	m	m	m	m	m	m	
9001	46.0	46.0	880	880	0.051	200	24.0	1.62	0.051	2.290	9.990	3.70	11.40	1.20	1.20	1.20	1.20	-	Force Main
9002	26.0	26.0	430	430	0.029	150	36.0	1.64	0.029	5.740	10.040	7.10	11.40	1.20	1.20	1.20	1.20	-	Force Main
9003	0.0	72.0	290	1,170	0.080	250	18.0	1.63	0.080	9.940	10.790	11.40	12.25	1.20	1.20	1.20	1.20	-	Force Main
9004	57.0	57.0	550	550	0.063	200	37.0	2.01	0.063	13.190	10.840	14.60	12.25	1.20	1.20	1.20	1.20	-	Force Main
9005	0.0	129.0	590	1,760	0.143	350	9.6	1.49	0.143	10.687	26.357	12.25	27.92	1.20	1.20	1.20	1.20	-	Force Main
9006	129.0	258.0	660	2,420	0.287	600	3.0	1.19	0.336	25.750	14.970	27.92	16.82	1.52	1.20	1.20	1.20	6	
9007	0.0	258.0	690	3,110	0.287	600	3.0	1.19	0.336	14.950	12.860	16.82	15.02	1.22	1.51	1.20	1.51	6	
9008	92.0	350.0	220	3,330	0.389	700	3.0	1.32	0.507	12.760	11.390	15.02	13.18	1.50	1.03	1.03	1.03	3	
9009	0.0	350.0	94	3,424	0.389	800	2.9	1.42	0.712	11.390	11.120	13.18	12.72	0.92	0.73	0.73	0.73	0	
9010	0.0	350.0	130	3,554	0.389	1000	2.0	1.37	1.072	11.120	10.820	12.72	12.50	0.52	0.60	0.60	0.60	1	
9011	0.0	350.0	820	4,374	0.389	1000	2.3	1.46	1.150	10.820	8.934	12.50	12.95	0.60	2.93	2.93	2.93	7	
9012	0.0	350.0	232	4,606	0.389	1200	22.0	5.11	5.783	8.934	3.806	12.95	9.62	2.72	4.52	4.52	4.52	1	
9013	80.0	430.0	311	4,917	0.478	1200	1.5	1.34	1.510	3.790	3.310	9.62	6.23	4.54	1.63	1.63	1.63	2	
9014	0.0	430.0	672	5,589	0.478	1400	1.5	1.48	2.278	3.310	2.340	6.23	5.86	1.41	2.01	2.01	2.01	6	
9015	0.0	430.0	91	5,680	0.478	1400	1.4	1.43	2.200	2.340	2.213	5.86	5.78	2.01	2.06	2.06	2.06	0	
9016	0.0	430.0	57	5,737	0.478	1400	4.9	2.67	4.117	2.210	1.930	5.78	4.48	2.06	1.04	1.04	1.04	0	
9017	0.0	430.0	62	5,799	0.478	1400	12.6	4.29	6.601	1.930	1.150	4.48	4.19	1.04	1.59	1.59	1.59	0	
Flow to Sewerage Farm																			

Table Sewerage Computation Sheet

Parcelles Assainies and Its Surroundings

NO of Sewer	Flow to Sewer	Sewerage Area		Sewer Length		Unit Sewerage Flow Per ha			0.0011117 m ³ /sec/ha			Ground Elevation		Earth Cover		NO of MH	Remark		
		Increment Area	Cumulated Area	Increment Length	Cumulated Length	Design Flow	Sewer Diameter	Slope	Velocity	Capacity	Begin	End	Begin	End	Begin			End	
		ha	ha	m	m	m ³ /s	mm	%	m/s	m ³ /s	m	m	m	m	m			m	
1		20.2	20.2			0.022													
9018	9019	6.0	26.2	220	220	0.029	250	5.0	0.86	0.042	11.880	10.280	14.25	12.13	2.09	1.57	4	4	
2		21.6	21.6			0.024													
9019		8.9	56.7	430	650	0.063	250	5.0	0.86	0.042	10.280	2.430	12.13	4.53	1.57	1.82	10	10	
9020	9021	14.0	70.7	230	880	0.079	400	3.0	0.91	0.114	2.280	1.590	4.53	5.00	1.82	2.98	3	3	
Flow to UNITE 15 No.1 pumping station (A=70.3 ha)																			
9021	9028	0.0	0.0	1,770	1,770	0.047	200	20.6	1.50	0.047	3.590	19.710	5.00	21.12	1.20	1.20	-	Force Main	
3		23.5	23.5			0.026													
9022	9023	10.1	33.6	400	400	0.037	250	5.0	0.86	0.042	12.920	4.370	15.78	6.57	2.58	1.92	7	7	
4		20.9	20.9			0.023													
9023	9024	2.2	56.7	210	610	0.063	350	2.5	0.76	0.073	4.270	3.744	6.57	5.91	1.92	1.78	3	3	
5		16.8	16.8			0.019													
9024	9025	4.8	78.3	200	810	0.087	400	2.0	0.74	0.093	3.694	3.294	5.91	5.00	1.78	1.27	3	3	
Flow to UNITE 15 No.2 pumping station (A=78.3 ha)																			
9025	9026	0.0	78.3	1,090	1,900	0.119	350	1.7	1.24	0.119	3.437	13.877	5.00	15.44	1.20	1.20	-	Force Main	
5		6.0	6.0	70	70	0.007	100	16.5	0.85	0.007	13.810	14.130	15.12	15.44	1.20	1.20			
9026		0.0	84.3	420	2,320	0.126	350	7.5	1.31	0.126	13.877	13.647	15.44	15.21	1.20	1.20	-	Force Main	

