THE GOVERNMENT OF MAURITIUS
MINISTRY OF ENERGY, WATER RESOURCES AND POSTAL SERVICES
CENTRAL WATER AUTHORITY

THE DETAILED DESIGN ON THE PORT LOUIS WATER SUPPLY PROJECT IN MAURITIUS

FINAL REPORT (2)

SUMMARY REPORT

FOR

LOT III : RAW WATER TRANSMISSION PIPELINE AND TREATMENT FACILITIES

MARCH 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request from the Government of Mauritius, the Government of Japan decided to conduct a Detailed Design Study on Port Louis Water Supply Project in Mauritius, and entrusted the study to the Japan International Cooperation Agency (JICA).

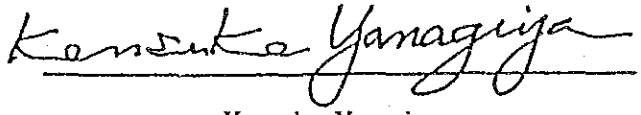
JICA sent to Mauritius a study team headed by Mr. Norizo FUJITA, Nippon Koei Co.,Ltd., and composed of members from Nippon Koei Co.,Ltd. and Nihon Suido Consultants Co.,Ltd., for four times from May 1990 to December 1991.

The team held discussions with the officials concerned of the Government of Mauritius, and conducted field surveys at the study area. After the team returned to Japan , further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Mauritius for their close cooperation extended to the team.

March , 1992



Kensuke Yanagiya
President
Japan International Cooperation Agency

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On Detailed Design For Port Louis Water Supply Project
(Lot III Raw Water Transmission Pipeline and Treatment Facilities)

1. Introduction

1) Port Louis City water supply system is served by a sole water treatment works, the Pailles treatment works, which has a 60,000 m^3/d capacity. Presently one hundred and thirty thousand people or more (more than 90 % of the population) are enjoying potable water supply through this system. However, due to shortage of raw water to meet increasing water demand in the dry season, the Central Water Authority (CWA) is facing difficulties to maintain a constant supply of the design capacity for the city. Suppressed or intermittent supply has occurred sometimes. The Government of Mauritius (GOM) has planned to construct a dam for storing water of the Grand River North West (GRNW), to improve the present supply and to facilitate expansion of the existing treatment works for the future water demand, as projected in the year 2030.

2) The Japan International Cooperation Agency (JICA), the executing agency of technical cooperation programme, carried out the Feasibility Study for the Port Louis Water Supply Project in 1988 to 1989, in response to the request of the GOM. The Study concluded that the dam should be constructed upstream of the GRNW, and the treatment works be expanded to 100,000 m^3/d in two phases, by increasing 30,000 m^3/d and 10,000 m^3/d, targeting at 2005 and 2030, respectively.

3) Succeeding the Feasibility Study, Detailed Design was conducted by JICA in 1990 to 1992. In 1990, the Basic Design Report was prepared, and in 1991 to 1992, the facilities' design and tender documents were prepared in compliance with the Basic Design concept.

4) In the course of the Basic Design, a set of design criteria was established and the preliminary design for facilities was made on the basis of the criteria, incorporating the foundation investigation, the topographical survey, water quality survey, the field investigation of the existing facilities and comparative studies on raw water transmission pipe materials and major treatment process facilities.

5) The Design Report was prepared for the expansion of 30,000 m^3/d targeting at 2005, based on the previous studies by JICA in 1992. This Summary Report presents the outline of the Phase 1 Project including the raw water transmission design, treatment facility design, the project costs and the implementation schedule.

2. Existing Pailles Treatment Works

The Pailles Treatment Works was commissioned in 1925 and has been expanded in 1960 and 1981. The raw water source is Grand River North West (GRNW), and raw water is abstracted at the Municipal Dyke and conveyed via three pipelines, approximately 2.1 km in length, by gravity flow into the Treatment Works. The location of the intake and the route of the pipelines are illustrated on Fig. 1 to Fig. 3.

General layout of the existing facilities is as shown on Fig. 4.

Slow sand filters are used for filtration, most of the treated water is conveyed to a number of service reservoirs located at strategic points in the city, except for a minor part delivered directly to consumers from the clear water tank of the treatment works. Major features are outlined as below:

(1)	Production capacity	:	60,000 m^3/d
(2)	Slow sand filter	:	12 units, total area of 10,080 m^2
(3)	Clear water tank	:	2 units, total capacity of 20,900 m^3
(4)	Chlorination equipment	:	2 units of chlorinators with booster pumps and 1,000 kg chlorine containers are used.
(5)	Workshops	:	3 nrs for instruments, chlorinators and pumps/engines generators

Present raw water quality is generally good. However, during and after rainfall turbidity and colour increase, causing clogging of the slow sand filters and interrupting the continuous supply. With the increasing water demand, raw water is insufficient during the dry season causing inconstant supply although the CWA draws the irrigation water to supplement the river water during this period.

3. Outline of the Phase 1 Project

1) The source of raw water is the Grand River North West (GRNW), and raw water is abstracted at the Municipal Dyke. The existing intake structure is to be partially modified so as to accommodate the new raw water pipeline.

2) New raw water pipeline with 800 mm in dia. and 2,100 m in length is to be constructed. This new pipeline augments a transmission capacity by 55,000 m^3/d to the total transmission capacity which complies with the requirement in the year 2030. The material of pipe is Ductile Iron Pipe (DIP).

3) The raw water quality is generally good although turbidity and colour tend to increase during the wet season. Ordinary rapid sand filtration system is adopted for removal of such increased turbidity and colour.

