

**Metropolitan Waterworks and Sewerage System  
Manila Water Company, Inc.**

**Initial Environmental Examination**

*of the*

**Community Sanitation Project  
Manila Second Sewerage Project  
IBRD 4019**

**Project No. 5  
San Miguel Village  
Makati City, Philippines**

Prepared by:

Manila Water Company, Inc.  
489 Katipunan Rd, Balara, Quezon City

December 2001

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## EXECUTIVE SUMMARY

The proposed project for San Miguel Village is one of the twenty-three (23) sub-projects of the Community Sanitation Project Phase 1, which is a component of the World Bank-assisted Manila Second Sewerage Project (MSSP).

The project is intended to reduce the current wastewater pollution discharged to the Pasig River by the two hundred and six (206) residential units and six (6) commercial establishments within the village. The project involves the construction of a sewerage system using combined sewage and drainage flows collection and treatment. Specifically, the project includes the construction and installation of: (i) an underground centralized sewage treatment plant (STP), (ii) seven hundred (700) meters of sewer mains and appurtenances, (iii) three (3) interceptor chambers, (iv) three (3) underground lift stations and (v) forty six (46) sewer service connections.

A Memorandum of Agreement (MOA) for the project was executed between the San Miguel Village Association, Inc. (SMVAI) and Manila Water Company. The Barangay Captain of Poblacion also endorsed this project.

In conformity with the requirements of the Department of Environment and Natural Resources (DENR), an Environmental Compliance Certificate (ECC) NCR-2001-06-25-114-211 pursuant to P.D. 1586 was secured for the project.

### I. BASELINE ENVIRONMENTAL CONDITIONS

San Miguel Village was developed in 1961 by the then Makati Development Corporation (now Ayala Corporation). The village is situated in the northern portion of Makati City in Metro Manila and is bounded by J. P. Rizal Avenue in the north, Nicanor Garcia Street (formerly Reposo Street) in the west, Spring Street in the east and Kalayaan Avenue (formerly Imelda Avenue) in the south.

The village has a total land area of 10 hectares, 80% of which are residential areas, 13% are commercial areas and the remaining 7% are parks, playgrounds and common areas.

Floral population within the village constitutes ornamental plants and trees. Faunal population is limited to household pets. The area is characterized by a relatively even distribution of precipitation during the year. Like in most parts of Metro Manila, the village has two distinct seasons: the dry season during the months of November to May and the wet season during the months of June to October.

There is no existing sewerage system in San Miguel Village. Wastewater is partially treated in individual septic tanks and flows to the drainage system which discharges to Pasig River. At present, Pasig River does not meet the Class C standards (i.e., suitable for propagation and growth of fishes, recreational uses and industrial water supply) especially during the summer months when there are no sufficient inflows. At these times, the BOD in Pasig River reaches 120 mg/L, which is 12 times higher than the permitted level for Class C water; DO drops to zero; and total coliforms exceed the MPN/100 ml standard by up to several thousand degrees.

## II. ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

<b>Potential Environmental Impact</b>	<b>Mitigating Measures</b>
<b>CONSTRUCTION PHASE</b>	
1. Poor quality of construction	<ul style="list-style-type: none"> <li>• Manila Water Company will monitor the supply and installation contract to assure quality of equipment and construction. Site Managers and Engineers with experience in construction management shall approve all materials and equipment to be used and installed at the site.</li> <li>• The contractor will be required to post a performance bond for the Design and Construction Contract of the sewerage system.</li> </ul>
2. Air pollution (suspended particulates, odor and fumes, vehicle emissions e.g. CO <sub>2</sub> , CO NO <sub>x</sub> )	<ul style="list-style-type: none"> <li>• Efficient construction planning and work scheduling</li> <li>• Formulation of appropriate work plans, work scheduling, work specifications and work methodologies</li> <li>• Provision of properly maintained storage area for keeping stocks of construction materials and equipment</li> <li>• Prompt and fast removal of excavated materials or dredges spoils from construction site</li> <li>• Sprinkling of water on dust generating mounds resulting from earthmoving activities and civil works.</li> <li>• Control of motor vehicle emissions</li> <li>• Dust accumulation will also be prevented through proper washing of construction vehicles prior to departure from the site</li> <li>• Development and enforcement of strict health and safety pollution control regulations specific for the project site               <ul style="list-style-type: none"> <li>- Good housekeeping of workplace and construction affected areas</li> <li>- Use of Protective Gear by all workers</li> </ul> </li> </ul>

<p>3. Water pollution due to wastewater, oil leakage/spills</p>	<ul style="list-style-type: none"> <li>• Provide temporary drain systems and storage facilities for excavation soils, fuel and oils needed for equipment</li> <li>• Cautious and sensible planning for construction and post-construction phases of the project</li> <li>• Provision of a routine chemical and oil spill clean-up plan</li> <li>• Formulation of a monitoring program</li> </ul>
<p>4. Noise pollution from operation of construction equipment</p>	<ul style="list-style-type: none"> <li>• Establish temporary sound barriers around the work site</li> <li>• Proper scheduling and phasing of high-noise activities</li> <li>• Use of appropriate mufflers and sound proofing for construction machinery, equipment and engines</li> <li>• Use of Personnel Protective Equipment by all workers</li> </ul>
<p>5. Temporary disruption of traffic flow within the village</p>	<ul style="list-style-type: none"> <li>• Public information campaign posting schedule of construction</li> <li>• Provision of a liaison officer from the SMVAI to assist in the information dissemination regarding inevitable changes in schedule of vehicular operations</li> <li>• Provision of temporary alternative routes, including visible traffic warning signals</li> <li>• Scheduling of delivery materials and removal of excavated material during non-rush hour periods</li> </ul>
<p><b>OPERATIONAL PHASE</b></p>	
<p>1. Environmental hazards due to accidents, man-made or natural disasters e.g. accidental spills, fire, seismic activity, earthquakes, heavy rain/flooding and design failure</p>	<ul style="list-style-type: none"> <li>• Carefully designed post-construction maintenance, contingency and monitoring programs</li> <li>• Well designed plan for detection of accident or natural events including precautionary and remedial measures to be observed</li> <li>• Provision of preventive and remedial procedural manuals at workplace</li> <li>• Adequate plans for environmental rehabilitation and restoration of site and removal of temporary structures and facilities installed during the construction phase</li> </ul>
<p>2. Water Pollution (effluent discharge)</p>	<ul style="list-style-type: none"> <li>• Wastewater discharged by the STP shall conform with the Effluent Standards set forth in DENR Administrative Order 34 and 35 for Class C waters</li> <li>• Regular monitoring of wastewater effluent by the Manila Water Company Central Laboratory</li> <li>• Regular check on sewer mains to prevent discharge/seepage of untreated wastewater to the environment</li> </ul>

<p>3. Noise Pollution (STP equipment, lift stations)</p>	<ul style="list-style-type: none"> <li>• Use of appropriate mounting for machinery to minimize vibration</li> <li>• All mechanical/electrical equipment shall be installed inside enclosures</li> <li>• Motors shall be provided with soundproofing devices</li> <li>• Maintenance of greenbelt zones and vegetation with appropriate tree species</li> </ul>
<p>4. Solid Waste (in the interceptor chambers and generated within and by the STP)</p>	<ul style="list-style-type: none"> <li>• Regular collection and disposal of solid waste collected in the interceptor chambers and generated within and by the STP</li> <li>• Disposal of generated sludge will be in accordance with established procedures of relevant authorities (disposal of sludge for use as soil conditioner)</li> </ul>
<p>5. Odors (organic and sulfur compounds coming from raw wastewater and during desludging of septic tanks)</p>	<ul style="list-style-type: none"> <li>• Maintenance of greenbelt zones and vegetation with appropriate tree species</li> <li>• Provision of landscape which will improve the aesthetic of the area by planting green strips using appropriate plant or tree species</li> <li>• Use of vacuum trucks for desludging of septic tanks</li> <li>• Provision of odor control mechanisms (deodorizer/adsorbent/masking agent) to prevent malodorous emissions</li> </ul>
<p>6. Maintenance and Operation of the System</p> <ul style="list-style-type: none"> <li>• Poor maintenance of mechanical equipment (pumps and motors)</li> <li>• Connections</li> </ul>	<ul style="list-style-type: none"> <li>• Regular asset condition monitoring by Manila Water Company personnel</li> <li>• Regular maintenance works for the STP and lift stations equipment (pumps and motors), sewer network, interceptor chambers and septic tanks</li> <li>• Adequate training of STP and lift stations operators</li> <li>• A liaison officer from the SMVAI will assist the STP and lift stations operators in assuring the facilities' efficient operation</li> <li>• Provision of adequate maintenance equipment and spares for the sewerage system facilities</li> </ul>

### III. ENVIRONMENTAL MONITORING PLAN

Environmental monitoring will be the responsibility of Manila Water Company.

Parameter	Location	Frequency
<p><u>Construction Phase</u></p> <p>Compliance with Manila Water Company health and safety policies (dust emissions, good housekeeping, noise, odors)</p> <p>Traffic</p>	<ul style="list-style-type: none"> <li>• At STP site and its perimeter</li> <li>• Other excavation sites (sewer mains, interceptor chambers, lift stations and service connections)</li> <li>• Equipment and materials storage area</li>   <li>• Ingress and egress to the construction site</li> </ul>	<ul style="list-style-type: none"> <li>• On-the-spot daily inspection and monitoring will be implemented by the Health and Safety Dept. of Manila Water Company using the Safety Task Analysis Risk Reduction Talk (STARRT) Card (Annex 1)</li>   <li>• Daily</li> </ul>
<p><u>Operational Phase</u></p> <p>Effluent Water Quality for parameters like pH, 5-day BOD, COD, Total coliform, suspended solids, and oil and grease</p> <p>Odor</p> <p>Sludge accumulation/clogging</p>	<ul style="list-style-type: none"> <li>• Influent</li> <li>• Samples from Treatment stages</li> <li>• Effluent</li>   <li>• STP site and perimeter</li>   <li>• At STP site</li> <li>• Sewer network</li> </ul>	<ul style="list-style-type: none"> <li>• Annex 2 describes in detail the schedule of wastewater quality monitoring</li>   <li>• Daily</li>   <li>• Weekly</li> </ul>

## 1.0 PROJECT DESCRIPTION

### 1.1 Basic Project Information

Name of Project : **SAN MIGUEL VILLAGE  
COMMUNITY SANITATION PROJECT  
MANILA SECOND SEWERAGE PROJECT**

Address : San Miguel Village, Barangay Poblacion,  
Makati City, Philippines

Contact Persons : Leonor C. Cleofas  
Manager, Engineering and Project  
Management Office  
Metropolitan Waterworks and Sewerage  
System  
Ground Floor, Engineering Building, MWSS  
Complex, 489 Katipunan Road, Balara,  
Quezon City 1105  
Tel No. (632) 920-5413; (632) 920-5521 to 40  
locals 3570/3569  
Telefax: (632) 922-2568

Ma. Fiorella De Los Reyes-Fabella  
Wastewater Project Development Manager  
Manila Water Company, Inc.  
489 Katipunan Road, 1105 Balara, Quezon  
City, Philippines  
Tel No. (632)981-8147; (632)926-7999 loc2032  
Fax (632) 981-8106

### 1.2 PROJECT LOCATION

The proposed project for San Miguel Village is one of the twenty-three (23) sub-projects of the Community Sanitation Project Phase 1, which is a component of the World Bank-assisted MSSP.

The service area covers the residential units and commercial establishments along Fatima, Lourdes, Carmel, F. Zobel, M. Layug, D. Oliman and Candelaria Street. The project site is easily accessible from either J. P. Rizal Avenue or Kalayaan Avenue. Figure 1 presents the location map of the project.

Figure 1  
Location Map



### 1.3 PROJECT RATIONALE

In Metro Manila, untreated/partially treated domestic wastewater is the major source of pollution of inland waters. Most residential houses in Metro Manila treat their wastewater by means of septic tanks, which do not provide adequate treatment to satisfy the DENR requirements for wastewater effluent standards. Moreover, majority of septic tanks in Metro Manila is not properly maintained. This situation has led to the deterioration of the Pasig River and other inland waters. The DENR has estimated that around 60% of the pollution load to Pasig River come from domestic discharges.

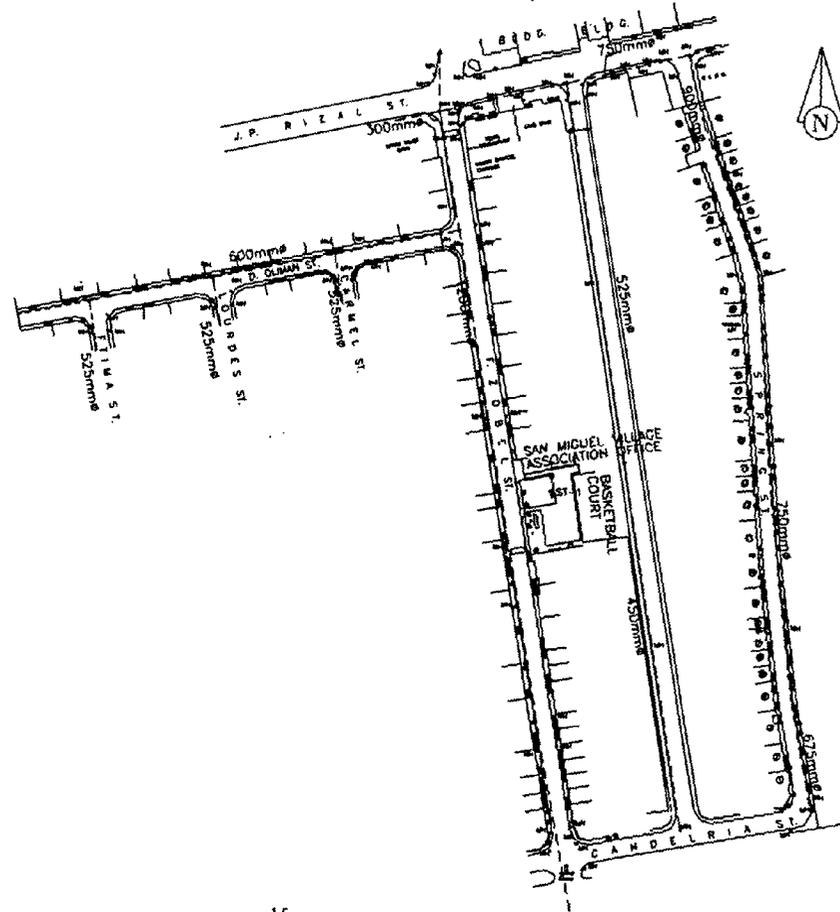
There is therefore an urgent need to establish collection and treatment methods that will help reduce the pollution load to inland waters. The provision of an efficient and cost-effective sewage collection, treatment and disposal is the primary objective of the Community Sanitation Project under the MSSP.