Table Sewerage Computation Sheet

Parcelles Assainies and Its Surroundings

NO of Sewer	Flow to Sewer	Sewerage Area		Sewer Length		Unit Sewerage Flow Per ha				0.0011117 m ² /sec/ha				NO of MH	Remark		
		Increment Area	Cumulated Area	Increment Length	Cumulated Length	Design Flow	Designed Sewer		Sewer Invert		Ground Elevation		Earth Cover				
							Sewer Diameter	Slope %	Velocity	Capacity	Begin	End	Begin			End	Begin
ha	ha	m	m	m ³ /s	mm	%	m/s	m ³ /s	m	m	m	m	m	m	m		
7		19	19	690	690	0.021	150	19.4	1.20	0.021	13.78	13.85	15.14	15.21	1.20	1.20	
9027		0.0	103.3	280	2,600	0.147	350	10.2	1.53	0.147	13.647	19.557	15.21	21.12	1.20	1.20	- Force Main
9028	9031	0.0	103.3	60	2,660	0.194	500	3.0	1.05	0.207	19.378	19.198	21.12	21.19	1.20	1.50	0
8		24.6	24.6			0.027											
9029	9030	7.2	31.8	190	190	0.035	250	3.9	0.76	0.037	12.110	11.361	13.73	13.00	1.34	1.36	4
9	9030	21.9	21.9			0.024											
10	9030	10.3	10.3			0.011											
9030	9023	0.0	64.0	280	470	0.071	250	14.4	1.45	0.071	11.540	19.730	13.00	21.19	1.20	1.20	- Force Main
9031	9042	0.0	167.3	1,090	3,750	0.265	600	3.0	1.19	0.336	19.098	14.480	21.19	16.45	1.44	1.32	11
11	9032	32.3	32.3			0.036											
9032	9037	0.0	32.3	1,080	1,080	0.036	200	12.0	1.14	0.036	7.970	11.030	9.38	12.44	1.20	1.20	- Force Main
12		20.3	20.3			0.023											
9033		4.7	25.0	170	170	0.028	250	4.4	0.80	0.039	10.700	9.960	13.70	11.90	2.72	1.66	3
9034		6.0	31.0	200	370	0.034	250	3.3	0.70	0.034	9.960	9.360	11.90	12.19	1.66	2.55	4
9035	9036	5.7	36.7	60	430	0.041	250	5.0	0.86	0.042	9.360	9.060	12.19	12.66	2.55	3.32	1
9036		0.0	36.7	320	750	0.041	200	16.0	1.32	0.041	11.250	11.030	12.66	12.44	1.20	1.20	- Force Main
9037	9042	0.0	69.0	1,290	2,370	0.077	250	16.7	1.57	0.077	10.980	14.990	12.44	16.45	1.20	1.20	- Force Main

DATA 3

COST ESTIMATES

COST ESTIMATES

1. WASTEWATER SYSTEM

1.1 Gravity Sewer Pipes

1) PVC Pipes

Unit construction costs of the gravity sewer pipes of the following three cases are shown in Tables 1 to 3.

Diameter (mm)	Earth Covering Depth (m)	
	1.0	3.0
250	○	
300	○	○

2) Concrete Pipes

Unit construction costs of concrete pipes with diameters 500 mm, 800 mm, and 1,000 mm, each with earth covering depth of 1.0 m and 3.0 m, are shown in Table 4.

1.2 Force Main

Unit construction costs of force mains with diameters from 100 mm to 1,350 mm are shown in Tables 5 to 7.

1.3 Pumping Station

1) Replacement of Mechanical and Electrical Equipment for the Existing Pumping Stations

Four cases of replacement costs are shown in Table 8.

2) Construction of Submersible Type Pumping station

Construction cost of a submersible type pumping station is shown in Table 9.

3) Construction of Dry Pit Type Pumping Station

Construction cost of a dry pit type pumping station is shown in Table 10.

1.4 Wastewater Treatment Plant

Construction costs of the second and the third process trains of the Camberene WWTP are estimated separately for civil and mechanical/electrical works as shown in Table 11.

1.5 Ocean Outfall

Construction cost of an ocean outfall which consists of a junction pit and outfall pipes is shown in Table 12.

2 DRAINAGE SYSTEM

2.1 Concrete Pipe

Unit construction costs of concrete pipes with diameters from 600 mm to 1,200 mm are shown in Table 13.

2.2 Force Main

Unit construction costs of force mains with diameters from 400 mm to 1,100 mm are shown in Table 14.

2.3 Open Channel (Concrete Lining)

Unit construction costs of three kinds of open channel with concrete lining are shown in Table 15.

2.4 Retention Pond

Construction cost of a retention pond is shown in Table 16.

2.5 Pumping Station

Construction costs of pumping stations, four cases of design flow, are shown in Table 17.