4) The new rapid sand filtration system has a treatment capacity of 30,000 m^3/d, and be constructed in the premises of the existing Pailles Treatment Works. Location of major treatment facilities to be constructed are shown on Fig. 5, and the flow diagram and hydraulic profile are illustrated on Fig. 6. The major facilities are listed below:

<u>Treatment Process Facilities</u>

(1) Receiving tank

- Design treatment capacity : 55,000 m^3/d
- Number : 1 unit
- Dimension : 5.00 L x 4.75 B x 2.80 D (m)

(2) Rapid mixing tank

- Design treatment capacity : 42,000 m^3/d
- Number : 1 unit
- Type : water-fall mixing
- Dimension : 5.70 L x 3.20 B x 4.65 D (m)

(3) Flocculation tank

– Design treatment capacity	:	31,500 m^3/d
– Number	:	3 units with each 3–compartment
– Type	:	up–and–down baffle wall
– Dimension	:	9.60 L x 0.80, 1.00 and 1.40 B x 2.89, 2.72 and 2.67 D (m)

(4) Sedimentation tank

– Design treatment capacity	:	31,500 m^3/d
– Number	:	3 units
– Type	:	horizontal flow type
– Dimension	:	30.4 L x 9.60 B x 3.00 D (m)

(5) Rapid sand filter

– Design treatment capacity	:	31,500 m^3/d
– Number	:	6 units
– Type	:	constant rate filtration and water level rising for filtration head–loss
– Dimension	:	9.60 L x 3.90 B (m)
– Backwashing	:	water backwashing with air–scouring
– Backwash water tank	:	elevated tank with 150 m^3 capacity

(6) Wastewater and desludge ponds

– Design treatment capacity	:	42,000 m^3/d
– Number	:	4 units
– Dimension	:	25.0 L x 8.00 B x 2.00 D (m)

<u>Chemical dosing equipment</u>

(1) Alum dosing equipment

– Solution tank	:	2 units, 2.50 L x 2.50 B x 3.00 D (m)
– Mixer	:	2 units of vertical mixer x 2.2 kW
– Dosing pump	:	3 units of rotary type tubing pump x 0.55 kW

(2) Lime dosing equipment

- Solution tank	:	2 units, 1.50 L x 1.50 B x 3.00 D (m)
- Mixer	:	2 units of vertical mixer x 1.5 kW
- Dosing pump	:	2 units of rotary type tubing pump x 0.55 kW
- Injection pump	:	2 units of volute pump x 2.2 kW

(3) Chlorination equipment

- Chlorinator	:	2 units of 6 kg/h and 1 unit of 5 kg/h
- Booster pump	:	2 units of 3.7 kW and 1 unit of 1.5 kW of volute pump
- Weighing scale	:	2 units of load cell type x 2,000 kg

Mechanical equipment other than chemical dosing equipment

(1)	Blower for air-scouring	:	2 units of roots blower x 30 kW
(2)	Plant water pump	:	2 units of centrifugal pump x 7.5 kW
(3)	Flush water pump for sedimentation tank	:	2 units of centrifugal pump x 7.5 kW

Electrical facilities

(1)	Power receiving and distribution	:	low-voltage switchboard, motor control panel, auxiliary relay panel, local control panel, emergency generator(150 kVA)
(2)	Control and monitoring	:	flow-meters for raw water and filtered water, clear water level meter and electrode level detectors, central monitoring panel, intercommunication system and laboratory equipment

Buildings

(1)	Operation building	:	480 m^2, electric room, generator room, laboratory, control room , office and conference room
(2)	Chemical building	:	480 m^2, chemical solution tanks room, storage room, and elevated tank
(3)	Chlorination building	:	183 m^2, remodelling and expanding existing chlorination building
(4)	Workshop building	:	460 m^2, chlorinators, instruments, generator sets repair, office and store room

4. Design of Raw Water Transmission Pipeline

1) Ductile iron pipe selected for the raw water transmission pipeline is specified as follows:

- Dimension	:	DN 800 mm of 5.5 m long
- Inner lining	:	cement mortar lining
- Outer coating	:	non-toxic coal-tar coating
- Applicable standard	:	ISO 2531, BS 4772, JIS G 5526/G 5527

2) The available hydraulic gradient is computed at 2.51‰ by the 5.40 meter head loss, from +76.20 m LWL (Low Water Level) at the intake and +70.80 m WL (Water Level) at the receiving tank, and 2,145 meter pipeline length. The hydraulic profile is shown on Fig. 3. Applying Colebook and White formula, pipe diameter necessary for the design flow rate, 55,000 m^3/d was selected to be DN 800 mm. Assuming pipe roughness to be 0.15 mm for mortar lined pipes, the maximum flow capacity is calculated at 72,000 m^3/d for 800 mm dia, which has enough capacity to transmit the maximum design flow rate. At the initial stage of operation when the flow is considerably lower than the design rate, regulating the flow by throttling will be required.

Five air-release valves of DN 75 mm and one washout valve of DN 150 mm are

installed in the pipeline.

3) The pipeline is to be covered by concrete cast in situ at some sections upstream the river crossing No.2, where the trench is excavated in shallow depth due to rocky ground and the pipe may be damaged by falling stones. Other sections are to be covered by crusher-run up to 30 cm above the pipe crown. To save construction cost, inverted siphon river crossing will be used. The river crossing sections also will be covered by concrete.

5. Design of Treatment Facilities

1) Of the treatment facilities to be constructed newly under the Project, the major parts are located at the vacant lot in the northwestern section of the treatment works compound, while the new receiving tank is set closely to the existing receiving tank to facilitate splitting the raw water inflow to the two tanks.