This project specifically aims to address the problems of inadequate wastewater treatment and disposal in San Miguel Village. Figure 2 shows the current system in the Village where individual septic tanks discharge polluted effluent into the drainage lines. Inadequate treatment of wastewater in septic tanks is indicated by the analysis of the effluent of one of the septic tanks in the area (see Table 1). The project will help reduce public health risks and environmental pollution from untreated/partially treated domestic wastewater by providing a sustainable sanitation and sewerage facility. It will also serve as a good illustration of proper sanitation especially to the neighboring communities near Pasig River.

**Table 1**  
**Analysis of Septic Tank Effluent Quality from San Miguel Village**

<b>Parameter</b>	<b>Limit(s) DENR-EMB</b>	<b>Effluent Sample</b>
pH	6.5-9	7.8 @ 24.3°C
Suspended solids, mg/L	70	122.00
Dissolved Oxygen, mg/L	-	0.30/24.1°C
Biochemical Oxygen Demand (BOD <sub>5</sub> ), mg/L	50	206.7
Chemical Oxygen Demand, mg/L	100	284.0

Figure 2  
Existing Drainage System Layout



## **1.4 DESCRIPTION OF PROJECT PHASES**

### **1.4.1 Pre-Operational / Construction Phases**

#### **1.4.1.1 Construction Plan**

The project is scheduled for bidding in December 2001. Construction is expected to commence in March 2002 and project completion is targeted in September 2002 (210 calendar days).

Figure 3 shows the implementation schedule for the project. Manila Water Company will undertake the project implementation.

#### **1.4.1.2 Total Surface Development Block**

The service area is approximately 9 hectares and is estimated to have a current population of 1,300. The project will serve 212 residential and commercial establishments within the village. Any increase in population is not considered because there are no further planned development within the village that would significantly affect the quality and/or quantity of wastewater discharges.

#### **1.4.1.3 Estimate of Total Land Area to be Opened for Civil Works**

Civil Works will include the construction of an underground STP, 3 interceptor chambers and 3 lift stations and installation of sewer mains and sewer service connections. The STP will be located in a 480 square-meter area in the Village park which is being leased by the SMVAI from the Ayala Corporation. Sewer mains totaling 700 meters in length will be opened for civil works. Figure 4 shows the proposed sewer collection system layout.

#### **1.4.1.4 Major Openings and Construction Activities**

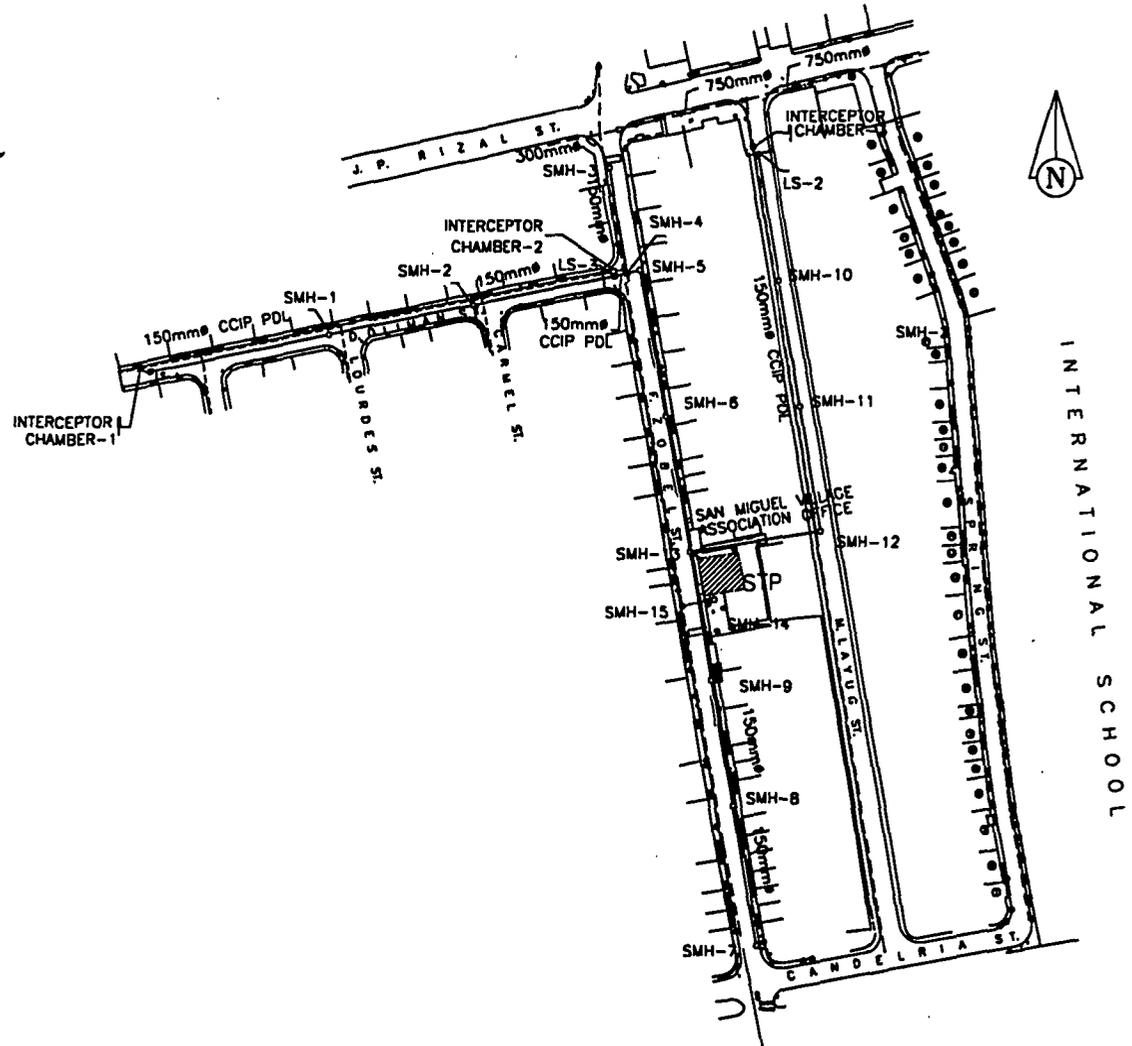
The complete sewerage system will include the following components:

- ◆ 3 interceptor chambers with land requirement of 6.25 m<sup>2</sup> each
- ◆ 3 underground lift stations with land requirement of 4 m<sup>2</sup> each
- ◆ 700 meters of sewer mains with diameter of 150 mm
- ◆ 15 sewer manholes
- ◆ 46 sewer service connections
- ◆ Underground STP with a design capacity of 288 m<sup>3</sup>/day and land requirement of not more than 480 m<sup>2</sup>

**Figure 3**  
**Proposed Implementation Schedule**  
**for the SAN MIGUEL VILLAGE Community Sanitation Project**

Week No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Permits and Clearances	■	■	■	■	■	■																								
Layout and Staking							■	■	■																					
Order Equipment			■	■	■	■	■	■	■	■																				
Temporary Field Office									■	■	■	■	■																	
Excavation for Main Reactor												■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Formwork, Steelwork and Pouring													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Form Removal and Curing																														
Excavate and Install Sewer Lines													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Testing of Sewer Lines													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Backfilling and Restoration																														
Purchase Imported/ Special Equipment for Treatment																														
Install Treatment Equipment																														
Install Electrical and Plumbing																														
Testing, Acceptance and Turnover																														

**Figure 4**  
**Proposed Sewer Collection System Layout**



The civil works to be implemented are as follows:

**For STP/Lift Stations**

- ◆ Site clearing
- ◆ Earthworks
  - excavation and handling
  - dewatering
  - backfill and compaction
  - lean concrete/gravel bedding
- ◆ Concrete Works
  - shoring and soil protection
  - formworks
  - concreting
- ◆ Electro-mechanical
  - Internal and external pipeworks
  - mechanical installation
  - electrical installation
- ◆ Site restoration
- ◆ Clearing/miscellaneous activities

**For Interceptor Chambers/Sewers**

- ◆ Pavement cutting
- ◆ Shoring and removal
- ◆ Excavation and handling
- ◆ Dewatering
- ◆ Pipelaying
- ◆ Backfill and compaction
- ◆ Testing pavement restoration
- ◆ Clearing/miscellaneous activities

**1.4.1.5 Types of Equipment to be Used**

The civil works contractor will provide equipment which include, but is not limited to, the following:

- ◆ backhoe/loader
- ◆ dewatering equipment
- ◆ concrete mixer/concrete pump
- ◆ welding machine
- ◆ compactor
- ◆ jackhammer and air compressor
- ◆ generator
- ◆ dump trucks

**1.4.1.6 Source of Construction Materials and Facilities**

The following alternative type of pipe materials will be permitted for sewer mains:

- ◆ UPVC Pipe
- ◆ Polyethylene
- ◆ Fiberglass Pipe
- ◆ Ductile Iron Pipe
- ◆ Cast Iron Soil Pipe

The contractor can choose from any of the above pipe materials.

#### 1.4.1.7 Support Services and Facilities Requirements and Availability

Support services and facilities will be tapped from the available utilities on site. Arrangements with the SMVAI and/or any other party will be made by the contractor.

#### 1.4.1.8 Estimate of Total Cut Soil Volumes

Table 2 presents the estimated dimension, depth and excavation volume of each project component.

**Table 2**  
**Estimates of Soil Excavation Volumes**

Project Component	Estimated Dimensions (sq.m)	Average Excavation Depth (m)	Average Excavation Volume (cu. m.)
STP site	100	4	400
Sewer main, 150 mm Ø	0.45 x 700 *	1.5	473
3 interceptor chambers	3 x 3	4	108
3 lift stations	2.5 x 2.5	5	94
46 sewer service connections	0.45 x 3	1.5	93
<b>TOTAL</b>			<b>1,168</b>

\* Estimated dimension of sewer main excavation (sq.m.)= [(pipe diameter + 0.3) x total length of pipe required]

#### 1.4.1.9 Total Manpower Requirement

The project will be bid out based on World Bank procedures. The winning bidder will provide contractual work for a period of around 210 calendar days. The contractor will provide skilled and unskilled workers to carry out the scope of works as detailed in the bid documents. The general scope of works includes:

- ◆ site clearing
- ◆ installation works for the sewer network
- ◆ detailed engineering design and construction/installation works for the STP and its appurtenances
- ◆ landscaping of the STP site and its vicinity
- ◆ abandonment activities (road restoration, etc.)
- ◆ STP start-up operations

## 1.4.2 Operational Phase

### 1.4.2.1 Project Operation Schedule and Duration

Completion of construction is expected by September 2002. Start-up operations will begin immediately after project completion.

### 1.4.2.2 Process Technology and Activities

The project will be bid on the basis of performance specifications for the STP Treatment Process:

- ◆ Domestic wastewater flows were computed on the basis of a per capita water demand of 200 liters per day and a 70% wastewater discharge. The combined sewage and drainage flows were regulated at 150% of the dry weather flows.
- ◆ The influent flow characteristics were based on laboratory analysis of a sample of septic tank effluent as well as samples from the other project sites. The influent quality assumptions are shown in Table 3 below:

**Table 3**  
**Influent Flow Characteristics**

TSS (mg/l)	BOD <sub>5</sub> (mg/l)	COD (mg/l)	Oil and Grease (mg/l)	pH
100	200	350	50	6-9

TSS = Total Suspended Solids  
BOD<sub>5</sub> = 5-day biochemical oxygen demand at 20°C  
COD = Chemical Oxygen Demand

- ◆ Wastewater discharged by the STP shall conform with the Effluent Standards set forth in DENR Administrative Order 34 and 35 for Class C waters as shown in Table 4.
- ◆ Wastewater treatment will reduce the BOD<sub>5</sub> from 200 mg/L to 50 mg/L, at the minimum. This illustrates an STP treatment efficiency of at least 75%.

**Table 4  
DENR Effluent Parameters for Class C Waters**

<b>Parameters</b>	<b>Units</b>	<b>Concentration</b>
Color	PCU	150
PH		6-9
COD	mg/L	100
Settleable solids	mg/L	0.5
5-day 20°C BOD	mg/L	50
Total Suspended Solids	mg/L	70
Total Dissolved Solids	mg/L	7
Oil and Grease	mg/L	5
Phenolic Substances	mg/L	0.10
Total Coliforms	MPN/100 ml	10,000

### **Process Scheme of STP**

The proposed STP in San Miguel Village will be constructed below ground. The only aboveground structure will be the control room/panel.