TABLE 1 GRAVITY SEWER PIPE (PVC) CONSTRUCTION COST

Dia.250mm Earth Covering C= 1.0 m

Item	Unit Cost	Unit	Quantity	Cost(FCFA/m)
Excavation	2,430	m3	1.725	4,192
Sand Bed	1,825	m3	0.815	1,487
Common Worker	1,900	d	0.452	859
Pipe	-	m		7,369
Common Worker	1,900	d	0.249	473
Light Driver	2,100	d	0.111	233
Back fill	3,340	m3	1.676	5,598
Pavement	11,730	m2	1.300	15,249
Manhole				8,800
Miscellaneous				4,540
Pipe Total				48,800

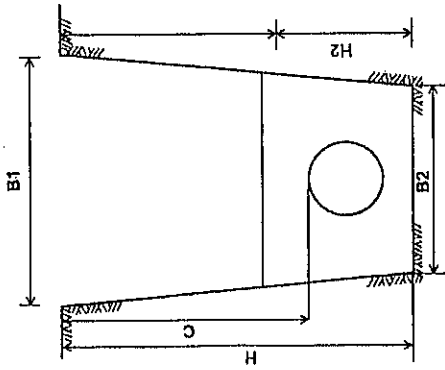


TABLE 2 GRAVITY SEWER PIPE (PVC) CONSTRUCTION COST

Dia. 300 mm, Earth Covering C = 1.0 m

Item	Unit Cost	Unit	Quantity	Cost(FCFA/m)
Excavation	2,430	m3	1.725	4,192
Sand Bed	1,825	m3	0.793	1,447
Common Worker	1,900	d	0.452	859
Pavement Breaking	4,860	m3	0.195	948
Pipe	12,986	-		12,986
Common Worker	1,900	d	0.288	547
Light Driver	2,100	d	0.120	252
Back fill	3,340	m3	0.666	2,224
Pavement	22,850	m2	1.900	43,415
Manhole		unit		42,130
Miscellaneous				11,000
Pipe Total				120,000

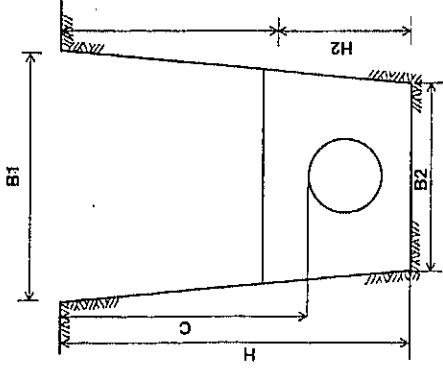


TABLE 3 GRAVITY SEWER PIPE (PVC) CONSTRUCTION COST

Dia. 300 mm, Earth Covering C = 3.0 m

Item	Unit Cost	Unit	Quantity	Cost(FCFA/m)
Excavation	4,050	m3	3.500	14,175
Sand Bed	1,825	m3	0.729	1,330
Common Worker	1,900	d	0.416	790
Pavement Breaking	4,860	m3	0.150	729
Pipe	12,986	-		12,986
Common Worker	1,900	d	0.288	547
Light Driver	2,100	d	0.120	252
Back fill	3,340	m3	2.550	8,517
Pavement	22,850	m2	1.600	36,560
Timber Plate	7,200	m2	7.000	50,400
Manhole		unit		169,000
Miscellaneous				29,714
Pipe Total				325,000

