Valenzuela Sewerage System Project
Environmental Assessment Report

March 2014
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<th>Full Form</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>BOD</td>
<td>Biochemical oxygen demand</td>
</tr>
<tr>
<td>CLUP</td>
<td>Comprehensive Land Use Plan</td>
</tr>
<tr>
<td>DENR</td>
<td>Department of Environment and Natural Resources</td>
</tr>
<tr>
<td>DO</td>
<td>Dissolved oxygen</td>
</tr>
<tr>
<td>DOH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>DPWH</td>
<td>Department of Public Works and Highways</td>
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<tr>
<td>ECC</td>
<td>Environmental Compliance Certificate</td>
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<tr>
<td>ECP</td>
<td>Environmentally Critical Project</td>
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<tr>
<td>EIA</td>
<td>Environmental impact assessment</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental impact statement</td>
</tr>
<tr>
<td>EMB</td>
<td>Environmental Management Bureau</td>
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<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
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<tr>
<td>EMoP</td>
<td>Environmental Monitoring Plan</td>
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<tr>
<td>ESSF</td>
<td>Environmental and Social Safeguards Framework</td>
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<tr>
<td>FMB</td>
<td>Forest Management Bureau</td>
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<tr>
<td>HW</td>
<td>Hazardous waste</td>
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<tr>
<td>IEC</td>
<td>Information and Education Campaign</td>
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<tr>
<td>IEE</td>
<td>Initial Environmental Examination</td>
</tr>
<tr>
<td>LBP</td>
<td>Land Bank of the Philippines</td>
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<tr>
<td>LGU</td>
<td>Local government unit</td>
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<tr>
<td>MMDA</td>
<td>Metro Manila Development Authority</td>
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<tr>
<td>MGB</td>
<td>Mines and Geosciences Bureau</td>
</tr>
<tr>
<td>MLD</td>
<td>Million liters per day</td>
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<tr>
<td>MPN</td>
<td>Most probable number</td>
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<tr>
<td>MRF</td>
<td>Materials Recovery Facility</td>
</tr>
<tr>
<td>MWCI</td>
<td>Manila Water Company, Inc.</td>
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<tr>
<td>MWMP</td>
<td>Metro Manila Wastewater Management Project</td>
</tr>
<tr>
<td>MWSI</td>
<td>Maynilad Water Services, Inc.</td>
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<tr>
<td>MWSS</td>
<td>Metropolitan Waterworks and Sewerage System</td>
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<tr>
<td>NCR</td>
<td>National Capital Region</td>
</tr>
<tr>
<td>NMTT</td>
<td>Navotas-Malabon-Tullahan-Tinajeros</td>
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<tr>
<td>NSMP</td>
<td>National Sewerage and Septage Management Program</td>
</tr>
<tr>
<td>NSO</td>
<td>National Statistics Office</td>
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<tr>
<td>NWRB</td>
<td>National Water Resources Board</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>Oil and grease</td>
</tr>
<tr>
<td>OP</td>
<td>Operational Policy</td>
</tr>
<tr>
<td>PAGASA</td>
<td>Philippine Atmospheric, Geophysical, Astronomical Agency</td>
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<tr>
<td>PFZ</td>
<td>Philippine Fault Zone</td>
</tr>
<tr>
<td>Phivolcs</td>
<td>Philippine Institute of Volcanology and Seismology</td>
</tr>
<tr>
<td>SS</td>
<td>Suspended solids</td>
</tr>
<tr>
<td>STP</td>
<td>Sewage treatment plant</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>TSS</td>
<td>Total suspended solids</td>
</tr>
<tr>
<td>VFS</td>
<td>Valley Fault System</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

PROJECT FACT SHEET

Name of Project: VALENZUELA SEWERAGE SYSTEM PROJECT
Location: Valenzuela City
Type of Project: Construction of a sewerage system within Valenzuela catchment area
Objective: To expand sewerage service coverage leading to reduction in pollution load discharges into the Tullahan River, Meycauayan River and Polo River
Project Components: 60 MLD STP (with future upgrade to 125 MLD), interceptor boxes, sewer-drainage network/conveyance with interceptor boxes, manholes, and pumping stations
Estimated Project Cost: Php 3.8 Billion
Project Proponent: Maynilad Water Services, Inc.
Business Address: MWSS Administration Building
G/F Engineering Building, MWSS Compound, Katipunan Riad, Balara, Quezon City 1105 Philippines
Telephone: (632) 928-1454
Fax: (632) 920-5408
Email: frankie.arellano@mayniladwater.com.ph
Authorized Representatives: Francisco Arellano
Vice President, Quality Assurance Planning and Environment, Safety and Health Management Group
EIA Consultant: Engr. Cherry B. Rivera
Environmental Engineer
Telephone: (632) 668-5989
Email: chebrivera@yahoo.com

INTRODUCTION

The Maynilad Water Services, Inc. (MWSI) signed a concession agreement with the Metropolitan Waterworks and Sewerage System (MWSS) to provide water and wastewater treatment services for the 17 cities and municipalities that comprise the West Zone of Metro Manila. These areas include Caloocan, Las Pinas, Malabon, Manila, Muntinlupa, Navotas, Pasay, Paranaque, Valenzuela, and parts of Quezon City, a part of Makati, Cavite City, and the municipalities of Rosario, Imus, Noveleta, Bacoor, and Kawit in Cavite Province.
The proposed Valenzuela Sewerage System Project is part of MWSI’s commitment to improve the sewerage and sanitation services in the Valenzuela catchment area. The project aims to increase the coverage and effectiveness of wastewater collection and treatment in support of the National Sewerage and Septage Management Program (NSSMP) as required under the Philippine Clean Water Act.

This environmental assessment report is presented for the proposed project and follows the requirements of the DENR as outlined in DENR Administrative Order 2003-30. The assessment was also guided by the World Bank Policy OP/BP4.01 and the Environment and Social Safeguards Framework (ESSF) for the Metro Manila Wastewater Management Project (MWMP).

The following methodology has been implemented in the conduct of the environmental assessment:

a) Review of project-related documents and literature
b) Site visits to assess the conditions in the project area
c) Consultation with local authorities to gather information on project area characteristics
d) Screening of environmental impacts and assessment of residual impacts
e) Development of environmental management and monitoring plans.

The Feasibility Study prepared in June 2011 for the Three-River System, the Initial Environmental Examination Report for the Valenzuela Catchment and the public consultations that were conducted by MWSI for the project were referred to in this report.

**BRIEF DESCRIPTION OF THE PROJECT**

**A. Project Location**

The Valenzuela hydrological catchment is characterized by multiple river boundaries, namely, Meycauayan River in the north, Tullahan River in the south, and the Polo River in the west. On the inland portion, the relatively higher elevations of Quezon City form the eastern borders of the catchment. Three (3) sub-catchments correspond to the three main rivers within the Valenzuela hydrological catchment (Figure 1). All three catchments have a total area of 4,900 ha. Sub-catchment A has an area of 1,200 ha and lies along the Polo River; Sub-catchment B covers 2,200 ha and lies along the Meycauayan River; and Sub-catchment C has an area of 1,500 ha which forms part of the Tullahan River catchment.

![Figure 1. The Valenzuela Catchment Area](source: Feasibility Study of Three-River System)
The proposed STP will be located within a 2.56 ha property located at F. Bautista St., Barangay Marulas, Valenzuela City. The said property was acquired by MWSI from the city government which has a small space occupied by the City Dog Pound in the southwestern end and a Materials Recovery Facility (MRF) and Eco Center near the entrance at the southeastern end. The property is adjacent to the Tullahan River.

The site is accessible to vehicles from the main road of McArthur Highway through the F. Bautista St. The STP site is approximately centered by geographic coordinates 14° 40’ 40.05” north latitude and 120° 58’ 32.17” east longitude.

![Figure 2. Location Map showing proposed site of the STP](image)

**B. Project Components**

Aside from the construction of the STP, the proposed project also involves the laying of combined sewer-drainage lines or conveyance system with interceptor boxes, manholes and pumping stations to capture and intercept the flow from drainage-sewer lines towards the proposed STP for treatment prior to discharge into the Tullahan River. More specifically, the project infrastructure consists of the following:

(a) **Conveyance System** – interceptor boxes, gravity sewers, pressure mains, collector (reticulation) pipelines, pump stations, manholes, and river crossings

(b) **Wastewater Treatment Facility** – wastewater treatment facilities, interconnecting pipework (above and below ground), various mechanical equipment for flows and pumps, inlet and outfall, chemical storage facilities, control rooms, administration buildings, access roads, and parking area.

The treated effluent will be discharged to channels for chlorination prior to final discharge into the Tullahan River. The effluent from the STP is expected to comply with the prescribed Effluent Standards of the DENR for Class C waters.
C. Project Rationale

The project objectives are to enhance the urban environment and public health through better wastewater management. Specifically, the proposed project aims to:

(i) Contribute to reducing the discharge of untreated wastewater to the Tullahan River, Meycauayan River, and Polo River which all lead to the Manila Bay;

(ii) Improve the living conditions of residents, sanitation and public health by reducing human exposure to sewage;

(iii) Comply with the National Sewerage and Septage Management Program under the Philippine Clean Water Act as well as with the Supreme Court Mandamus on the rehabilitation of Manila Bay; and

(iv) Contribute to the economic growth in Metro Manila, particularly in Valenzuela City.

D. Project Cost

The construction of the proposed project will entail an estimated cost of Php3.8 Billion, including taxes and duties, engineering design and construction supervision and contingencies.

E. Project Phases

The proposed project will undergo the following phases: (Details of the various phases are discussed in Chapter 4).

Pre-Construction Phase: This phase consists of the project planning and activities relating to securing the necessary permits and clearances prior to project construction. Land acquisition is included in this phase. The proper collection and disposal of materials at the site also forms part of this phase.

Construction Phase: The construction phase can be further divided into two elements: the construction of the STP and the construction of the sewage interception and conveyance system. Construction of the project will commence once all permits and clearances have been secured from the Government. STP construction will be most likely procured as a Design and Build contract. The timeframe is largely dependent on the contractor’s approach but STP of this scale would exceed two years to construct.

The pipes or sewer lines will run mostly along roads and traffic management plans will be consulted and agreed upon with the local government unit prior to commencement of construction. Construction works for the sewer lines will be sub-contracted once the detailed design is approved. Completion of the conveyance system will take about two to three years. Activities will include pipe laying, installation of interceptor boxes and construction of pump stations. Construction of these pipes will be undertaken in sections to minimize the impact on traffic particularly along major roads.

Operational Phase: As soon as sewage is collected, it needs to be conveyed through the network of pipelines to the STP for treatment. Treated sewage will be discharged through an effluent outfall to the Tullahan River. This phase involves all daily activities necessary for the smooth operation of the sewerage system such as equipment checks/maintenance, sewage treatment, sludge stabilization, disposal and transport, environmental management, monitoring and implementation of social development programs and operationalization of the institutional plan. The operation and maintenance of the sewerage system will managed thereon by MWSI.

Abandonment Phase: After completion of construction works, necessary rehabilitation measures will be implemented. A decommissioning plan will be required from the contractor to ensure that disturbed areas are restored.
Once in operation, the facilities are unlikely to be abandoned. Concrete structures are usually designed to last for at least 50 years. Electro-mechanical parts will be replaced or upgraded after their effective life of 10 to 15 years.

F. Types of Major Wastes

Wastes from the sewerage system project will consist of the following:

- Sludge
- Solid wastes and screenings
- Air pollutants from the operation of standby generator set
- Hazardous waste such as busted fluorescent lamps, empty chemical containers from analysis, treatment, and maintenance activities and used oil from maintenance of generator set.

SUMMARY OF PROJECT’S EIA PROCESS

The preparation of the Environmental Impact Statement (EIS) is guided by the Implementing Rules and Regulations of Presidential Decree No. 1586 which is embodied in DENR Administrative Order No. 30, series of 2003 and DENR Administrative Order 2010-14. The EIS report is also guided by the World Bank’s Environmental and Social Safeguards Policy as outlined in Operational Policy (OP) / Bank Procedure (BP) 4.01: Environmental Assessment.

A. Description of Philippines Policy, Legal and Administrative Framework

The Philippines implements an Environmental Impact Assessment (EIA) system by virtue of the Presidential Decree 1586 or the Environmental Impact Statement (EIS) system. P.D. 1586 was originally devised as an administrative procedure for an action-forcing policy that requires proponents of development projects to study and disclose the environmental impacts of their projects. Based on P.D. 1586, project proponents are required to secure an Environmental Compliance Certificate (ECC) as a prerequisite for implementation. The DENR subsequently strengthened P.D. 1586 through the issuance of implementing rules and regulations and administrative orders.

Under DENR Administrative Order 2003- 30, the proposed project falls under Group II – Non-Environmentally Critical Project (ECP) located in Environmentally Critical Area (ECA) as a "Waste Management Project". Since the design capacity of the proposed domestic wastewater treatment facility exceeds 5,000 m$^3$ per year, an EIS report is prescribed to the project in securing the ECC from the DENR.

Under the revised Procedural Manual of DENR Administrative Order 2003- 30, Group II projects are required to undertake the following:

- Submit an EIS to the DENR- Environmental Management Bureau (EMB) Regional Office
- Conduct Technical Scoping with DENR and the Review Committee
- Conduct Public Consultation
- Conduct environmental impact assessment study that will include requirements outlined during the Technical Scoping
- Submit EIS containing EIA findings, environmental management plan, and environmental monitoring plan
- Undergo procedural screening by the DENR-EMB
- Review of the EIS by DENR- EMB which includes DENR Review Committee meetings/deliberations and site visit.

The DENR prescribes a processing period of 20 working days for Group II projects. The review of the EIS by the DENR is guided by three general criteria: (1) environmental considerations are integrated into the overall project planning, (2) technically sound and effective environmental mitigation measures, and (3) social acceptability of the project. For projects required to submit the EIS, a public consultation process is required with the stakeholders to inform the public about the proposed project and to enhance community participation in the planning process.
In the past, proofs of social acceptability are pre-requisite to the approval of the ECC. However, by virtue of DENR Administrative Order 2003-30, endorsements/clearances from the LGU or other agencies are no longer required in the processing of the ECC. However, the proponent is required to initiate public consultations to ensure that environmentally relevant concerns of the stakeholders are taken into consideration in the EIA study and in the formulation of the environmental management plan. All consultation meetings should be documented and shall constitute part of the records of the EIA process.

Aside from P.D. 1586, other relevant regulatory, policy and administrative requirements for environmental assessment in the country which was considered in this EIA are as follows:

- Philippine Clean Water Act (Republic Act 9275)
- Philippine Clean Air Act (Republic Act 8749)
- Ecological Solid Waste Management Act (Republic Act 9003)
- Toxic, Hazardous and Nuclear Waste Control Act (Republic Act 6969)
- Code on Sanitation of the Philippines (P.D. 856)
- Occupational Health and Safety Standards.

Other environmental permits and approvals that are necessary prior to the implementation of the proposed project, as follows:

<table>
<thead>
<tr>
<th>Permit/Clearance</th>
<th>Issuing Agency</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit to Cut/Ball Out Trees</td>
<td>DENR-FMB</td>
<td>Applicable if the proposed project will cut/ball out trees</td>
</tr>
<tr>
<td>Discharge Permit</td>
<td>DENR-EMB</td>
<td>For operation and maintenance of the STP</td>
</tr>
<tr>
<td>Permit to Operate – Air Pollution Source Equipment</td>
<td>DENR-EMB</td>
<td>Applicable if the proposed project will utilize generator sets even if as standby units only</td>
</tr>
<tr>
<td>Hazardous Waste Registration</td>
<td>DENR-EMB</td>
<td>For generation of hazardous wastes such as empty chemical containers, used oil, busted fluorescent lamps</td>
</tr>
</tbody>
</table>

### B. World Bank’s Environment Safeguards Requirements

The World Bank Safeguards Policies is outlined in OP/BP 4.01. Considering that the project will be financed through Land Bank of the Philippines (LBP) as Financial Intermediary, the project has been categorized as FI and LBP as borrower will ensure that the WB’s policies as well as relevant national regulations are followed and appropriate instruments prepared. However, the sub-project is classified as Category B project and a specific Environmental & Social Safeguards Framework (ESSF) was already drafted.

Environmental screening of the project is required to identify key potential environmental issues and to determine the environmental category of the project. Annex A presents the Environmental Screening checklist that was prepared for the Valenzuela sewerage system project.

The following are the environment safeguard policies of WB that might apply to the proposed project:

<table>
<thead>
<tr>
<th>Environment Safeguard Policies</th>
<th>Status</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td>OP/BP 4.01 – Environmental Assessment</td>
<td>√</td>
<td>Based on the Environmental Screening and ESSF, it was deemed that the project falls under Category B and therefore, requires an Initial Environmental Examination (IEE) and an Environmental Management Plan (EMP). MWSI shall be responsible for the implementation of the EMP, subject to regular visits throughout project implementation by LBP.</td>
</tr>
<tr>
<td>OP/BO 4.04 – Natural Habitats</td>
<td>√</td>
<td>The project is located in an urban environment. It will not generate loss or degradation of natural habitat, but rather will contribute to the regeneration of the Tullahan River, Meycauayan River and Polo River which are currently degraded. Existing trees within the site can be preserved through site development planning. This policy may not be triggered.</td>
</tr>
<tr>
<td>Environment Safeguard Policies</td>
<td>Status</td>
<td>Remarks</td>
</tr>
<tr>
<td>--------------------------------</td>
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</tr>
<tr>
<td>OP 4.12 – Involuntary Resettlement and Chance Finds</td>
<td>Yes</td>
<td>There are no involuntary land acquisition/resettlement, loss of assets or access to assets or reported archaeological or cultural significance of the site.</td>
</tr>
<tr>
<td>OP 4.13 – Indigenous Peoples</td>
<td>Yes</td>
<td>The site or project will not affect indigenous peoples.</td>
</tr>
</tbody>
</table>

C. Organization and Structure of the EIS Report

This EIS report followed the annotated outline for EIA projects as prescribed in DENR Memorandum Circular 2010-14. The report includes information and data on the following:

- Project Description including discussion of location, area, rationale, alternatives, components, technology, size, project phases, manpower requirements, and project investment cost
- General description of the environment of the project area and analysis of key environmental impacts
- Environmental management plan (EMP)
- Environmental monitoring plan (EMoP)
- Social development framework and IEC Framework
- Environmental compliance monitoring
- Emergency response policy
- Institutional plan for EMP implementation.

D. EIA Study Schedule

The EIA commenced in April 2013. Initial environmental assessment was undertaken during the preparation of the Feasibility Study of the proposed project. The following activities were conducted to complete the EIA:

- Feasibility study in June 2011
- Initial environmental examination in June 2011
- Water quality sampling during the project feasibility phase
- Noise sampling on May 2-3, 2013
- Public Consultation on March 21, 2013
- Data gathering of secondary data on environmental baseline condition
- Social perception survey and key informant interviews from July 21 – 31, 2013.

E. EIA Study Area

The EIA study area comprises of the project site of the proposed STP, sewer lines, pumping stations, and other related facilities as primary impact area. The primary impact area is defined as the immediate vicinity to the perimeter up to a radius of 100 meters. This includes part of the adjoining properties, roads, and residential/commercial/industrial establishments. The primary impact area was identified based on the potential impacts that may be generated by the project particularly during the construction phase. These environmental impacts include generation of dust, noise and traffic that may cause nuisance and hazards to residents and passersby.

The secondary impact area consists of the catchment area covered by the proposed STP. The secondary impact area was identified where a greater number of population will be affected either directly or indirectly by the potential environmental and socio-economic effects of the project. These environmental impacts to the secondary impact areas include improvement of sanitation, improvement of water quality of Tullahan River, Meycauayan River, Polo River, and Manila Bay, impacts to local utilities, among others.
F. EIA Methodology

The EIS report made reference to the Feasibility Study for the Three Rivers Project which was commissioned by MWSI and prepared by GHD. Secondary data sources include previous studies and reports from the Department of Environment and Natural Resources (DENR), Environmental Management Bureau (EMB), National Statistics Office (NSO), PAGASA, Mines and Geosciences Bureau (MGB), the Development Profile of Valenzuela City and other pertinent researches conducted within the vicinity.

The study was conducted using the following key methodologies:
* Data gathering and review of previous reports
* Social impact assessment covering areas where construction of facilities may affect communities and those who will benefit from the project particularly households and establishments including commercial, industrial, institutional, and other stakeholders
* Public consultation and stakeholder meetings and interviews
* Site visits and environmental surveys and sampling.

The scope of the EIS includes:
* A Baseline Environmental Survey to establish the existing environmental conditions in the project area;
* An assessment of environmental impacts likely to arise from the implementation of the project such as noise, potential flooding, dust, traffic-related problems, odor from the STP and other related concerns;
* Conduct of public consultation meetings and surveys with project stakeholders and affected persons to ensure public participation in all aspects of the project.