The STP treatment process will provide secondary treatment to combined sewage and drainage flows. It is expected that bidders will propose different process technologies based on the performance specifications in the bidding documents. Some of the factors which will be considered in selecting the STP treatment process are:

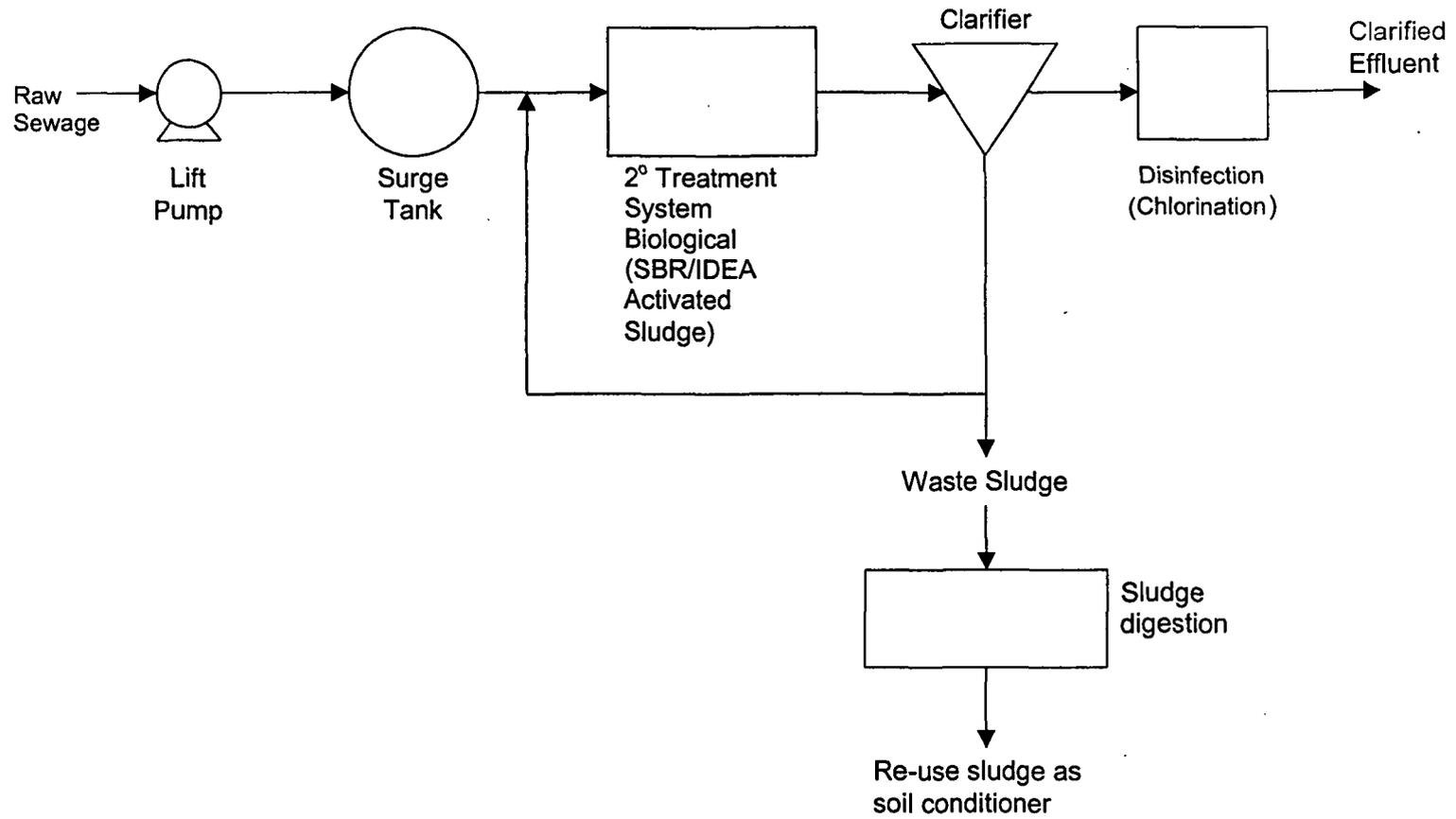
- ◆ Suitability in project site
- ◆ Performance/Treatment efficiency
- ◆ Capital and Replacement costs
- ◆ Operations and Maintenance Costs
- ◆ Complexity of operations
- ◆ Flexibility of treatment process

A general scheme for the treatment process is illustrated in Figure 5.

#### **1.4.2.3 Waste Production Scheme**

Up to 2005, sludge produced in the treatment process will be transported to a centralized Barge Loading Station for sea disposal. The station is located in J.P. Rizal St, Bgy. West Rembo, Makati City and the disposal site is located in Luzon Sea which is about 68 km offshore of Corregidor Island. Mobile vacuum tankers will collect the sludge produced in the STP.

**Figure 5**  
**General Treatment Process Scheme**  
San Miguel Village Project



A long-term disposal scheme for biosolids from the STP will be as soil conditioner for sugarcane and corn in Pampanga. *Experiments done in coordination with the Sugar Regulatory Administration on the use of sludge in enhancing the soil quality of lahar-covered areas and the growth of crops such as sugarcane, corn and bittergourd resulted in the issuance of a temporary license issued by the Fertilizer and Pesticide Authority. The license allows the use of sludge in growing similar crops.*

Sludge generated from the STP can also be treated in the 600 cu.m/day septage treatment facility which is expected to be operational by 2004. This facility is part of the Sanitation Component of the Pasig River Rehabilitation Project. Manila Water Company will operate this facility.

#### **1.4.2.4 Manpower Requirement**

Manila Water Company will assign an LLDA and DENR-accredited Pollution Control Officer (PCO) who will be responsible for the compliance of the STP with government regulations. The PCO will have trained operators/crews who will monitor and manage the operation of the sewerage system.

Since the STP operations will be operated largely by automation, regular maintenance works will include declogging of sewer lines, removal of solid wastes in the interceptor chambers and removal of sludge from the STP site and the individual septic tanks. The STP operator will visit the project site daily. Monitoring of the effluent quality will be the joint responsibility of the PCO and the Central Laboratory of Manila Water Company.

The SMVAI has also agreed to provide a liaison officer who will coordinate with Manila Water Company personnel on the proper operations of the STP and the sewer network. A 24-hour Customer Service Hotline (1627) is available to accept complaints and other emergency reports. Manila Water Company has sewer network repair crews who work in regular round-the-clock 8-hour shifts and who are readily available for any emergency work.

#### **1.4.3 Abandonment Phase**

Upon completion of the project scope, the contractor will remove all temporary structures and facilities installed during the construction phase. All pavements will be restored. The cost of abandonment will be incorporated in the overall cost of the project. Manila Water Company will issue a certificate of final acceptance only upon completion of all abandonment works by the contractor and upon turnover of the STP operations.

## **2.0 BASELINE ENVIRONMENTAL CONDITIONS**

### **2.1 STUDY METHODOLOGY**

This Initial Environmental Examination (IEE) was prepared in compliance with the World Bank's Operational Directive 4.01 on Environmental Assessment. An IEE was previously carried out according to the DENR Administrative Order No. 96-37, for which an Environmental Compliance Certificate (ECC) dated June 25, 2001 has been issued by the DENR-Regional Office (Annex 3).

### **2.2 LAND**

#### **2.2.1 Land Resource Utilization**

San Miguel Village has an estimated land area of 10 hectares. Approximately 80% of the total area are devoted to residential use, 13% to commercial use and 7% to open spaces.

#### **2.2.2 Physiography and Geology**

San Miguel Village lies on a relatively flat plain sloping downward towards the direction of Pasig River in the north. The highest elevations are located in Candelaria Street.

The soil/rock is made up of Guadalupe Formation which is characterized by thin to medium-bedded, fine-grained vitric tuffs and welded volcanic breccias with subordinate amount of tuffaceous, fine to medium-grained sandstone.

#### **2.2.3 Vegetation and Wildlife**

The proposed site for the STP is in a 480-square meter area in the Village park. This park is being leased by SMVAI from the Ayala Corporation. Figure 6 shows photographs of the proposed site.

The plant species that can be found in the vicinity of the STP site are:

Balete (*Ficus Benjamina*)  
Mango (*Mangifera indica*)  
Sabila  
Miana

Only the sabila and miana will be uprooted during construction.

There are no animals in the STP site.

Figure 6



## **2.2.4 Land Acquisition Assessment**

Manila Water Company will be allowed to use a parcel of land for the STP by way of a grant of perpetual easement from the Ayala Corporation and the SMVAI. The STP site is free from informal settlers.

## **2.3 Water**

### **2.3.1 Inventory of Water Bodies**

The project area is not in the immediate vicinity of any water body. From the drainage channels, the ultimate discharge point is the Pasig River. The location map shows the pathway of wastewater from San Miguel Village to Pasig River.

At present, Pasig River does not meet the Class C standards (i.e., suitable for propagation and growth of fishes, recreational uses and industrial water supply) especially during the summer months when there are no sufficient inflows. At these times, the BOD in Pasig River reaches 120 mg/L, which is 12 times higher than the permitted level for Class C water; DO drops to zero; and total coliforms exceed the MPN/100 ml standard by up to several thousand degrees.

### **2.3.2 Water Quality (Surface/Ground)**

Surface Water Quality. Pollution loading to the Pasig River will be reduced since raw wastewater and septic tanks effluent from the project area will no longer be discharged directly to the River. The effluent from the STP will comply with DENR Effluent Quality standards sufficient for Class C waters.

The current BOD loading entering the Pasig River is estimated at 242 tons/day which is 21% above the river's estimated maximum assimilative capacity. Domestic wastewater contributes 168 tons/day of BOD. Without any sewerage or sanitation interventions, the pollution load entering the river is expected to increase to 269 tons/day in year 2005, which is expected to come from domestic sewage.

Ground Water Quality. Since the septic tanks effluent will undergo further treatment in the STP, the possibility of contaminating the aquifers due to leachate from the septic tanks discharge or from raw wastewater will be eliminated. Seepage from the plant operations will be non-existent.

## **2.4 AIR**

Makati City experiences only two types of weather conditions, rainy season and dry season. Rainy season occurs between the months of July and October,

while the dry season occurs between November and June. Mean annual temperature is 27.4°C and average annual humidity is 77% for Metro Manila.

Air quality within San Miguel Village is moderately unpolluted. However, outside the Village are national roads where exhaust fumes from public and private vehicles contribute to the air pollution in the vicinity.

## **2.5 PEOPLE**

### **2.5.1 Population**

All of the residential and commercial units are presently occupied. Assuming 6 persons per unit, the total population is about 1,300. The social status of the families is Class A based on the classification of the National Statistics Office (NSO).

### **2.5.2 Project Affected Persons**

During construction, the project will cause noise and traffic nuisance to the Village, pedestrians and motoring public. Once operational, the project will directly affect the residents of the service area. The sanitation of the Village will also be improved.

Manila Water will assign skilled personnel to operate and maintain the system up to approved standards.

### 3.0 ALTERNATIVES

There are no other alternative locations for the STP since the use of the common areas in the Village has been maximized. The identified STP site is the ideal location because of its proximity to the main drainage line.

### 4.0 IMPACT ASSESSMENT

#### 4.1 IMPACT IDENTIFICATION

**Table 5  
Sources and List of Potential Environmental Impacts**

Source of Impacts	Potential Environmental Impact
<b>CONSTRUCTION PHASE</b>	
<u>Air Pollution</u> 1. Dust emission will occur due to civil works such as excavation, disposal of excess soil, etc. 2. Emission of dust and other air pollutants by vehicles.	The impact on the air quality will only occur during the construction phase, but could be controlled through proper measures. Among the potential air impacts are: <ul style="list-style-type: none"> <li>• Ground level concentration of suspended solids will increase</li> <li>• Air pollutants such as CO<sub>2</sub>, CO<sub>1</sub> and NO<sub>x</sub> will occur from vehicle emissions</li> </ul>
<u>Water Pollution</u> 1. Domestic waste made by the construction workers and staff. 2. Wastewater will be produced due to the washing of vehicles. 3. Spillage of oil might occur through improper handling.	<ul style="list-style-type: none"> <li>• Improper disposal of the wastewater produced could lead to contamination of ground water.</li> <li>• Uncontrolled wastewater discharge, construction debris and oil leakage/spill will increase the sedimentation/contribute to the pollution of the nearest body of water</li> </ul>
<u>Noise Pollution</u> 1. Noise pollution from the operation of construction equipment and vehicles.	<ul style="list-style-type: none"> <li>• Noise level will increase due to the usage of noise generating equipment.</li> </ul>
<b>OPERATIONAL PHASE</b>	
<u>Water Pollution</u> 1. Improper operation and maintenance of the STP will result to water pollution.	<ul style="list-style-type: none"> <li>• The project will reduce the wastewater load into the Pasig River and will constitute a positive impact. However, improper operations/maintenance of the STP will result to the discharge of untreated or partially treated effluent.</li> </ul>

<p><u>Odor Pollution</u></p> <p>1. Unpleasant odor will result from the anaerobic conditions and improper operation and maintenance of the STP.</p>	<ul style="list-style-type: none"> <li>The whole village, especially the SMVAI office and the houses near the STP, will experience unpleasant odor during periods of odor emission.</li> </ul>
<p><u>Noise Pollution</u></p> <p>1. Noise generating engines and equipment that are necessary for the operation of STP and lift stations will be used. Added noise will be created during its operation.</p>	<ul style="list-style-type: none"> <li>Impact will be insignificant and can easily be controlled through proper preventive measures.</li> </ul>
<p><u>Socio-Economic</u></p> <p>1. The project will result to proper treatment of wastewater. 2. Value of land will increase.</p>	<ul style="list-style-type: none"> <li>The STP will result to a positive impact since the domestic wastewater and drainage flows will be treated. This will help decrease the pollution load into Pasig River. Furthermore, the treated water could be re-used.</li> </ul>
<p><u>Residual and Unavoidable Impacts</u></p> <p>1. Accidents and man-made disasters might occur due to design failure and improper construction practices. 2. Environmental hazards might occur due to natural disasters like earthquakes, typhoon, etc.</p>	<ul style="list-style-type: none"> <li>Proper precautionary and preventive measures to avoid these kinds of impacts.</li> </ul>

#### 4.1.1 Impacts During Construction Phase

##### A. Air Quality

During the implementation of the project, an increase in emission of dust and suspended particulates will occur in the vicinity of the STP site and other construction areas. This can be attributed to civil works such as excavation, disposal of excess soil and other related construction activities. Another cause will be emission of fumes and other air pollutants from the vehicles to be used.