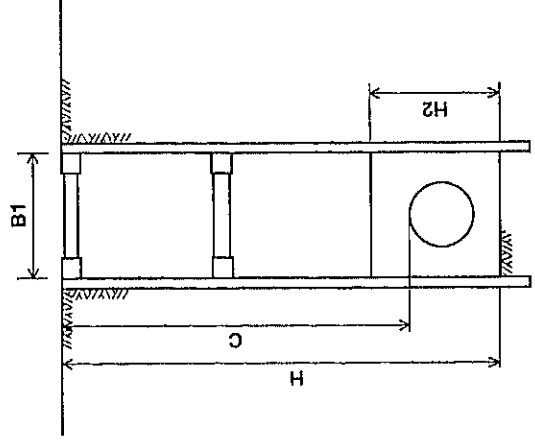


TABLE 4 GRAVITY SEWER PIPE (CONCRETE PIPE) CONSTRUCTION COST

Dia. 500,800,1000

Item	Unit Cost	Unit	Dia. 500		Dia. 800		Dia. 1000							
			C = 1.0 m		C = 3.0 m		C = 1.0 m		C = 3.0 m					
			Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)		
Excavation	4,050	m3	3,213	13,013	6,213	25,163	5,032	20,380	9,032	36,580	6,399	25,914	10,999	44,544
Timber Plate	7,200	m3	4,284	30,845	8,284	59,645	5,032	36,230	9,032	65,030	5,564	40,061	9,564	68,881
Base Concrete	69,665	m3	0,266	18,540	0,266	18,540	0,499	34,767	0,499	34,767	0,668	46,550	0,668	46,550
Form Work	12,250	m3	1,000	12,250	1,000	12,250	1,400	17,150	1,400	17,150	1,600	19,600	1,600	19,600
Plane Concrete	59,190	m3	0,150	8,879	0,150	8,879	0,210	12,430	0,210	12,430	0,340	20,125	0,340	20,125
Gravel Base	8,750	m3	0,200	1,750	0,200	1,750	0,280	2,450	0,280	2,450	0,340	2,975	0,340	2,975
Pavement breakin	4,860	m3	0,225	1,094	0,225	1,094	0,300	1,458	0,300	1,458	0,345	1,677	0,345	1,677
Pavement	22,850	m2	2,100	47,985	2,100	47,985	2,600	59,410	2,600	59,410	2,900	66,265	2,900	66,265
Pipe	-	m	-	34,000	-	34,000	-	61,000	-	61,000	-	82,000	-	82,000
Common Worker	1,900	d	0,753	1,431	0,753	1,431	1,041	1,978	1,041	1,978	1,245	2,366	1,245	2,366
Driver (light)	2,100	d	0,207	435	0,207	435	0,279	586	0,279	586	0,375	788	0,375	788
Back fill	3,340	m3	2,104	7,028	5,104	17,047	3,061	10,224	7,061	23,584	3,642	12,164	8,242	27,528
Manhole Cost	-		-	40,000	-	122,000	-	71,000	-	103,000	-	49,000	-	77,000
Miscellaneous	-		-	21,752	-	34,782	-	32,937	-	42,577	-	37,516	-	46,722
Total Cost	-		-	239,000	-	385,000	-	362,000	-	462,000	-	407,000	-	507,000

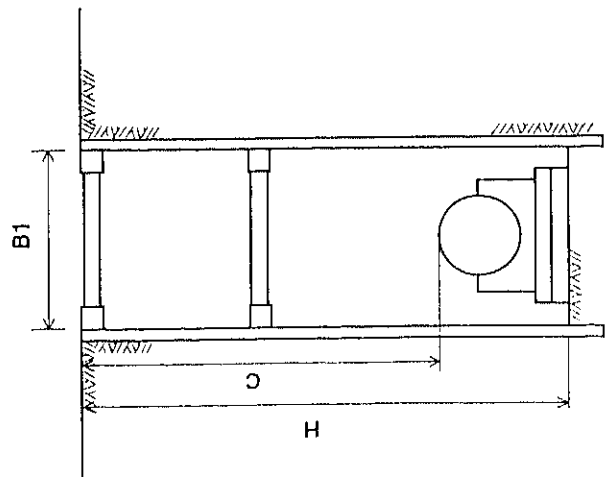


TABLE 5 FORCE MAIN (DUCTILE IRON PIPE) CONSTRUCTION COST

Dia. 100 ~ 250

Earth Covering = 1.20 m

Item	Unit	Unit Cost	Dia. 100		Dia. 150		Dia. 200		Dia. 250	
			Quantity	Cost(FCFA/m)	Quantity	Cost	Quantity	Cost	Quantity	Cost
Excavation	m3	2,430	0.910	2,211	0.950	2,309	1.120	2,722	1.160	2,819
Back fill	m3	3,340	0.900	3,006	0.930	3,106	1.090	3,641	0.990	3,307
Pipe	m	-	-	21,250	-	30,300	-	40,000	-	49,600
Miscellaneous	-	-	-	5,533	-	7,285	-	9,638	-	11,275
Total				32,000		43,000		56,000		67,000

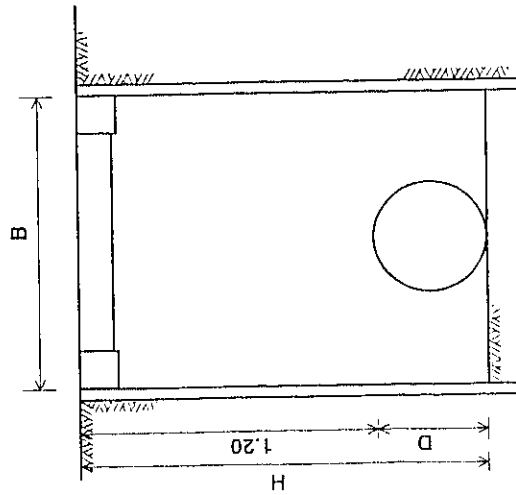


TABLE 6 FORCE MAIN (DUCTILE IRON PIPE) CONSTRUCTION COST

Dia. 300 ~ 400

Item	Unit	Unit Cost	Dia. 300		Dia. 350		Dia. 400	
			Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)
Excavation	m3	2,430	1.58	3,839	1.71	4,155	1.84	4,471
Pavement breakin	m3	4,860	0.16	778	0.17	826	0.17	826
Pavement	m2	22,850	1.65	37,703	1.70	38,845	1.75	39,988
Back fill	m3	3,340	1.34	4,476	1.44	4,810	1.54	5,144
Pipe	m	-	-	62,667	-	75,958	-	89,250
Timber board	m2	7,200	3.0	21,600	3.1	22,320	3.2	23,040
Miscellaneous				25,938		29,086		32,281
Total				157,000		176,000		195,000