The major parts, flocculation/sedimentation tanks and filter beds, are arranged in parallel to the existing slow sand filters, for improving regularity of the layout plan.

Ground level (GL) of the vacant lot is sloped down to north, from + 68.400 to + 67.500. The formation ground levels to be finished are designed at + 68.000 for the rapid mixing tank, flocculation/sedimentation tanks and rapid sand filters, + 66.000 for the wastewater ponds and + 65.000 for the sludge ponds.

2) Design details of the major facilities are given below:

(1) Receiving Tank

The capacity of the receiving tank is designed to be 66.5 m^3. The retention time for the inflow-rate of 55,000 m^3/d is 1.7 min. The tank is connected to the existing receiving tank by a DN 700 mm pipe to deliver the raw water inflow there.

(2) Rapid Mixing Tank

The rapid mixing tank is composed of an inlet chamber and an outlet chamber. The total storage capacity is 73 m^3 providing a retention time of 2.5 min. for the treatment flow-rate of 42,000 m^3/d.

Aluminum sulphate is to be dosed at the overflow weir, and pre-lime is to be added upstream of the alum dosing point. Pre-chlorine is to be dosed with diffuser which is installed close to the tank inlet.

A flow controller is provided at the tank inlet to regulate the inflow, from 4,500 m^3/d at minimum to 42,000 m^3/d at maximum.

(3) Flocculation Tank

The flocculation tank consists of three (3) compartments of width 80 cm, 100 cm and 140 cm with up-and-down baffles, and the total length of the compartments is 57.6 m. Total capacity is 155.35 m^3 which corresponds to a retention time of 21.3 min. "G" values are selected at 80 sec^{-1} for 1st compartment, 52 sec^{-1} for 2nd compartment and 20 sec^{-1} for 3rd compartment to provide tapered flocculation.

"Gt" value is computed as 60,983. This value falls well within a reasonable range for flocculation, 23,000 to 210,000.

The outlet arrangements are so designed to distribute flocculated water uniformly to the sedimentation tank without excessive turbulence, which would break up floc. End baffles and perforated baffle walls are placed between the flocculation tank and sedimentation tank for this purpose.

(4) Sedimentation Tank

Three sedimentation tanks of horizontal-flow type are to be used. The required area of each tank is calculated at 292 m^2 based on the surface loading of 1.5 $m^3/m^2/hr$. The mean horizontal flow velocity in the tank is calculated at 25 cm/min. The tank has an allowance of 296 m^3 for settled sludge.

Sludge is to be washed out to the sludge ponds by manual scouring and washing. To facilitate the sludge removal, water from the scouring valves and jet water are to be used.

When the raw water turbidity falls less than 10 FTU during the dry season, the water is designed to be treated in a direct filtration mode as an operation option,

omitting the flocculation and sedimentation processes.

(5) Rapid Sand Filter

Constant-rate filtration type with hydraulic control of variable water level for filtration losses is employed. Sand medium is to be used. Air-scouring system is adopted as an auxiliary scouring for the filter backwashing. Backwash water is to be supplied from the elevated tank on the top of chemical building.

The thickness of the sand bed is 1.1 m, consisting of 1.0 mm grain in effective size with the uniform coefficient of less than 1.5. For air-scouring, nozzles are to be installed in the underdrain system. The supporting gravel layer with gravel size 2.38 to 4.76 mm is 100 mm thick,

(6) Wastewater and Sludge Ponds

Two wastewater ponds are designed to receive wastewater of backwash carried out daily for each filter. Two sludge ponds are designed to receive wash-out from each sedimentation tank. The wastewater pond capacity is 400 m^3 each which can accommodate 360 m^3/day of backwash wastewater from four filters. The ponds are to be used alternately for filter washing. Waste water is discharged to the river through drain pipe regulating waste water by removing stop logs.

Wash-out from the sedimentation tank is to be conveyed to the sludge ponds to settle the sludge. The supernatant is to be discharged to the river. Settled sludge is to be left for dry-up and sludge cake be disposed for land reclamation.

(7) Flow measurement and control

All flow rates are monitored in the control room in the operation building and controlled at the sites' panel, based on the treatment works manager's judgment.

(a) Raw water flow meter

- Total flow-rate : installed on the new pipeline before the receiving tank
- Rapid sand filtration system : installed before rapid mixing tank

	– Arithmetical meter	:	computing allotted flow to the slow sand filtration system
(b)	Filtered water flow meter		
	– Slow sand filter (F)	:	using the existing flow meter
	– Rapid sand filter	:	installed on the filtered water pipeline before the junction with the filtered water main
	– Total filtered water	:	replacing the existing meter with new one
	– Arithmetical meter	:	computing filtered water flow for the slow sand filter (E)
(c)	Distribution flow meter		
	– Transmission flow (1)	:	using the existing meter for flow to the existing service reservoirs
	– Transmission flow (2)	:	using the existing meter for transmitted flow to the Anse Courtois service reservoir

3) Structural Design

The design criteria were established for the structural analysis for the treatment facilities. The analysis was done by a computer with the elastic design for every cross section of the facilities as one body of slab, wall and base giving the following combined loads of dead weight, earth pressure, water pressure and seismic load.

(1) For permanent load
- dead weight + earth pressure
- dead weight + earth pressure + water pressure
- dead weight + water pressure

(2) For temporary load
- dead weight + earth pressure + seismic load
- dead weight + earth pressure + water pressure + dynamic water pressure + seismic load

4) Chemical Dosing System

(1) Aluminium sulphate dosing equipment

(a) Design dosing rate

- Wet season : max. 100 mg/l, min. 10 mg/l, ave. 30 mg/l
- Dry season : max. 9 mg/l, min. 6 mg/l, ave. 8 mg/l

(b) Alum solution tank

The capacity of the tank is 12 m^3 which corresponds to one day storage of alum solution with 10 % concentration at average dosing rate of 30 mg/l.