## B. Water Quality

Excavation activities in the project site could loosen soils which could be transported to the drainage lines and eventually to Pasig River resulting in siltation or increased turbidity. Inappropriate disposal of human waste by construction workers, excessive use of water for washing of equipment and spillage of oil might also occur.

## C. Noise

Noise will be generated during the construction of the project due to the operation of equipment and other construction activities. Considering that the proposed project site is near the residential units, proper mitigating measures will be implemented to ensure that the equipment and activities will cause negligible or no disturbance to the residents.

Heavy equipment will be monitored to operate only in short periods of time to avoid sustained high level of noise. The operator of heavy equipment will be required to suspend work for 10-15 minutes after every two (2) hours of operation. The use of heavy equipment will be strictly prohibited from 6:00 P.M. until 8:00 A.M. on weekdays.

Table 6 shows the typical noise emissions of common construction equipment used at various distances from source.

**Table 6**  
**Typical Noise Emissions of Construction Equipment**  
**at Various Distances from Source in dB(A)**

<b>Equipment</b>	<b>15 meters</b>	<b>30 meters</b>	<b>60 meters</b>
Air Compressor	75-87	69-81	63-75
Backhoe	71-92	65-87	59-81
Compactor	72	66	60
Concrete Mixer	75-88	69-82	63-76
Pumps	70-90	64-84	56-78
Tractors, Bulldozers	78-95	72-89	66-83
Trucks	83-93	77-87	71-81
Jack Hammer	81-97	75-91	69-85

## D. Ecological Effects

Since there are no rare, endemic species of flora and fauna in the project area, project implementation has minimal impact on the overall terrestrial ecology of San Miguel Village. Some plants will be unavoidably cleared during civil works.

#### **4.1.2 Impacts During Operation Phase**

##### **A. Air Quality**

There will be minimal effect on the air quality during the operational phase of the STP. Aside from the occasional odor nuisance, there will be no adverse effect on the air quality. The performance specifications for the STP treatment process specifically state that the facility should have odor control mechanisms (eg., deodorizer, masking agent, adsorbent, etc.). Manila Water Company will not accept the turnover of the STP by the contractor if the facility emits unpleasant odors. Permanent solution(s) to address any odor nuisance will be the responsibility of the contractor.

##### **B. Water Quality**

Without wastewater treatment, San Miguel Village accounts for an estimated 58 kg BOD<sub>5</sub>/day loading to the Pasig River. The implementation of the project will contribute to the improvement of the quality of water in Pasig River by reducing discharge of untreated/partially treated wastewater. From a pollution loading of 58 kg BOD<sub>5</sub>/day, loading will be reduced to 9-14 kg BOD<sub>5</sub>/day or a 76-84% BOD reduction when the STP becomes operational.

##### **C. Socio-Economic**

A flat sewer charge equivalent to 50% of the water charge will be included in the water bill once the STP is commissioned. This fee will help cover the costs for the operations and maintenance of the STP and the sewer network. This arrangement was clearly explained to the Board of Governors of SMVAI who also consulted with their other members. The negotiation with the Board is explained in Chapter 6.0.

The general sanitation conditions in the project area will significantly improve. The project will reduce, if not eliminate the threat of water borne diseases such as diarrhea and typhoid, which are more costly to manage.

##### **D. Sludge Disposal and Management**

The existing septic tanks in the area produce an estimated 8.775 kg of sludge per year. Table 7 illustrates the sludge production averages for various wastewater treatment processes. Also indicated is the estimated sludge production of the STP considering each type of treatment.

**Table 7  
Sludge Production of Various Wastewater Treatment Processes**

<b>Treatment Process</b>	<b>Typical Dry Solids Production (kg/m<sup>3</sup>)</b>	<b>Estimated STP Sludge Production (kg/day)</b>
Activated sludge	85	24,480
Trickling filtration	70	20,160
Extended aeration	100*	28,800
Aerated lagoon	100*	28,800

*\*assumes no primary treatment*

*The bidders for the project may propose any of the above wastewater treatment process or their modifications. Cost and operational efficiency are among the considerations for awarding the bid.*

In the interim (i.e. up to 2005), sludge produced in the treatment process and collected from the communal septic tanks will be transported to the Barge Loading Station. Vacuum tankers will collect and haul the sludge produced in the STP and the septage from septic tanks.

A long-term alternative is the disposal of sludge and septage to the lahar areas in Pampanga. The sludge can be used as soil conditioner for sugarcane and corn. *Experiments done in coordination with the Sugar Regulatory Administration on the use of sludge in enhancing the soil quality of lahar-covered areas and the growth of crops such as sugarcane, corn and bittergourd resulted in the issuance of a temporary license from the Fertilizer and Pesticide Authority. The license allows the use of sludge in growing similar crops.*

Starting 2004, a septage treatment facility will also be available to treat sludge and septage from the STP. The septage treatment facility is part of the Sanitation Component of the Pasig River Rehabilitation Project. Manila Water Company will operate this facility. Stabilized sludge may also be used as filling material.

#### **4.2 IMPACT PREDICTION AND EVALUATION**

Table 8 presents a summary of the assessment of the impacts of the project.



Mitigating measures will be implemented to minimize, if not eliminate any adverse impact that the project may cause. Measures to enhance the existing environmental conditions in the project site shall be implemented, as needed.

**4.3 UNAVOIDABLE AND RESIDUAL IMPACTS**

Unavoidable and residual impacts are those which occur as a result of natural calamities such as floods caused by typhoons or heavy rains, earthquakes and the like. Appropriate measures will be done to anticipate these impacts and to implement contingency action plans.

**5.0 ENVIRONMENTAL MANAGEMENT PLAN**

**5.1 IMPACTS MITIGATION / ENHANCEMENT PLAN**

Table 9 is a matrix on the environmental management plan of the proposed project.

**Table 9  
ENVIRONMENTAL MANAGEMENT PLAN**

<b>CONSTRUCTION PHASE</b>			
<b>Potential Environmental Impact</b>	<b>Mitigating Measures</b>	<b>Manner of Implementation</b>	<b>Schedule</b>
1. Poor quality of construction	<ul style="list-style-type: none"> <li>Manila Water Company will monitor the supply and installation contract to assure quality of equipment and construction. Site Managers and Engineers with experience in construction management shall approve all materials and equipment to be used and installed at the site.</li> <li>The contractor will be required to post a performance bond for the Design and Construction Contract of the sewerage system.</li> </ul>	To be included in the contractor's scope of work, under the supervision of Manila Water Company*.	Daily

<p>2. Air pollution (suspended particulates, odor and fumes, vehicle emissions e.g. CO<sub>2</sub>, CO, NO<sub>x</sub>)</p>	<ul style="list-style-type: none"> <li>• Efficient construction planning and work scheduling</li> <li>• Formulation of appropriate work plans, work scheduling, work specifications and work methodologies</li> <li>• Provision of properly maintained storage area for keeping stocks of construction materials and equipment</li> <li>• Prompt and fast removal of excavated materials or dredges spoils from construction site</li> <li>• Sprinkling of water on dust generating mounds resulting from earthmoving activities and civil works.</li> <li>• Control of motor vehicle emissions</li> <li>• Dust accumulation will also be prevented through proper washing of the vehicles prior to its departure from the site</li> <li>• Development and enforcement of strict health and safety pollution control regulations specific for the project site <ul style="list-style-type: none"> <li>– Good housekeeping of workplace and construction affected areas</li> <li>– Use of Protective Gear by all workers</li> </ul> </li> </ul>	<p>To be included in the contractor's scope of work, under the supervision of Manila Water Company*.</p>	<p>Start of construction and daily</p>
<p>3. Water pollution due to wastewater, oil leakage/spills, toxic and hazardous substances</p>	<ul style="list-style-type: none"> <li>• Provide temporary drain systems and storage facilities for excavation soils, fuel and oils needed for equipment</li> <li>• Cautious and sensible planning for construction and post-construction phases of the project</li> <li>• Provision of a routine chemical and oil spill clean-up plan</li> <li>• Formulation of a monitoring program</li> </ul>	<p>To be included in the contractor's scope of work, under the supervision of Manila Water Company*.</p>	<p>During construction</p>

<p>4. Noise pollution from operation of construction equipment</p>	<ul style="list-style-type: none"> <li>• Establish temporary sound barriers around the work site</li> <li>• Proper scheduling and phasing of high-noise activities</li> <li>• Use of appropriate mufflers and sound proofing for construction machinery, equipment and engines</li> <li>• Use of Personnel Protective Equipment by all workers</li> </ul>	<p>To be included in the contractor's scope of work, under the supervision of Manila Water Company*.</p>	<p>Daily</p>
<p>5. Temporary disruption of traffic flow within the Village</p>	<ul style="list-style-type: none"> <li>• Public information campaign and posting schedule of construction</li> <li>• Provision of a liaison officer from the residents of the compound to assist in the information dissemination regarding inevitable changes in schedule of operations</li> <li>• Provision of temporary alternative routes, including visible traffic warning signals</li> <li>• Scheduling of delivery materials and removal of excavated material during non-rush hour periods.</li> </ul>	<p>To be included in the contractor's scope of work, under the supervision of Manila Water Company*.</p>	<p>Daily</p>
<p>6. Accumulation of solid waste in the construction site</p>	<ul style="list-style-type: none"> <li>• Hauling and proper disposal of waste construction materials by contractor, supervised by Manila Water Company</li> <li>• Provision of temporary toilet facilities for workers</li> </ul>	<p>To be included in the contractor's scope of work, under the supervision of Manila Water Company*.</p>	<p>Daily</p>

\* Manila Water Company's contractor shall comply with all the conditions stipulated in the scope of work. Any violation by the contractor will be penalized by a performance security incorporated in the bid. This performance security will be in the form of an unconditional bank guarantee in the amount of 10% of the contract price.

<b>OPERATIONAL PHASE</b>			
<b>Potential Environmental Impact</b>	<b>Mitigating Measures</b>	<b>Manner of Implementation</b>	<b>Schedule</b>
<p>1. Environmental hazards due to accidents, man-made natural disasters e.g. Accidental spills, fire, seismic activity, earthquakes, heavy rain/flooding and design failure</p>	<ul style="list-style-type: none"> <li>• Carefully designed post-construction maintenance, contingency and monitoring programs</li> <li>• Well designed plan for detection of accident or natural events including precautionary and remedial measures to be observed</li> <li>• Provision of preventive and remedial procedural manuals at workplace</li> <li>• Adequate plans for environmental rehabilitation and restoration of site and removal of temporary structures and facilities installed during construction phase</li> </ul>	<p>Manila Water Company</p>	<p>Observance of guidelines will be done daily.</p>
<p>2. Water Pollution</p>	<ul style="list-style-type: none"> <li>• Wastewater discharged by the STP shall conform with the Effluent Standards set forth in DENR Administrative Order 34 and 35 for Class C waters. Annex 2 describes in detail the schedule of wastewater quality monitoring.</li> <li>• Regular monitoring of wastewater effluent by the Manila Water Company Central Laboratory</li> <li>• Regular check on sewer mains to prevent discharge/seepage of untreated wastewater to the environment</li> </ul>	<p>Manila Water Company</p>	<p>Refer to Annex 2</p>
<p>3. Noise Pollution</p>	<ul style="list-style-type: none"> <li>• Use of appropriate mounting for machinery to minimize vibration</li> <li>• All mechanical/electrical equipment shall be installed inside enclosures</li> <li>• If appropriate, motors shall be</li> </ul>	<p>Manila Water Company</p>	<p>Observance shall be done daily.</p>

	<p>provided with soundproofing devices</p> <ul style="list-style-type: none"> <li>Maintenance of greenbelt zones and vegetation with appropriate tree species</li> </ul>		
4. Solid Waste (in the interceptor chambers and generated within and by the STP)	<ul style="list-style-type: none"> <li>Regular collection and disposal of solid waste collected in the interceptor chambers and generated within and by the STP</li> <li>Disposal of sludge generated will be in accordance with established procedures of relevant authorities (disposal of sludge for use as soil conditioner)</li> </ul>	Manila Water Company	Weekly
5. Odors (organic and sulfur compounds coming from raw wastewater and during desludging of septage)	<ul style="list-style-type: none"> <li>Maintenance of greenbelt zones and vegetation with appropriate tree species</li> <li>Provision of landscape which will improve the aesthetic of the area by planting green strips using appropriate plant or tree species</li> <li>Provision of odor control mechanisms (deodorizer / adsorbent / masking agent) to prevent malodorous emissions</li> </ul>	Manila Water Company	This shall be inspected daily.
6. Maintenance and Operation of the System <ul style="list-style-type: none"> <li>Poor maintenance of mechanical equipment (pumps and motors)</li> </ul>	<ul style="list-style-type: none"> <li>Regular asset condition monitoring by Manila Water Company personnel</li> <li>Regular maintenance works for STP and lift stations equipment (pumps and motors), sewer network and septic tanks</li> <li>Adequate training of STP operators</li> <li>A liaison officer from the SMVAI will assist the STP and lift stations operator in assuring the facility's efficiency in operation</li> <li>Provision of adequate maintenance equipment and spares for the sewerage system facility</li> </ul>	Manila Water Company	This shall be done daily.

## 5.2 ENVIRONMENTAL MONITORING ACTION PLAN

Tables 10 and 11 below present the action plan for environmental monitoring for the proposed project. Manila Water Company will be responsible for the monitoring of the entire sewerage system.