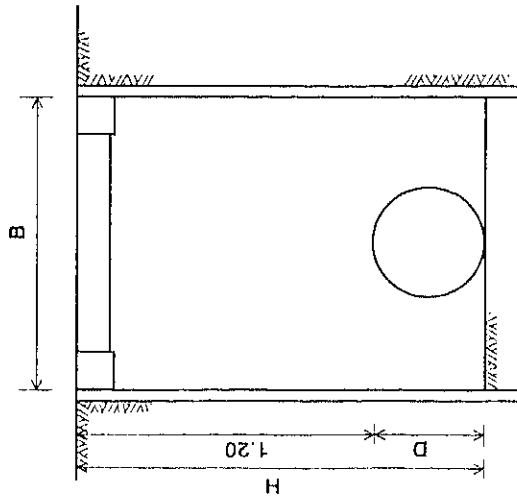


TABLE 7 FORCE MAIN (DUCTILE IRON PIPE) CONSTRUCTION COST
Earth covering depth 1.2 m DIA. 900. DIA. 1350

Dia. 300 ~ 400

Item	Unit	Unit Cost	Dia. 900		Dia. 1350	
			Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)
Excavation	m3	2,430	4.639	11,273	5.662	13,759
Pavement breakin	m3	4,860	0.302	1,468	0.369	1,793
Pavement	m2	22,850	2.731	62,403	3.331	76,113
Back fill	m3	3,340	3.741	12,495	4.566	15,250
Pipe	m	-	-	256,052	-	312,500
Timber board	m2	7,200	5.458	39,298	6.662	47,966
Miscellaneous		-	-	75,012	-	91,618
Total				458,000		559,000

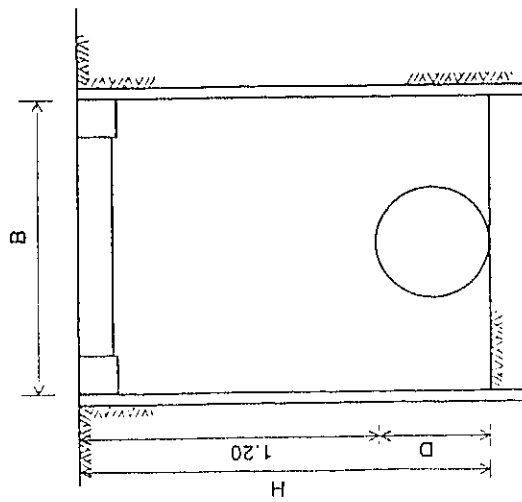


TABLE 8 REPLACEMENT OF MECHANICAL AND ELECTRICAL EQUIPMENT COST FOR THE EXISTING PUMPING STATION

Q = 0.7 m³ / min < Q < 1.6 m³ / min

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Mechanical & Electrical Work	Pump	unit	2,011,000	2	4,022,000
	Piping	unit	-	1	8,210,000
	Generator	unit		1	9,098,000
Miscellaneous					4,270,000
Total					25,600,000

Q = 1.6 m³ / min < Q < 3.6 m³ / min

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Mechanical & Electrical Work	Pump	unit	3,025,000	2	6,050,000
	Piping	unit	-	1	8,260,000
	Generator	unit	-	1	9,098,000
Miscellaneous			-	1	5,192,000
Total					28,600,000

Q = 5.0 ~ 6.0 m³ / min

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Mechanical & Electrical	Pump	unit	6,700,000	2	13,400,000
	Piping	unit		1	22,200,000
	Generator	unit		1	16,300,000
Miscellaneous					10,400,000
Total					62,300,000

TABLE 9 SUBMERSIBLE TYPE PUMPING STATION CONSTRUCTION COST

Q = 60 l / sec = 3.6 m³ / min P/S

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Civil	Preparation				442,962
	Earth Retention Wall	m ²	10,700	69	738,300
	Excavation	m ³	8,280	69	571,320
	Concrete Work	m ³	300,000	10.4	3,120,000
Architecture					
Mechanical & Electrical	Pump	unit	350,000	25	8,750,000
	Piping	unit	4,057,000	2	8,114,000
	Generator	unit	1	1	13,362,000
Miscellaneous					9,800,000
					9,001,418
Total					53,900,000

TABLE 10 DRY TYPE PUMPING STATION CONSTRUCTION COST

Q = 145 l / sec = 8.7 m³ / min P/S

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Civil	Preparation				10,912,832
	Earth Retention Wall	m ²	10,700	448	4,793,600
	Excavation	m ³	8,280	1224	10,134,720
	Concrete Work	m ³	300,000	314	94,200,000
Architecture					
Mechanical & Electrical	Pump	unit	350,000	96	33,600,000
	Piping	unit	4,057,000	3	12,171,000
	Generator	unit	1	1	17,121,000
Miscellaneous					31,000,000
					42,766,848
Total					256,700,000

TABLE 11 WASTEWATER TREATMENT PLANT CONSTRUCTION COST**Civil Work**

Item	FCFA	
	2nd Train	3rd Train
Administration Bld.	-	-
Generator Bld.	-	-
Grit Chamber	-	98,560,000
Primary Sedimentation Tank	422,400,000	422,400,000
Aeration Tank	-	-
Final Sedimentation Tank	-	-
Chlorination Tank	-	-
Sludge Digester 1st	211,200,000	211,200,000
Sludge Digester 2st	-	211,200,000
Sludge Drying Bed.	-	70,400,000
	633,600,000	1,013,760,000