(c) Dosing pump

Dosing volume of the alum is computed by the treated water volume and dosing rate as follows:

- Wet season : 0.30 to 27.78 l/min
- Dry season : 0.18 to 2.50 l/min

Three (3) dosing pumps with a capacity of 14 l/min (regulating to 50 : 1) are to be installed.

(2) Lime dosing equipment

(a) Design dosing rate

- Wet season : max. 50 mg/l, min. 0 mg/l, ave. 10 mg/l
- Dry season : not applied

(b) Lime solution tank

The capacity of the tank is 4.2 m^3 which corresponds to one day storage lime solution with 10 % concentration at 10 mg/l of average dosing rate.

(c) Dosing pump

The dosing volume is computed at a range from 0.31 l/min to 14.58 l/min. Two (2) dosing pumps with a capacity of 15 l/min (regulating to 50 : 1) are to be installed.

(3) Chlorine dosing equipment

(a) Design dosing rate

- Pre-chlorination : max. 3 mg/l, min. 0.5 mg/l, ave. 1 mg/l
- Post-chlorination : max. 2 mg/l, min. 0.5 mg/l, ave. 1 mg/l

(b) Chlorinator

- Dosing amount for pre-chlorination : 0.66 kg/h to 5.25 kg/h
- Dosing amount for post-chlorination : 0.66 kg/h to 3.50 kg/h

Two (2) chlorinators with a capacity of 6 kg/h for pre-chlorination and one (1) chlorinator with 5 kg/h (regulating to 20 : 1) are to be installed.

5) Electric Equipment

(1) Power receiving and distributing

Total power requirement for the new system is calculated at 156 kW. Power receiving panel is placed on an electric room in the operation building. At present, the power is received at two spots; one for chlorination equipment and the other for the transmission pump. Considering the maintenance, the existing power reception is to be integrated in the new system.

(2) Emergency generator

The generator with a capacity of 150 kVA and 215 PS engine is provided to operate the transmission pump to Anse Courtois, booster pumps for chlorinator, plant water pump and lighting, total power of 113 kW, during power interruption.

(3) Instrumentation

Flow and water level meters installed at every facility are indicated and monitored on the monitoring panel in the operation building. The control is to be done by operating the site panel. The instruments, which are indicated or recorded, are as follows:

- raw water flow meter
- filtered water flow meter
- treated water transmission and distribution flow meters
- water level meter and indicator

- chlorine gas leak detector
- chlorine gas container weighing

6. Implementation Programme

1) Project Cost and O/M Cost

(1) Project cost

In accordance with the bill of quantities in the tender document, the direct construction cost is estimated. The project costs are also estimated as follows adding the engineering and administration costs and contingencies :

(unit: MRs million)

Items	F/C	L/C	Total
- Construction cost	93.21	37.03	130.24
- Engineering and administration costs	9.32	4.87	14.19
- Physical contingency	5.12	2.10	7.22
- Price contingency	9.35	8.80	18.15
Total	117.00	52.80	169.80

(2) Annual O/M cost

Annual O/M cost for max. treatment flow of 31,500 m^3/d is estimated as follows:

(unit: MRs million)

Items	Annual Expenses
- Personnel cost (44 persons x 12 months)	2.06
- Chemical cost for alum, lime and chlorine	2.28
- Power cost (basic rate and power charge)	0.55
- Maintenance cost for equipment	0.16
Total	5.05

(3) Preliminary financial analysis

A financial statement was preliminarily prepared to evaluate the feasibility of the project as shown on Table 1. Assuming the water rate of Rs. 6.0 per m^3, the balance will be changed from deficit to surplus at 15 years after the commencement of the new system.

2) Implementation Schedule

The construction period for the water supply facilities is scheduled to be two years. After completion of the facilities, two month test operation of the facilities is to be done. The implementation schedule after tendering is shown on Fig. 7.

TABLE AND FIGURES

Table 1 Preliminary Financial Statement (Unit: MRs. x 1,000)

Year	Capital Investment	O&M Cost	Loan Payment		Total Outgo	Revenue	Balance	Accumulate Surplus
			Capital	Interest				
1	23,400				23,400		-23,400	-23,400
2	21,200			3,378	24,578		-24,578	-47,978
3	8,200			7,637	15,837		-15,837	-63,815
4		3,319		9,278	12,597	17,197	4,600	-59,215
5		3,307		9,278	12,585	17,260	4,675	-54,540
6		3,293		9,278	12,571	17,051	4,480	-50,060
7		3,281	3,043	9,278	15,602	17,091	1,489	-48,572
8		3,268	6,879	9,037	19,184	16,894	-2,290	-50,861
9		3,340	8,357	8,491	20,188	18,304	-1,884	-52,745
10		3,413	8,357	7,829	19,599	19,484	-115	-52,860
11		3,485	8,357	7,166	19,008	20,665	1,657	-51,203
12		3,558	8,357	6,503	18,418	21,845	3,427	-47,776
13		3,630	8,357	5,840	17,827	23,026	5,199	-42,577
14		3,698	8,357	5,178	17,233	24,421	7,188	-35,390
15		3,764	8,357	4,515	16,636	25,203	8,567	-26,823
16		3,832	8,357	3,852	16,041	26,291	10,250	-16,573
17		3,898	8,357	3,190	15,445	27,379	11,934	-4,639
18		3,966	8,357	2,527	14,850	28,468	13,618	8,979
19		3,985	8,357	1,864	14,206	28,774	14,568	23,548
20		4,003	8,357	1,201	13,561	29,081	15,520	39,068
21		4,022	5,314	539	9,875	29,388	19,513	58,580
22		4,041	1,479	117	5,637	29,694	24,057	82,637
23		4,060			4,060	30,429	26,369	109,007
24		4,079			4,079	30,740	26,661	135,668
25		4,098			4,098	31,051	26,953	162,621
26		4,117			4,117	31,362	27,245	189,867
27		4,135			4,135	32,119	27,984	217,851
28		4,155			4,155	32,435	28,280	246,131
29		4,173			4,173	32,750	28,577	274,708
30		4,192			4,192	33,065	28,873	303,582
31		4,211			4,211	33,844	29,633	333,215
32		4,229			4,229	34,164	29,935	363,150
33		4,249			4,249	34,484	30,235	393,385