**Table 2. Generic EIA Approach and Data Sources**

<table>
<thead>
<tr>
<th>EIA Module</th>
<th>Approach and Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water quality</td>
<td>River sampling and analysis for pH, temperature, TSS, DO, BOD, COD, total coliform and faecal coliform, DENR-EMB-NCR water quality monitoring data</td>
</tr>
<tr>
<td>Hydrology and flow measurements</td>
<td>Data gathering, Feasibility Study for the Valenzuela Catchment, secondary data sources (DPWH), interviews with residents</td>
</tr>
<tr>
<td>Groundwater</td>
<td>Secondary data from NWRB</td>
</tr>
<tr>
<td>Air quality</td>
<td>Ambient air sampling for TSP, SO$_2$, and NO$_2$</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise level measurement using sound level meter</td>
</tr>
<tr>
<td>Land Use</td>
<td>Reconnaissance survey, CLUP of Valenzuela City</td>
</tr>
<tr>
<td>Soil</td>
<td>MGB</td>
</tr>
<tr>
<td>Geohazard survey</td>
<td>MGB, Phivolcs</td>
</tr>
<tr>
<td>Tectonic Setting</td>
<td>Phivolcs, previous researches/studies</td>
</tr>
<tr>
<td>Aquatic biology</td>
<td>Interviews, field assessment, previous researches/studies</td>
</tr>
<tr>
<td>Climate</td>
<td>PAGASA</td>
</tr>
<tr>
<td>Demographics</td>
<td>Secondary data from socio-economic profile of Valenzuela City and NSO, household survey</td>
</tr>
</tbody>
</table>

G. Public Participation

MWSI conducted public consultation meetings with the stakeholders. The latest public consultation was held on March 21, 2013 at the Eco Center building within the compound. The meeting was attended by the Barangay Council of Marulas headed by Chairman Boy de Guzman, residents of F. Bautista, representatives from the World Bank, LBP, and MWSI. The Minutes of the Public Consultation Meeting dated March 21, 2013 is presented in Annex B. The following outlines the concerns raised by the stakeholders during the public consultation.
In addition to the public consultation, social perception survey and key informant interviews were conducted from July 21 to 31, 2013 to gather information from the stakeholders in Valenzuela City about their concerns and perception on the proposed Valenzuela Sewerage System project. Among those interviewed are those living in the primary and secondary impacts zones surrounding the proposed STP site and along the right-of-way of the conveyance line. The survey primarily aims to determine the stakeholders’ perception, awareness, and acceptance of the project through the following:

- Identifying the socio-economic background and living conditions of the respondents, their household, and community issues
- Collating respondents’ insights and experiences regarding the environment and sanitation in the affected communities
- Gathering environmental and sociological issues that needs to be addressed prior to the implementation of the project.

The results of the social perception survey and key informant interviews is presented in the main report and are considered in the development of the EMP.

SUMMARY OF BASELINE CHARACTERIZATION

Land Use: The land use within the Valenzuela catchment is equally divided amongst residential (30%), commercial (30%), and industrial (30%) uses. Undeveloped or agricultural uses account for 10% of Valenzuela’s land area.

The site of the proposed STP is approximately centered at geographic coordinates 14°40'40.05" north latitude and 120°58'32.17" east longitude. The proposed site in Barangay Marulas, Valenzuela City is adjacent to the Tullahan River, which is a tributary of Manila Bay. The site is currently characterized as a vacant open area with remaining structures of the City Dog Pound. At the entrance to the STP site is the Eco Center and MRF of Valenzuela City. Residential houses are found along the western, northern and eastern sides of the property. The Tullahan River abuts the property on the southern side. Across the Tullahan River is the Globe Paper Mills. Considering that the proposed project will support the provision of utility services in the area, there is no foreseen adverse impact on land use.

Topography: A large part of the study area is located on flat to gently undulating topography. The highest elevation is at 38 m above sea level, with an average of 2 m above sea level and a surface gradient of 0.55%.
Soil: The project area and its immediate vicinity are underlain by the Guadalupe Formation which was formed during the Pleistocene Period. The soil at the site of the STP appears to be gravelly clay. Soil mixed with garbage can also be found which may have been carried in the area after flooding events.

Vegetation: Patches of vegetation consisting of fruit and shade trees can be found at the proposed STP site. There are economically important tree species that include Balite, Talisay, Narra, Mahogany, Acacia, Ipil-Ipil, mango, santol, coconut, star apple, Samak, Kalingag, Bulala, and banana trees.

Fauna: In general, the STP site it does not have diverse wildlife species. Common faunal population includes domesticated animals. There are no identified endangered terrestrial fauna.

Freshwater Biology: The Tullahan River is heavily polluted. Based on observations and interviews, there are no fish species and other freshwater flora and fauna in the river.

Hydrology: The catchment area is composed of the Meycauayan River on the north, Tullahan River in the south, and the Polo River in the west. Most of the streams are estuarial in nature which leads to the Manila Bay.

Flooding: There are moderate to flat terrain on the western section of the catchment area which are susceptible to flooding. The slope in the estuarial areas such as near the Polo River and Meycauayan River is flat which permit re-entry of seawater from tidal flows coming from Manila Bay. Areas bounded by Tullahan River suffer from flooding due to occasional releases from the La Mesa Reservoir.

A flood control structure can be found at the northern tip of the STP site. Highest flood level (recorded near the city dog pound) was during Typhoon Ondoy, measured at 2.0 meters from ground level which lasted for about two weeks. Near the gate of the property, the flood levels reached 1.60 meters from ground level during Typhoon Ondoy.

Water Quality: Water quality monitoring results of the Tullahan River showed that BOD and total coliform exceeded the water quality criteria for Class C waters. This is attributed to the untreated domestic wastewater from human waste and other domestic activities. Nitrate and oil and grease concentrations were within the Class C water quality criteria.

Climate: The study area is situated within a Type 1 climate which is characterized by two pronounced seasons, dry from December to April and wet for the rest of the year. Maximum rain period is in the months of May to November with July as the rainiest month.

Air Quality: In general, the project area’s air quality is affected by the pollutants coming from industrial facilities, open burning of domestic wastes, from motor vehicles, and other community activities. The more common pollutants are suspended particulates, sulfur dioxide, and carbon monoxide.

Sewerage and Sanitation: There are no sewerage systems currently in place within the Valenzuela catchment area. Most households use individual septic tanks to treat domestic sewage.

Health: Health records from the City Health Office show that there is a high incidence of upper respiratory tract infection and other primary diseases like pneumonia and influenza in Valenzuela City. The leading causes of morbidity or illnesses in all ages in the city are acute respiratory tract infection, bronchitis, diarrhea, pneumonia and influenza. Morbidity problems in the city are basically related to pollution. The leading causes of mortality are heart disease, hypertension, pneumonia and cancer.

Traffic: During the construction and excavation of the proposed sewer network and other facilities, there are roads traversing the city which may be directly affected, namely, McArthur Highway, A.R. Valenzuela St., Gov. Santiago St., Rincon St., G. Lazaro St., Pasolo Road, Hernandez St., P. Sevilla St., Coloong II St., and F. Bautista St.
**Socio-Economic:** Informal settlers are present throughout Valenzuela City and even in the vicinity of the site of the proposed STP. Some houses have encroached the walls of the property but there are no settlers inside the STP property compound. A security guard mans the entrance of the property to prevent any illegal entry and authorized settlement.

**KEY ENVIRONMENTAL IMPACTS**

A. **Benefits**

The proposed project will significantly improve the ecosystem of the Valenzuela by improving wastewater management. Specifically, the ecological benefits of the project are (i) discharge of treated wastewater into the river systems, (ii) prevent further degradation of the river systems, and (iii) improve health and sanitation of the community.

B. **Adverse Impacts and Associated Mitigating Measures**

Being an environmental enhancement and mitigation project, it can be concluded that environmental impacts on air, water, and noise environment will be temporary and localized, and if proper mitigation measures are implemented, the adverse impacts on communities can be minimized or even eliminated. The adverse environmental impacts during operation are minimal if the mitigation measures are likewise properly implemented.

During construction, dust from construction sites, noise from powered mechanical equipment, wastewater, solid wastes, and construction traffic are the major adverse impacts. Mitigation measures are recommended in the EMP.

During operation, generator set emissions, odor from the STP, noise from pumping stations and plant machinery, chlorine hazard, solid wastes, and wastewater are the major adverse impacts. With the implementation of the EMP, these impacts will likewise largely become insignificant.

**ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

An Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) have been developed for the design, tendering, construction and operational phases of the project. These plans include the institutional arrangement and enhancement measures. These plans will be continually developed as the project progresses.

The EMP serves to outline the mitigation, monitoring and institutional measures to be considered during project implementation and operation to avoid or control adverse environmental impacts, and the actions deemed necessary to implement these measures. The EMP provides the crucial link between impacts and alternative mitigation measures evaluated and identified in the EIA and the way these measures are implemented. For each proposed measure, the EMP defines the technical content, the estimated cost, the schedule of implementation, the role and responsibilities, and the source of funding. Table 27 presents the summary matrix of the EMP.

The EMoP basically covers monitoring activities during construction and operation phases of the project. It also includes specific areas to be monitored, manner, frequency, responsibility and cost of carrying out the monitoring. Table 30 presents the Environmental Monitoring Plan.
### Summary of Impact Assessment and Environmental Management Plan

<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. SEWAGE TREATMENT PLANT</strong></td>
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<tr>
<td><strong>I. Pre-Construction Phase</strong></td>
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</tr>
<tr>
<td>Acquisition of clearances, approvals, and permits</td>
<td>People</td>
<td>Public concern on environmental and social impacts of STP</td>
<td>Conduct of Information and Education Campaign (IEC) on the project</td>
<td>MWSI</td>
<td>Part of pre-planning cost</td>
<td>IEC reports, EIA report, Barangay/City Clearance/Permit</td>
</tr>
<tr>
<td>Land acquisition and zoning</td>
<td>Land People</td>
<td>Compatibility of project with the approved land use plan of the city</td>
<td>MWSI needs to secure Locational Clearance from Valenzuela City prior to construction of the project.</td>
<td>MWSI</td>
<td>Part of pre-planning cost</td>
<td>Locational Clearance</td>
</tr>
<tr>
<td>Site clearing</td>
<td>Vegetation</td>
<td>Removal of affected trees, Develop landscaping plan</td>
<td>Secure Permit to Cut/Earthball Trees</td>
<td>MWSI</td>
<td>Part of pre-planning cost</td>
<td>Permit to Cut/Earthball Trees</td>
</tr>
<tr>
<td>Removal of remaining concrete structures</td>
<td>Land People</td>
<td>Generation of debris</td>
<td>Pre-identify areas where debris is to be disposed.</td>
<td>Contractor</td>
<td>Part of pre-planning cost</td>
<td></td>
</tr>
<tr>
<td>Geologic Hazards and Emergencies</td>
<td>Land People</td>
<td>Geologic hazards resulting from earthquakes, flooding, liquefaction, and settlement.</td>
<td>The structural design of the facility shall consider the seismic engineering design and analysis and findings/recommendations of the geotechnical assessment.</td>
<td>MWSI</td>
<td>Part of structural design of STP</td>
<td></td>
</tr>
<tr>
<td><strong>II. Construction Phase</strong></td>
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<tr>
<td>Erosion and surface soil runoff</td>
<td>Water</td>
<td>Clogging of canals</td>
<td>Construction of temporary works such as silt traps, deviation channels, mounting, barriers and trenches around the stock piles.</td>
<td>Project mgmt office / Contractor</td>
<td>Php50,000</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
<td>Guarantee/ Financial Arrangements</td>
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</tr>
<tr>
<td>Mud tracking of vehicles coming in and out of the construction site</td>
<td>Land  People</td>
<td>Aesthetics</td>
<td>Provision of wash bays  Regular cleaning of surroundings by project street sweepers/cleaners.</td>
<td>Project management / Contractor</td>
<td>Part of management cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Wastewater from worker’s camps</td>
<td>Water</td>
<td>Discharge of untreated sewage into Tullahan River</td>
<td>Temporary toilet facilities will be utilized to avoid contamination of surface and groundwater by sewage</td>
<td>Project mgt office / Contractor</td>
<td>Php20,000/ month</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Oil spills or leaks from heavy equipment  Washing of cement mixers</td>
<td>Water  Soil</td>
<td>Discharge of oily wastes and cement-containing residues</td>
<td>Restrict maintenance of construction vehicles onsite to prevent oil spill.  Require contractors to collect used oil and other hazardous wastes for appropriate disposal.  Prohibit washing of cement mixers at construction sites</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Dust emission from the civil works and movement of vehicles.</td>
<td>Air  People</td>
<td>Air pollution</td>
<td>Dust control at the stock pile of aggregates through regular water sprinkling  Driving speeds on unpaved roads should be limited to less than 25kph  Avoid excavation and grading activities during periods of strong winds.</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Increased noise and vibration due to construction activities</td>
<td>Noise  People</td>
<td>Noise and Vibration</td>
<td>Proper scheduling of construction works  Inform the barangay and adjoining communities of construction schedule.</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction management cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Traffic along F. Bautista Road due to frequent movement of vehicles.  Threat to safety of residents</td>
<td>People</td>
<td>Traffic Safety</td>
<td>Develop a diversion route in coordination with the barangay.  Implement construction hazard rules and regulations.  Schedule deliveries of construction materials at night.  Deploy traffic aides around the STP site during peak hours</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction management cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Accidental spill of materials</td>
<td>People</td>
<td>Traffic accidents</td>
<td>Require haulers to cover materials</td>
<td>Contractor</td>
<td>Part of construction</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
<td>Guarantee/ Financial Arrangements</td>
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<tr>
<td>during hauling</td>
<td>with canvass</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Impact of construction activities on welfare and safety of workers and passersby.</td>
<td>People</td>
<td>Health and Safety of Workers and Passersby and Damage to Adjacent Properties</td>
<td>Wearing of safety gadgets such as hard hats, gloves, rubber boots, goggles, etc. will be a mandatory requirement for workers. Safety signs/reminders will be posted in strategic areas within the construction area Sufficient lighting shall be installed at night.</td>
<td>Project mgt office / Contractor</td>
<td></td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Generation of construction debris and other solid wastes</td>
<td>Land People</td>
<td>Solid wastes generation Additional burden to LGU on solid waste management</td>
<td>Collection and recycling of construction wastes. To be offered to junk shops as scrap material Handling and storage of potential contaminants under strict conditions</td>
<td>Project mgt office / Contractor</td>
<td>Php10,000/wk</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Increased employment opportunities</td>
<td>People</td>
<td>Provide employment opportunities</td>
<td>Priority in hiring will be given to qualified locals from the barangay.</td>
<td>Project mgt office / Contractor</td>
<td></td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>III. Operation Phase</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Flooding in the area</td>
<td>Water</td>
<td>Flood surge from Tullahan River during heavy rainfall that may affect the STP site.</td>
<td>Implement climate-proof measures such as: -Interceptor systems taking into consideration the storm water runoff -Riverbank protection and earthfilling of site up to current street level -Planting of trees and other vegetation.</td>
<td>MWSI-Operations Group</td>
<td></td>
<td>Drainage plans Building Permit Sanitary Permit</td>
</tr>
<tr>
<td>Change in hydrology/impact on flooding</td>
<td>People Water</td>
<td>Increased flow into the Tullahan River from the effluent discharge from the STP. Flooding may likely be reduced due to diverted discharges from sub-catchments 1</td>
<td>Design STP outfall after the flood control gate Consider tidal fluctuations to schedule outfall releases during low tide.</td>
<td>MWSI-Operations Group</td>
<td></td>
<td>STP plans</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
<td>Guarantee/ Financial Arrangements</td>
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</tr>
</tbody>
</table>
| Discharge of wastewater which could contaminate surface and groundwater | Water | Water pollution | Regular inspection and maintenance of the STP  
STP effluent should comply with the Effluent Standards of DENR for Class C waters.  
Secure Discharge Permit from DENR-EMB-NCR | MWSI-Operations Group | Php50,000 per month | Discharge Permit  
Self-Monitoring Reports (SMR) |
| Reduced domestic pollution load of the Tullahan River, Polo River and Meycauayan River | Water | Improvement of water quality | Monitoring of water quality of Tullahan River (upstream and downstream of STP outfall) | MWSI-Operations Group | Php30,000 per month | SMR  
Effluent test results |
| Odor from waste processing | Air | Odor generation | The plant will include an odor control system.  
Planting of more trees around the periphery to act as buffer against potential odor. | MWSI-Operations Group | P100,000.00 | Plans of odor control system  
Landscaping Plans |
| Sludge generation | Land | Land contamination | Onsite-treated sludge will be transported to the approved lahar disposal area of F.G. Agro Industrial Corporation in Barangay Telabanca, Concepcion, Tarlac for composting and use as soil conditioner. | MWSI-Operations Group | Part of operations cost | Monitoring reports |
| Transport of sludge | People | Traffic caused by regular plying of sludge trucks | Transport sludge during non-truck ban hours to avoid causing traffic along the narrow streets.  
Sludge haulers are required to follow the traffic management policies of MWSI | MWSI-Operations Group | Part of management cost | Contract with sludge haulers  
Log reports of sludge haulers |
<p>| Emissions from the operation of the standby generator unit. | Air | Air and noise quality | Secure Permit to Operate from DENR-EMB | MWSI-Operations Group | Part of maintenance cost | Permit to Operate |
| Screenings and solid waste generation. | Land | Solid waste | Implementation solid waste management system according to LGU plan. | MWSI-Operations Group | Part of operations cost | Contract with LGU/hauler |</p>
<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/ Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>MWSI shall establish a service level agreement with the LGU or its approved waste hauler to ensure proper disposal of solid waste and screenings.</td>
<td></td>
<td></td>
<td></td>
<td>MWSI-Operations Group</td>
<td>Part of project cost</td>
<td>Project design</td>
</tr>
<tr>
<td>Require segregation of hazardous wastes. Collection of HW by a DENR-recognized hazardous waste transporter and treater.</td>
<td></td>
<td></td>
<td></td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Monitoring reports</td>
</tr>
<tr>
<td>Monitoring of effluent quality Monitoring of community health profile, through Valenzuela City Health Office</td>
<td></td>
<td></td>
<td></td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Monitoring reports</td>
</tr>
<tr>
<td>People</td>
<td>Improvement of health and sanitation</td>
<td></td>
<td></td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Monitoring reports</td>
</tr>
</tbody>
</table>

**B. CONVEYANCE SYSTEM**

**I. Pre-Construction Phase**

<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/ Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of construction of sewer network to drainage canals, roads, adjacent buildings and sensitive receptors (e.g. hospitals, schools, residential areas, business establishments, etc.)</td>
<td>People</td>
<td>Construction of sewer network will most likely result to traffic and temporary disruption of businesses and normal operations/activities.</td>
<td>Conduct a line survey and coordinate with DPWH, MERALCO, PLDT, and LGU to check location/presence of other utilities and structures Design a shoring and bracing plan to protect adjacent structures and foundations Implement a phased-in schedule of construction works for the network</td>
<td>MWSI</td>
<td>Part of design cost</td>
<td>Design of sewer network</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
<td>Guarantee/ Financial Arrangements</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>II. Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic congestion due to closure or partial closure of roads for sewer construction</td>
<td>People</td>
<td>Traffic</td>
<td>Prepare and present a Traffic rerouting scheme to the LGU for approval. Sidestreet parking of construction vehicles will not be allowed. Install flashing boards, bollards, concrete barriers, safety warnings/signages.</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction management cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Dust emission from civil works and movement of vehicles</td>
<td>Air</td>
<td>People</td>
<td>Air pollution</td>
<td>Water sprinkling of areas prone to dust emission</td>
<td>Project mgt office / contractor</td>
<td>Part of construction cost</td>
</tr>
<tr>
<td>Soil runoff into canals and water bodies</td>
<td>Water</td>
<td>Clogging of canals</td>
<td>Provision of silt traps Washing of cement mixers will not be allowed onsite.</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor and cement hauler</td>
</tr>
<tr>
<td>Impact of construction activities on welfare and safety of workers</td>
<td>People</td>
<td>Health and safety of workers</td>
<td>Implementation of Construction Safety and Management Plan Designation of Safety Officer by the contractor Require wearing of safety gadgets by workers.</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Safety of passersby and damage to adjacent structures</td>
<td>People</td>
<td>Safety of passersby; damage to adjacent properties</td>
<td>Barricades and steel plate covers will be provided in open excavations during non-working hours. Warning signages and flashing boards will be posted at the</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
</tbody>
</table>
### Project Phase / Environmental Aspect

<table>
<thead>
<tr>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONSTRUCTION PHASE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation of excavated soil and construction debris</td>
<td>Land People</td>
<td>Excavated soil Solid wastes</td>
<td>Excavated soil shall be disposed in an LGU-approved disposal area</td>
<td>Project mgt office / contractor</td>
<td>Part of construction cost</td>
</tr>
<tr>
<td>III. Operation Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generation of screenings and solid waste</td>
<td>Land</td>
<td>Solid waste generation</td>
<td>Daily collection of screening wastes at interceptors and manholes Coordinate with LGU on the implementation of the Ecological Solid Waste Management Program to encourage households to collect solid wastes and avoid disposal on canals and creeks.</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
</tr>
<tr>
<td>Noise from operation of equipment, pumps and motors</td>
<td>People</td>
<td>Noise</td>
<td>Provision of enclosure for pumps and motors and regular maintenance of equipment</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
</tr>
</tbody>
</table>