**Table 10  
Environmental Monitoring Action Plan**

<b>Parameter</b>	<b>Location</b>	<b>Frequency</b>
<b><u>Construction Phase</u></b>		
Compliance with Manila Water Company health and safety policies (dust emissions, good housekeeping, noise, odors)	<ul style="list-style-type: none"> <li>• At STP site and its perimeter</li> <li>• Other excavation sites (sewer mains, interceptor chambers, lift stations and service connections)</li> <li>• Equipment and materials storage area</li> </ul>	<ul style="list-style-type: none"> <li>• On-the-spot daily inspection and monitoring will be implemented by the Health and Safety Dept. of Manila Water Company using the STARRT Card (Annex 1)</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>• Ingress and egress to the construction site</li> </ul>	<ul style="list-style-type: none"> <li>• Daily</li> </ul>
<b><u>Operational Phase</u></b>		
Effluent Water Quality for parameters like pH, 5-day BOD, COD, Total coliform, suspended solids, and oil and grease.	<ul style="list-style-type: none"> <li>• Influent</li> <li>• Samples from treatment stages</li> <li>• Effluent</li> </ul>	<ul style="list-style-type: none"> <li>• Annex 2 describes in detail the schedule of wastewater quality monitoring</li> </ul>
Odor	<ul style="list-style-type: none"> <li>• STP site and perimeter</li> </ul>	<ul style="list-style-type: none"> <li>• Daily</li> </ul>
Sludge accumulation/clogging	<ul style="list-style-type: none"> <li>• At STP site</li> <li>• Sewer network</li> <li>• Septic tanks</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly</li> </ul>

**Table 11  
Institutional Monitoring**

Item	Reporting Scheme		Frequency
	Reporter	Recipient	
<b>Pre-Construction Phase</b>			
Confined Space Permit	Contractor	Manila Water	every entry into a confined space
Welding Accreditation	Contractor	Manila Water	once
<b>Construction Phase</b>			
STARRT Card	Contractor	Manila Water	daily
Progress Report	Manila Water	MWSS	quarterly
	MWSS	World Bank	
<b>Operation Phase</b>			
PCO Report (See Annex 4 for the PCO Report Format)	Manila Water PCO	DENR/LLDA MWSS	quarterly

The procedures to be used during the sampling and analysis will be based on the standard methods prescribed in DENR Administrative Order No. 34 and 35. Annex 5 presents a sample monitoring sheet of effluent quality used by Manila Water Company.

## **6.0 COMMUNITY CONSULTATION PROCESS**

The development of the project included consultations with the SMVAI Board of Governors and Barangay officials. The Barangay endorsement is presented in Annex 6. The Memorandum of Agreement (MOA) for the project between the SMVAI and Manila Water Company is shown in Annex 7.

Meanwhile, negotiations for the use of the lot for the proposed STP are ongoing. Annex 8 shows the draft MOA among the SMVAI, Ayala Corporation and Manila Water Company.

**ANNEX 1**

## ANNEX 1. MANILA WATER COMPANY STARTT CARD FOR MONITORING CONSTRUCTION WORKS

SAFETY TASK ANALYSIS RISK REDUCTION TALK (STARTT) CARD			
NAME OF CONTRACTOR : _____		DATE: _____	
SUPERVISOR/FOREMAN : _____			
JOB DESCRIPTION : _____		NIGHT <input type="checkbox"/>	
LOCATION : _____		DAY <input type="checkbox"/>	
<b>TODAY ACTIVITIES:</b> _____			
PRIMARY HAZARDS INVOLVED: _____			
SAFETY PRECAUTIONS TAKEN: _____			
<b>PUBLIC SAFETY</b>		<b>HAZARDS (ENVIRONMENTAL)</b>	
BARRICADES	N/A YES NO	NOISE	N/A YES NO
TRENCH PLATE	N/A YES NO	HEAT STRESS	N/A YES NO
SIGNS	N/A YES NO	GROUND CONTAMINATION	N/A YES NO
<b>HAZARDS (BODY)</b>		<b>WORKING AT HEIGHT</b>	
BARRIERS	N/A YES NO	FULL BODY HARNESS	YES NO
FLASHERS	N/A YES NO	SHOCK ABSORBING LANYARD	YES NO
GUARDS	N/A YES NO	ACCESS LADDERS	YES NO
NOTICES	N/A YES NO	TIE OFF POINTS	N/A YES NO
OTHER	N/A YES NO	HORIZONTAL SAFETY LINE	N/A YES NO
FALL POTENTIAL	N/A YES NO	ENERTIA REAL	N/A YES NO
PINCH POINTS	N/A YES NO	SLIP GRIPS	N/A YES NO
ELECTRICAL SHOCK	N/A YES NO	SAFETY NETS	N/A YES NO
SLIP-TRIP	N/A YES NO	MAN BASKETS	N/A YES NO
FLYING PARTICLES	N/A YES NO	SUSPENDED PLATFORM	N/A YES NO
THERMAL BURNS	N/A YES NO	DROP AREA PROTECTION	N/A YES NO
MANUAL LIFTING	N/A YES NO	BARRICADES	N/A YES NO
SHARP OBJECT	N/A YES NO	<b>SCAFFOLD</b>	
<b>HOUSEKEEPING</b>		GREEN TAG UP TO DATE	N/A YES NO
AREA TIDY	YES NO	HANDRAILS, LADDERS, BOARDS	N/A YES NO
FREE OF WASTE	YES NO	FULL WIDTH PLANKING	N/A YES NO
<b>PPE</b>		ALL PLANKS IN GOOD CONDITION	N/A YES NO
HARD HAT	YES NO	<b>CONFINED SPACE</b>	
SAFETY GLASSES	YES NO	CONFINED SPACE PERMIT ISSUED	YES NO
WORK GLOVES	YES NO	CONFINED SPACE STANDBY PERSON	YES NO
SAFETY BOOTS	YES NO	ATMOSPHERE TESTED	YES NO
CHEMICAL GLOVES	N/A YES NO	WORKERS TOLD OF HAZARDS	YES NO
RUBBER BOOTS	N/A YES NO	ENTRY PERMIT COMPLETED	YES NO
MONO GOGGLES	N/A YES NO	<b>WELDING</b>	
FOOT GUARDS	N/A YES NO	HOT WORK PERMIT	YES NO
<b>EXCAVATION</b>		FIRE WATCH MAN	YES NO
EXCAVATION PERMIT	YES NO	FIRE EXTINGUISHERS	YES NO
DAILY INSPECTION	YES NO	FIRE BLANKET	YES NO
BENCHED/SLOPED/STEPED	YES NO	SHIELDS	N/A YES NO
LADDER PROVIDED	YES NO	CYLINDERS SECURED...	
SIGNS & BARRICADES IN PLACE	YES NO	... & MOVED FROM SPARK AREA	N/A YES NO
<b>ELECTRICAL</b>		SPARKS CONTAINED	N/A YES NO
CORDS IN GOOD CONDITION	N/A YES NO	COMBUSTIBLES CLEARED	N/A YES NO
PLUGS & RECEPTORS NOT -		FACE SHIELD	N/A YES NO
BROKEN	N/A YES NO	BURNING GOGGLES	N/A YES NO
CORRECT VOLTAGE RATING	N/A YES NO	FRESH AIR	N/A YES NO
STRUNG ABOVE GROUND	N/A YES NO	RESPIRATOR	N/A YES NO
NOT THROUGH WATER	N/A YES NO	EAR PROTECTION	N/A YES NO
		SAFETY HARNESS	N/A YES NO
		OTHERS: _____	

15			
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1			

SUPERVISOR: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 FOREMAN: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 EMPLOYEE NAME: \_\_\_\_\_  
 ID #: \_\_\_\_\_  
 EMPLOYEE SIGNATURE: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

REMARKS:

<b>LIFTING</b>	
RIGGING IN GOOD CONDITION	YES NO
PROPER RIGGING	YES NO
LIFTING ZONE BARRICADED	YES NO
CURRENT INSPECTION ON CRANE	YES NO
OVERHEAD POWER	YES NO
LINES CLEARANCE (10'+)	YES NO
<b>OVERHEAD WORK OR FLOOR OPENING</b>	
FIXED BARRICADES	YES NO
(TAPE) DANGER	N/A YES NO
(TAPE) CAUTION	N/A YES NO
BARRIERS	N/A YES NO
SIGNS	N/A YES NO
TRENCH & HOLE COVER IN PLACE	N/A YES NO
HANDRAILS/TOEBOARD	N/A YES NO
<b>EMERGENCY EQUIPMENT</b>	
FIRE EXTINGUISHER	N/A YES NO
SAFETY SHOWER	N/A YES NO
EYEWASH	N/A YES NO
<b>REPAIR PROCESS EQUIPMENT</b>	
VALVES LOCKED	N/A YES NO
TAGS HUNG	N/A YES NO
<b>PROPER EQUIPMENT</b>	
MANLIFT	N/A YES NO
FORKLIFT	N/A YES NO
TRUCKS, TRACTOR ETC.	N/A YES NO
HAND TOOLS	N/A YES NO
HAND POWER TOOLS	N/A YES NO
<b>GENERAL</b>	
TRAFFIC WATCH	N/A YES NO
PERMIT & START CARD	N/A YES NO
DISPLAYED	N/A YES NO

# **ANNEX 2**

**ANNEX 2. WASTEWATER QUALITY MONITORING SCHEDULE**

Parameters	Sample Identity	Frequency	Agency	Total Costs for Manila Water (PhP/month)
				TOT=46,961.00
pH Suspended solids Dissolved Oxygen BOD <sub>5</sub> COD Oil & grease Residual Chlorine Total Coliform Fecal Coliform	Influent, effluent	quarterly monthly weekly	DENR MWSS Regulatory Office Manila Water	14,696.00
30-Minute settling test  COD Residual Chlorine	Sample from Aeration tank effluent effluent	daily	Manila Water	25,080.00
Dissolved oxygen Sludge Volume Index Settleable Matter Suspended Solids Total Solids	Return activated sludge, Mixed liquor tanks	weekly	Manila Water	2,640.00
pH Suspended solids Cyanide Cadmium Chromium Copper Iron Manganese Lead Zinc	Raw sludge, Digested sludge	monthly	Manila Water	4,545.00

# **ANNEX 3**

## ANNEX 3. ENVIRONMENTAL COMPLIANCE CERTIFICATE (ECC)



Republic of the Philippines  
Department of Environment and Natural Resources  
NATIONAL CAPITAL REGION  
Congressional Bldg., Building # 51 Congressional Avenue, Project 8, Quezon City  
Tel. No. 926-0929 • 926-0907



*NCR 2001 - 06 - 25 - 114-211*  
*2001 - 04 - 104 - MKT - 211*

### ENVIRONMENTAL COMPLIANCE CERTIFICATE

DENR-NCR hereby grants **Environmental Compliance Certificate (ECC)** for the construction and operation of the **Sewage Treatment Plant** project of **Manila Water Company Inc. (MWCI)** located in San Miguel Village, Bgy. Poblacion, Makati City after complying with the Environmental Impact Statement (EIS) system requirements as prescribed in the guidelines of the implementing Rules and Regulations of Presidential Decree 1586.

This Certificate is issued subject to the following conditions:

#### **I. PRE-CONSTRUCTION AND CONSTRUCTION STAGE:**

1. That all amenities/utilities (e.g. recreational areas, parking areas, drainage lines, paved areas, etc. ) affected by the project shall be immediately restored and rehabilitated;
2. That in case of cutting of trees, the proponent should first secure a "Permit to Cut" from DENR-NCR Forestry Sector;
3. That the proponent shall conduct orientation for resident engineers and contractor who will undertake and implement the project to apprise them of the conditions/stipulations of this ECC and the necessary measures that will mitigate adverse environmental impacts and submit report within fifteen (15) days from date of orientation;
4. That a billboard measuring at least 2 ft. x 4 ft. bearing the following message: **"Notice to the Public, This Project, construction and operation of the Sewage Treatment Plant of Manila Water Company Inc. (MWCI) has been issued an Environmental Compliance Certificate (ECC NCR 2001 - 06 - 25 - 114-211) by the Department of Environment and Natural Resources, EMB-NCR on 25 JUN 2001"** shall be installed at all entry/exit points of the project site facing the road;

#### **II. OPERATION STAGE:**

5. That this Certificate covers the operation of a 300 cu.m. per day capacity, below ground mounted Sewage Treatment Plant to exclusively serve the existing San Miguel Village;
6. That adequate maintenance procedures shall be undertaken to avoid emission of objectionable odor from said facility;

#### **III. OTHERS**

7. That all the proposed environmental management measures contained in the Environmental Management Plan shall be effected;

8. That should adverse impacts occur as a result of project operations, all the activities causing the same shall be immediately stopped and remedial measures shall be effected;
9. That in case of abandonment or indefinite work stoppage, the project proponent shall submit a written notification thirty (30) days before the scheduled abandonment/work stoppage and provide safety and protective measures to prevent adverse environmental impacts that may be caused by the project;
10. That restoration works/grading of the exposed grounds shall be immediately undertaken for safety, enhancement and ecological purposes;
11. That this Certificate shall be posted in a conspicuous place in the Administration's Office for easy reference and guidance.
12. That the proposed Environmental Monitoring Program must be implemented, the report and/or result under oath of said monitoring and on the compliance with each of the conditions of the ECC shall be submitted to this Office annually;
13. That a written notification shall be made to the DENR-NCR for approval, in case the project proponent cannot comply with any of the conditions for technical reasons; and
14. That the project proponent shall allow DENR-NCR personnel with proper identification card and travel/mission order to conduct inspection/monitoring of the project without prior notice to oversee compliance to ECC conditions.

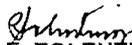
Non-compliance with any of the above stipulations and/or misrepresentations in the IEE submitted by the proponent will be sufficient cause for the suspension or cancellation of this Certificate and/or imposition of a fine in an amount not to exceed **Fifty Thousand Pesos (P50,000.00) for every violation** thereof pursuant to Article IX, Section 6.0, DENR Administrative Order No. 37, Series of 1996. This ECC is not a permit rather it is a certification that the proponent has committed to undertake or implement mitigation measures to reduce the negative impacts to acceptable level.