Note: 1) Loan condition
- Total loan amount : MRs 117 million
- Repayment period : 20 years (6-year grace period)
- Interest : 7.93 %

FIG. 1

PAILLES WATER TREATMENT WORKS

Production Capacity
Proposed: 30,000 m3/day
Existing : 60,000 m3/day

RAW WATER TRANSMISSION PIPELINE

Proposed: 800mm dia, 2,100m
Existing : 27", 19" and 18" dia 2,100m

MUNICIPAL DYKE (Existing)

L.W.L + 76,200 m

MAIN DAM

Crest	El.196.0m
Height	84m

RESERVOIR

H.W.L.	El.193.5m
Gross Capacity	6.7 mil.m3
Effective Capacity	6.3 mil.m3
Surface Area	30 ha

SCALE 1:25,000

METRES 1000 500 0 1000

YARDS 1000 500 0 ½ ½

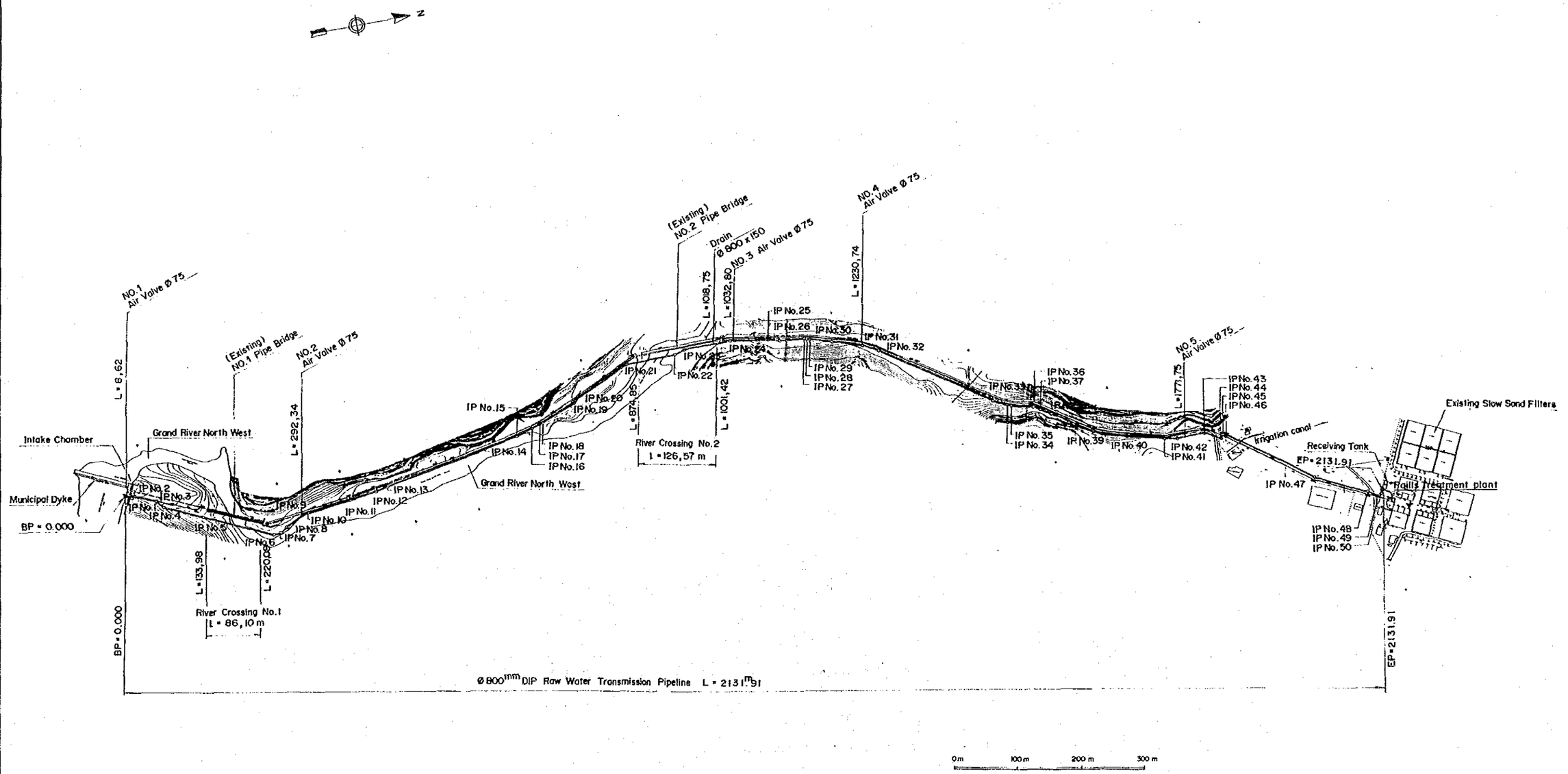
LOCATION MAP

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

FIG. 2

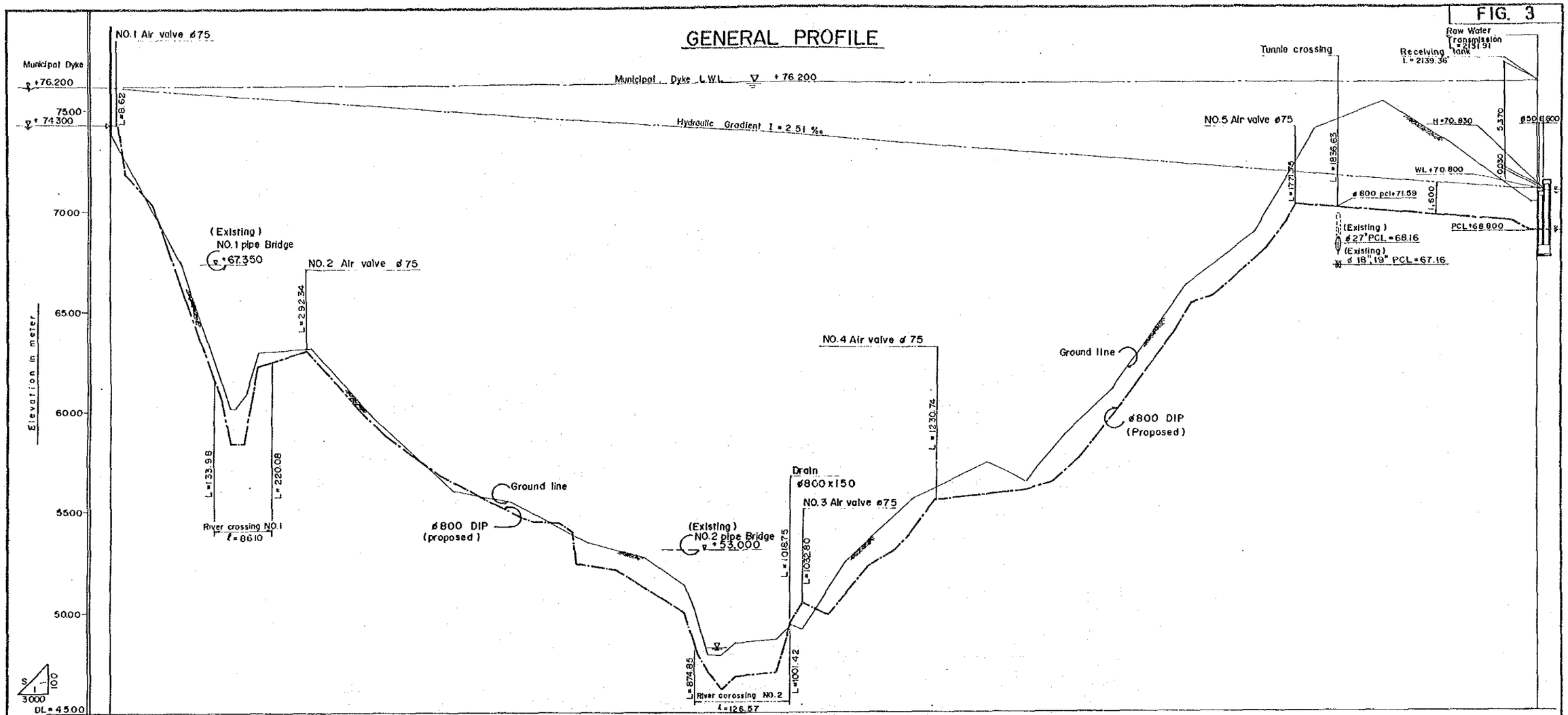
GENERAL PLAN