### SUMMARY OF ENVIRONMENTAL MONITORING PLAN

<table>
<thead>
<tr>
<th>Key Environmental Aspects per Project Phase</th>
<th>Potential Impacts per End Sector</th>
<th>Parameter to be Monitored</th>
<th>Sampling &amp; Measurement Plan</th>
<th>Lead Person</th>
<th>Annual Estimated Cost</th>
<th>EQPL Management Scheme</th>
<th>EQPL Range</th>
<th>Management Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Method</td>
<td>Frequency</td>
<td>Location</td>
<td>Alert</td>
<td>Action</td>
<td>Limit</td>
</tr>
<tr>
<td>CONSTRUCTION PHASE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust generation</td>
<td>Air quality</td>
<td>Dust emission</td>
<td>observation</td>
<td>Daily</td>
<td>Construction sites</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>√</td>
</tr>
<tr>
<td>Traffic</td>
<td>Air quality</td>
<td>Dust</td>
<td>observation</td>
<td>daily</td>
<td>Construction sites</td>
<td>contractor</td>
<td>Php10,000</td>
<td>Traffic mgmt measures</td>
</tr>
</tbody>
</table>
## Key Environmental Aspects per Project Phase

### Safety hazards
- Noise levels
- Measurement using noise meter; observation
- Daily
- Construction sites
- Contractor
- Excessive noise
- Noise standards
- PD 984

### Operational Phase

<table>
<thead>
<tr>
<th>Parameter to be Monitored</th>
<th>Sampling &amp; Measurement Plan</th>
<th>Lead Person</th>
<th>Annual Estimated Cost</th>
<th>EQPL Management Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water pollution</strong></td>
<td>Effluent sampling in accordance with DAO 34/35 Weekly Effluent of STP PCO P200,000 per yr Non-conformance with stds Maintenance and adjustment of facilities DAO 35</td>
<td>PCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Discharge of treated wastewater</strong></td>
<td>River sampling in accordance with DAO 34 Quarterly Upstream and downstream of STP outfall PCO P50,000 per yr</td>
<td>PCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>Observation Daily STP site PCO Foul odor Check facilities -</td>
<td>PCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Solid waste generation</strong></td>
<td>Volume of solid waste generated daily Waste segregation area PCO P50,000 per yr Regular collection by hauler RA 9003</td>
<td>PCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sludge generation</strong></td>
<td>Volume of sludge hauled by sludge Weighing / estimation Weekly/ Monthly STP site PCO -</td>
<td>PCO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Environmental Aspects per Project Phase</td>
<td>Potential Impacts per Emitt Sector</td>
<td>Parameter to be Monitored</td>
<td>Sampling &amp; Measurement Plan</td>
<td>Lead Person</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------</td>
<td>-----------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Contractor</td>
<td>contractor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous waste generation</td>
<td>Hazardous waste</td>
<td>Qty of hazardous waste generated</td>
<td>measurement quarterly Waste segregation area</td>
<td>PCO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alert</th>
<th>Action</th>
<th>Limit</th>
<th>Alert</th>
<th>Action</th>
<th>Limit</th>
</tr>
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<tbody>
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</tr>
</tbody>
</table>
ENVIRONMENTAL MONITORING FUND AND ENVIRONMENTAL GUARANTEE FUND

Funds shall be allocated for the implementation of the Environmental Management Plan and Environmental Monitoring Action Plan, as indicated in the EMP and EMoP. An Environmental Guarantee Fund (EGF) will be set-up in the extreme event of damage to property and life caused by the project. The amount of the fund shall be determined by the DENR.
1. PROJECT BACKGROUND AND RATIONALE

The MWSI is a concessionaire of the MWSS that serves the West Zone. The MWSI is committed to provide potable water as well as manage wastewater and sanitation services in accordance with the Concession Agreement. In addition, MWSI through the MWSS is mandated to comply with the requirements of the Philippine Clean Water Act (R.A. 9275) and the Supreme Court Mandamus for the rehabilitation of Manila Bay. Because of these commitments, MWSI continues to implement sewerage and sanitation programs for effective wastewater collection and treatment in its service area. One of these projects is the Metro Manila Wastewater Management Project (MWMP) which will be financed by the World Bank (WB) through the Land Bank of the Philippines (LBP).

2. PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND AREA

The proposed project will be located within the Valenzuela hydrological catchment, which covers an area of approximately 4,900 hectares. Valenzuela hydrological catchment is characterized by multiple river boundaries: Meycauayan River in the north, Tullahan River in the south and the Polo River in the west. In general, the Valenzuela catchment is part of the Meycauayan River Basin which has an hydrological catchment area of 21,400 ha.

Three sub-catchments correspond to the three main rivers within the Valenzuela hydrological catchment. Sub-catchment A has an area of 1,200 ha and lies along Polo River; Sub-catchment B has 2,200 ha of area and lies along the Meycauayan River; and the Tullahan River forms Sub-catchment C with an area of 1,500 ha.

The main portion of the wastewater catchment of Valenzuela is situated within the boundaries of Meycauayan River in the north, Tullahan River in the south, Obando in the west and Quezon City in the east. The Tullahan River which flows west forms the boundary at the southern portion of Valenzuela with parts of Quezon City, Caloocan City, and Malabon City, while the western side of Valenzuela is generally bound by the Polo River.

The proposed STP will be constructed in a property with an area of 2.56 ha located at the east end of F. Bautista St., Barangay Marulas, Valenzuela City. The said property is adjacent to the Tullahan River. The site is accessible to vehicles from the main road of McArthur Highway through F. Bautista St. The proposed STP site is approximately centered by geographic coordinates 14° 40’ 40.05” north latitude and 120° 58’ 32.17” east longitude.

A Contract to Sell was entered between the City Government of Valenzuela and MWSS. The property consists of four (4) lots with an aggregate area of 25,560 sqm, technically defined as follows:

<table>
<thead>
<tr>
<th>Lot No.</th>
<th>TCT No.</th>
<th>Area (sqm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>698-A-1</td>
<td>V-65573</td>
<td>788</td>
</tr>
<tr>
<td>698-a-3</td>
<td>V-65586</td>
<td>7,386</td>
</tr>
<tr>
<td>698-A-2</td>
<td>V-65587</td>
<td>7,386</td>
</tr>
<tr>
<td>698-B-1</td>
<td>V-65574</td>
<td>10,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25,560</td>
</tr>
</tbody>
</table>
The property is bounded by the F. Bautista St. on the northeast and by the Tullahan River on the southern, eastern, and northwestern sections. Residential houses can be found at the eastern boundary of the property. Inside the property is the Eco Center, MRF and remaining structures of the City Dog Pound of Valenzuela City. Affected structure will be the City Dog Pound. The local government of Valenzuela City has identified an area within the Lingunan Solid Waste Disposal site for the new city dog pound building. Construction of the building is now under bidding.

The site used to be owned by Marulas Farm which ceased operation in 2005. The property was later acquired by the City Government. The copy of the Contract to Sell that was entered by MWSS and the City of Valenzuela for the purchase of the property is shown in Annex C.

2.2 PROJECT RATIONALE

The project objectives are to enhance the urban environment and public health through better wastewater management. Specifically, the proposed project aims to:

- enhance the management of wastewater, human waste and storm water;
- reduce pollution load being discharged into the Tullahan River, Polo River, Meycauayan River and eventually to Manila Bay;
- contribute to the clean-up of creeks and rivers draining to Manila Bay;
- comply with the National Sewerage and Septage Management Program as prescribed in the Philippine Clean Water Act;
• Contribute to the economic growth of Metro Manila, particularly Valenzuela City; and
• Improve public health and sanitation in Valenzuela City.

2.3 PROJECT ALTERNATIVES

2.3.1 Without Project Alternative

Without the project, large amounts of wastewater will be continuously discharged into the river systems and Manila Bay, resulting in continued pollution of the water bodies in Metro Manila. Unless comprehensive efforts are undertaken to change the attitude and practices of the different sectors contributing to the pollution of the canal, waterways and rivers, the situation will worsen the pollution and health conditions particularly for those living near the easements and riverbanks. Increasing population will further aggravate the situation, contributing to flooding and breeding of harmful bacteria and insects that will cause more diseases.

2.3.2 Siting Alternative

MWSI considered six potential sites for the STP. The following presents the potential STP locations that have been considered by MWSI.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Location</th>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F. Bautista St., Barangay Marulas, Valenzuela City (Eco Center)</td>
<td>2.56 ha</td>
<td>Owned by Valenzuela City. Undeveloped with a small space occupied by the City Dog Pound in the southwestern end and an MRF near the entrance.</td>
</tr>
<tr>
<td>2</td>
<td>Rubber Master Road, Barangay Lingunan, Valenzuela City</td>
<td>8.33 ha</td>
<td>Privately-owned vacant lot which is used as a local government waste dumping area in Lingunan, Valenzuela City. The site is adjacent to the Polo River.</td>
</tr>
<tr>
<td>3</td>
<td>San Francisco St. near PNR corridor</td>
<td>7.29 ha</td>
<td>Open land by Tullahan River</td>
</tr>
<tr>
<td>4</td>
<td>Engracia St. cor. Jacinto St., Barangay Marulas</td>
<td>3.19 ha</td>
<td>Private land near Meycauayan River</td>
</tr>
<tr>
<td>5</td>
<td>La Mesa Road, Barangay Ugong, Valenzuela</td>
<td>3.68 ha</td>
<td>Vacant, private lot along La Mesa St., near Tullahan River</td>
</tr>
<tr>
<td>6</td>
<td>A. Mariano St., Barangay Bagbaguin, Valenzuela</td>
<td>7.78 ha</td>
<td>Vacant public land near Our Lady of Holy Rosary Parish in Barangay Bagbaguin.</td>
</tr>
</tbody>
</table>

The sites were assessed based on land area availability, avoidance of informal settlements, proximity to a discharge point, access, location within the catchment (upstream/downstream) site conditions, and land type. Of the six sites, the lots along Tullahan River in Barangay Marulas, Valenzuela City with an area of 2.56 ha was evaluated as the most appropriate for the site of the STP.

2.3.3 Sewerage Alternatives

The conveyance options are the result of the combination of:
• Three service areas
• Two treatment plant candidate sites
• Up to three stages.

The selected option involves the interception of major outfall flows of areas A and B prior to reaching the Tullahan, Meycauayan and Polo Rivers, followed by diversion to one treatment facility located at STP site 1. Area A is the area west of NEX and is generally south of T. Santiago and Sevilla Road while Area B is the area west of NLEX and is generally north of T. Santiago St. With this option, the water bodies to be protected are Tullahan, Meycauayan, and Polo Rivers, as well as Manila Bay.
Prior to reaching the rivers, flows from outfalls will be diverted by means of pump stations or by gravity. The flows will be directed to spine sewers running parallel to the river of Tullahan and Polo or intercepting at one or various major pollution clusters at Meycauayan tributaries. Gravity sewers will be laid along the road network to minimize ROW issues.

The area east of NLEX and bounded by the city boundary with Caloocan and Quezon City, defined as Area C, will include the upstream sections of the Tullahan River and a small tributary of Meycauayan River. This area contributes less pollution to the streams and was determined during the feasibility study as better served by a separate treatment facility treating along with the flows from Caloocan.

2.3.3.1 Sewage Treatment Options

Four STP technologies were considered for the Valenzuela catchment. These are the Activated Sludge Plant (ASP), Sequencing Batch Reactor (SBR), Membrane Bioreactor (MBR), and Moving Bed Bioreactor (MBBR). During the feasibility study, the four options were narrowed down to only two recommended technologies – the ASP and SBR. The ASP and SBR are of similar costs, however, the ASP required a higher footprint or area requirement than SBR. An SBR requires higher operational expenditure since it
would require running wastewater treatment cycles or batch process within a day’s operation. The MBR and MBBR technologies are not preferred due to their upgradability issues and high capital and operational expenditures.

2.3.3.2 Implementation Schedule and Risks

The criteria for implementation schedule/risks considers the timelines and other factors that could delay the project implementation like right-of-way (ROW) and land acquisition.

2.3.3.3 Environmental and Health Benefits

This criterion considers the impact on water quality of the rivers in the Valenzuela catchment. All options will result in the improvement of the Manila Bay.

2.4 PROJECT DEVELOPMENT PLAN, PROCESS TECHNOLOGY AND PROJECT COMPONENTS

The project involves the construction of a STP and the installation of a sewerage system through a conveyance system that feeds into the STP. More specifically, the project infrastructure involves the following:

(a) Conveyance System – consisting of interceptor boxes, gravity sewers, pressure mains, collector (reticulation) pipelines, pump stations, manholes, and river crossings

(b) Wastewater treatment facility – wastewater treatment facility, interconnecting pipework (above and below ground), various mechanical equipment for flows and pumps, inlet and outfall, chemical storage facilities, control rooms, administration building, access roads, and parking area.

2.4.1 Interception and Conveyance System

The pipes or sewer lines will run mostly along roads, therefore, traffic management issues and plans for mitigation will be discussed and agreed upon with the local government of Valenzuela City, prior to commencing construction. Work will be sub-contracted, once a detailed design is approved. Completion of the conveyance system will take about two to three years. This will include pipe laying, installation of interceptor boxes and construction of pump stations. Construction of these pipes will be done in sections to minimize impact on traffic particularly along major roads. The major road and stream crossings of the conveyance system is outlined in Table 4 while Figure 4 presents the conveyance system.

<table>
<thead>
<tr>
<th>Stage 5. Major Road and Stream Crossings of the Conveyance System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stream/Road</strong></td>
</tr>
<tr>
<td>Polo River</td>
</tr>
<tr>
<td>Meycauayan River</td>
</tr>
<tr>
<td>M. Hernandez St.</td>
</tr>
<tr>
<td>Pasolo/Rincon Road</td>
</tr>
<tr>
<td>T. Santiago</td>
</tr>
<tr>
<td>I. Santiago</td>
</tr>
<tr>
<td>McArthur Highway</td>
</tr>
<tr>
<td><strong>Stage 2</strong></td>
</tr>
<tr>
<td>T. Santiago</td>
</tr>
</tbody>
</table>

Stage 1 will cover initial workers for Service Area A, west of NLEX, generally south of T. Santiago and Sevilla Road. This option is expected to be implemented by 2014. For Stage 2, there will be no additional stream crossing but a new major road crossing will be encountered.
The details of the sewerage system, including gravity sewers and pressure mains are summarized in Table 5 while the details of proposed pump stations are presented in Table 6.

Table 6. Sewers and Pressure Main

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Approximate Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gravity Sewer</td>
</tr>
<tr>
<td>Stage 1</td>
<td></td>
</tr>
<tr>
<td>&lt; 250 mm</td>
<td>550</td>
</tr>
<tr>
<td>250 – 450 mm</td>
<td>800</td>
</tr>
</tbody>
</table>
Interceptor boxes shall be laid along the existing drainage canals to divert the flow of the water towards the STP. The interceptor boxes shall be equipped with basket screen to trap solid wastes and other screenings and avoid problems on equipment and pumps associated with solid entrapment in the STP.
2.4.2 Sewage Treatment Plant

The construction of the STP will most likely be procured as a Design and Build contract. The timeframe is largely dependent on the contractor’s approach. Based on past STP projects of MWSI, the scale of 60 MLD with future upgrade to 125 MLD would exceed two years to construct.

The STP will be designed to comply with the effluent standards stated in DENR Administrative Order No. 35, series of 1990 for new/proposed industry discharging into Class C inland waters (Table 7). The STP will be designed to remove carbonaceous material with allowance for future expansion for capacity increase and changing effluent standards including nutrient removal.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Maximum Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemical oxygen demand (BOD), mg/l</td>
<td>50</td>
</tr>
<tr>
<td>Chemical oxygen demand (COD), mg/l</td>
<td>100</td>
</tr>
<tr>
<td>Total suspended solids (TSS), mg/l</td>
<td>70</td>
</tr>
<tr>
<td>Total dissolved solids (TDS), mg/l</td>
<td>-</td>
</tr>
<tr>
<td>Settleable Solids, mg/l</td>
<td>0.5</td>
</tr>
<tr>
<td>pH (range)</td>
<td>6.5 – 9.0</td>
</tr>
<tr>
<td>Color, PCU</td>
<td>150</td>
</tr>
<tr>
<td>Oil and grease, mg/l</td>
<td>5.0</td>
</tr>
<tr>
<td>Phenolic substances as Phenols, mg/l</td>
<td>0.1</td>
</tr>
<tr>
<td>Total Coliforms, MPN/100ml</td>
<td>10,000</td>
</tr>
</tbody>
</table>

Source: DENR Administrative Order 35, series of 1990

The proposed STP will consist of preliminary treatment system, biological treatment system, sludge handling and treatment, disinfection, and odor control system.

Industrial and commercial sources in Valenzuela City that will directly discharge to the proposed sewerage system will be required to pre-treat their effluents particularly for oil and grease and other toxic and deleterious substances.

2.4.2.1 Preliminary Treatment System

Sewage from the influent pump stations or force mains will be directed to the treatment plant passing through a series of mechanically-cleaned bar screens to remove coarse solids and solid wastes. These will be installed at the inlet channel prior to the grit chamber. A primary clarifier will be used to further remove suspended solids.

2.4.2.2 Secondary Treatment

The Activated Sludge Process or the Sequencing Batch Reactor will be utilized for the biological treatment process. ASP is one of the most popular biological treatment systems for municipal and industrial wastewaters. ASP can effectively reduce the organic elements of the wastewater through metabolic reactions of the microorganisms, separation and settling of solids and collection and recycling of microorganisms back into the system. The ASP can reduce BOD, total nitrogen and total phosphorus.

The SBR process utilizes the fill-and-draw reactor with complete mixing during the batch reaction step (after filling). The phases and sequence of the SBR process involves the following steps:

1. Fill – substrate (raw wastewater or primary effluent) is added into the reactor and allows the liquid level to rise from 75% of capacity (at the end of the idle period) to 100%. The Fill process normally lasts about 25% of the total cycle time. During Fill, the reactor maybe mixed only or mixed and aerated to promote biological reactions with the influent wastewater.

2. React – biomass consumes the substrate under controlled environmental conditions. React process takes up approximately 35% of the total cycle time.
(3) Settle – solids are allowed to separate from the liquid under quiescent conditions, resulting in a clarified supernatant that can be discharged as effluent. Settle usually lasts 20% of the total cycle time.

(4) Decant – the clarified effluent is removed from the reactor. Floating or adjustable weirs are popularly used for decanting mechanisms. Decant takes about 15% of the total cycle time.

(5) Idle – Idle in a multi-tank system which provides time for one reactor to complete its Fill cycle before switching to another unit. Because Idle is not a necessary phase, it is sometimes omitted.¹

Effluent from the ASP or SBR will be fed into a clarifier. Majority of the settled sludge will be recycled back to the aeration tank to maintain the required MLSS for BOD removal. The excess sludge from the activated sludge system will be removed from the clarifier on a regular basis using sludge pump.

2.4.2.3 Tertiary Treatment

Disinfection of the effluent will be undertaken to reduce the level of coliform bacteria to the required standard. Disinfection is usually performed using liquid chlorine, sodium hypochlorite, calcium hypochlorite, ozone or UV rays. The chlorine contact rate is set at 15 minutes or more.

2.4.2.4 Sludge Management

The sludge will be treated through sludge thickening methods that includes gravity sludge thickening, flotation sludge thickening or centrifugal thickening. Sludge digestion processes are divided into anaerobic sludge digestion and aerobic sludge digestion. Normally, the anaerobic sludge digestion process is adopted in facilities that handle large quantities of sludge. Anaerobic sludge digestion entails biologically decomposing the organic matter in sludge in an anoxic environment. When sludge is left in a sludge digestion tank for around 20 days, the organic matter in the sludge is gasified and the sludge is reduced in quantity to around 40~60%. Following digestion, the sludge undergoes sedimentation and is separated into supernatant (separated liquid) that includes soluble organic matter, digestion gas and stable digested sludge.

Sludge dewatering will be carried out with the objective of removing the water content from sludge, thereby, reducing its volume and making it more amenable to treatment and disposal. Mechanical dewatering methods that are being considered include the centrifugal dewatering machine, belt press filter, and multi-disc dewatering machine.

The dewatered solids will be transported offsite for stabilization. Disposal site of sludge will be in the lahar area in Barangay Telabanca, Concepcion, Tarlac where it is processed as compost and utilized as soil conditioner. The sludge processing facility of F.G. Agro Industrial Corporation holds an approved Environmental Compliance Certificate (ECC) from the DENR-EMB-Region 3 (Annex H). The same facility has been utilized by subprojects under the Manila Second Sewerage Project (MSSP) and Manila Third Sewerage Project. (MTSP). The process flow of F.G. Agro can be seen below.