Mechanical . Electrical Work

Item	FCFA	
	2nd Train	3rd Train
Main Pump	33,303,000	33,303,000
Screen	-	39,038,000
Grit	-	52,439,000
Primary Sedimentation Tank	265,985,000	265,985,000
Aeration Tank	-	-
Final Sedimentation Tank	-	-
Sludge Digester 1st	159,320,000	159,320,000
Sludge Digester 2st	-	159,320,000
Drying Bed	-	29,670,000
Chlorinator	-	-
Effluent Pump	71,230,000	71,230,000
Instrumentation	43,067,000	43,067,000
Generator	705,760,000	705,760,000
	1,278,665,000	1,559,132,000

TABLE 12 OCEAN OUTFALL CONSTRUCTION COST

Junction Pit				FCFA
Item	Unit	Unit Cost	Quantity	Cost
Preparation	-			1,491,405
Excavation	m3	2,430	335	814,050
Concrete Work	m3	300,000	47	14,100,000
Miscellaneous	-			3,294,545
Total				19,700,000

Outfall Pipe (Dia. 900)				FCFA
Item	Unit	Unit Cost	Quantity	Cost
Steel Pipe	ton	450,000	67	30,150,000
Coating	m2	40,000	1,130	45,200,000
Tag Boat	day	2,500,000	32	80,000,000
Caged Rock	m	15,750	12	189,000
Miscellaneous	-			31,061,000
Total				186,600,000

TABLE 13 CONCRETE PIPE CONSTRUCTION COST

Dia. 600 - 1200
Earth Covering C = 1.5 m

Item	Unit Cost	Unit	Dia. 600		Dia. 800		Dia. 900		Dia. 1000		Dia. 1100		Dia. 1200	
			Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)
Excavation	4,050	m3	5.130	20,777	6.032	24,430	6.676	27,037	7.549	30,572	8.570	34,709	9.614	38,938
Timber Plate	7,200	m2	5.400	38,880	6.032	43,430	6.21	44,712	6.564	47,261	6.856	49,363	7.256	52,243
Base Conc.	69,665	m3	0.258	17,974	0.499	34,763	0.547	38,107	0.668	46,536	0.782	54,478	0.897	62,490
Form Work	12,250	m3	1.00	12,250	1.400	17,150	1.46	17,885	1.6	19,600	1.78	21,805	1.9	23,275
Plane Conc.	59,190	m3	0.165	9,766	0.210	12,430	0.233	13,791	0.340	20,125	0.360	21,308	0.390	23,084
Gravel Base	8,750	m3	0.220	1,925	0.280	2,450	0.31	2,713	0.34	2,975	0.36	3,150	0.39	3,413
Pave. Break	4,860	m3	0.285	1,385	0.300	1,458	0.323	1,567	0.345	1,677	0.375	1,823	0.398	1,932
Pavement	22,850	m2	2.500	57,125	2.600	59,410	2.750	62,838	2.900	66,265	3.100	70,835	3.250	74,263
Pipe	-	m	-	44,000	-	61,000	-	72,000	-	82,000	-	99,000	-	115,000
Common Worker	1,900	d	0.840	1,596	1.041	1,978	1.128	2,143	1.245	2,366	1.356	2,576	1.524	2,896
Light Driver	2,100	d	0.210	441	0.279	586	0.312	655	0.375	788	0.384	806	0.396	832
Back Fill	3,340	m3	4.010	13,392	4.402	14,703	4.831	16,134	5.324	17,782	6.054	20,220	6.589	22,009
Manhole Cost	-		-	43,902	-	41,068	-	44,937	-	50,692	-	57,011	-	63,056
Miscellaneous	-		-	52,587	-	63,144	-	68,481	-	77,364	-	87,915	-	96,572
Total				316,000		378,000		413,000		466,000		525,000		580,000

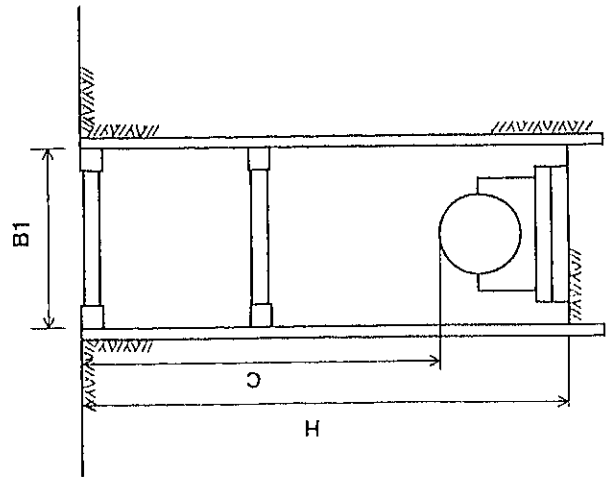


TABLE 14 FORCE MAIN (DUCTILE IRON PIPE) CONSTRUCTION COST

Dia. 400 ~ 1100

Earth Covering = 1.50 m

Item	Unit	Unit Cost	Dia. 400		Dia. 600		Dia. 800		Dia. 1100	
			Quantity	Cost(FCFA/m)	Quantity	Cost(FCFA/m)	Quantity	Cost(FCFA/m)	Quantity	Cost(FCFA/m)
Excavation	m3	2,430	2,280	5,540	3,045	7,399	3,910	9,501	9,691	23,549
Pavement Break	m3	4,860	0.180	875	0.218	1,057	0.255	1,239	0.559	2,717
Pavement	m2	22,850	1.800	41,130	2.050	46,843	2.300	52,555	4.792	109,497
Back Fill	m3	3,340	2.099	7,010	2.545	8,500	3.153	10,530	7.446	24,870
Pipe	-	-	-	89,250	-	142,400	-	215,800	-	281,000
Timber	m2	7,200	3.800	27,360	4.200	30,240	4.600	33,120	9.230	66,456
Miscellaneous	-	-	-	33,835	-	47,261	-	64,555	-	100,511
Total	-	-	-	205,000	-	283,700	-	387,300	-	608,600