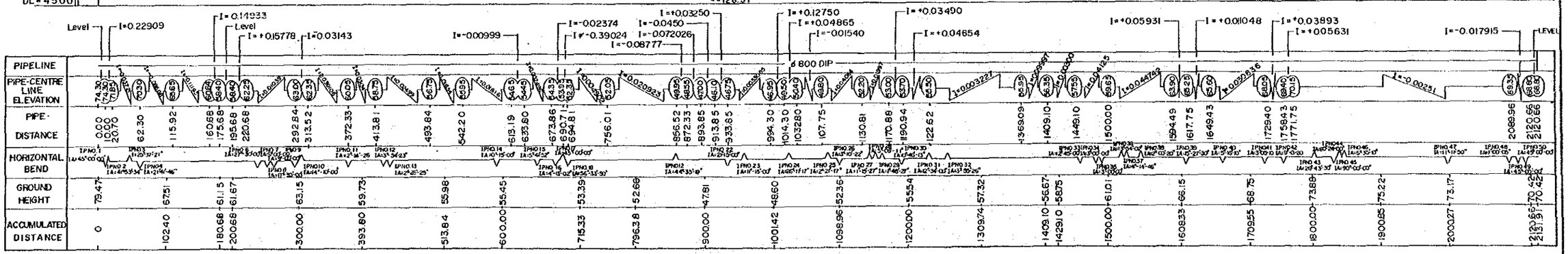


GENERAL PLAN	GOVERNMENT OF MAURITIUS PORT LOUIS WATER SUPPLY PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY

FIG. 3

GENERAL PROFILE





VERTICAL 0 5 10m
HORIZONTAL 0 100 200 300m

GENERAL PROFILE

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

FIG. 4

E No. 6 E No. 4 E No. 2
SLOW SAND FILTERS
E No. 5 E No. 3 E No. 1
Scum & Waste Water Drain
ø450mm Concrete Pipe
ø600mm Dip
WORKSHOP
JTP4
JTP6
Distribution Pipelines ø600mm ø400mm
Pierrefonds Pipeline ø250
CHLORINATOR HOUSE
CLEAR WATER TANK
Pylon
Overhead Power Transmission Line
ø200 Porous UPVC Pipe & ø300mm Concrete Pipe
ø400mm Dip
ø450mm GIp
ø800mm Dip
To Clear Water Tank
ø900mm Dip
ø900mm Concrete Pipe
F No. 6
F No. 4
F No. 2
ø500mm SP
To English Filter Beds ø700mm Dip