The volume of sludge produced will depend on the selected technology for the treatment process. Since the project has a design and build scheme, the volume of sludge is not yet final. The number of trucks that will collect/haul the sludge is also based on the volume of the sludge produced. However, hauling of sludge will be scheduled monthly.

¹ Source: Table 5 - Operational Steps of the SBR, Feasibility Study of Three River Systems, STP Technology Options.
2.4.2.5 Odor Control

Odor management scenarios were analyzed by MWSI depending on the area and the amount of odor to be captured. Odor control technologies such as the biotrickling filter and the chemical scrubbers will be evaluated. Biotrickling filter uses microorganisms that feed on foul odor-producing organic matters while chemical scrubbers use chemicals such as sodium hydroxide or sodium hypochlorite to scrub off pollutants in the gas. The evaluation and recommended technology for the odor control system to be used will be part of the Tender documents.

2.4.2.6 Amenities, Equipment and Machinery

- Power Supply
The Manila Electric Company (MERALCO) will supply the electricity for the entire project. A back-up generator shall be provided to enable continuance of the vital STP unit processes in the event of power outage.
- **Administration Building**
  An administration building will be provided to house the manager’s office, changing facilities and lockers for workers, associated shower facilities, and washbasins.

- **Buffer Zone, Landscaping, Open Spaces, and Security**
  The proposed project will maintain the concept of an environment-friendly development. A buffer zone planted with trees shall be maintained around the STP site. In addition, the project will have adequate open spaces, landscaped areas, and vegetation-lined walkways.

  Security will also be maintained at the access gates. A 24-hour security system and a secure and permanent perimeter fence will be provided.

### 2.5 Description of Project Phases (Activities/Environmental Aspects, Associates Wastes and Built-in Pollution Control Measures)

#### 2.5.1 Pre-Construction/Pre-Operational Phase

The pre-construction phase will consist of project planning and activities relating to securing the necessary permits and clearances prior to construction. The conduct of the EIA study is part of this phase. Land acquisition will also be finalized at this phase.

#### 2.5.2 Construction/Development Phase

The construction of the project can be further divided into two elements: the construction of the STP and the construction of the sewage interception and conveyance system. These are two separate items that need to be phased accordingly.

Project implementation will be constructed in stages. Stage 1 will include the construction of the STP and about 55% of the total pipeline and appurtenances such as interceptor boxes and pump stations. The goal is to accomplish Stage 1 by 2015.

Stage 2 will then include laying the remaining lengths of pipes, construction of respective appurtenances and possible upgrade and/or addition of STP facilities.

Stages 1 and 2 will service about 61% of the total Valenzuela area, which is generally that part of Valenzuela that is west of the North Luzon Expressway (NLEX). When MWSI extends its service area coverage to the east of NLEX, Stage 3 part of the construction will commence between 2022 and 2037. Additional pipework will be laid and constructed, including the upgrade of the STP facilities.

#### 2.5.2.1 Construction Wastes and Management Measures

Wastes to be generated during the construction phase include wastes from the site clearing activities, construction of staging and temporary facilities, and from excavation of the sewer network. These wastes shall generally consist of stripped vegetation, primarily grasses and shrubs. These wastes shall be disposed as regular garbage.

The construction wastes also include organic debris, stumps, wooden planks, steel bars, cement bags, and other related materials. The organic debris shall be disposed by the contractor as garbage while the cut soil will be used as fill material within the site.

#### 2.5.3 Operational Phase

As soon as sewage is collected, it needs to be conveyed through the network of pipelines to the STP facility for treatment. Treated sewage will be discharged through the effluent outfall to the Tullahan River.
This phase involves all daily activities necessary for the smooth operation of the sewerage system such as equipment checks/maintenance, sewage treatment, sludge stabilization, disposal and transport, environmental management, monitoring and implementation of social development programs and operationalization of the institutional plan.

The project will operate daily, excluding days required for major maintenance.

2.5.3.1 Waste Production and Management Scheme During Operational Phase

Wastes from the sewerage system project will consist of the following:

- Sludge
- Solid wastes and screenings
- Air pollutants from the operation of standby generator set
- Hazardous waste such as busted fluorescent lamps, empty chemical containers from analysis, treatment, and maintenance activities and used oil from maintenance of generator set.

2.5.4 Abandonment Phase

Abandonment activities of the project will be limited to the removal of temporary structures used during the construction stage of the project. During the abandonment of the temporary facilities, the contractor and project management group shall ensure that the construction wastes will be properly collected. Recyclable materials such as steel bars, wooden planks, and the like will be sold as scrap to junk shops.

The contractor shall guarantee that the abandonment activities during the post-construction stage will be immediately undertaken to ensure the smooth turn-over of the project.

Once in operation, the facilities are unlikely to be abandoned. Concrete structures are usually designed to last for at least 50 years. Electro-mechanical parts will be replaced or upgraded after their effective life of 10 to 15 years.

2.6 Manpower Requirements

Manpower requirements for the construction and operation of the proposed project will be determined as soon as the detailed design has been completed. In terms of skills requirements, skilled and unskilled personnel consisting of the engineers, foreman, leadmen, carpenters, masons, laborers, electrician, plumber, and other utility personnel will be employed.

2.7 Project Cost

The construction of the proposed project will entail an estimated cost of Php3.8 Billion, including taxes and duties, engineering design and construction supervision and contingencies.
3 ANALYSIS OF KEY ENVIRONMENTAL IMPACTS

3.1 LAND

Valenzuela City has a total land area of approximately 4.77 ha. The city is composed of 32 barangays which are grouped into two congressional districts and two legislative districts. Two major highways traverse Valenzuela City – the McArthur Highway and the North Luzon Expressway. Valenzuela City is bounded to the north and northwest by Caloocan City and Malabon and to the west by Navotas.

The largest barangays of the city include Canumay in District 1 and General Tiburcio de Leon (Gen. T. de Leon) in District 2, each comprising of land areas below 10% of the total area of Valenzuela.

3.1.1 Land Use and Classification

The city is known to be the agro-industrial zone of the metropolis having the biggest industrial hectarage in absolute terms in Metro Manila. Valenzuela City is primarily an industrial and residential suburb of Metro Manila.

The prevailing land use along the peripheral areas of the STP site is medium-scale manufacturing industries and medium to low-income residential communities. On the other hand, both sides along the stretch of McArthur Highway are traces of light commercial establishments, banks, gas stations, mixed business-residential establishments, schools, and hospitals.

The dominant land use in Valenzuela City is composed of residential (30%), commercial (30%) and industrial (30%). About 10% of the total land area is undeveloped or agricultural in nature. This is the land use classification at the site of the proposed STP which used to be occupied by Marulas Farms.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Area, ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (low, medium and high density)</td>
<td>1,427.57</td>
<td>30.0%</td>
</tr>
<tr>
<td>Commercial</td>
<td>1,427.57</td>
<td>30.0%</td>
</tr>
<tr>
<td>Industrial</td>
<td>1,427.57</td>
<td>30.0%</td>
</tr>
<tr>
<td>Undeveloped/open area/Agricultural/ agro-industrial</td>
<td>475.86</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>4,758.58</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.1.1.1 Affected Structures at Proposed STP Site

At the proposed site of the STP in Barangay Marulas, the land use classification of the property is agro-industrial based on the CLUP. The City Dog Pound measuring about 8 x 15 m can be found inside the property. Near the entrance is the Eco Center building and the MRF of Valenzuela. Only the City Dog Pound structures will be affected when the STP is constructed. An area within the Lingunan Solid Waste Disposal site has been allocated by Valenzuela City for the new city pound. The construction of the city pound building is now under bidding.

In the immediate vicinity of the property is a textile manufacturing plant on the right side of the main gate which ceased operation due to damages encountered by flood and Globe Paper Mills which is located across the Tullahan River. There is also a flood control facility and a concrete blocks manufacturing facility of Simeon Trading located at the northern tip of the property. Residential houses can be found at the eastern boundary of the property.
The city Materials Recovery Facility (MRF) near the entrance of the property.

Residential houses on the eastern side of the property.

The textile manufacturing plant on the right side of the main gate to the property which already ceased operation.

The Eco Center of Valenzuela City

Flood control facility and the Simeon Concrete Products on the northern tip of the property.


Photo 4. Establishments and facilities inside and in the immediate vicinity of the STP site.
3.1.1.2 Affected Structures along Sewer Network

There will be no land to be acquired for the construction of the sewer network. However, the construction activities will most likely result to impact on businesses, dust and noise, wastewater from workers and other activities, construction debris, and more importantly, traffic congestion. The affected structures include business establishments along roads, residential houses, shops, schools, public market, hospitals and other institutions. The detailed number of structures that will be affected will be determined after the detailed survey and design of the sewer line and work program. Access to these businesses and establishments will be provided and a phased-in schedule of construction works for the network and traffic re-routing plan in consultation with Valenzuela City’s traffic management department is necessary to avoid inconvenience to the public. Figure 5 present the affected roads of the proposed sewer network.

![Figure 5. Roads that will be affected by the sewer network](image)

3.1.2 Topography

The Valenzuela catchment area is located on a flat to gently undulating terrain. Its highest elevation point is 38 m above sea level with an average of 2 m above sea level and a surface gradient of 0.55%. The catchment typically features moderate to flat terrain with multiple areas susceptible to flooding. The slope in the estuarial areas at the Polo River and Meycauayan River is flat enough to permit re-entry of seawater from tidal flow coming from Manila Bay. Valenzuela also contains no ridgeline boundaries with adjacent cities offering little natural flood mitigation to local flooding. The portion of Valenzuela bonded by the Tullahan River is also downstream of the La Mesa Reservoir which occasionally releases flow through
the dam spillway. Areas adjacent to the Tullahan River are often affected by these releases from the dam.

The STP project site itself has a flat topography that is in similar configuration with the surrounding areas. The elevation at the proposed STP site ranges from 5 – 6 meters above sea level. Since the site is relatively located within the flood plain, special site development works will be required in the design of the facility.

3.1.3 Geology

There are only two (2) formations in Metro Manila that may stratigraphically be correlated and these are the Quaternary Alluvium and Guadalupe Formation, as discussed in the succeeding sections:

**Quaternary Alluvium (QAI)**

This formation covers the flat lowland areas and consists of unconsolidated or poorly consolidated gravel, sand, silts and clays on riverbeds, floodplains, and deltas (MGB, 1981). This formation is distributed along the Manila Bay Coast and the floodplains of Pasig River in the west and the Marikina River valley in the east. Based on actual drilling data, Oca (1968) described the prominent deltaic plain along the Manila Bay Coast as underlain by plastic clays, silts, sands, gravels with an intimate admixture of marine shells, corals, and decayed plants. Layers are typically lenticular and intertongue with one another. Lateral persistency among individual beds is so poorly developed that they terminate abruptly at a short distance as 3 meters. The thickness of alluvial materials reaches a maximum of 244 meters at the Port Area (Oca, 1968) but thins out towards Sta. Mesa down south to Makati. At the east side, another alluvial deposit is distributed in Marikina Valley. Gervasio (1968) described this as an alluviated graben valley. The thickness of the alluvial deposits vary erratically from about 117 meters in Montalban, 15 meters in Marikina, 30-40 meters towards Pasig River, and 130 meters farther south.

In terms of seismic response, the loose and poorly consolidated sediments like the above do not absorb seismic energy. They even amplify such energy and transmit it to structures. In previous earthquakes that hit the Metro Manila area, damaged buildings are usually located on this type of deposit. Other hazards associated with this deposit are liquefaction and settlement. Piling is always a must if one has to erect tall structures on this formation. This formation therefore may be considered as one engineering geological zone or EGZ-1. The site of the proposed STP appears to be located in this formation.

**Guadalupe Formation (GF)**

The Pleistocene Guadalupe Formation underlies the Guadalupe Plateau. It is widespread and quite dominant occupying a large area around Laguna de Bay and extends as far as the southeastern part of Nueva Ecija in the north (MGB, 1981). The thickness is also appreciable reaching to as much as 2,000 meters (MGB, 1981). It has two (2) members, the upper Diliman Tuff and the underlying Alat Conglomerate. The upper Diliman Tuff is typified by the geologic section in Guadalupe, Makati City. It consists practically of thin to medium beds of fine-grained vitric tuffs. Volcanic breccias or agglomeratic tuffs (Gervasio, 1968) are sparingly intercalated with some lamellae of fine- to medium-grained sandstones. Massive fine to coarse-grained tuffs are also observed particularly beneath the bedded layers. Andesitic to basic flows are also common. Erosional surfaces marked by preserved light brown fossil soil or decayed tuffs (Gervasio, 1968) are distinct and these are usually prone to slaking. This is known to many workers as paleosols. The Diliman Tuff which constitute wholly the Guadalupe Formation is generally well consolidated and cemented. However, varying degrees of chemical decomposition (rock decay) and disintegration (partial break-up) are indicated at different intervals in the section (Oca, 1968). Alat Conglomerate on the other hand, is described as possessing clasts of diverse origin set in a coarse-grained matrix and cemented by calcareous materials. This member is substantially indurated.

Based on existing regional geological records, the geology at the proposed STP site is generally stratigraphically correlated to the Quaternary Alluvium and the Guadalupe Formation. The proposed site is situated on the geomorphic boundary between the alluvial plain and the footslope zone of the Guadalupe Plateau.
3.1.4 Tectonic Setting

The Philippines is a tectonically active island arc system with many earthquake generators such as subduction zones, active faults, and active volcanoes. Around the project site or within a 150-km radius, the earthquake generators are the Valley Fault System (VFS), Philippine Fault (PFZ), the Manila Trench (MT), the East Luzon Trench (ELT), the Lubang Fault (LF), and the Casiguran Fault (CF). Some or most of these generators are capable of delivering earthquakes with magnitude greater than 7 and therefore are potential sources of disasters. History tells us that Magnitude 7.8 earthquakes had already occurred in the past including the November 1645 earthquake that leveled the Manila Cathedral to the ground.
Six (6) known tectonic earthquake generators (Figure 7) may affect the project site, namely; the Valley Fault System (VFS), the Philippine Fault Zone (PFZ), the Manila Trench (MT), the Digdig Fault (DF), the Lubang Fault (LF) and the Casiguran Fault (CF). Most of these generators can produce earthquakes with magnitudes greater than 7 and therefore potential sources of disasters. History tells us that Intensity 9 earthquakes had already occurred in the past including the November 1645 earthquake that leveled the Manila Cathedral to the ground (Daligdig & Besana, 1993). Another potential source of high intensity earthquake is the Lubang Fault. The 1645 earthquake cited above was generated by this fault and therefore has already proven its worth.

Some of the hazards that may be brought about by earthquakes at the STP site are ground shaking, and differential settlement and liquefaction.

3.1.4.1 Geologic Hazards

A. Ground Rupture

Ground rupture is not expected at the site since no splays of fault lines are perceived to pass through the area. However, during excavation, it is necessary to look closely into the fracturing that may be encountered in the excavation walls.

B. Ground Shaking

The intensity of ground shaking is magnitude-dependent, and decreases with increasing distance from the source. Thus, the degree and extent of vulnerability is dependent on the site’s proximity to known earthquake generators in the region. In addition, difference in ground conditions may cause deviations. Ground shaking is more intense in loose materials such as backfills. It is much less in massive bedrocks. Ground shaking alone can damage or even cause the collapse of large structures if founded on loose sands. Thus, it is important that in the structural design of the STP, the ground acceleration should be considered.

The nearest possible earthquake generator is the West Valley Fault which could deliver a magnitude of 7.5 (Daligdig and Besana, 1993). Fukushima and Tanaka in 1990 devised a deterministic method of estimating the attenuation of peak ground acceleration.

C. Differential Settlement and Liquefaction

Settlement in the foundation materials may take place particularly in transported soil including the alluvial belt. The alluvium deposits and silty sand layers in the project area may be loose and may liquefy during a seismic event. During ground vibration, an area loaded with a surcharge can compact substantially as to effect damage to the structure. This phenomenon should be considered in the design of footings. The degree of compaction should be based on sound engineering practice to avoid significant settlement.

Consolidation or primary settlement may occur in the underlying loose layers if the proposed structures at the STP site and other structures are supported by shallow foundation. The use of deep foundation such as piles will mitigate any form of settlement. Consequently, the piles stiffen the underlying soil and rock and effectively classifies as Soil Profile Type SD per NSCP.

Loose sediments near the surface are expected to have water seepages when exposed upon excavation. The seepage and the vertical excavation for the proposed structures may impart an unstable wall and would need protection. To mitigate mass movement and other foundation hazards, the proposed structures of the STP may be supported by deep foundations such as cast-in place (bored) or driven piles.
Figure 7. Distribution of nearest active faults and trenches that generated high-intensity earthquakes (Daligdig JA and Besana GM, 1993 after Punongbayan et al, 1990 and Besana et al 1992)

D. Damage to Adjacent Properties

The construction works could cause damage to adjoining properties and residents brought about by excavation of the sewer network and foundations of the facilities. This is considered a negative impact of the project during the construction stage. Appropriate protection works should be undertaken to prevent collapse of adjoining structures while protection against falling debris should be in-place during the construction of the facilities.

To prevent cave-ins and damage to adjacent structures such as the drainage canals, streets, and buildings during excavation, the contractor of the project should be required to design a shoring plan. A preliminary survey of the areas to be excavated, surrounding ground, geological features, roads, and facilities, should be undertaken. If necessary, the building of enclosures, retaining walls/slope protection as well as construction and maintenance of temporary drainage should be considered in the construction plan. All shoring, bracing, and sheeting as required for safety to support adjoining walls, walks, soils, streets, buildings, fences, etc. should be executed.

Protection measures such as braced sheet piles may be designed, depending on the findings of the soil investigation, to avoid damage to the adjacent structures. The specifications set by the National Structural Code for Buildings and the National Building Code of the Philippines should be complied with.
In addition, only ripping and dozing should be used in excavating for the foundation. No blasting should be done so as not to affect the integrity of the surrounding structures (drainage lines, fences, buildings, etc.).

### 3.1.5 Terrestrial and Freshwater Biology

The site of the proposed STP in Barangay Marulas can be considered as a shrub land with patches of grassland and a very small patch of secondary forest growth, no more than 100 sqm (Photo 5). Forest tree species such as narra (*Pterocarpus indicus*), mahogany (*Swietenia macrophylla*), bangkal (*Nauclea orientalis*), datilis (*Muntingia calabura*) and raintree (*Samanea saman*) can be found in the area. Near the center of the site are balete (*Ficus species*) and ipil-ipil (*Leucaena leucocephala*). Talahib (*Saccharum spontaneum*) and cogon (*Imperata cylindrica*) were also found to be common. Table 9 presents the inventory of trees inside the property.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banyan Tree (Balite)</td>
<td><em>Ficus indica</em></td>
<td>40</td>
</tr>
<tr>
<td>Talisay</td>
<td><em>Terminalia catapa</em></td>
<td>12</td>
</tr>
<tr>
<td>Narra</td>
<td><em>Pterocarpus indicus</em></td>
<td>4</td>
</tr>
<tr>
<td>Coconut</td>
<td><em>Cocos nucifera</em></td>
<td>8</td>
</tr>
<tr>
<td>Bangkal</td>
<td><em>Nauclea orientalis</em></td>
<td>1</td>
</tr>
<tr>
<td>Star Apple (Caimito)</td>
<td><em>Chrysophyllum cainito</em></td>
<td>2</td>
</tr>
<tr>
<td>Mahogany</td>
<td><em>Swietenia macrophylla</em></td>
<td>24</td>
</tr>
<tr>
<td>Mango</td>
<td><em>Mangifera indica</em></td>
<td>4</td>
</tr>
<tr>
<td>Bulala</td>
<td><em>Nephelium Mutabile Pulasan</em></td>
<td>8</td>
</tr>
<tr>
<td>Ipil-ipil</td>
<td><em>Leucaena leucocephala</em></td>
<td>12</td>
</tr>
<tr>
<td>Datilis</td>
<td><em>Muntingia calabura</em></td>
<td>1</td>
</tr>
<tr>
<td>Acacia (Rain tree)</td>
<td><em>Samanea saman</em></td>
<td>1</td>
</tr>
</tbody>
</table>

A Bulala tree (*Nephelium Mutabile Pulasan*) exists at the STP site. This species is considered endemic and is commonly found in wetlands. The species thrives on watery environment or swampy areas.

Narra (*Pterocarpus indicus*) is a protected/endangered species that was found at the STP site. However, the narra tree is located near the boundary of the site and therefore could be retained or avoided during project construction.

The understorey species found at the site include shrubs, herbs, vines, and grasses such as banana (*Musa sapientum*) and cogon (*Imperata cylindrica*).

It was observed that the number of trees in the project site is low. Although common, some of the species exhibit a variety of uses such as food, medicine, ornamentals, and construction materials.