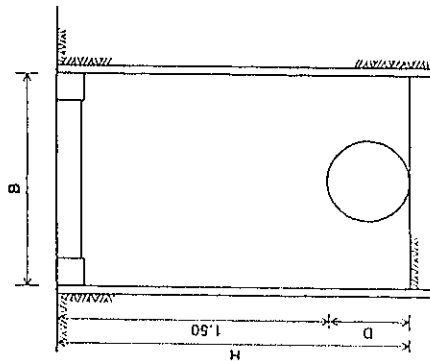


TABLE 15 OPEN CHANNEL (CONCRETE LINING) CONSTRUCTION COST

Item	Unit Cost	Unit	B3.0 X H2.5		B2.0 X H1.5		B1.0 X H1.5	
			Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)	Quantity	Cost (FCFA/m)
Preparation	-	-	0	14,327	0	8,466	0	7,021
Excavation	2,430	m3	14	34,020	5.25	12,758	3.75	9,113
Tamper	5,400	m2	10	54,000	6.2	33,480	5.2	28,080
Plane Conc.	59,190	m3	1	59,190	0.62	36,698	0.52	30,779
Concrete	69,665	m3	2	139,330	1.24	86,385	1.04	72,452
Miscellaneous	-	-	-	30,133	-	18,214	-	14,556
Total	-	-	-	331,000	-	196,000	-	162,000

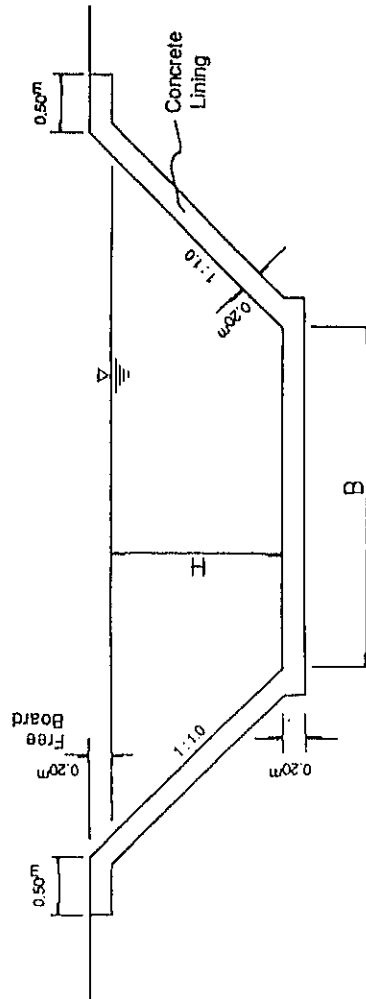


TABLE 16 RETENTION POND CONSTRUCTION COST

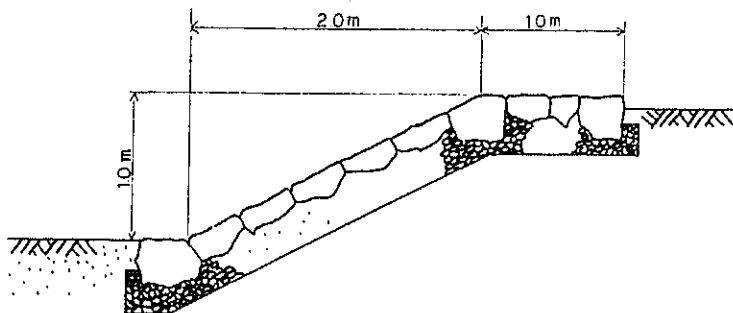
Retention Pond. Area 1.2 ha

Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Preparation	-			2,207,810
Excavation	m3	2,430	12,000	29,160,000
Roller	m2	332	11,096	3,683,872
Masonry	m2	7,685	1,472	11,312,320
Miscellaneous	-			4,636,400
				51,000,402

Unit Cost of Slope Protection

Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Assistance	P	1,600	0.02	32
Bricker	P	2,000	0.04	80
Common Worker	P	1,900	0.09	171
Masonry	m2	2,002	1.00	2,002
Gravel	m2	5,400	1.00	5,400
Total				7,685

$51,000,402 \div 1.2 = 42,500,000$ FCFA / ha



**TABLE 17 PUMPING STATION CONSTRUCTION COST
(DRAINAGE)**

Q = 30 m3 / sec

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Civil	Preparation				8,625,300
	Excavation	m3	4,050	8,260	33,453,000
	Concrete Work	m3	300,000	176	52,800,000
Architecture		unit	350,000	162	56,700,000
Mechanical & Electrical	Pump	unit	19,500,000	3	58,500,000
	Piping	unit	-	-	99,800,000
	Generator	unit	-	-	20,000,000
Miscellaneous					66,021,700
Total					395,900,000