ø700mm Dip
JTP1
B.M H=70.393m
Municipal Pipelines
19"CIP, 18"CIP & 27"RCP
ROUGH FILTERS
SLOW SAND FILTERS
F No. 5
F No. 3
F No. 1
JTP3
Transformer
OFFICE & WORK SHOP
PRIVATE PROPERTY
ø600mm Concrete Pipe
Distribution Pipelines
ø400mm
Air Valve Chamber
Valve Chamber
Abandoned / Unused Concrete Floor Slab
Gate
FACTORY
Soreze Pipe Line ø150mm AC
STAFF HOUSE
WORK SHOP
WC
To Aime Courtois Reservoir ø150mm Dip
Pam Motebello ø150mm SP
Chain Link Fence
PIPE YARD
Gate
PAILLES JUNCTION ROAD
PITOT STREAM
SCALE 0 10 20 30 40 50m

LEGEND

⊙	Location of Boreholes No. JTP 1 to 6
———	Pipelines
⊗ o □	Manhole
—o	Power Pole
•	Lighting Pole

F : Slow Sand Filters Constructed by French AID

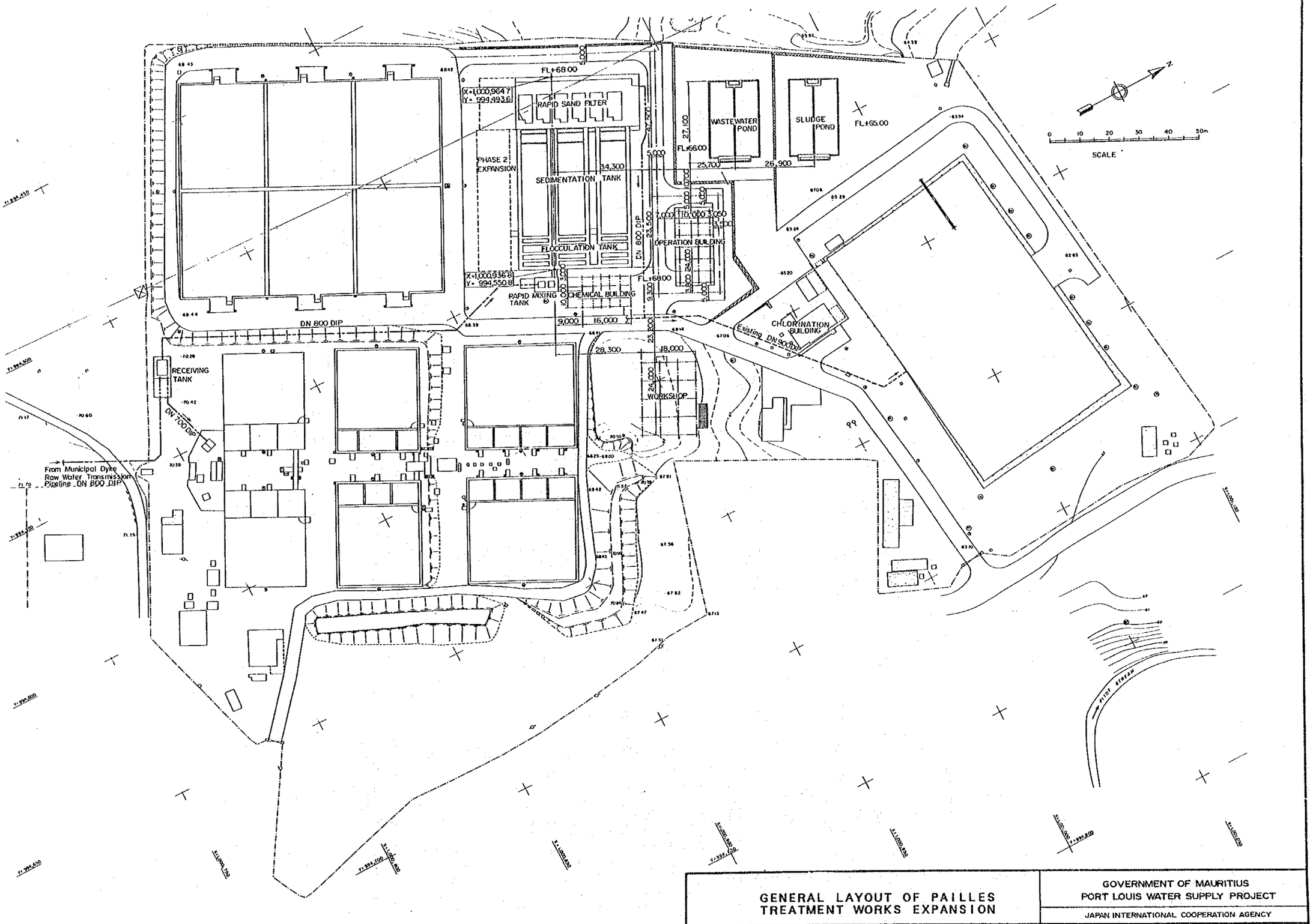
E : Slow Sand Filters Constructed by English AID