Given this \_\_\_\_ day of 25 JUN 2001 2001.



**CORAZON C. DAVIS**  
OIC, Regional Executive Director

Recommending Approval:



**SIXTO E. TOLENTINO, JR.**  
Regional Director for Environment



# **ANNEX 4**





1 – Name of Air Pollution Installations  
the Quarter

2 – Number of Hours of Operation of the Installation During

3 – Name of Materials Processed by the Source Installations

4 – Name of the Pollution Control Device of the Installations

5 – Number of Hours of Operation of the Devices During the Quarter

6 – Name of Air Contaminants by the Installations

7 - Concentration of Air Contaminants Emitted by the Installations

8 – Name the Collected Solid Wastes and Means of Disposal

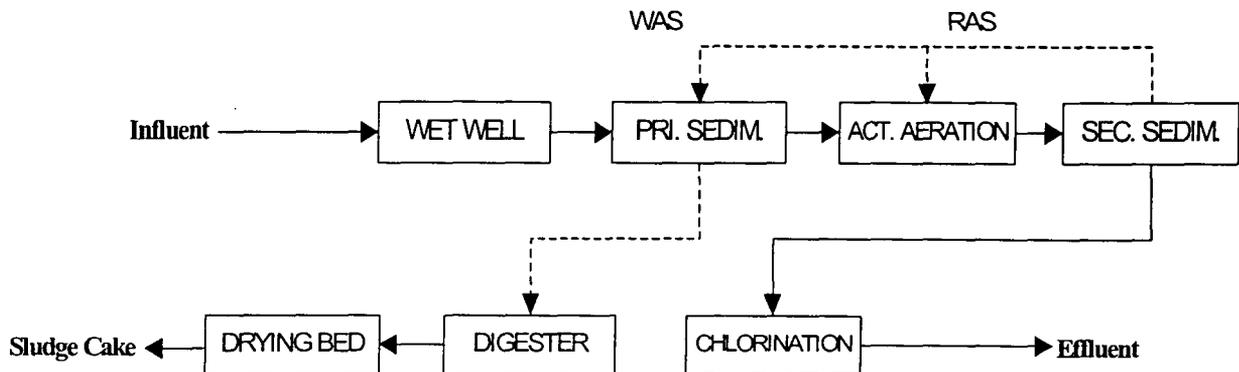
### B.1. Sources of Wastewater

Sources	Quantity
1. Domestic	19,820 m <sup>3</sup> / d
2. Process	200.0 m <sup>3</sup> / d
3. Cooling	m <sup>3</sup> / d
4. Washings: Equipment	2.6 m <sup>3</sup> / d
Floor	2.0 m <sup>3</sup> / d

### B.2. Wastewater Treatment Process

- Treatment Scheme**

*Indicate wastewater flow directions and rates and the different units involved in the process.*



- Design Capacity of the Wastewater Treatment Facilities**

\_\_\_\_\_ m<sup>3</sup> / day

- Operation of the Treatment Facilities:**

Average Hours/Day 24

Number of Days During the Quarter 92

• **Sludge Management :**

Quantity Produce: \_\_\_\_\_ m<sup>3</sup>, day

Method Used for Sludge Thickening \_\_\_\_\_  
 Method Used for Sludge Treatment \_\_\_\_\_  
 Method Used for Sludge Disposal \_\_\_\_\_  
 Frequency of Disposal \_\_\_\_\_

**B.3. Wastewater Characteristics**

*Attach results of the monthly physical and chemical laboratory analysis on the WTP effluent.*

**Physical & Chemical Analysis include the following:**

Parameters	Results
Color	Color Un
Temperature	
pH	
Suspended Solids	mg
BOD <sub>5</sub>	mg
Oil/Grease	mg

**C. Maintenance & Repairs Works** *(Indicate any breakdown on the air & water pollution installations, problems encountered in the operation; repair & maintenance works undertaken & improvements made on the control devices.)*

Submitted by:

Attested by:

\_\_\_\_\_  
 Pollution Control Officer

**ANTONINO T. AQUINO**  
 President

Quality and Regulation  
Laboratory Services  
Analytical Services

**RESULT OF ANALYSIS**

AC-01-03-012  
AT-01-03-013

Source of Sample :  
Submitted by :  
Collected by :  
Date/Time Collected :  
Date/ Time Submitted :  
Analyzed by : Analytical Services Personnel

PARAMETER(S)	LIMIT(S)	RESULT(S)	
		INFLUENT	EFFLUENT
Color	TCU	150.00	
Turbidity	NTU	-	
Settleable Matter	mL/L	0.50	
Suspended Solids, 103°C	mg/L	70.00	
Dissolved Solids , 180°C	mg/L	-	
pH		6.50-9.00	
Dissolved Oxygen (DO)	mg/L	-	
Biochemical Oxygen Demand (BOD) <sub>5</sub>	mg/L	50.00	
Chemical Oxygen Demand	mg/L	100.00	
Surfactants (MBAS)	mg/L	5.00	
Oil and Grease	mg/L	5.00	
Phenols	mg/L	0.10	
Cadmium	mg/L	0.05	
Chromium (Cr <sup>+6</sup> )	mg/L	0.10	
Copper	mg/L	-	
Cyanide*	mg/L	0.20	
Iron	mg/L	-	
Lead	mg/L	0.30	
Manganese	mg/L	-	
Zinc	mg/L	-	
Residual Chlorine	mg/L	-	
<b>BACTERIOLOGICAL EXAMINATION</b>			
Total Coliform	MPN/100 ml	10,000	
Fecal Coliform	MPN/100 ml	-	

Sample analyzed as submitted

eur-equipment under repair

\* Analyzed qualitatively

Certified Correct : *Orig. Sgd.*  
**ELIZABETH P. SEVILLENO**  
Sr. Quality & Regulation Officer

Date Test Report Issued :

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# **ANNEX 5**

# ANNEX 5. SAMPLE MONITORING SHEET FOR EFFLUENT QUALITY

Quality and Regulation  
Laboratory Services  
Analytical Services

Ctrl #: LE-00-06-004

## RESULT OF ANALYSIS

Source of Sample :  
 Submitted by :  
 Collected by :  
 Date/Time Collected :  
 Date/ Time Submitted :  
 Date Analyzed :  
 Analyzed by : Analytical Services Personnel  
 Analytical Methods Used : <sup>1</sup>Electrometric, <sup>2</sup>Cobalt-Platinum Scale, <sup>3</sup>Gravimetric, <sup>4</sup>Azide Modification,  
<sup>5</sup>Open Reflux Dichromate, <sup>6</sup>Multiple Tube Fermentation Technique

PARAMETER(S)	LIMIT(S)	RESULT(S)
pH <sup>1</sup> <span style="float: right;">Units</span>	6.50-9.00	
Color <sup>2</sup> <span style="float: right;">TCU</span>	150.00	
Suspended Solids <sup>3</sup> <span style="float: right;">mg/L</span>	70.00	
Dissolved Oxygen <sup>4</sup> <span style="float: right;">mg/L</span>	-	
Biochemical Oxygen Demand <sup>4</sup> (BOD) <sub>5</sub> <span style="float: right;">mg/L</span>	50.00	
Chemical Oxygen Demand <sup>5</sup> <span style="float: right;">mg/L</span>	100.00	
<b>BACTERIOLOGICAL EXAMINATION<sup>6</sup></b>		
Total Coliform <span style="float: right;">MPN/100 mL</span>	10,000	
Fecal Coliform <span style="float: right;">MPN/100mL</span>	-	

REMARKS : Sample analyzed as submitted

Submitted by:

*Original Signed*  
**MA VIRGINIA B. PINEDA**  
Sr. Analyst

Certified Correct :

*Original Signed*  
**ELIZABETH P. SEVILLENO**  
Unit Head, Analytical Services

Date Test Report Issued :

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# **ANNEX 6**

## ANNEX 6. ENDORSEMENT FROM BARANGAY CAPTAIN



Republic of the Philippines  
CITY OF MAKATI  
BARANGAY POBLACION  
Tel. No. 899-70-27



### CERTIFICATION OF ENDORSEMENT

To Whom It may Concern:

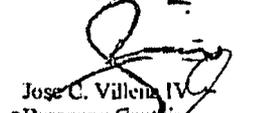
As the sole provider of sewerage and sanitation services in the Eastern part of Metropolitan Manila, The Manila Water Company, Inc. ( MWCI ) shall undertake projects on improving the sewerage and sanitation system of Makati City, more specifically, the San Miguel Village.

With the project's objective of environmental preservation and protection of the health of the residents of this community, I, Jose C. Villena IV, Barangay Captain, of Poblacion City of Makati, give my all out support and endorsement to this project in San Miguel Village.

This certification is issued upon the request of MWCI for whatever legal purpose(s) this may serve.

Issued this 26<sup>th</sup> day of February 2001, Office of Barangay Captain, Barangay Poblacion, District I, City of Makati.

Sincerely yours, =

  
Jose C. Villena IV  
Barangay Captain  
Poblacion, City of Makati

# **ANNEX 7**

ANNEX 7. MEMORANDUM OF AGREEMENT (MOA) BETWEEN SAN MIGUEL VILLAGE ASSOCIATION, INC. AND MANILA WATER COMPANY

MEMORANDUM OF AGREEMENT

For the Provision of Sewerage Services to San Miguel Village  
Through a Combined Sewage and Drainage System  
With a Package Sewage Treatment Plant

This Memorandum of Agreement (the "Agreement") executed at Makati City, Metro Manila, on this day of May 23, 2001, by and between:

SAN MIGUEL VILLAGE ASSOCIATION, INC., an association of the homeowners of San Miguel Village, duly organized and existing under and by virtue of the laws of the Philippines, with principal office at F. Zobel St., San Miguel Village, Barangay Poblacion, Makati City, represented herein by its President, MR. SALVADOR S. MARTINEZ, thereunto duly authorized, hereinafter referred to as the "SMVAI";

-and-

MANILA WATER COMPANY, INC., a corporation duly organized and existing under Philippine laws, acting as concessionaire/contractor/agent of the Metropolitan Waterworks and Sewerage System (the "MWSS") with principal office address at MWSS Administration Building, 489 Katipunan Road, Balara, Quezon City, represented herein by its President, MR. ANTONINO T. AQUINO, thereunto duly authorized, hereinafter referred to as the "MWCI";

WITNESSETH THAT -

WHEREAS, under its Charter (Republic Act No. 6234, as amended), the MWSS has jurisdiction, supervision and control over all waterworks and sewerage systems within its franchise area which includes, among others, Makati City;

WHEREAS, by virtue of and pursuant to a Concession Agreement dated February 21, 1997 (the "Concession Agreement") executed by and between the MWSS and MWCI, MWSS granted to MWCI, as concessionaire/contractor/agent, the sole right to manage, operate, repair, decommission and refurbish all fixed and movable assets required to provide water delivery and sewerage services in the East Service Area (which includes Makati City) of the franchise area of MWSS;

WHEREAS, the MWSS owns a deepwell pumping station located at the park and playground along F. Zobel St., San Miguel Village, and which has been donated to MWSS by Ayala Corporation pursuant to a Deed of Donation dated May 13, 1977 executed by MWSS and Ayala Corporation;

WHEREAS, the SMVAI operates and maintains the drainage system within the San Miguel Village;

WHEREAS, in line with a program initiated by MWCI in pursuance of the Concession Agreement, MWCI has offered to provide sewerage services to San Miguel Village through a combined sewage and drainage system which includes the

*Handwritten initials: SMVAI*

*Handwritten signature: S. Martinez*

*Handwritten initials: MWCI*

*Handwritten signature: A. Aquino*

sewer network and its appurtenances, interconnection chambers and package sewage treatment plant (the "STP"), hereinafter collectively referred to as the "Sewerage System";

NOW THEREFORE, for and in consideration of the foregoing premises and of the terms, conditions and stipulations herein contained, the parties hereto have mutually agreed to the following terms and conditions:

Article I. *RIGHTS AND RESPONSIBILITIES OF MWCI*

1. The MWCI shall, at its expense, construct, operate and maintain the Sewerage System. The STP shall be constructed underground at the site of the MWSS deepwell pumping station and part of the adjacent playground.
2. Prior to the construction of the Sewerage System, the MWCI shall secure an Environmental Compliance Certificate and all other related governmental permits.
3. The MWCI shall provide the SMVAI with the detailed plans and specifications of the Sewerage System, tentatively shown in Annex A, and the detailed project schedule, tentatively shown in Annex B.
4. The MWCI shall require its contractors involved in the construction of the Sewerage System to wear identification cards issued by the SMVAI.
5. The MWCI shall also require its contractors to strictly observe the San Miguel Village entry and exit hours. Entry shall start at 7:00 a.m. and exit shall not be later than 7:00 p.m., from Monday to Saturday. All construction works shall be suspended on Sundays and holidays.
6. Any loss and/or damage to property, which may be caused by the construction of the Sewerage System, shall be the responsibility of the MWCI. The MWCI shall require its contractors to post a cash bond equivalent to the cost of road restoration works in favor of the SMVAI prior to any road excavation work.
7. Commencing from the date of commissioning of the Sewerage System, the MWCI, as operator of the Sewerage System, shall have the sole liability for any charges or fines that may be assessed in case of any violation of national and local environmental laws and standards, provided, however, that such charges or fines are not the result of or due to the acts, fault or negligence of the SMVAI and/or any homeowner/locator in San Miguel Village.
8. At its expense, the MWCI has the option to make any additions and/or modifications to the Sewerage System, subject to a written approval by the SMVAI. The MWCI shall restore to its original condition all facilities that may be damaged by the addition and/or modification on the Sewerage System.