<table>
<thead>
<tr>
<th>Family</th>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree species</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Acacia (Rain Tree)</td>
<td><em>Samanea saman</em></td>
<td>Timber, shade</td>
</tr>
<tr>
<td>Moraceae</td>
<td>Balete (Banyan Tree)</td>
<td><em>Ficus indica</em></td>
<td>Ornamental (bonsai cultivation), shade</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td>Caimito (Star Apple)</td>
<td><em>Chrysophyllum cainito</em></td>
<td>Food, timber, with medicinal uses, for shade</td>
</tr>
<tr>
<td>Palmae</td>
<td>Coconut</td>
<td><em>Cocos nucifera</em></td>
<td>Food, leaves for roof thatch, midrib for brooms, source of oil, and flowers with</td>
</tr>
<tr>
<td>Family</td>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Uses</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------</td>
<td>-------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Ipil ipil aka “Miracle Tree” due to its many uses</td>
<td>Leucaena leucocephala</td>
<td>High fodder value for ruminants; in cropping system, used as contour strips as erosion control; capable of producing a large volume of medium-light hardwood for fuel charcoal; used for parquet flooring and small furniture as well as for paper pulp; useful as windbreaks and firebreaks;</td>
</tr>
<tr>
<td>Anacardiaceae</td>
<td>Mangga (mango)</td>
<td>Mangifera indica</td>
<td>Food, wood for carving, leaves and bark with medicinal uses</td>
</tr>
<tr>
<td></td>
<td>Talisay</td>
<td>Terminalia catapa</td>
<td></td>
</tr>
</tbody>
</table>

**Common vegetation cover**

<table>
<thead>
<tr>
<th>Family</th>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poaceae</td>
<td>Cogon grass</td>
<td>Imperata cylindrica</td>
<td>Uses include paper-making, thatching and weaving into mats and bags. However, its most common usefulness may be seen in its medicinal properties which include astringent, febrifuge, diuretic, tonic and styptic action; also used for grazing purposes</td>
</tr>
<tr>
<td>Convolvulaceae</td>
<td>Kangkong</td>
<td>Ipomaea aquatica</td>
<td>A common vegetable in Asian cuisine</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>Makahiya</td>
<td>Mimosa pudica</td>
<td>With medicinal uses</td>
</tr>
<tr>
<td>Poaceae</td>
<td>Talahib</td>
<td>Saccharum spontaneum</td>
<td>With medicinal uses</td>
</tr>
</tbody>
</table>

With regards to the fauna, the project site is not a critical habitat for a specific wildlife. Domesticated animals dominated the site rather than wildlife species. There were no faunal species that are considered as threatened or endangered in the locality. There are no ecological sensitive habitats near the STP site.

In terms of freshwater biology, it is less likely to have fish species and other freshwater flora and fauna in the portion of Tullahan River and Meycauayan River based on observation. Tullahan River is one of the polluted waterways in Metro Manila.
3.2 The Water

3.2.1 Hydrology

The Valenzuela hydrological catchment is bounded by three river systems (Meycauayan-Marilao-Obando River in the north, Polo River in the west and the Tullahan River in the south and its inland area is penetrated with numerous tributaries. All of these streams lead to the Manila Bay and are affected by tidal flows.

The proposed STP will discharge into the Tullahan River. The Tullahan River, also called as the Navotas-Malabon-Tullahan-Tinajeros (NMTT) River, is a basin in itself and is independent from the Meycauayan River Basin. The NMTT River is approximately 21 km in length and originates from the Novaliches watershed. The river stretches from La Mesa dam in Quezon City and southwestward towards the Bangkulasi channel in Navotas, before it finally empties into the Manila Bay. The river resembles to a radial drainage pattern where rivers flow in all directions away from a raised feature.

The main river bisecting the STP site is the section of the Tullahan River. The flow capacity of the existing river channel at the lower 6 km is influenced by tidal fluctuation in Manila Bay. During high tidal condition, the bankfull flow capacity nearly zero and the waters from the rivers of Polo, Maypajo, Dampalit, Tanza, Muzon, and Tangos discharges at the Tullahan River. During low tide, these rives flow towards the Manila Bay. Downstream of Lambingan Bridge, the Malabon River is rather narrow and has a rather steep riverbed gradient of about 1/1,000. The flow capacity as mean sea level is less than 100 m³/sec.

The topography, particularly in the areas of Valenzuela and Malabon makes some barangays in the western portion of McArthur Highway and areas near the Tullahan River prone to flooding. Natural flood occurs during tide changes at the low-lying areas particularly Wawang Pulo, Coloong and other nearby barangays. Portions of McArthur Highway, particularly the sections of Malanday, Dalandanan, Karuhatan and Marulas are easily flooded during the rainy months.

Flood control structures consist of river walls and dikes coupled with floodgates and pumping stations. There are six (6) dike system which have been installed, namely, the Malabon-Tullahan dike, Malabon ring dike, Muzon-Dampalit dike, Tanza ring dike, Navotas ring dike, and Valenzuela-Obando dike.

Along the Navotas-Marala River and Malabon River, limited flood protection is provided by several different types of river walls. These types include reinforced concrete walls, concrete hollow block (CHB) walls, and wet masonry type walls. The dike/river wall of Malabon River is permanent but those of the other tributary rivers are earthdikes. The earthdikes are found along the fishpond areas while CHB wall were seen along the congested areas. The condition of the dikes shows that these are deteriorated, including the permanent dike along the Malabon River. Serious seepage was observed from the masonry bank and river wall.

There are a total of twenty-six (26) Tidal Control Gate Structures (TCGS) which were constructed during the last 10 to 20 years. The TCGS have both flood control and drainage functions. During high tide, the gates are closed to prevent the high tide from entering the protected areas while during low tide, the gates are opened to allow drainage and circulation of water in the creeks. These TCGS are manually operated. The gates are in poor condition with steel gates severely corroded.

In recent years, Metro Manila suffered from serious flooding in September 1999, July 2000, and most recently in August 2009. Figure 8 presents the location of flood-prone areas. In general, flooding was more severe in September 2009 (Typhoon Ondoy) due to the unusual volume of rain that flooded the metropolis. Typhoon Ondoy which is equivalent to a Category I storm, brought an unusually high volume of rain which inundated the central part of Luzon. During the 12-hour period starting at 8:00AM on September 26, the rainfall was recorded as approximately 450mm at the Manila Observatory, an extremely rare occurrence. Ondoy caused extensive flooding in Metro Manila area and the neighboring...
Rizal province including the cities of Antipolo, Makati, Malabon, Marikina, Muntinlupa, Pasig, Quezon, San Juan, Taguig, and Valenzuela.

During a flood event in 2000, the highest recorded tide level of 11.93 meters was observed on 4 July 2000. In the area south of Malabon River, Catmon, and Maypajo, reported flood depth reach up to 0.5 to 1.0 meters in both 1999 and 2000 flood events. During the 2000 year flood, the low lying areas in Catmon reported depths over 1.5 meters.

In the area north of Malabon River, flooding was generally severe with flood depths of over 1.5 meters during both the 1999 and 2000 floods. These were reported in North Navotas, Dampalit, and South Pinagkabalian drainage areas.
3.2.1.1 Drainage

A survey of the existing drainage facilities was conducted during the Feasibility Study. Existing drainage facilities in the Valenzuela catchment are normally designed as open canals or canals with covers that are ultimately connected to existing water bodies. Parts of Valenzuela appear to be underdrained particularly in the north where few drainage facilities were observed. Roads in this area adjacent to Meycauayan do not appear to consistently have drainage canals and are at times serviced by dug earth channels.

Earthen drains, in particular, may contribute sedimentary deposits to the system. During extreme conditions, this can clog the drainage structure. The drainage facilities are more developed in the industrial areas near the Tullahan River, along McArthur Highway, M.H. Del Pilar Avenue, and Maysan Road. Canals along these roads are typically covered and are directed to the Tullahan River through large concrete pipes, measuring up to 1,050 in nominal diameter.

The drainage facilities leading to Polo River have the same features as those in Meycauayan and Tullahan Rivers. Aside from stormwater and wastewater from the drainage facilities, these rivers are subject to direct dumping of solid waste from informal settlements.

The need of full reconstruction and improvement of existing drainage canals as well as protection of natural waterways needs serious attention. This has been pointed out as a major cause of the outbreak of diseases. Major water supply lines and service pipes are crossing and passing through dirty polluted canals ready to sip in contaminated water at times when weak water pressure in the water lines occur.

3.2.2 Water Quality

3.2.2.1 Surface Water Quality

Baseline water quality conditions at two stations of the creeks/rivers in Valenzuela City were taken from February 17 – 22, 2011. These stations are located at the Tullahan River and another at Polo River. Station 1 is located near Azicate homes end of Ana St. while Station 2 is at T. Santiago St., Barangay Viente Reales.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Station 1 (Tullahan River)</th>
<th>Station 2 (Polo River)</th>
<th>Class C Water Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fecal Coliform MPN/100ml</td>
<td>12x10^6</td>
<td>16x10^6</td>
<td>-</td>
</tr>
<tr>
<td>Total Coliform MPN/100ml</td>
<td>12x10^6</td>
<td>11x10^6</td>
<td>5,000(a)</td>
</tr>
<tr>
<td>pH</td>
<td>7.56</td>
<td>9.15</td>
<td>6.5-8.5</td>
</tr>
<tr>
<td>Temperature deg. C</td>
<td>28</td>
<td>27</td>
<td>3(b)</td>
</tr>
<tr>
<td>Biological Oxygen Demand mg/L</td>
<td>162</td>
<td>31</td>
<td>7(10)</td>
</tr>
<tr>
<td>Chemical Oxygen Demand mg/L</td>
<td>39.87</td>
<td>1,474.33</td>
<td></td>
</tr>
<tr>
<td>Dissolved Oxygen mg/L</td>
<td>0.52</td>
<td>0.85</td>
<td>5.0</td>
</tr>
<tr>
<td>Oil &amp; Grease, mg/L</td>
<td>2.4</td>
<td>1.3</td>
<td>2</td>
</tr>
<tr>
<td>Total Dissolved Solids mg/L</td>
<td>159</td>
<td>393</td>
<td>-</td>
</tr>
<tr>
<td>Total Suspended Solids mg/L</td>
<td>75</td>
<td>15</td>
<td>(c)</td>
</tr>
<tr>
<td>Turbidity NTU</td>
<td>12.5</td>
<td>1,654</td>
<td></td>
</tr>
<tr>
<td>NO₃, mg/l</td>
<td>0.7</td>
<td>1.4</td>
<td>10</td>
</tr>
</tbody>
</table>

(a) – refer to the geometric mean of the most probable number of coliform organism during a 3-month period and that the limit indicated shall not be exceeded in 20% of the samples taken during same period.
(b) – The allowable temperature increase over the average ambient temperature for each month. This rise shall be based on the average of the maximum daily temperature readings recorded at the site but upstream of the mixing zone over a period of one month.
(c) – Not more than 30mg/l increase
Source: Feasibility Study of the Three-River System, MWSI

The above results indicate that the measured DO levels in the rivers were below the 5 mg/l Class C criteria needed by aquatic organisms to survive. Coliform levels were also high which reflects the
contribution of untreated domestic wastewater entering the waterways. At the Polo River, high BOD concentration of 162 mg/l was registered. Based on observation, both rivers were noted with high concentration of floating solids.

The Tullahan River, which is adjacent to the proposed STP site, is classified under DENR Administrative Order No. 34 as a “Class C” surface freshwater. This means that the water is ideal for the propagation and growth of fishes; recreational water class II (boating, etc.); and industrial water supply class I (for manufacturing processes after treatment).

The DENR maintains several monitoring stations along the stretch of the Tullahan River. The nearest monitoring station to the project site is located at the Tullahan Bridge along McArthur Highway in Marulas. Based on the DENR monitoring results, the Tullahan River system exhibits water quality that is comparable to a Class D water or a waterbody appropriate only for agricultural irrigation and livestock watering, as well as, for industrial cooling and navigation. However, official river classification is still settled at Class C.

Historical data from DENR monitoring results indicate that the DO levels in all monitoring stations failed to meet the prescribed DO criteria of 5 mg/l for Class C waters. This may be attributed to the discharge of untreated sewage by settlements in the area as well as the downstream sections up to the discharge point in Manila Bay. DO is in the order of 1.68 – 2.00 mg/l. The highest BOD level was recorded by the DENR at the McArthur Highway Station which is near the proposed STP site. Poor water quality results confirm that the discharges of high organic wastes into the Tullahan River lead to the increasing demand for oxygen in the water. Table 12 presents the results of the monitoring by the DENR on the Tullahan River.

Table 13. DENR Water Quality Monitoring Results of Tullahan River

<table>
<thead>
<tr>
<th>Sampling location</th>
<th>Criteria</th>
<th>Value</th>
<th>Standard</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fairview, Quezon City</td>
<td>DO, mg/liter</td>
<td>1.71</td>
<td>5 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>BOD, mg/liter</td>
<td>6</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>SS, mg/liter</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PH</td>
<td>8.94</td>
<td>6.5 – 8.5</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>Temp, °C</td>
<td>28.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SS change, mg/L</td>
<td>-</td>
<td>30 mg/L inc.</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Temp. Changes, °C</td>
<td>-</td>
<td>3°C max. rise</td>
<td>-</td>
</tr>
<tr>
<td>Gulod, Quezon City</td>
<td>DO, mg/liter</td>
<td>1.77</td>
<td>5 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>BOD, mg/liter</td>
<td>13</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>SS, mg/liter</td>
<td>13.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PH</td>
<td>8.96</td>
<td>6.5 – 8.5</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>Temp, °C</td>
<td>29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SS change, mg/L</td>
<td>0.33</td>
<td>30 mg/L inc.</td>
<td>Passed</td>
</tr>
<tr>
<td></td>
<td>Temp. Changes, °C</td>
<td>0.6</td>
<td>3°C max. rise</td>
<td>Passed</td>
</tr>
<tr>
<td>North Expressway, Valenzuela City</td>
<td>DO, mg/liter</td>
<td>1.76</td>
<td>5 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>BOD, mg/liter</td>
<td>16.7</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>SS, mg/liter</td>
<td>13.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>PH</td>
<td>8.99</td>
<td>6.5 – 8.5</td>
<td>Failed</td>
</tr>
<tr>
<td></td>
<td>Temp, °C</td>
<td>29.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>SS change, mg/L</td>
<td>0</td>
<td>30 mg/L inc.</td>
<td>Passed</td>
</tr>
<tr>
<td></td>
<td>Temp. Changes, °C</td>
<td>0.1</td>
<td>3°C max. rise</td>
<td>Passed</td>
</tr>
<tr>
<td></td>
<td>DO, mg/liter</td>
<td>1.78</td>
<td>5 mg/L</td>
<td>Failed</td>
</tr>
</tbody>
</table>
### Sampling location

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
<th>Standard</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD, mg/liter</td>
<td>15.7</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td>SS, mg/liter</td>
<td>13.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PH</td>
<td>9.28</td>
<td>6.5 – 8.5</td>
<td>Failed</td>
</tr>
<tr>
<td>Temp, ºC</td>
<td>28.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SS change, mg/L</td>
<td>0</td>
<td>30 mg/L inc.</td>
<td>Passed</td>
</tr>
<tr>
<td>Temp. Changes, ºC</td>
<td>0.3</td>
<td>3ºC max. rise</td>
<td>Passed</td>
</tr>
</tbody>
</table>

**McArthur Highway, Valenzuela City**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
<th>Standard</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD, mg/liter</td>
<td>20</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td>SS, mg/liter</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PH</td>
<td>9.66</td>
<td>6.5 – 8.5</td>
<td>Failed</td>
</tr>
<tr>
<td>Temp, ºC</td>
<td>29</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SS change, mg/L</td>
<td>0.67</td>
<td>30 mg/L inc.</td>
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</tr>
<tr>
<td>Temp. Changes, ºC</td>
<td>0.2</td>
<td>3ºC max. rise</td>
<td>Passed</td>
</tr>
</tbody>
</table>

**Gov. Pascual Ave., Malabon**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
<th>Standard</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO, mg/liter</td>
<td>1.78</td>
<td>5 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td>BOD, mg/liter</td>
<td>3.7</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td>SS, mg/liter</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PH</td>
<td>8.82</td>
<td>6.5 – 8.5</td>
<td>Passed</td>
</tr>
<tr>
<td>Temp, ºC</td>
<td>29.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SS change, mg/L</td>
<td>10</td>
<td>30 mg/L inc.</td>
<td>Passed</td>
</tr>
<tr>
<td>Temp. Changes, ºC</td>
<td>0.7</td>
<td>3ºC max. rise</td>
<td>Passed</td>
</tr>
</tbody>
</table>

**Bangkulasi, Navotas**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
<th>Standard</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO, mg/liter</td>
<td>1.78</td>
<td>5 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td>BOD, mg/liter</td>
<td>3.7</td>
<td>10 mg/L</td>
<td>Failed</td>
</tr>
<tr>
<td>SS, mg/liter</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PH</td>
<td>8.82</td>
<td>6.5 – 8.5</td>
<td>Passed</td>
</tr>
<tr>
<td>Temp, ºC</td>
<td>29.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SS change, mg/L</td>
<td>10</td>
<td>30 mg/L inc.</td>
<td>Passed</td>
</tr>
<tr>
<td>Temp. Changes, ºC</td>
<td>0.7</td>
<td>3ºC max. rise</td>
<td>Passed</td>
</tr>
</tbody>
</table>

Source: Water Quality Monitoring Report, DENR-EMB-NCR

**Figure 9. Location of DENR Water Quality Sampling Stations**
3.2.3 Groundwater

The project site falls within the hydrogeological setting of the Guadalupe Formation. This is mainly composed of clastic facies, such as tuffaceous sandstone, conglomerate and coarse tuff. The thickness is also estimated to range from 700 to 2,000 meters.

The Guadalupe formation, which covers 472 square kilometers and much of Metro Manila’s area, is the main aquifer. The Guadalupe formation is believed to extend beneath the bed of Laguna Lake. Groundwater is stored and transmitted in this main aquifer by openings and fractures in the tuffaceous formation. This main aquifer is capable of rising to the surface by internal hydrostatic pressure, thus, making artesian well systems possible. The aquifer is separated from the overlying material by a semi-permeable or semi-confining layer called an aquitard. The thickness of this layer varies from 15 to 45 meters.

The semi-permeable layer is responsible for creating a pressurized condition and also separates the aquifer below, making the Guadalupe formation a confined aquifer. However, in some parts of Metro Manila, where drawdowns of more than 50 meters have been caused by overpumping, the main aquifer has transformed into a water table aquifer. This means the aquifer is no longer pressurized.

On the basis of topography, geology, and well data from the National Water Resources Board (NWRB), the hydrogeologic system of the area can be described as a confined aquifer. The main recharge of the aquifer is attained thru direct infiltration and percolation into the permeable outcropping section of the pyroclastic and alluvium formations, particularly during the wet season. The major recharge areas are the western slopes of the Sierra Madre mountain range in the east.

3.3 The Air

3.3.1 Meteorology

Using the Modified Coronas system for rainfall distribution, PAGASA has divided the country into four (4) climate types. The catchment area is situated within a Type 1 climate which is characterized by two (2) pronounced seasons, dry from December to April and wet for the rest of the year. Maximum rain period is in the months of May to November with August as the rainiest month. Table 13 shows the mean monthly rainfall recorded at the PAGASA Science Garden Station in Quezon City that fits exactly this description. During this period, the area is exposed to the southwest monsoon, a regional wind pattern laden with rain clouds and is the dominant factor why rains come at this time of the year. Cyclones in most cases exacerbate the rainy season as rainfall becomes intense. The presence of Inter-tropical Convergence Zone (ITCZ) where warm and cold air meets, also contributes to the increase in rainfall depth. The driest month of the year is February when the northeast monsoon prevails.

3.3.1.1 Cyclone Frequency

Based on PAGASA’s typhoon frequency classification, the project area lies within the geographical zone number 4. This zone experiences typhoons at a rate of 5 times in 3 years. Typhoons passing over this area usually come from the Pacific Ocean where genesis takes place but on occasions, they originate from the South China Sea. Their occurrences are distributed within the wet season, i.e., from May to November. Generally, typhoons are the biggest single contributor of abnormal rainfalls that oftentimes lead to unusual flooding.

3.3.1.2 Rainfall

Because it is the nearest, the synoptic station in the Science Garden, Diliman, Quezon City was used in assessing the rainfall data in the area. It is also located in the same climate type where the project is sited and has an extensive record dating back to 1961 without data gaps. During the wet months (May to November), rainfall depths range from 147.2 mm to 517.1 mm. The lower limit is in the month of
November while the upper limit is in the month of August. August therefore is the rainiest month. The months of June to September also registered readings of greater than 300 mm.