(1)	Air Valve Chamber	(11)	Gate Valve Chamber
(2)	Chamber No.4 (Flow Meter)	(12)	Gate Valve Chamber
(3)	Chamber No.2 (Valves & Water Receiving)	(13)	Gate Valve Chamber
(4)	Chamber No.1 (Valves & Water Receiving)	(14)	Gate Valve Chamber
(5)	Chamber No.3 (Flow Meter)	(15)	Disused Chlorination House
(6)	Anchor Block	(16)	Flow Measurement Chamber (Disused)
(7)	Strainer Chamber	(17)	Valve Chamber
(8)	Control Valve Chamber	(18)	Flow Meter Chamber (Disused)
(9)	Break Pressure Chamber	(19)	Chlorination Chamber
(10)	Pumping Station		

GENERAL LAYOUT OF EXISTING PAILLES TREATMENT WORKS

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

FIG. 5



GENERAL LAYOUT OF PAILLES TREATMENT WORKS EXPANSION

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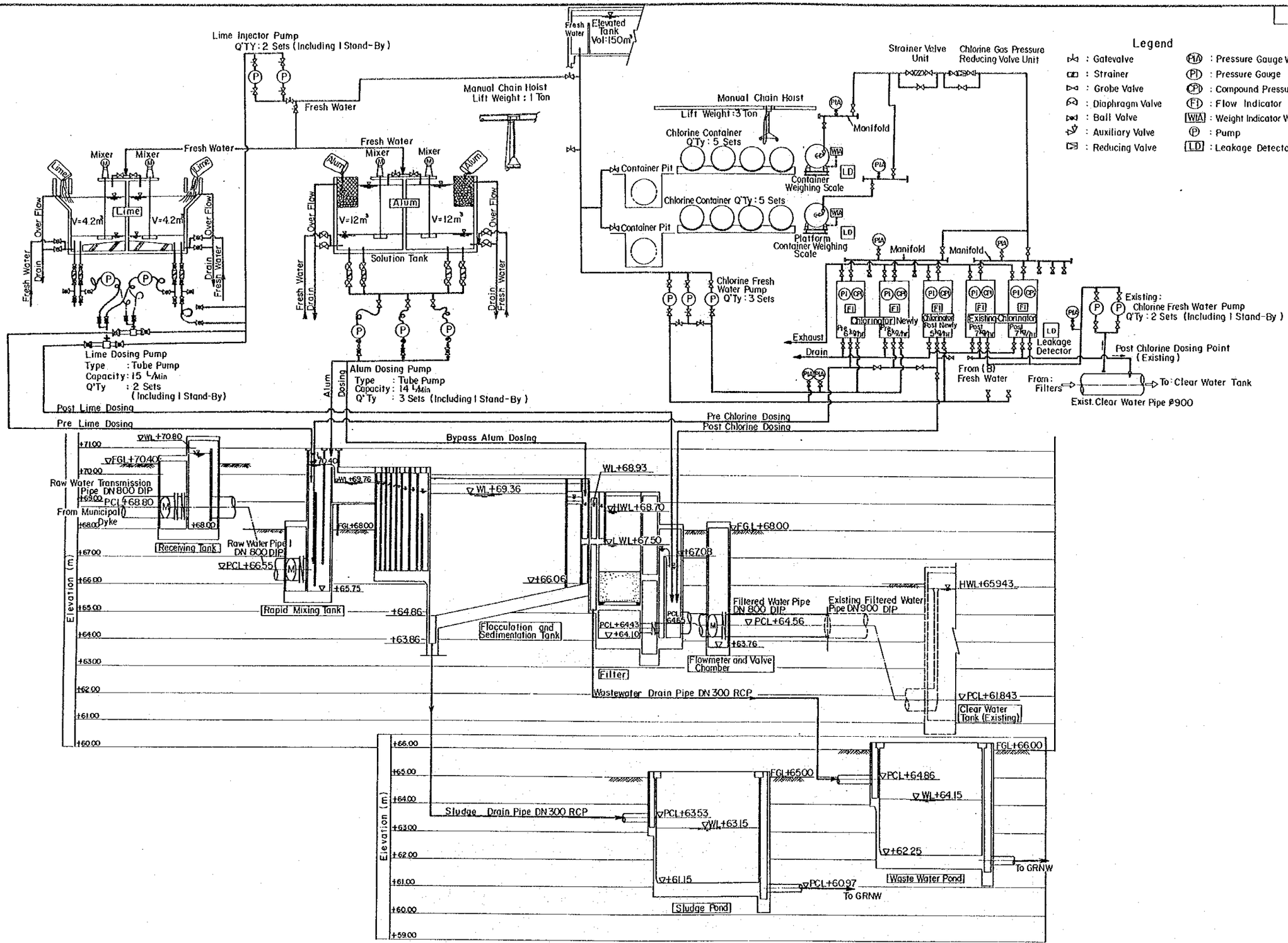
FIG. 6



Legend

: Gatevalve	PIA : Pressure Gauge With Contacts
: Strainer	PI : Pressure Gauge
: Grobe Valve	CPI : Compound Pressure Indicator
: Diaphragm Valve	FI : Flow Indicator
: Ball Valve	WIA : Weight Indicator With Alarm Contact
: Auxiliary Valve	P : Pump
: Reducing Valve	LD : Leakage Detector

FLOW DIAGRAM AND HYDRAULIC PROFILE

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

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Fig. 7 Construction Schedule