9. The MWCI shall bill, collect and receive payments from the SMVAI and/or homeowners/locators in San Miguel Village for sewer charges, the rates of which shall be in accordance with the Concession Agreement. The sewer charges shall be incorporated in the MWCI water bill commencing from the date of commissioning of the Sewerage System.
10. The ownership of the Sewerage System shall pertain to MWCI during the effectivity of the Concession Agreement. It is hereby understood that upon the expiration of the Concession Agreement, the ownership of the Sewerage System shall be automatically transferred to MWSS pursuant to Articles 6.15 and 16.12 of the Concession Agreement.

Article II. *RIGHTS AND RESPONSIBILITIES OF THE SMVAI*

1. The SMVAI shall continue to operate and maintain the drainage system, at its sole expense.
2. Prior to the commencement of the construction of the Sewerage System, the SMVAI shall provide/grant a gratuitous perpetual easement on the appropriate piece(s) of land whereon MWCI shall construct the Sewerage System.
3. The SMVAI shall provide identification cards and a right-of-way or entry to any authorized representative(s) of MWCI, its contractors, and assigns for the construction/installation, operation and maintenance of the Sewerage System and for the execution/performance of all necessary and related works/activities in connection therewith.
4. The SMVAI shall provide a liaison personnel who shall coordinate with the MWCI and/or its contractors during the construction activities.
5. In the event that the MWCI and its contractors shall not be able to complete the road excavation and/or restoration works as specified in the detailed project schedule stated in Section 3 of Article I, due to unforeseen and unavoidable circumstances, the SMVAI, in order to minimize inconvenience to the affected homeowners/locators, shall have the option to impose to the MWCI, the appropriate period/schedule for the continuance and completion of the remaining excavation and/or restoration works.
6. In the event that the ownership or lease to any common area subject of this Agreement (including but not limited to the piece(s) of land mentioned in Section 3 of this Article II) is transferred or encumbered to another party, the SMVAI shall cause such party to respect the rights and obligations of the parties in this Agreement, through appropriate stipulation(s) in relevant agreements, among others.

hr

Signature

Signature  
P.B.S.

7. The SMVAI shall ensure that the homeowners/locators of San Miguel Village are duly notified of MWCI's construction, operation and maintenance of the Sewerage System as well as of the inclusion of the sewer fees and related charges in the MWCI monthly water bills and shall cause such homeowners/locators to assist and cooperate, to the extent possible, MWCI in this connection.

### Article III. DURATION OF AGREEMENT

This Agreement shall take effect on the date of its execution by both parties and shall be co-terminus with the Concession Agreement.

### Article IV. MISCELLANEOUS

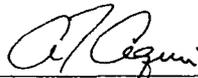
1. No party may assign, transfer or convey, any or all of its rights and obligations under this Agreement without the prior written consent of the other party.
2. This Agreement contains the entire agreement of the parties. No party may modify any of the terms of this Agreement unless in writing and signed by both parties.
3. This Agreement shall be governed by and construed in accordance with the laws of the Republic of the Philippines. In the event of any dispute arising out of or in connection with this Agreement, the venue shall be the proper courts of Makati City.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their respective officers, thereunto duly authorized, on the date and at the place above stated.

MANILA WATER COMPANY, INC.

SAN MIGUEL VILLAGE ASSN., INC.

By:

  
ANTONINO T. AQUINO  
President

By:

  
SALVADOR S. MARTINEZ  
President

SIGNED IN THE PRESENCE OF:

  
ALBERTO L. JUGO

  
FRED C. RETES

ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES

MAKATI CITY, METRO MANILA) S.S.

On this 23rd day of May, 2001, before me, a Notary Public in and for Makati City, Metro Manila, personally appeared the following:

<u>Name</u>	<u>Comm. Tax Cert. No.</u>	<u>Date/Place Issued</u>
Manila Water Company, Inc. Represented by: Antonino T. Aquino	<u>05959688</u>	<u>Jan. 12 / Quezon City</u>
San Miguel Village Association, Inc. Represented by: Salvador S. Martinez	<u>04184819</u>	<u>Feb. 28, 2001 / MAKATI CITY</u>

both known to me and to me known to be the same persons who executed the foregoing Agreement, and they acknowledged to me that the same is their free and voluntary act and deed as well as the free and voluntary act and deed of their respective principals.

This Memorandum of Agreement, which consists of five (5) pages including this page wherein this acknowledgment is written, has been signed by the parties executing the same and their witnesses on each and every page thereof.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my notarial seal on the date and at the place herein above stated.

Doc. No. 1005;  
Page No. 22;  
Book No. 16;  
Series of 2001

REPUBLIC OF THE PHILIPPINES  
NOTARY PUBLIC  
UNTIL DECEMBER 31, 2001  
PTR NO. 132-416-117  
JAN 21 2001

*[Handwritten signature]*  
P. A. G.



# SAN MIGUEL VILLAGE COMBINED SYSTEM PROJECT

June				July				August				September				October				November										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
<div style="border: 1px solid black; width: 100%; height: 100%; position: relative;"> <!-- This area contains a Gantt chart with several task bars. --> <!-- Task 1: A bar spanning from approximately June 15 to July 15. --> <!-- Task 2: A bar spanning from approximately July 15 to August 15. --> <!-- Task 3: A bar spanning from approximately August 15 to September 15. --> <!-- Task 4: A bar spanning from approximately August 15 to October 15. --> <!-- Task 5: A bar spanning from approximately September 15 to October 15. --> <!-- Task 6: A bar spanning from approximately October 15 to November 15. --> <!-- Task 7: A bar spanning from approximately October 15 to November 15. --> <!-- Task 8: A bar spanning from approximately October 15 to November 15. --> <!-- Task 9: A bar spanning from approximately October 15 to November 15. --> <!-- Task 10: A bar spanning from approximately October 15 to November 15. --> <!-- Task 11: A bar spanning from approximately October 15 to November 15. --> <!-- Task 12: A bar spanning from approximately October 15 to November 15. --> <!-- Task 13: A bar spanning from approximately October 15 to November 15. --> <!-- Task 14: A bar spanning from approximately October 15 to November 15. --> <!-- Task 15: A bar spanning from approximately October 15 to November 15. --> <!-- Task 16: A bar spanning from approximately October 15 to November 15. --> <!-- Task 17: A bar spanning from approximately October 15 to November 15. --> <!-- Task 18: A bar spanning from approximately October 15 to November 15. --> <!-- Task 19: A bar spanning from approximately October 15 to November 15. --> <!-- Task 20: A bar spanning from approximately October 15 to November 15. --> <!-- Task 21: A bar spanning from approximately October 15 to November 15. --> <!-- Task 22: A bar spanning from approximately October 15 to November 15. --> <!-- Task 23: A bar spanning from approximately October 15 to November 15. --> <!-- Task 24: A bar spanning from approximately October 15 to November 15. --> <!-- Task 25: A bar spanning from approximately October 15 to November 15. --> <!-- Task 26: A bar spanning from approximately October 15 to November 15. --> <!-- Task 27: A bar spanning from approximately October 15 to November 15. --> <!-- Task 28: A bar spanning from approximately October 15 to November 15. --> <!-- Task 29: A bar spanning from approximately October 15 to November 15. --> <!-- Task 30: A bar spanning from approximately October 15 to November 15. --> <!-- Task 31: A bar spanning from approximately October 15 to November 15. --> <!-- Task 32: A bar spanning from approximately October 15 to November 15. --> <!-- Task 33: A bar spanning from approximately October 15 to November 15. --> <!-- Task 34: A bar spanning from approximately October 15 to November 15. --> <!-- Task 35: A bar spanning from approximately October 15 to November 15. --> <!-- Task 36: A bar spanning from approximately October 15 to November 15. --> <!-- Task 37: A bar spanning from approximately October 15 to November 15. --> <!-- Task 38: A bar spanning from approximately October 15 to November 15. --> <!-- Task 39: A bar spanning from approximately October 15 to November 15. --> <!-- Task 40: A bar spanning from approximately October 15 to November 15. --> <!-- Task 41: A bar spanning from approximately October 15 to November 15. --> <!-- Task 42: A bar spanning from approximately October 15 to November 15. --> <!-- Task 43: A bar spanning from approximately October 15 to November 15. --> <!-- Task 44: A bar spanning from approximately October 15 to November 15. --> <!-- Task 45: A bar spanning from approximately October 15 to November 15. --> <!-- Task 46: A bar spanning from approximately October 15 to November 15. --> <!-- Task 47: A bar spanning from approximately October 15 to November 15. --> <!-- Task 48: A bar spanning from approximately October 15 to November 15. --> <!-- Task 49: A bar spanning from approximately October 15 to November 15. --> <!-- Task 50: A bar spanning from approximately October 15 to November 15. --> </div>																														
Project: Project1.MPP												Task: [REDACTED]																		
Date: 4/10/01																														
Page 2																														

# SAN MIGUEL VILLAGE COMBINED SYSTEM PROJECT

ID	Task Name	Duration	Start	Finish	February			March			April				May						
					11	18	25	4	11	18	25	1	8	15	22	29	5	12	19	26	
1	Survey works	40d	2/15/01	4/11/01	[Gantt bar for Survey works]																
2	NCA signing	23d	3/1/01	4/20/01	[Gantt bar for NCA signing]																
3	Design	30d	4/12/01	5/9/01	[Gantt bar for Design]																
4	Cost Estimates	29d	5/10/01	5/11/01	[Gantt bar for Cost Estimates]																
5	ECC and other permits	110d	3/2/01	8/2/01	[Gantt bar for ECC and other permits]																
6	Bidding process	55d	5/14/01	7/27/01	[Gantt bar for Bidding process]																
7	Construction	85d	8/3/01	11/29/01	[Gantt bar for Construction]																

Project: Project1.MPP  
Date: 4/10/01

Task: [Redacted]

# **ANNEX 8**

ANNEX 8. DRAFT MEMORANDUM OF AGREEMENT (MOA) AMONG SAN MIGUEL VILLAGE ASSOCIATION, INC., AYALA CORPORATION, AND MANILA WATER COMPANY

MEMORANDUM OF AGREEMENT

For the Provision of Sewerage Services to San Miguel Village

This Memorandum of Agreement (the "Agreement") executed at Makati City, Metro Manila, on this day of \_\_\_\_\_, 2001 by and among:

SAN MIGUEL VILLAGE ASSOCIATION, INC., an association of the homeowners of San Miguel Village duly organized and existing under and by virtue of the laws of the Philippines, with principal office at F. Zobel St., San Miguel Village, Barangay Poblacion, Makati City, represented herein by its President, MR. SALVADOR S. MARTINEZ, thereunto duly authorized, hereinafter referred to as the "SMVAI";

AYALA CORPORATION, a corporation duly organized and existing under Philippine laws, acting in its capacity as successor-in interest of Makati Development Corporation, with principal office at the 34<sup>th</sup> Floor, Tower One and Exchange Plaza, Ayala Triangle, Ayala Avenue, Makati City, represented herein by its Attorneys-in-Fact, \_\_\_\_\_ and \_\_\_\_\_, thereunto duly authorized, hereinafter referred to as "AC";

-and-

MANILA WATER COMPANY, INC., a corporation duly organized and existing under Philippine laws, acting as concessionaire/contractor/agent of the Metropolitan Waterworks and Sewerage System (the "MWSS") with principal office address at MWSS Administration Building, 489 Katipunan Road, Balara, Quezon City, represented herein by its President, MR. ANTONINO T. AQUINO, thereunto duly authorized, hereinafter referred to as the "MWCI";

WITNESSETH THAT –

WHEREAS, under its Charter (Republic Act No. 6234, as amended), the MWSS has jurisdiction, supervision and control over all waterworks and sewerage systems within its franchise area which includes, among others, Makati City;

WHEREAS, by virtue of and pursuant to a Concession Agreement dated February 21, 1997 (the "Concession Agreement") executed by and between the MWSS and MWCI, MWSS granted to MWCI, as concessionaire/contractor/agent, the sole right to manage, operate, repair, decommission and refurbish all fixed and movable assets required to provide water delivery and sewerage services in the East Service Area (which service area includes Makati City) of the franchise area of MWSS;

WHEREAS, pursuant to a Contract of Lease, attached as Annex "A", dated May 28, 1964 (the "Contract of Lease"), SMVAI was granted by Makati Development Corporation, by way of lease, rights of possession and maintenance to parcels of land defined therein as Lot 13, 14, 15, 34 and 35, Block 6 of the subdivision plan Psd-8555 with a total area of 1,704 square meters (the "Lot") for the exclusive use of SMVAI as a park and playground for the recreation, athletic and social activities of the members of SMVAI and for the utilization of the same for the installation and maintenance of all public services and utilities thereon, including the sanitary facilities for San Miguel Village;

WHEREAS, in line with a program initiated by MWCI in pursuance of the Concession Agreement, MWCI has offered to SMVAI to provide sewerage services to San Miguel Village by means of combined sewage and drainage flows collection and treatment, and which includes the construction, installation, operation and maintenance of: (i) a package sewage treatment plant (the "STP"); (ii) a sewer network and its appurtenances; (iii) interconnection chambers, and (iv) underground lift stations (all constructions and installations being, hereinafter collectively referred to as the "Sewerage System");

WHEREAS, SMVAI has agreed to such offer by MWCI and, pursuant to Sections 2 and 8 of the Contract of Lease, has endorsed for the approval of AC, the use of an underground portion of the Lot more particularly identified in Annex "B" hereto (the "STP Area") for the construction and maintenance of the Sewerage System which is vital for the operation of the Sewerage System for the benefit of the homeowners and locators of San Miguel Village;

NOW THEREFORE, for and in consideration of the foregoing premises and of the terms, conditions and stipulations herein contained, the parties hereto have mutually agreed to the following terms and conditions:

## Article I. AUTHORITY TO CONSTRUCT AND OPERATE

Pursuant to and conformably with the request of SMVAI, and in consideration for the undertaking of MWCI (and its assigns and successors-in-interest) to strictly comply with the terms and conditions herein contained, AC, in its capacity as successor-in-interest of Makati Development Corporation (as registered owner of the Lot at the time of execution of the Contract of Lease), hereby authorizes and allows the construction and operation by MWCI of the Sewerage System (including the STP on the STP Area), it being understood that such Sewerage System constitutes a public utility which is necessary for the full and complete enjoyment of the common areas of San Miguel Village by its homeowners and locators. This authorization shall be deemed a grant by AC of its consent to the aforesaid additional use of the Lot in connection with Section 2 of the Contract of Lease. Notwithstanding this grant of consent, however, nothing herein shall be deemed to mean an endorsement by AC of the necessity or desirability of the construction and operation of the Sewerage System as it shall be the joint responsibility of MWCI and SMVAI to determine that the construction of and operation of the Sewerage System is fitting and desirable for the purpose for which it is intended. In this regard, SLVAI and MWCI hereby hold AC free and harmless from any loss, damage, injury, inconvenience, cost or expense which may result from the construction and operation by MWCI of the Sewerage System and all activities associated therewith.