In some instances, a daily extreme surpasses that of the monthly mean. Nine (9) out of 12 extremes coincided with the passage of a cyclone. Though some of the cyclones were not close enough, they could have sucked the southwest monsoon clouds that precipitated upon hitting land. The three (3) most extreme 24-hr monthly rainfall values recorded at the same synoptic station are 334.5 mm (7 June 1967), 276.5 mm (1 September 1970), and 223.0 mm (15 Aug 1979). Table 14 lists the extreme rainfall depths recorded for a 24-hr observation in the last 38 years. In some instances, a daily extreme surpasses that of the monthly mean. Nine (9) out of 12 extremes coincided with the passage of a cyclone.

![Climate Map (A) and Cyclone Map (B) of the Philippines](image)

**Figure 10. Climate Map (A) and Cyclone Map (B) of the Philippines**

Source: PAGASA

<table>
<thead>
<tr>
<th>Month</th>
<th>Rainfall, mm</th>
<th>Temperature, °C</th>
<th>Percent</th>
<th>Wind</th>
<th>No. of days with</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amt. Rdgs</td>
<td>Max</td>
<td>Min</td>
<td>Mean</td>
<td>Humidity</td>
</tr>
<tr>
<td>Jan</td>
<td>18.7</td>
<td>4</td>
<td>30.2</td>
<td>20.1</td>
<td>25.2</td>
</tr>
<tr>
<td>Feb</td>
<td>7.4</td>
<td>2</td>
<td>31.4</td>
<td>20.2</td>
<td>25.8</td>
</tr>
<tr>
<td>Mar</td>
<td>16.7</td>
<td>3</td>
<td>33.2</td>
<td>21.4</td>
<td>27.3</td>
</tr>
<tr>
<td>Apr</td>
<td>28.5</td>
<td>4</td>
<td>34.8</td>
<td>22.9</td>
<td>28.9</td>
</tr>
<tr>
<td>May</td>
<td>141.0</td>
<td>11</td>
<td>34.6</td>
<td>24.1</td>
<td>29.3</td>
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<td>Jun</td>
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<td>24.0</td>
<td>28.3</td>
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<tr>
<td>Jul</td>
<td>478.6</td>
<td>22</td>
<td>31.3</td>
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<tr>
<td>Aug</td>
<td>517.1</td>
<td>24</td>
<td>30.8</td>
<td>23.6</td>
<td>27.2</td>
</tr>
<tr>
<td>Sep</td>
<td>402.2</td>
<td>22</td>
<td>31.1</td>
<td>23.4</td>
<td>27.3</td>
</tr>
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</table>
3.3.1.3 Winds

The extremes recorded from January to July were not produced by any typhoon. However, the values are high enough for them to be classified under typhoon signal numbers 2 and 3 (Table 15). All the extremes recorded after July coincided with the occurrences of typhoons though most centers did not pass the synoptic station. November extreme may be considered as a direct effect of a typhoon because the center passed through Central Luzon. Again most of these extremes could have been caused by local thunderstorms. Thus, the effects of local thunderstorm may be as grave as that of a typhoon except for the area coverage.

On the annual average, the direction of surface wind at the Science Garden, Diliman, Quezon City is southwesterly with wind speed of 2 meters per second (mps). The strongest wind recorded in the area was 56 mps coming from the west, which occurred on November 19, 1970.

Wind rose analysis for the project area was generated by the PAGASA for the period 1971-2000. The annual wind rose (Figure 11) shows that the significant wind directions in the project area and their frequencies are N (12%), NE (10.4%), SE (9.6%), SW (9.6%) and S (8.3%). Mean wind speed is 1.5 meters per second.

3.3.1.4 Temperature

Temperature in the area has a maximum monthly average range of 29.6 – 34.5 °C and a minimum average range of 22.3 – 24.7 °C (Table 15). April, May, and June are the months that registered high temperature values suggesting of a warm weather condition. A cold period runs through December, January, and February when temperature values are low. On temperature extremes, the warmest recorded was in 16 May 1987 at 38.5 °C while the coldest was in 1 January 1982 at 18 °C.
3.3.1.5 Sea Level Pressure

Being the peak of the southwest monsoon season, the month of August has the lowest mean sea level pressure. This is a consequence of high frequency of tropical cyclone occurrence during this period. The annual mean sea level pressure in the project area is 1009 hPa (mbs). The mean monthly pressure gradually increases after August reaching a maximum in January around 1012.5 hPa (mbs).
3.3.2 Air Quality

Atmospheric pollution at the project site is due mainly to industrial emission, open burning of garbage, and vehicular emissions. The more common pollutants are suspended particulates, sulfur dioxide, and carbon monoxide. Deteriorating air quality is impairing the health and welfare of a large portion of the population. The primary causes of air pollution--vehicles and industrial processes--continue to expand rapidly. If not addressed, the detrimental effects of air pollution will significantly erode the gains of economic and social development.

The DENR-EMB-NCR maintains ambient air quality monitoring stations throughout Metro Manila. The regular schedule is to obtain 24-hour average TSP samples every six days on a rotational basis. The stations are capable of monitoring TSP using high volume samplers. Samples are analyzed using the gravimetric method.

The monitoring station in Valenzuela is considered as the oldest station of all the stations being maintained by EMB-NCR. The High Volume sampler is situated at the 2nd floor ledge of the building of the Valenzuela City Hall (~3.5 meters from the ground) and is positioned approximately 100 meters from the street. The street facing the building is used as a route of jeepneys, tricycles, trucks, taxis and private vehicles. Aside from the commercial and institutional establishments in the area, the city of Valenzuela is considered as a highly industrialized zone.

Table 16 presents the annual geometric mean of total suspended particulates based on the records of the EMB-NCR from 1987 up to 2001 as compared to the annual mean of Metro Manila.

Table 17. Annual Geometric Mean of Total Suspended Particulates

<table>
<thead>
<tr>
<th>Station</th>
<th>Annual Mean Total Suspended Particulates (µg/cubic meter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valenzuela</td>
<td>282</td>
</tr>
<tr>
<td>NCR Average</td>
<td>151</td>
</tr>
</tbody>
</table>

The results indicate that the air quality in the area is way above the annual mean TSP of Metro Manila. The potential sources of air pollution in the area are the passing motor vehicles along roads and industrial emissions. Although the major roads are paved, the air pollution and suspended dusts caused by moving vehicles may be considered as a significant factor in the increase of pollution levels in the project site and its vicinity.

The vicinity is also characterized as an industrial area where several industries that emit smoke and other gaseous pollutants operate. As compared with other monitoring stations, the Valenzuela station consistently register high readings of TSP (Figure 12).

3.3.3 Noise

Data on ambient noise level was taken by using a sound level meter. It was in accordance with the provision provided in the NPCC Memorandum Circular 002 (1980) which sets the median of seven maximum readings comparable to the standard and the sampling procedure outlined by Wilson (1989). A total of 50 readings were recorded per station wherein the median of the seven maximum-recorded noise levels gives the noise level comparable to the standard.

The country implements an Environmental Quality Standard for noise in general areas as outlined in Presidential Decree 984, or the Pollution Control Law of the Philippines. The noise standards specify the allowable level of noise based on category of area as outlined in Table 17.
Figure 12. Average TSP Concentration of the Ambient Air Quality Monitoring Stations

Table 18. Environmental Quality Standards for Noise in General Areas

<table>
<thead>
<tr>
<th>Category of Area</th>
<th>Daytime</th>
<th>Morning &amp; Evening</th>
<th>Nighttime</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>50 dB</td>
<td>45 dB</td>
<td>40 dB</td>
</tr>
<tr>
<td>A</td>
<td>55 dB</td>
<td>50 dB</td>
<td>45 dB</td>
</tr>
<tr>
<td>B</td>
<td>65 dB</td>
<td>60 dB</td>
<td>55 dB</td>
</tr>
<tr>
<td>C</td>
<td>70 dB</td>
<td>65 dB</td>
<td>60 dB</td>
</tr>
<tr>
<td>D</td>
<td>75 dB</td>
<td>70 dB</td>
<td>65 dB</td>
</tr>
</tbody>
</table>


Notes:
Division of 24-hour period is as follows:
- Morning: 5:00 AM to 9:00 AM
- Daytime: 9:00 AM to 6:00 PM
- Evening: 6:00 PM to 10:00 PM
- Nighttime: 10:00 PM to 5:00 AM.

The following are the description of the areas based on NPCC Memorandum Circular 002 Series of 1980:
- Class AA areas: a section or contiguous area which requires quietness, such as an area within 100 meters from school sites, nursery schools, hospitals and special homes for the aged;
- Class A areas: a section or contiguous area primarily used for residential purposes;
- Class B areas: a section or contiguous area primarily commercial area; and
- Class C areas: a section primarily reserved as a light industrial area.

The results of the noise level monitoring at nine sampling stations are presented in Table 18. The measured noise levels were compared to the standards for their corresponding areas.

Table 19. Noise Level Monitoring Results (dBA)

<table>
<thead>
<tr>
<th>Stn No.</th>
<th>Location</th>
<th>Period</th>
<th>Date</th>
<th>Time</th>
<th>Noise Level</th>
<th>Noise Standard</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Near STP site, F. Bautista, Marulas</td>
<td>Morning</td>
<td>May 3, 2013</td>
<td>6:40AM</td>
<td>71</td>
<td>65</td>
<td>Exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daytime</td>
<td>May 3, 2013</td>
<td>10:00AM</td>
<td>73</td>
<td>70</td>
<td>Exceeded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evening</td>
<td>May 2, 2013</td>
<td>7:40PM</td>
<td>63</td>
<td>65</td>
<td>Within</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nighttime</td>
<td>May 3, 2013</td>
<td>12:20AM</td>
<td>58</td>
<td>60</td>
<td>Within</td>
</tr>
<tr>
<td>2</td>
<td>Along McArthur</td>
<td>Morning</td>
<td>May 3, 2013</td>
<td>6:15AM</td>
<td>73</td>
<td>50</td>
<td>Exceeded</td>
</tr>
</tbody>
</table>
The results of the ambient noise monitoring show that the morning, daytime, evening and nighttime noise levels already exceeded the prescribed noise standard for the area in all of the monitoring stations. There were only two noise sampling events in the evening and nighttime at the station located near the STP site whereby the noise measurement was found to be within the standard. Another instance was noted near the Pabilina Compound in Barangay Karuhatan, Manggahan Street, Industrial Park whereby the nighttime noise level was recorded below 60dBA. Overall, the recorded noise levels were higher than the DENR prescribed limits. Noise was primarily attributed to the loud honking of horns, movement of motor vehicles including tricycles, and community noise.

### 3.4 The People

Historically, the City of Valenzuela used to be an agricultural community of Bulacan with agricultural products consisting of rice, corn and vegetables. It is also well known for its poultry and swine products. Valenzuela was then a flourishing community because of its proximity to the fast urbanizing city of Manila and adjoining districts. Cost of delivery of products is inexpensive, fast, on time regardless of season and weather. The division of Polo, through E.O. 401 signed by President Carlos P. Garcia gave way to the creation of Valenzuela.

The rapid growth of population from the provinces flocking the metropolis, and the ever-growing residential, commercial, and industrial establishments have occupied the prime agricultural lands. The creeks and rivers that used to be sources of marine products suffered pollution.

On 14 February 1998, former President Fidel V. Ramos signed RA 8526 which classified Valenzuela as a highly urbanized city. The ever-increasing population and the corresponding growth of social and economic requirements of Metro Manila where Valenzuela is a contiguous community manifested the need for a coordinated and integrated delivery of essential services.

Table 19 presents the land area and population per barangay.

<table>
<thead>
<tr>
<th>Barangay/ Area</th>
<th>Land Area (hectares)</th>
<th>2007 Population</th>
<th>2010 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>AREA I Bignay</td>
<td>1015.3</td>
<td>77,252</td>
<td>85,726</td>
</tr>
<tr>
<td></td>
<td>268.3</td>
<td>19,915</td>
<td>22,462</td>
</tr>
</tbody>
</table>
The proposed STP will be located within Area III. As of October 2010, the population of Barangay Marulas is 52,170. This area has the highest population among the five areas because it is considered the center of the city and where most of the commercial and industrial establishments as well as educational institutions are located.

It is projected that the city will have a declining population of this area due to the city government’s program of relocating its informal settlers most especially located in depressed areas along esteros, creeks and other private properties. This move is one way of ridding one cause of perennial flooding problem and to give way to more to productive income-generating locators.
Population ages 14 years old and below comprises 32.7% of the total projected population, while less than 3.0% consists of ages more than 69 years old. The dependent population is estimated at 35% of the total population, while the productive population is 65%. The city has a high daytime population because of the workers of factories and college students flocking the city from many places of Metro Manila and nearby towns in the north.

Majority of the population of the barangay are not original residents of the city. Most of them are migrants from all over the country. They are the ascendants of the migrant workers in the different factories and business establishments since way back 1960s who established their families within the barangay. Many are still coming from the provinces to take advantage of the employment of the existing companies.

3.4.1 Economic Activities

The main products of the city are chemical and mineral products, paper and paper products, textiles, wearing apparels, hollow blocks/bricks/tiles, printing and publishing, electrical machinery and apparatus. At present, there are more than 1,136 manufacturing industries in the city. Most of them are export-based industries. Majority of these industries are concentrated within Area III comprising of Barangay Gen. T. de Leon, Karuhatan, Marulas and Parada.

<table>
<thead>
<tr>
<th>Manufacturing Industries</th>
<th>AREA I</th>
<th>AREA II</th>
<th>AREA III</th>
<th>AREA IV</th>
<th>AREA V</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical/Mineral</td>
<td>11</td>
<td>21</td>
<td>10</td>
<td>9</td>
<td>5</td>
<td>56</td>
</tr>
<tr>
<td>Metal Products</td>
<td>22</td>
<td>51</td>
<td>71</td>
<td>67</td>
<td>6</td>
<td>217</td>
</tr>
<tr>
<td>Rubber/plastic</td>
<td>40</td>
<td>45</td>
<td>75</td>
<td>85</td>
<td>7</td>
<td>252</td>
</tr>
<tr>
<td>Paper &amp; Paper Products</td>
<td>4</td>
<td>17</td>
<td>10</td>
<td>6</td>
<td>-</td>
<td>37</td>
</tr>
<tr>
<td>Foods and beverage</td>
<td>16</td>
<td>21</td>
<td>66</td>
<td>46</td>
<td>6</td>
<td>155</td>
</tr>
<tr>
<td>Textile</td>
<td>13</td>
<td>14</td>
<td>16</td>
<td>15</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>Wearing Apparel</td>
<td>2</td>
<td>6</td>
<td>60</td>
<td>28</td>
<td>8</td>
<td>104</td>
</tr>
<tr>
<td>Hollowblocks/Bricks/Tiles</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>Footwear &amp; leathers</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Feedmill,Bonemill,Fishmill</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>Furnitures</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>23</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Wood &amp; Wood Products</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>5</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>Printing and Publishing</td>
<td>9</td>
<td>18</td>
<td>45</td>
<td>23</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Motor and Transport</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>102</td>
</tr>
<tr>
<td>Electrical Machineries</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>Machinery and Equip</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>Assembler</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Recycling</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>TOTAL</td>
<td>136</td>
<td>233</td>
<td>391</td>
<td>327</td>
<td>49</td>
<td>1,136</td>
</tr>
</tbody>
</table>

Source: Business Permit and License Office, Valenzuela City

There are almost 8,000 commercial establishments located within the city. Forty-three percent (43%) and the largest share of these establishments are located within Area III. There are at least 14 supermarkets and convenience stores in the city. Prominent of these establishments are: SM Supercenter Valenzuela, Puregold Valenzuela, South Supermarket, Mercury Drug Stores, 7-11 Stores, HBC Stores, and CVC Supermarket.

Major commercial and savings banks operate in the city to compliment the growing needs and financial requirements of the different industries. These are mostly situated along the stretch of McArthur Highway.
Table 22. Classification of Registered Business Establishments By Area

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>Area I</th>
<th>Area II</th>
<th>Area III</th>
<th>Area IV</th>
<th>Area V</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>0</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>136</td>
<td>233</td>
<td>391</td>
<td>326</td>
<td>49</td>
<td>1,135</td>
</tr>
<tr>
<td>Electricity, Gas and Water Supply</td>
<td>5</td>
<td>4</td>
<td>27</td>
<td>26</td>
<td>5</td>
<td>67</td>
</tr>
<tr>
<td>Construction</td>
<td>3</td>
<td>nil</td>
<td>nil</td>
<td>2</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Tertiary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholesale/Retail/Trade/Importer/Exporter/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Repair Shop and Welding Shop</td>
<td>347</td>
<td>446</td>
<td>2,071</td>
<td>1,342</td>
<td>451</td>
<td>4,657</td>
</tr>
<tr>
<td>- Transport, Storage and Communication</td>
<td>17</td>
<td>44</td>
<td>44</td>
<td>43</td>
<td>5</td>
<td>153</td>
</tr>
<tr>
<td>Finance, Insurance, Real Estate &amp; Business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Activities: Financial Intermediation</td>
<td>2</td>
<td>22</td>
<td>81</td>
<td>50</td>
<td>3</td>
<td>158</td>
</tr>
<tr>
<td>- Real Estate, Rental &amp; Business Act.</td>
<td>93</td>
<td>161</td>
<td>566</td>
<td>330</td>
<td>72</td>
<td>1222</td>
</tr>
<tr>
<td>Commercial, Social &amp; Personal Services:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hotels and Restaurants</td>
<td>6</td>
<td>20</td>
<td>109</td>
<td>53</td>
<td>1</td>
<td>189</td>
</tr>
<tr>
<td>- Education</td>
<td>3</td>
<td>3</td>
<td>38</td>
<td>13</td>
<td>5</td>
<td>62</td>
</tr>
<tr>
<td>- Health and Social Work</td>
<td>3</td>
<td>15</td>
<td>27</td>
<td>17</td>
<td>10</td>
<td>72</td>
</tr>
<tr>
<td>- Other Comm., Social &amp; Personal Services</td>
<td>12</td>
<td>27</td>
<td>64</td>
<td>61</td>
<td>13</td>
<td>177</td>
</tr>
<tr>
<td>- Public Adm. &amp; Defense, Compulsory Social Security</td>
<td>nil</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>TOTAL</td>
<td>631</td>
<td>987</td>
<td>3,428</td>
<td>2,275</td>
<td>620</td>
<td>7,939</td>
</tr>
</tbody>
</table>

Source: Business Office & License Office, Valenzuela City

3.4.2 Housing

Housing and building structures along the main thoroughfare (McArthur Highway) are built with permanent materials. However, settlements at the inner streets and around warehouses and factories are built with semi-permanent to temporary materials. These settlements are rented by low-income earners to middle-income earners working and doing business in the barangays and nearby barangays. Shanties are found within the fenced-up compound of vacated lands in the depressed areas of San Jeremias, Saint Brigida and Pagasa.

Multilevel residential condominiums and low-cost housing are on the rise to accommodate middle-earning class of the population.

3.4.3 Health

There is a high incidence of upper respiratory tract infection and other primary diseases like pneumonia and influenza in Valenzuela City. This can be attributed to air pollution related diseases like Bronchitis, Pneumonia and influenza which are also in the leading causes of morbidity or illnesses in all ages.

There are 7 hospitals in the whole city of Valenzuela. Four are located in barangay Marulas, while barangays Pasolo, Palasan and Polo have one hospital each. Geographically the hospitals are located in Area 3 (Marulas) and Area 5 only. The total combined bed capacity is 361 for a ratio of 1 bed for every 1,326 inhabitants.

Morbidity problems in Valenzuela City are basically related to environment. The high incidence of upper respiratory tract infection and other primary diseases like pneumonia and influenza can be attributed to pollution. Data on the trend of morbidity in Valenzuela City show that the three-year (2004 to 2006) leading causes of morbidity are Acute Respiratory Tract Infection, Bronchitis, Diarrhea and Pneumonia.
On the other hand, the leading causes of mortality during the same period are Heart Disease, Hypertension, Pneumonia and Cancer.

The notifiable diseases monitored in Valenzuela City consist of Cholera, Diptheria, Hepatitis A, Hepatitis B, Leptospirosis, Meningococcal Disease, Non-neonatal Tetanus, Pertusis, Rabies and Typhoid Fever.

Valenzuela City has a total of 46 health centers. There is at least one for each barangay except for Poblacion and Pariancillo Villa. Private health establishments (medical clinic, dental clinic, optical clinic, drug store) are mostly located in six barangays, namely, Karuhatan, Gen. T. de Leon, Malanday, Malinta, Marulas and Paso de Blas. Marulas stands out among all barangays having the most number of health facilities. It has 4 hospitals, 6 health centers, 1 health station, 1 of the 2 lying-in clinics in the city (the other being in Paso de Blas), and the most number of private health establishments. Area 1 has the least number of private health establishments.

3.4.4 Solid Waste Management

Valenzuela has the highest number of identified waste recycling companies in Metro Manila based on the 2002 Metro Manila Solid Waste Management Report of the ADB. Sixty percent of the wastes collected in the city are hauled and dumped in controlled dumpsites, 5% are retrieved and recycled while the remaining 35% are disposed elsewhere by residents. Half of the wastes are non-biodegradable which consists of plastic, tetra pack, Styrofoam, and rubber while biodegradable wastes are mainly composed of food wastes (70%), plant wastes (20%), and animal wastes (10%).