Q = 20 m3 / min

Work	Item	Unit	Unit Cost	Quantity	Cost (FCFA)
Civil	Preparation				7,749,150
	Excavation	m3	4,050	7,430	30,091,500
	Concrete Work	m3	300,000	158	47,400,000
Architecture		unit	350,000	162	56,700,000
Mechanical & Electrical	Pump	unit	13,200,000	3	39,600,000
	Piping	unit	-	-	67,300,000
	Generator	unit	-	-	11,000,000
Miscellaneous					51,959,350
Total					311,800,000

Q =15 m3 / min

Work	Item	Unit	Unit Cost	Material	Cost (FCFA)
Civil	Preparation				6,877,050
	Excavation	m3	4,050	6,610	26,770,500
	Concrete Work	m3	300,000	140	42,000,000
Architecture		unit	350,000	132	46,200,000
Mechanical & Electrical	Pump	unit	13,000,000	2	26,000,000
	Piping	unit	-	-	44,000,000
	Generator	unit	-	-	10,500,000
Miscellaneous					40,452,450
Total					242,800,000

Q = 9 m3 / min

Work	Item	Unit	Unit Cost	Material	Cost (FCFA)
Civil	Preparation				6,877,050
	Excavation	m3	4,050	6,610	26,770,500
	Concrete Work	m3	300,000	140	42,000,000
Architecture		unit	350,000	132	46,200,000
Mechanical & Electrical	Pump	unit	8,900,000	2	17,800,000
	Piping	unit	-	-	30,200,000
	Generator	unit	-	-	5,000,000
Miscellaneous					34,952,450
Total					209,800,000

CONSTRUCTION COST FOR HOUSE CONNECTION AND BRANCH SEWERS

1. House Connection

Construction cost of the house connection is estimated on the following assumptions. Two subzones, Patte d'Oie and Djily Mbaye, are excluded from the cost estimation because these subzones are already or now being provided with house connections.

- Unit construction cost: 264,000 FCFA/unit
- Number of house connection per area: 35 units/ha
- Area to be provided with house connection:

- a. Area of 7 subzones (Nos. 1 to 7): 362 ha
Connection ratio: 25 %, 1993
50 %, 2000

$$362 \times (0.50 - 0.25) = 90.5 \text{ ha}$$

- b. Area of 2 subzones (Nos. 8 and 9): 83 ha
Connection ratio: 0 %, 1993
25 %, 2000

$$83 \times 0.25 = 20.75 \text{ ha}$$

- c. Area of 3 subzones (Nos. 11, 12 and 14): 249 ha
Connection ratio: 0 %, 1993
100 %, 2000

$$249 \times 1.0 = 249 \text{ ha}$$

Total area for house connection

$$90.5 + 20.75 + 249 = 360.25 \text{ ha}$$

Thus the construction cost is;

$$360.25 \times 35 \times 264,000 = 3,328,710,000 \text{ FCFA}$$

2. Branch Sewer

Branch sewer construction cost is estimated as described below. Unit construction cost of branch sewer of 40,000 FCFA/m (dia. 250 mm, PVC) and manhole of 282,000 FCFA/unit are used uniformly for 9 subzones of Parcelles Assainies. For the three new development subzones, cost for network pumping station of 54,000, 000 FCFA/unit is added. Two subzones mentioned above are excluded from the cost estimation for the same reason.

- a. Seven (7) Subzones in Parcelles Assainies

A plan for the construction of branch sewers has been established for the 7 subzones, Nos. 1 to 7, by SONEES. Therefore, total length of new sewers and number of manholes are measured and counted on the plan. Then half of these are assumed to be completed by 2000. Thus, the construction cost is;

$$\text{Sewer} \quad 57,245 \times 40,000 \times 0.5 = 1,144,900,000 \text{ FCFA}$$

Manhole	$820 \times 282,000 \times 0.5 =$	115,620,000 FCFA
Subtotal		1,260,520,000 FCFA

b. Two (2) Subzones in Parcelles Assainies

An average length of sewers and number of manholes per area worked out in the Master Plan , i.e. 282 m/ha and 8.77 units/ha respectively, are used to estimate the cost. Average connection ratio of 25 % in 2000 is used.

Total area: 83 ha

The construction cost is;

Sewer:	$83 \times 282 \times 40,000 \times 0.25 =$	234,060,000 FCFA
Manhole:	$83 \times 8.77 \times 282,000 \times 0.25 =$	51,317,655 FCFA
Subtotal:		285,377,655 FCFA

The same average length of sewers and number of manholes per area are used for cost estimation. An additional construction cost for network pumping station is added because of the uncertainty.

Total area: 249 ha

The construction cost is;

Sewer	$282 \times 249 \times 40,000 =$	2,808,720,000
Manhole	$8.77 \times 249 \times 282,000 =$	615,811,860
Network P/S	$0.018 \times 54,000,000 \times 249 =$	242,028,000
Subtotal		3,666,559,860

Total branch sewer construction cost is, therefore, 5,212,457,515 FCFA.