## Article II. RIGHTS AND RESPONSIBILITIES OF MWCI

1. MWCI shall, at its expense, construct, install, operate and maintain the Sewerage System to service the requirements of San Miguel Village. MWCI shall be fully responsible for the care and safekeeping of all temporary structures, goods, materials, tools, machinery and equipment brought to the work areas in connection with, or for the purpose of executing and completing the construction and installation of the Sewerage System, as well as the adequacy, stability and safety of all operations, temporary works, and methods of construction and installation of the same.
2. Prior to the conduct of any construction and installation works for the Sewerage System, the MWCI shall:
  - (a) secure an Environmental Compliance Certificate from the Department of Environment and Natural Resources and all other related governmental permits allowing the construction and installation of the Sewerage System (collectively, the "ECC and Permits"), shall maintain the same in good standing as and until the commencement of operation of the Sewerage System, and strictly comply with all the conditions imposed under the ECC and Permits;

(b) conduct a survey of all underground utilities which may be affected by the conduct of any construction and installation works for and the operation and maintenance of the Sewerage System, for the purpose of finalizing and implementing such plans and specifications for the Sewerage System with the least inconvenience to such underground utilities, if any;

(c) undertake soil preparation activities on the Lot as may be necessary;

(d) provide AC and SMVAI with the plans and specifications of the Sewerage System, which are tentatively shown in Annex "C";

(e) within \_\_\_ days from the execution of this Agreement, MWCI shall submit to AC and SMVAI its proposed construction timetable setting forth therein the milestone dates at which the construction of the Sewerage System shall be accomplished; provided that, construction shall commence not later than \_\_\_\_\_ and shall be fully completed not later than \_\_\_\_\_; provided further that any extension of time to complete the works beyond the scheduled date of completion shall require the prior written approval of SMVAI; and provided finally that, SMVAI may impose penalties upon MWCI for any delay in the works which may result in undue inconvenience, hazard and risk to its homeowners and/or locators in particular and the public in general; and

(f) require its contractor(s) to obtain a comprehensive general liability insurance from a reputable insurance company in an amount sufficient to cover any accident for death, bodily injury and property damages arising out of the conduct of the works, and present and deliver a copy of the policy to SMVAI, such insurance policy to remain in force until the works are satisfactorily completed and the period of the contractual warranties thereon have expired; it is understood that the insurance policy shall continue to be in full force and effect notwithstanding the happening of one or more or all of the following events: (1) the novation of the construction contract entered into by MWCI with the contractor(s) for the works; (2) the change or extension of the period of construction; (3) the modification, increase or decrease in the construction cost of the works; (4) the completion or cancellation of the works if the continuation of the life of the policy is necessary to enforce any liability or obligation of MWCI or its contractor(s); and (5) any other event similar to any of the foregoing.

3. MWCI shall ensure that all acts and measures necessary for the installation and operation of the Sewerage System and the maintenance and repair thereof shall be carried on with the least inconvenience to the constituents of San Miguel Village and shall ensure that the same shall not impede access to, and the use

and occupation of, the roads and common areas within or adjoining the Lot. Further, MWCI shall maintain the STP Area and adjoining areas affected by the construction and installation works conducted thereon in a clean and tidy condition, repairing any damage caused by or consequential to the execution of the works and free from accumulation of waste materials or rubbish caused by its employees, contractors, or agents. Immediately upon the completion of the construction and installation works, MWCI shall restore to its original state the surface of the STP Area and the premises surrounding the same and shall remove therefrom all temporary structures, machinery and equipment, rubbish, tools, and other materials used thereon, without need for demand or further action. In the event that MWCI fails to comply with the condition herein prescribed, SMVAI shall have the option, but not the obligation, to cause the restoration of the surface of the STP Area and the premises surrounding the same and charge the costs thereof to MWCI.

4. Any loss and/or damage to the Lot or any property or facility thereon or adjoining thereto, which may be caused by the construction, operation and maintenance of the Sewerage System, shall be the sole responsibility of the MWCI. In this connection, MWCI hereby holds AC and SMVAI free and harmless from and agrees to indemnify AC and SMVAI against all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, the performance of any work or activity relating to the installation and operation of the Sewerage System and the repair and maintenance thereof.
5. MWCI shall ensure the safety and preservation of the Sewerage System to protect the viability of the service to be provided by MWCI to San Miguel Village and its constituents. MWCI shall undertake the necessary repairs and maintenance works to preserve and/or improve the Sewerage System, as the circumstances so warrant from time to time and obtain the necessary insurances for the preservation thereof. Commencing from the date of commissioning of the Sewerage System, the MWCI, as operator of the Sewerage System, shall have the sole liability for any charges or fines that may be assessed in case of any violation of national and local environmental laws and standards, provided, however, that such charges or fines are not the result of or due to the acts, fault or negligence of the SMVAI and/or any homeowner/locator in San Miguel Village.
6. At its expense, the MWCI has the option to make any additions and/or modifications to the STP; provided that, the STP Area shall be used by MWCI solely for the purposes of constructing, installing, operating and maintaining the STP; and provided further, that the following acts shall require the prior written approval of AC and SMVAI, which approval may be made subject to such conditions as AC and/or SMVAI shall deem fit to impose:

- (a) the construction of any additional structure or the establishment or addition of any amenity or facility within the STP Area other than the Sewerage Treatment Facility;
  - (b) any change in use of the STP Area or any additional use to which the STP Area shall be devoted, irrespective of whether, in MWCI's opinion such use constitutes an immaterial or an incidental deviation from the permitted use of the STP Area as expressly provided herein;
  - (c) other than as excepted under paragraph 8 of this Article II, the transfer, conveyance, lease, encumbrance or assignment (in whatever manner and for whatever intent) of the authority herein granted to MWCI under this Agreement and/or the Sewerage System (including the STP) to be constructed and installed on the STP Area, or any portion of thereof, or any other arrangement whereby the use and possession of the STP Area and/or the Sewerage System is transferred to any third person, irrespective of whether rental or other consideration is given therefor, and no right, title or interest in and to the STP Area shall be deemed conferred or vested in any person without AC's prior written approval; and
  - (d) the mortgage, encumbrance or creation of any security interest in and to the authority herein granted to MWCI and/or the Sewerage System.
7. MWCI shall bill, collect and receive payments from the SMVAI and/or homeowners/locators in San Miguel Village for sewer charges, the rates of which shall be in accordance with the Concession Agreement. The sewer charges shall be incorporated in the MWCI water bill commencing from the date of commissioning of the Sewerage System.
8. The ownership of the Sewerage System shall pertain to MWCI during the effectivity of the Concession Agreement. It is hereby understood that upon the expiration of the Concession Agreement, the ownership of the Sewerage System shall be automatically transferred to MWSS pursuant to the provisions of the Concession Agreement.

### Article III. RIGHTS AND RESPONSIBILITIES OF THE SMVAI

- 1. The SMVAI shall continue to operate and maintain the drainage system, at its sole expense.
- 2. The SMVAI shall grant a right-of-entry to the authorized representative(s) of MWCI and its contractors for the purpose of undertaking the construction and

installation works for the Sewerage System and to effect the operation and maintenance of the same.

3. In the event that either or both of AC's and SMVAI's respective rights to the Lot is transferred by SMVAI to another party, then the transferor of such right shall cause such party to respect this Agreement and be bound thereby.
4. SMVAI shall ensure that the homeowners/locators of San Miguel Village are duly notified of MWCI's construction, operation and maintenance of the Sewerage System and of the inclusion of the sewer fees and related charges which MWCI shall charge to the homeowners/locators of San Miguel Village which amounts shall be included in the MWCI monthly water bills.

#### Article IV. REPRESENTATIONS AND WARRANTIES

1. MWCI represents and warrants that it is an organization duly organized, validly existing and has all the necessary power, franchise and authority to carry on its business as presently conducted and perform its obligations under this Agreement. It is duly qualified or licensed to do business in the relevant jurisdiction where it currently conducts its business and operations or where the properties owned, possessed or controlled by it makes such qualification or licensing necessary and where the failure to be so qualified or licensed would impair its ability to perform its obligations under this Agreement or would result in material liability to or would have a material adverse effect on its financial condition, business, operations or prospects.
2. Each of the parties hereto warrants to the others that it has all the necessary power and authority to execute, deliver and perform its obligations under this Agreement, and each of the execution, delivery and performance by it of this Agreement has been duly authorized by all necessary actions on its part.
3. Each of the parties hereto warrants to the others that it has duly and validly executed and delivered the agreement and the same constitutes a legal, valid, binding obligation and enforceable against it in accordance with its terms.
4. Each of the parties hereto warrants to the others that there is no action, suit or proceeding, at law or in equity, or official investigation before or by any government authority, arbitral against or affecting it or any of its properties, rights, or assets, which could reasonably be expected to result in a material adverse effect on the ability to perform its obligations under this Agreement or on the validity of enforceability of this Agreement.

## Article V. DURATION OF AGREEMENT

This Agreement shall take effect on the date of its execution by the parties and shall be co-terminus with the Concession Agreement.

## Article VI. MISCELLANEOUS

1. No party may assign, transfer or convey, any or all of its rights and obligations under this Agreement without the prior written consent of the other parties. However, this Agreement shall be binding upon and inure to the benefit of the successors and permitted assigns of the parties hereto.
2. This Agreement contains the entire agreement of the parties. No party may modify any of the terms of this Agreement unless such modified terms are inscribed in writing and signed by the parties.
3. This Agreement shall be governed by and construed in accordance with the laws of the Republic of the Philippines. In the event of any dispute arising out of or in connection with this Agreement, the venue shall be the proper courts of Makati City.
4. Each party hereto shall pay its own expenses in connection with the execution of this Agreement and the consummation of the transactions contemplated herein.
5. The warranties and representations given by each of the parties hereto shall survive the execution of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their respective officers, thereunto duly authorized, on the date and at the place above stated.

SAN MIGUEL VILLAGE ASSOCIATION, INC.

SALVADOR S. MARTINEZ  
President

AYALA CORPORATION

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Attorneys-in-Fact

MANILA WATER COMPANY, INC.

ANTONINO T. AQUINO  
President

SIGNED IN THE PRESENCE OF:

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ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES  
MAKATI CITY, METRO MANILA) S.S.

On this \_\_\_\_\_ day of \_\_\_\_\_, 2001, before me, a Notary Public in  
and for Makati City, Metro Manila, personally appeared the following:

Name	<u>Community Tax Cert. No.</u>	<u>Date/Place Issued</u>
------	--------------------------------	--------------------------

Manila Water  
Company, Inc.  
Represented by:  
Antonino T. Aquino

San Miguel Village  
Association, Inc.  
Represented by:  
Salvador S. Martinez

Ayala Corporation  
Represented by:

known to me and to me known to be the same persons who executed the foregoing Agreement, and they acknowledged to me that the same is their free and voluntary act and deed as well as the free and voluntary act and deed of the corporations which they respectively represent.

This Memorandum of Agreement, which consists of eight (8) pages including this page wherein this acknowledgment is written, has been signed by the parties executing the same and their witnesses on each and every page thereof.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my notarial seal on the date and at the place above herein stated.

Doc. No. \_\_\_\_\_;  
Page No. \_\_\_\_\_;  
Book No. \_\_\_\_\_;

Series of 2001

**ACCOUNTABILITY STATEMENT OF THE PROJECT PROPONENT**

This is to certify that all the information in the enclosed Initial Environmental Examination (IEE) are true, accurate, and complete. Should we learn of any information which would make the enclosed IEE inaccurate, we shall bring the said information to the attention of the Environmental Management Bureau (EMB) of the appropriate DENR Regional Office and the Environmental Department of World Bank.

We hereby bind ourselves jointly and in solidarity with the preparers for any penalties that may be imposed arising from any misinterpretations or failure to state material information in the enclosed IEE.

In witness whereof, we hereby set our hands this 21<sup>st</sup> day of December 2001 at Quezon City.

Manila Water Company  
Project Proponent

by:

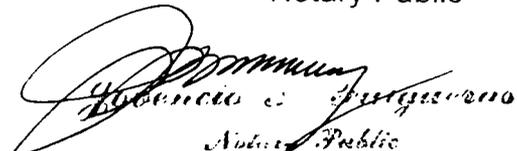


Antonino T. Aquino  
President

SUBSCRIBED AND SWORN to before me this 21<sup>st</sup> day of December 2001, affiant exhibiting to me his Community Tax Certificate No. 05959688 issued on January 12, 2001 at Quezon City.

\_\_\_\_\_  
Notary Public

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Book No. VI  
Series of 2001



Notary Public

My Commission Expires Dec. 31, 192001

PTA NOA 197 3806 PC (-03-01)