The Lingunan Controlled Dumpsite was opened in 1988 and was the city's first waste disposal facility, processing 60% of the city's solid waste (ADB, 2002). Waste segregation and recycling services are conducted in the area. This site was one of the considered sites for the proposed STP.

Valenzuela City also has an Ecology Center near the proposed STP site in Barangay Marulas. The ecology center serves as the operation center for the city's waste management program where biodegradable wastes are recycled into organic fertilizers.

Despite the introduction and strict implementation of wastes recycling and segregation, waste management is a growing problem just like other cities and municipalities of the metropolis.

3.4.5 Traffic

Valenzuela City is connected to the North Luzon Expressway through the Km 30 McArthur Highway intersection of Circumferential Road 5 (C5) which is located in Barangay Karuhatan. The McArthur Highway a major trunkline that runs parallel to North Luzon Tollway (NLT) linking Metro Manila with Central Luzon. It is a four (4) lane national road with a carriageway width of 14.0 meters.

During the construction and excavation of the proposed sewer network and other facilities, there are roads traversing the city which may be directly affected, namely, McArthur Highway, A.R. Valenzuela St., Gov. Santiago St., Rincon St., G. Lazaro St., Pasolo Road, Hernandez St., P. Sevilla St., Coloong II St., and F. Bautista St. These routes provide accessibility to the adjacent cities and municipalities. These roads are mostly concrete.

The F. Bautista St. will also be affected during the construction of the STP. The said road is one-lane coming from the McArthur Highway. Motorbikes, cars and trucks pass through F. Bautista St.

The present public transport demand in the area is being served mainly by jeepneys, buses, and mega taxi (AUV). Along McArthur Highway, the public transport routes cater to commuters to/from Metro Manila going to neighboring municipalities of Bulacan.

There are about twelve (12) PUJ routes plying the McArthur Highway. These routes are:
There are also AUV/FX Mega Taxis which directly competes with PUJ routes except that their riders are middle class commuters. There are basically four (4) public utility bus (PUB) routes servicing the area traversing McArthur Highway, i.e., Baclaran – Malanday, Baclaran – Sta. Maria, Malanday – NAIA, and Malanday – Alabang.

Some of the minor roads are also used by jeepneys which is the most common means of transportation outside the city. Considering the major impact that the sewer construction would pose on traffic, appropriate traffic rerouting scheme and management plan should be designed prior to construction of the sewer network in coordination with the LGU.

3.4.6 Resource Use Competition

3.4.6.1 Power Supply

The power requirement of the city and study area is being supplied by the National Power Corporation (NAPOCOR) and distributed by the Manila Electric Company (MERALCO). With the current adequacy of supply from NAPOCOR, there is no problem on power supply of the community and the proposed project.

3.4.6.2 Water Supply

Water service within the area is provided sufficiently by the MWSI.

3.5 Public Participation and Disclosure

MWSI conducted public consultation meetings with the stakeholders. The latest public consultation was held on March 21, 2013 at the Eco Center building within the STP site in Barangay Marulas. The meeting was attended by the Barangay Council of Marulas headed by Chairman Boy de Guzman, residents of F. Bautista, representatives from the World Bank, LBP, and MWSI. The Minutes of the Public Consultation Meeting dated March 21, 2013 is presented in Annex B. The following outlines the concerns raised by the stakeholders during the public consultation.

<table>
<thead>
<tr>
<th>Concern</th>
<th>MWSI Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional cost to water bill</td>
<td>Yes, there will be additional cost to the customers but this is not abrupt.</td>
</tr>
<tr>
<td>Pipelaying at McArthur Highway</td>
<td>There will be pipelaying activities at McArthur Highway but a traffic scheme will be designed in coordination with the LGU, MMDA, and DPWH to minimize disturbance to the public.</td>
</tr>
<tr>
<td>STP purpose and benefits</td>
<td>The purpose of constructing the STP is to treat the wastewater before it drains into the receiving bodies of water to reduce water pollution and to comply with the concession obligation of MWSI. The discharge of clean water will improve community cleanliness and health.</td>
</tr>
<tr>
<td>Labor force for the construction of STP</td>
<td>The residents within the host barangay will be given priority during the hiring of labor force for the construction of the STP. This will be specified in the contract of the winning contractor.</td>
</tr>
<tr>
<td>Sludge management</td>
<td>Treated sludge will be brought to an approved disposal site in Tarlac and will be processed as organic fertilizer.</td>
</tr>
<tr>
<td>Reuse of treated water for cleaning of roads and removing mud after flood events</td>
<td>MWSI will study and consider the proposal to reuse the treated water for cleaning of roads. WB representative emphasized that the clear water does not</td>
</tr>
</tbody>
</table>
Concern | MWSI Response
---|---
| mean that it is already safe for water reuse especially if households misidentify the clean water as potable water.

3.5.1 Social Perception Survey and Key Informant Interviews

From July 21 to July 31, 2013, the social perception survey was conducted to assess the social impacts of Valenzuela Sewerage System Project amongst those living on the primary and secondary impact zones surrounding the proposed site. This survey primarily aims to determine the stakeholders’ perception, awareness and acceptance of the said project through the following objectives:

- Identifying the socio-economic background and living condition of the respondents, their households and the community
- Collating respondents’ insight and experiences regarding the environment and sanitation of affected communities
- Gathering potential environmental and sociological issues that needs to be addressed prior to the implementation of the project

The Valenzuela Sewerage System Project will expand the sewerage service coverage located in F. Bautista St., Barangay Marulas, Valenzuela City. Those within the secondary impact areas are the MacArthur Highway and areas or streets near F. Bautista St., Barangay Marulas namely: Coloong, Gen. T de Leon, Malinta, Malanday, Dalandan, Karuhatan and Marulas.

3.5.1.1 Methodology

Random survey and interviews were used to collect data from respondents. The tool used is a social perception questionnaire attached in the Annex E. Key informants are barangay officials, government employees and students living or working within the concerned areas.

The City of Valenzuela has 23 barangays divided into two districts. Respondents came from Coloong, Gen. T de Leon, Malinta, Malanday, Dalandan, Karuhatan and Marulas. Secondary data were collected from respondents living alongside MacArthur Highway particularly areas near BBB and Fatima Hospital.

There were 100 questionnaires distributed in seven barangays and 100 questionnaires distributed in establishments along McArthur Highway. From the seven barangays, 23 respondents did not reply and about 27 questionnaires from respondents in McArthur Highway were incomplete. All tallied to 150 respondents. Answers in the questionnaires were validated by informant interviews from government offices, barangay representatives and other affected establishments.

3.5.1.2 Profile of Respondents

Majority of the respondents are female with a total of 66.67% or one hundred in counting while only 33.33% account for the male respondents. Half of the respondents are single while 47.33% are married. Only 2.67% are widowers.

Most of the respondents have attained fair degree of education making them able to understand easy terms used about describing and introducing the sewerage system project. More than half or 55.33% have attained college degrees. About 37.33% reached high school. A small fraction of the group or 3.33% had attained Elementary level.

The respondents are mostly private employees that will be affected especially throughout the implementation of the project. They either work in the barangay or are using roads that will be affected by the project. About 37.33% are government employees while 5.33% are students. Only 8% are unemployed.
3.5.1.3 Community Problems

This section will tackle about the problems that the community is currently experiencing in relation to the aim of the project. The respondents were able to identify community problems related to the project’s objectives.

Table 23 shows how the respondents perceive their rivers. Majority of them or 71.33% are concerned about the rivers while 28.67% did not raise any concern on the rivers. Out of all the concerned individuals, majority of them said that the rivers are murky in appearance. The respondents also thought that the rivers are polluted of garbage and human or animal feces. Some of the respondents or 19.63% complained that the rivers are odorous as well.

This only illustrates that the condition of the rivers are in a bad shape. The respondents said that the condition of the rivers is a burden to the community and that there is a need for an intervention that can help save the rivers since their condition can affect the health and well-being of the community. The project itself claims to address these kinds of situation.

Table 24. Comments about the Condition of Rivers

<table>
<thead>
<tr>
<th>Profile</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polluted rivers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concerned</td>
<td>43</td>
<td>28.67%</td>
</tr>
<tr>
<td>Not concerned</td>
<td>107</td>
<td>71.33%</td>
</tr>
<tr>
<td>Quality of river</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murky</td>
<td>98</td>
<td>91.59%</td>
</tr>
<tr>
<td>Water polluted with garbage</td>
<td>44</td>
<td>41.12%</td>
</tr>
<tr>
<td>Water polluted with human/animal feces</td>
<td>86</td>
<td>80.37%</td>
</tr>
<tr>
<td>Odorous</td>
<td>21</td>
<td>19.63%</td>
</tr>
</tbody>
</table>

In Table 24, one of the problems of the community is when there are strong typhoons that causes flooding. Only 24% have experienced flash floods during their stay in the city but the majority or 42% have experienced flood levels rising up to the waist. A high number of respondents, 34.67%, have experienced first floor flood level while 15.33% have dealt with second floor flood level. Only 8% can
account to the respondents that have experienced below the knee flood level. Some of the respondents wrote that they had to put aside days to months of rehabilitation, i.e., emotionally, physically and mentally to the effects of the floods. It is also financially draining. The community can be stagnant for awhile and there is a need for the local government to give help especially in finding alternative shelters and providing food.

Table 25. Climate-related Hazards and Flood Levels

<table>
<thead>
<tr>
<th>Climate related hazards</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash floods</td>
<td>36</td>
<td>24.00%</td>
</tr>
<tr>
<td>Strong typhoon</td>
<td>114</td>
<td>76.00%</td>
</tr>
<tr>
<td>Highest flood level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below knee</td>
<td>12</td>
<td>8.00%</td>
</tr>
<tr>
<td>Up to waist</td>
<td>63</td>
<td>42.00%</td>
</tr>
<tr>
<td>First floor level</td>
<td>52</td>
<td>34.67%</td>
</tr>
<tr>
<td>Second floor level</td>
<td>23</td>
<td>15.33%</td>
</tr>
</tbody>
</table>

3.5.1.4 Health Condition

Only two out of all the respondents have dealt with water-related diseases for the past 6 months. One of whom had diarrhea for four days and the other had dengue for five days.

3.5.1.5 Respondents' Perception About the Project

Awareness and Acceptance

Majority or 74% of the respondents were not aware of the project. Some asked personally about the overview of the project and how it can help their community before answering the questionnaire. Mostly, the people who are well informed were government employees that, in one way or another, will be part in implementing the project and were already met by representatives from MWSI.

Table 26. Project Awareness

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aware</td>
<td>39</td>
<td>26.00%</td>
</tr>
<tr>
<td>Not Aware</td>
<td>111</td>
<td>74.00%</td>
</tr>
</tbody>
</table>

Among the respondents, only 17.33% are undecided about the project while 82.67% approves of the project. Majority presents hesitancy at first but they eventually agreed when the project’s objectives are presented. The respondents are willing to take the negative effects of the projects aside and focus on its proposed benefits for the environment.

On the last part of the questionnaire, the respondents were asked to write their comments and suggestions about the project. This includes their foreseen negative effects of the projects, positive effects and recommendations according to their views.

Table 27. Acceptance of the Project

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approve</td>
<td>124</td>
<td>82.67%</td>
</tr>
<tr>
<td>Disapprove</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Undecided</td>
<td>26</td>
<td>17.33%</td>
</tr>
</tbody>
</table>
Foreseen Negative Effects of the Project

There are two main problems that the community always point out, one of which is traffic congestion. Public utility vehicle drivers claimed that they would have less income since they can transport passengers in a slower time frame than usual. According to some respondents, there can be delay of deliveries and at some point resulted to spoiling of perishable goods when the traffic builds up in the main road.

Some respondents were skeptical about the project whether it could truly deliver its purpose. If the sewerage system fails, they believe that it can cause more floods to happen rather than lessening it. They also wrote that more floods can be hazardous to their health and working condition. The San Miguel Polo Brewery particularly stated that their machines can be easily damaged by flood waters.

On the other hand, some of them thought that they wouldn’t know the problem at this moment when the project is not yet implemented. They believed that problems that may arise during the implementation phase can be fixed by the MWSI.

Positive Outcomes

Majority wrote that they approved of this project for the sake of the environment. The community is ready to take chances for the wellness of their environment.

Many respondents and key informants believed that the project can bring employment opportunities. They stated that construction workers may be needed when the project is implemented. Some wrote that “sari-sari” stores along the construction sites can generate additional income. Vendors see it also as a source of opportunity when traffic congests.

In addition, if the project is indeed successful, then there is no doubt that the rivers would be in better condition than it is now.

Recommendations

Most of the respondents and informants would like to suggest that there should be a well-organized traffic regulation during the implementation of the project. They are willing to go through little disturbance for the betterment of their community.

Some of them also made a note that proper implementing rules and regulations should be made. This enables the project team to have a quick yet qualified work. They wanted fast yet high quality results.

3.5.2 Future Public Participation Plans

Plans for public involvement during the construction and operational phases of the project will be developed, once the construction program is better defined. These plans will provide forums for updating stakeholders periodically on project progress and the implementation of mitigation measures. These plans are incorporated into an IEC plan.

3.6 Impact Prediction and Evaluation

The impact assessment categorization has been used to identify the likely level of significance of potential environmental impacts of the proposed project. The following presents the environmental screening of environmental impacts.
3.6.1 Pre-Construction Phase

The major activities in the pre-construction phase of the proposed project involve finalization of the sites for the facilities, detailed topographic survey, soil investigation and other technical surveys, detailed engineering design, tendering of civil works contract, right-of-way acquisition, securing of permits, endorsement, and clearances (barangay resolution, locational clearance, Environmental Compliance Certificate (ECC), and building permit, among others).

MWSI needs to closely coordinate with the LGU, particularly the host barangays as well as the communities that will be affected by the project during construction. Traffic rerouting plans and proposed construction schedule must be discussed with the LGU.

3.6.2 Construction Phase

3.6.2.1 STP site clearing and impact on vegetation

There are still a few remaining structures onsite which needs to be demolished and disposed off properly. In addition, some trees may be affected by the construction of the STP and may need to be cut or earthballed. In the event that there are trees that need to be removed, earthballing and then replanting will be undertaken. Appropriate Tree Earthballing/Cutting Permit shall be secured from the DENR.

A landscaping plan must be developed to consider the retention of trees at the periphery to act as buffer. These strips of vegetation will also serve as buffer zones to control odor. Landscaping shall consist predominantly of providing suitably shaped final ground surfaces and the establishment of grass and shrubs or small trees. Natural ecological rehabilitation along the banks of the Tullahan River will have to be adopted. Tree planting and vegetation growth on the peripheral boundary will be done to improve the ecological environment.

3.6.2.2 Runoff of silt

The land clearing, excavation and grading operations will result to the exposure of the soil surface to the forces of weathering. During periods of rainfall, sediments may become eroded and cause surface runoff into the low-lying areas. At the STP site, the natural drainage channel of the runoff is the receiving Tullahan River.

At the construction sites of the sewer network, dusts and sediments during periods of rainfall may contribute to runoff into the drainage system. As a result of runoff, silt will be transported into the canals and creeks/rivers causing sedimentation and turbidity.

To minimize dust emission, construction activities should be timed during the summer or months where low precipitation occurs. The mounds of stripped soils should be temporarily covered with impervious materials to minimize erosion and runoff.

Another potential problem is when concrete mixers conduct washing after every load at the construction sites. The concrete washing may lead to clogging of drainage canals and therefore washing of cement mixers should be strictly prohibited by the contractor at the construction sites.

3.6.2.3 Generation of domestic wastes from construction camp

Domestic sewage will be generated from the construction camps. If disposed untreated, the domestic wastewater could lead to the contamination of surface and groundwater and lead to the spread of water-borne diseases. Therefore, appropriate waste management measures such as provision of portable toilets should be instituted during the construction phase to prevent such occurrence.

3.6.2.4 Spillage of oil and other materials

Potential spill and leakage of fuel, petroleum products, lubricants, and other pollutants related to vehicle and equipment fuelling, maintenance, and cleaning may cause serious water pollution. The following
mitigation measures for reducing such risks are proposed: (i) all vehicles and equipment that regularly enter and leave the construction sites will be fuelled off-site; (ii) Vehicle and equipment wash areas will be properly identified by signs and located away from drainage facilities and watercourses. All vehicles and equipment that regularly enter and leave the construction sites will be cleaned offsite; and (iii) Storage of construction materials will be away from the river and retention areas will be provided in order to contain accidental spills of such toxic, hazardous, and harmful construction materials as acidic substances, oil and petroleum products, and asphalt materials.

3.6.2.5 Increase noise level
The noise level will increase temporarily during the construction of the project, particularly during the construction of the sewer lines. The expected noise sources during the construction of the project are the construction equipment such as jackhammers, bulldozers, graders, generators, compressors and heavy trucks. In work areas near communities, noise levels may exceed the DENR noise standards. Along access roads, noise levels ranging from 65 to 80 dB(A) may be experienced in residential houses and commercial establishments near the roadsides. Close supervision of the construction will be undertaken to minimize indiscriminate noise production particularly at night.

3.6.2.6 Air Pollution
During the construction stage, the expected primary impact of the project on air quality is the increase in TSP concentrations near construction areas. During the construction phase of the project, the civil works and operations will entail digging and excavation of the soil that may cause some level of dust pollution in the air. Winds may carry soil particles to nearby areas, including the adjacent built-up areas. This is particularly troublesome during dry and windy conditions. This can be prevented and minimized by regular watering/sprinkling of areas prone to dust emission.

3.6.2.7 Hazards due to Open Excavations
To prevent accidents during construction, barricades and steel plate covers will be provided in open excavations during non-working time. Warning signs shall also be posted in the area.

3.6.2.8 Generation of construction spoils and excavated materials
Excess excavated materials will be generated from the construction of STP tanks, foundation, and sewer network. The excess excavated materials must be removed from the site and disposed of in a suitable disposal area, away from canals and water courses.

3.6.2.9 Traffic
The frequent movement of construction vehicles hauling materials to and from the STP site might hamper the flow of traffic along F. Bautista St. This is particularly significant considering that the street is narrow and that some sections of the street are being used as parking area of residents or terminal of tricycles. Traffic congestion is also expected at McArthur Highway and other minor roads where the sewer lines will be laid out. Roads where pipes will be installed may likely be more congested. In order to avoid causing traffic along the streets, the delivery vehicles will be advised to conduct hauling during off-peak hours where vehicle and pedestrian movement along the street is not significant. In addition, traffic aide will be assigned to assist in the movement of vehicles going to and from the site. A traffic re-routing scheme will be developed in coordination with the local government of Valenzuela.

3.6.2.10 Safety of Construction Workers
During the construction phase, the construction activities could result to hazards on the safety of workers. The contractor will be required to implement a Construction Health and Safety Plan that will include the requirement on wearing of safety gadgets, posting of safety signages, and provision of sufficient lighting at night.
3.6.2.11 Employment

The proposed project may generate employment opportunities during the construction phase as workers would be needed for the construction of the STP, conveyance works and pump stations. The number of workers required during the construction phase will be identified during the detailed design phase. Priority should be accorded to the residents of the host community in the hiring of construction personnel. This request was aired by the residents of Barangay Marulas during the public consultation.

3.6.3 Operational Phase

3.6.3.1 Noise

During STP operation, noise generated by the equipment of the STP will be insignificant. The STP is located quite far from the residential communities. In addition, silencers will be provided on the pumps and motors. The entire facility will retain the concrete walls that will serve as sound barrier. Trees will be retained and more trees will be planted at the periphery to act as buffer.

Noise from the operation of pumping stations may cause nuisance in the vicinity of pumping stations. To avoid this problem, the motors and pumps will also be installed in an enclosed room. If necessary sound barrier will be installed to further reduce noise levels generated by the pumping stations.

3.6.3.2 Odor

The facility will be provided with an odor removal system to address any potential odor problems during the processing of the wastes. Odor control systems will be integrated in the design of the project to prevent odor nuisance. Vegetation and trees around the property of the STP will also lessen the impact of odor.

3.6.3.3 Generation of screenings and solid waste

Screenings and solid waste shall be generated from the operation of the interceptors and preliminary treatment system. The screening wastes shall be collected daily from the interceptors and manholes to prevent the wastes from damaging STP equipment and pumps. Coordination with the LGU shall be effected in the enforcement of the Ecological Solid Waste Management Act as well as on the disposal of collected solid wastes.

Within the STP facility, segregation bins shall be provided for non-biodegradable and for organic wastes. These solid wastes from the facility shall be properly disposed through the LGU or a hauler with appropriate permit from the LGU.

3.6.3.4 Generation of sludge

Sludge generated after wastewater treatment may contain pathogens, heavy metals and other pollutants. If not stored, handled and disposed properly, sludge can pose significant threats to human health and safety.

In accordance with the plans of MWSI, sludge produced during the operation of the facility will be properly treated and stabilized and sent to a sludge processing area in Tarlac where it is processed as soil conditioner.

3.6.3.5 Generation of hazardous waste

Hazardous wastes such as empty chemical containers, analytical wastes from the laboratory, used oil from the generator set, and busted lamps will be generated when the project becomes operational. These hazardous wastes shall be collected separately from the regular solid waste of the facility. A DENR-recognized treatment, storage, and disposal (TSD) facility shall be commissioned by MWSI to
collect and properly treat the hazardous wastes in accordance with the requirements of Republic Act 6969 (Toxic, Hazardous, and Nuclear Waste Control Act).

3.6.3.6 Changes in hydrology and impact on flooding

Flooding in the vicinity of the STP in Barangay Marulas has been reported by residents. Highest flood experienced was during the Typhoon Ondoy at the site of the proposed STP. The velocity of flood flow and the rise and frequency of the flood events in the catchment area should be studied and the results should be incorporated in the design of the proposed STP and its outfall. The proponent should take into consideration the effects of flooding events on the proposed project, tidal variations and the existence of the flood control structure north of the STP property. The discharge outfall may be located after the existing floodgate and tidal fluctuations should be verified to properly schedule outfall releases during low tide. In addition, the control room with all the electronic devices will be positioned higher than the predicted flood levels to ensure proper functioning in the event of an unforeseen flood event.

Climate-proof measures will be designed for the project that will take into consideration the storm water runoff in the design of the interceptor system as well as the planting of more trees and vegetation as part of the site’s landscaping. Retaining walls, sheet piling, driven piles, surface and subsurface drains, and other flood control measures may be necessary to prevent potential scouring of the banks of the Tullahan River and to prevent damage to the STP structures and equipment.

3.6.3.7 Hazards from chlorine handling

One of the disinfection options being considered for the STP is the use of chlorine. Chlorine is a reactive chemical and could potentially cause hazard to workers and communities nearby, particularly in case of accidental spill or leak. Concentration of chlorine above 2ppm will result to burning sensation to the eyes and the respiratory system while inhalation of concentrations of 50-100ppm could result in death.

The facility should implement special handling and storage requirements of chlorine onsite to reduce chlorine hazards. In the design of the STP facility, the chlorine storage should be sited as far as practicable from residential areas outside the plant and from the administrative building inside the plant. To reduce worker exposure, the application of chlorine should utilize automatic chlorine dosing equipment instead of manual dosing. The storage facility should be provided with safety features and alarm system to automatically alert workers of leaks or spills. A safety plan and an emergency response plan including training of workers should be prepared and undertaken on proper and safe handling of chlorine.

3.6.3.8 Social Impacts

The proposed site of the STP is vacant and free of informal dwellers. The site is being maintained and secured by the LGU of Valenzuela City. However, the immediate vicinity is characterized by residential houses. The potential social impacts of the construction and operation of the STP at the site include traffic due to frequent movement of vehicles along the narrow F. Bautista St., threat to safety of residents, accidental spill of materials, hazards to community health, dust emission, generation of solid wastes, hazards from flooding, odor, and accidental release of chlorine.

When the conveyance system is constructed, the social impacts will include traffic and temporary disruption to businesses and normal operations/activities of the establishments along the ROW, noise, damage to properties, generation of excavated soil and solid wastes, dust emission, impacts on health and safety of workers and community. Prior to construction, line survey and coordination with other utility companies, affected establishments and LGU should be conducted. Access to these businesses and establishments will be provided and a phased-in schedule of excavation will be developed. In addition, a traffic re-routing plan should be designed in coordination with the LGU.
3.6.3.9 Physical and Cultural Resources

The project is located within a highly urbanized area. There are no declared historical and cultural heritage sites along the alignment of the conveyance line and at the site of the proposed STP site. In the event of chance finds, the artifacts will be reported to the local authorities and to the National Museum.

3.6.3.10 Benefits of the Project

The implementation of the proposed project would have considerable positive impacts to the improvement of the environment. Direct local benefits include (1) improvement of public health, (2) improvement of environmental quality, and (3) tangible and non-tangible economic benefits such as tourism, fisheries, etc. The project will also have significant and direct trans-boundary environmental benefits extending to the downstream areas and eventually the communities in the Manila Bay area.

There is also a possible alleviation of flood conditions in the areas near the Meycauayan and Polo rivers due to the diversion of sewage flows from sub-catchments 1 and 2 towards the STP.

3.6.3.11 Future Environmental Issues without the Project

The general area where the project will be located is already highly developed. Therefore, even without the project, development activities will continue and would be composed mainly of residential, commercial, and industrial ventures. There will also be increased population density. The combined effect of population increase and economic activity will hasten the urbanization of the locality, with the attendant problems and opportunities. Increased human and economic activity also equates into waste management problems that need to be addressed.

The foreseen increase in economic activities in the catchment area would result to more wastes being generated and increased pressure on the improvement of infrastructure and utilities. Without the proposed project, the discharge of untreated domestic sewage will continue and the water quality of Tullahan River, Polo River and Meycauayan River will continue to deteriorate and health and sanitation problems of the community will remain.
4 ENVIRONMENTAL MANAGEMENT PLAN

4.1 IMPACTS MANAGEMENT PLAN

The following table presents the environmental mitigation measures to be implemented to address potential adverse impacts of the proposed project.

<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. SEWAGE TREATMENT PLANT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. Pre-Construction Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition of clearances, approvals, and permits</td>
<td>People</td>
<td>Public concern on environmental and social impacts of STP</td>
<td>Conduct of Information and Education Campaign (IEC) on the project, Conduct EIA of the proposed project, Inform Barangay and LGU about the project, Secure ECC, permits, clearances, and approvals from relevant government agencies</td>
<td>MWSI</td>
<td>Part of pre-planning cost</td>
<td>IEC reports, EIA report, Barangay/City Clearance/Permit</td>
</tr>
<tr>
<td>Land acquisition and zoning</td>
<td>Land People</td>
<td>Compatibility of project with the approved land use plan of the city</td>
<td>MWSI needs to secure Locational Clearance from Valenzuela City prior to construction of the project.</td>
<td>MWSI</td>
<td>Part of pre-planning cost</td>
<td>Locational Clearance</td>
</tr>
<tr>
<td>Site clearing</td>
<td>Vegetation</td>
<td>Removal of affected trees, Develop landscaping plan</td>
<td>Secure Permit to Cut/Earthball Trees</td>
<td>MWSI</td>
<td>Part of pre-planning cost</td>
<td>Permit to Cut/Earthball Trees</td>
</tr>
<tr>
<td>Removal of remaining concrete structures</td>
<td>Land</td>
<td>Generation of debris</td>
<td>Pre-identify areas where debris is to be disposed.</td>
<td>Contractor</td>
<td>Part of pre-planning cost</td>
<td></td>
</tr>
<tr>
<td>Geologic Hazards and Emergencies</td>
<td>Land People</td>
<td>Geologic hazards resulting from earthquakes, flooding, liquefaction, and settlement.</td>
<td>The structural design of the facility shall consider the seismic engineering design and analysis and findings/recommendations of the geotechnical assessment, Design the STP and control room at a</td>
<td>MWSI</td>
<td>Part of structural design of STP</td>
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<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
<td>Guarantee/ Financial Arrangements</td>
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</tr>
<tr>
<td>II. Construction Phase</td>
<td>Erosion and surface soil runoff</td>
<td>Water</td>
<td>Clogging of canals</td>
<td>Construction of temporary works such as silt traps, deviation channels mounting, barriers and trenches around the stock piles.</td>
<td>Project mgt office / Contractor</td>
<td>Php50,000</td>
</tr>
<tr>
<td></td>
<td>Mud tracking of vehicles coming in and out of the construction site</td>
<td>Land People</td>
<td>Aesthetics</td>
<td>Provision of wash bays Regular cleaning of surroundings by project street sweepers/cleaners.</td>
<td>Project management / Contractor</td>
<td>Part of management cost</td>
</tr>
<tr>
<td></td>
<td>Wastewater from worker’s camps</td>
<td>Water</td>
<td>Discharge of untreated sewage into Tullahan River</td>
<td>Temporary toilet facilities will be utilized to avoid contamination of surface and groundwater by sewage</td>
<td>Project mgt office / Contractor</td>
<td>Php20,000/month</td>
</tr>
<tr>
<td></td>
<td>Oil spills or leaks from heavy equipment</td>
<td>Water</td>
<td>Discharge of oily wastes and cement-containing residues</td>
<td>Restrict maintenance of construction vehicles onsite to prevent oil spill. Require contractors to collect used oil and other hazardous wastes for appropriate disposal. Prohibit washing of cement mixers at construction sites</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction cost</td>
</tr>
<tr>
<td></td>
<td>Dust emission from the civil works and movement of vehicles.</td>
<td>Air People</td>
<td>Air pollution</td>
<td>Dust control at the stock pile of aggregates through regular water sprinkling Driving speeds on unpaved roads should be limited to less than 25kph. Avoid excavation and grading activities during periods of strong winds.</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction cost</td>
</tr>
<tr>
<td></td>
<td>Increased noise and vibration due to construction activities</td>
<td>Noise People</td>
<td>Noise and Vibration</td>
<td>Proper scheduling of construction works inform the barangay and adjoining communities of construction schedule.</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction management cost</td>
</tr>
<tr>
<td></td>
<td>Traffic along F. Bautista Road due to frequent movement of</td>
<td>People</td>
<td>Traffic Safety</td>
<td>Develop a diversion route in coordination with the barangay. Implement construction</td>
<td>Project mgt office / Contractor</td>
<td>Part of construction management cost</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
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</tr>
<tr>
<td>vehicles. Threat to safety of residents</td>
<td></td>
<td></td>
<td>hazard rules and regulations. Schedule deliveries of construction materials at night. Deploy traffic aides around the STP site during peak hours</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Accidental spill of materials during hauling</td>
<td>People</td>
<td>Traffic accidents</td>
<td>Require haulers to cover materials with canvass</td>
<td>Contractor</td>
<td></td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Impact of construction activities on welfare and safety of workers and passersby.</td>
<td>People</td>
<td>Health and Safety of Workers and Passersby and Damage to Adjacent Properties</td>
<td>Wearing of safety gadgets such as hard hats, gloves, rubber boots, goggles, etc. will be a mandatory requirement for workers. Safety signs/reminders will be posted in strategic areas within the construction area Sufficient lighting shall be installed at night.</td>
<td>Project mgt office / Contractor</td>
<td></td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Generation of construction debris and other solid wastes</td>
<td>Land People</td>
<td>Solid wastes generation Additional burden to LGU on solid waste management</td>
<td>Collection and recycling of construction wastes. To be offered to junk shops as scrap material. Handling and storage of potential contaminants under strict conditions</td>
<td>Project mgt office / Contractor</td>
<td>Php10,000/wk</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Increased employment opportunities</td>
<td>People</td>
<td>Provide employment opportunities</td>
<td>Priority in hiring will be given to qualified locals from the barangay.</td>
<td>Project mgt office / Contractor</td>
<td></td>
<td>TOR with contractor</td>
</tr>
</tbody>
</table>

### III. Operation Phase

<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding in the area</td>
<td>Water</td>
<td>Flood surge from Tullahan River during heavy rainfall that may affect the STP site.</td>
<td>Implement climate-proof measures such as: -Interceptor systems taking into consideration the storm water runoff. -Riverbank protection and earthfilling of site up to current street level. -Planting of trees and other vegetation.</td>
<td>MWSI-Operations Group</td>
<td></td>
<td>Drainage plans Building Permit Sanitary Permit</td>
</tr>
<tr>
<td>Change in hydrology/impact on flooding</td>
<td>People Water</td>
<td>Increased flow into the Tullahan River from the effluent</td>
<td>Design STP outfall after the flood control gate.</td>
<td>MWSI-Operations Group</td>
<td>Part of STP design</td>
<td>STP plans</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
<td>Guarantee/Financial Arrangements</td>
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</tr>
<tr>
<td>Discharge of wastewater which could contaminate surface and groundwater</td>
<td>Water</td>
<td>Discharge from the STP. Flooding may likely be reduced due to diverted discharges from sub-catchments 1 and 2.</td>
<td>Consider tidal fluctuations to schedule outfall releases during low tide.</td>
<td>MWSI-Operations Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced domestic pollution load of the Tullahan River, Polo River and Meycauayan River</td>
<td>Water</td>
<td>Water pollution</td>
<td>Regular inspection and maintenance of the STP. STP effluent should comply with the Effluent Standards of DENR for Class C waters. Secure Discharge Permit from DENR-EMB-NCR</td>
<td>MWSI-Operations Group</td>
<td>Php50,000 per month</td>
<td>Discharge Permit Self-Monitoring Reports (SMR)</td>
</tr>
<tr>
<td>Odor from waste processing</td>
<td>Air</td>
<td>Odor generation</td>
<td>The plant will include an odor control system. Planting of more trees around the periphery to act as buffer against potential odor.</td>
<td>MWSI-Operations Group</td>
<td>~P100,000.00</td>
<td>Plans of odor control system Landscaping Plans</td>
</tr>
<tr>
<td>Sludge generation</td>
<td>Land</td>
<td>Land contamination</td>
<td>Onsite-treated sludge will be transported to the approved lahar disposal area of F.G. Agro Industrial Corporation in Barangay Telebanca, Concepcion, Tarlac for composting and use as soil conditioner.</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Monitoring reports</td>
</tr>
<tr>
<td>Transport of sludge</td>
<td>People</td>
<td>Traffic caused by regular plying of sludge trucks</td>
<td>Transport sludge during non-truck ban hours to avoid causing traffic along the narrow streets. Sludge haulers are required to follow the traffic management policies of MWSI</td>
<td>MWSI-Operations Group</td>
<td>Part of management cost</td>
<td>Contract with sludge haulers Log reports of sludge haulers</td>
</tr>
<tr>
<td>Emissions from the</td>
<td>Air</td>
<td>Air and noise quality</td>
<td>Secure Permit to</td>
<td>MWSI-</td>
<td>Part of</td>
<td>Permit to</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
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<tr>
<td>operation of the standby generator unit.</td>
<td></td>
<td></td>
<td>Operate from DENR-EMB</td>
<td>Operations Group</td>
<td>maintenance cost</td>
<td>Operate</td>
</tr>
<tr>
<td>Screenings and solid waste generation.</td>
<td>Land</td>
<td>Solid waste</td>
<td>Implementation solid waste management system according to LGU plan.</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Contract with LGU/hauler</td>
</tr>
<tr>
<td>Accidental release of chlorine</td>
<td>Air, Land, Water, People</td>
<td>Hazardous chemicals</td>
<td>Provision of chlorine storage facility equipped with chlorine gas detector and alarm system. Implementation of an emergency response plan for chlorine leak. Training of workers on safety and emergency procedures.</td>
<td>MWSI-Operations Group</td>
<td>Part of project cost</td>
<td>Project design</td>
</tr>
<tr>
<td>Hazardous waste (busted lamps, batteries, empty chemical containers, etc.) generation</td>
<td>Land</td>
<td>Hazardous waste</td>
<td>Require segregation of hazardous wastes. Collection of HW by a DENR-recognized hazardous waste transporter and treater</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Contract with TSD facility HW Waste Registration ID</td>
</tr>
<tr>
<td>Improvement of health and sanitation conditions in the area due to reduced exposure to untreated sewage</td>
<td>People</td>
<td>Improvement of health and sanitation</td>
<td>Monitoring of effluent quality Monitoring of community health profile, through Valenzuela City Health Office</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Monitoring reports</td>
</tr>
</tbody>
</table>

B. CONVEYANCE SYSTEM

I. Pre-Construction Phase

Impact of construction of sewer network to drainage canals, roads, adjacent buildings and sensitive receptors (e.g. hospitals, schools, residential areas, business) | People | Construction of sewer network will most likely result to traffic and temporary disruption of businesses and normal operations/activities. | Conduct a line survey and coordinate with DPWH, MERALCO, PLDT, and LGU to check location/presence of other utilities and structures Design a shoring and bracing plan to protect | MWSI | Part of design cost | Design of sewer network |
### VALENZUELA SEWERAGE SYSTEM PROJECT

<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishments, etc.)</td>
<td></td>
<td></td>
<td>adjacent structures and foundations.</td>
<td>Project mgt office/ Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ensure access to businesses and foundations.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Implement a phased-in schedule of construction works for the network</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Design a traffic rerouting plan in consultation with Valenzuela City's traffic management department.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Require contractors to comply with the traffic management policies of MWSI.</td>
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</tbody>
</table>

#### II. Construction Phase

<table>
<thead>
<tr>
<th>Project Phase / Environmental Aspect</th>
<th>Environmental Component Likely to be Affected</th>
<th>Potential Impact</th>
<th>Options for Prevention or Mitigation or Enhancement</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Guarantee/Financial Arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic congestion due to closure or partial closure of roads for sewer construction</td>
<td>People</td>
<td>Traffic</td>
<td>Prepare and present a Traffic rerouting scheme to the LGU for approval. Sidestreet parking of construction vehicles will not be allowed. Install flashing boards, bollards, concrete barriers, safety warnings/signages.</td>
<td>Project mgt office/ Contractor</td>
<td>Part of construction management cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Dust emission from civil works and movement of vehicles</td>
<td>Air People</td>
<td>Air pollution</td>
<td>Water sprinkling of areas prone to dust emission</td>
<td>Project mgt office/ Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Soil runoff into canals and water bodies</td>
<td>Water</td>
<td>Clogging of canals</td>
<td>Provision of silt traps Washing of cement mixers will not be allowed onsite.</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor and cement hauler</td>
</tr>
<tr>
<td>Impact of construction activities on welfare and safety of workers</td>
<td>People</td>
<td>Health and safety of workers</td>
<td>Implementation of Construction Safety and Management Plan Designation of Safety Officer by the contractor Require wearing of safety gadgets by workers.</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Project Phase / Environmental Aspect</td>
<td>Environmental Component Likely to be Affected</td>
<td>Potential Impact</td>
<td>Options for Prevention or Mitigation or Enhancement</td>
<td>Responsible Entity</td>
<td>Cost</td>
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</tr>
<tr>
<td>Safety of passersby and damage to adjacent structures</td>
<td>People</td>
<td>Safety of passersby; damage to adjacent properties</td>
<td>Barricades and steel plate covers will be provided in open excavations during non-working hours. Warning signages and flashing boards will be posted at the excavation site. Provide lighting at open excavations at night.</td>
<td>Contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
</tr>
<tr>
<td>Generation of excavated soil and construction debris</td>
<td>Land People Solid wastes</td>
<td>Excavated soil shall be disposed in an LGU-approved disposal area</td>
<td>Project mgmt office / contractor</td>
<td>Part of construction cost</td>
<td>TOR with contractor</td>
<td></td>
</tr>
<tr>
<td>III. Operation Phase</td>
<td></td>
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</tr>
<tr>
<td>Generation of screenings and solid waste</td>
<td>Land</td>
<td>Solid waste generation</td>
<td>Daily collection of screening wastes at interceptors and manholes Coordinate with LGU on the implementation of the Ecological Solid Waste Management Program to encourage households to collect solid wastes and avoid disposal on canals and creeks.</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td></td>
</tr>
<tr>
<td>Noise from operation of equipment, pumps and motors</td>
<td>People</td>
<td>Noise</td>
<td>Provision of enclosure for pumps and motors and regular maintenance of equipment</td>
<td>MWSI-Operations Group</td>
<td>Part of operations cost</td>
<td>Part of project plans</td>
</tr>
</tbody>
</table>

### 4.2 Social Development Program

The MWSI extends its corporate social responsibility (CSR) program through several water services projects for poor communities. One of these programs is the “Bayan Tubig Program” which started in 1999. The program aims to provide affordable potable water to low income and depressed communities who get water from communal faucets, from water vendors, or illegally tap to water pipelines. Through the program, households were given steady water supply in their respective homes with their own water meters through affordable and easy terms. The program also prevents illegal connections that result in water leaks and promote contamination due to seepage.

Another program is the Bayan Tubig Bayanihan or “Patubig ni Gloria” project which also started in 1999. The program is a joint undertaking of MWSS, MMDA, PAGCOR, MWSI and MWCI. The project involves community equity in the form of labor with MWSI providing the pipes and equipment and construction supervision.
During project construction, priority will be given to qualified local people in terms of hiring. Contractors will be directed to ensure that this becomes an internal policy. Orientation and training will be granted to hired personnel regarding construction management practices and regulations.

During the operational phase, in terms of social services, the proposed project will provide revenues in terms of tax payments to the barangay and the city government. The revenues from the project will correspond to additional funds to support social development projects in the locality.

4.3 Information Education Campaign (IEC) Framework

The Information, Education and Communication (IEC) program of MWSI will continue until the construction and operation phases of the project. Prior to the project construction, MWSI’s IEC involves consultation meetings with stakeholders and the LGU to increase the awareness of all concerned about the project and to solicit issues and concerns that could be integrated in the design of the project. During IEC meetings, the stakeholders from different sectors, i.e. national, provincial, municipal/city, key non-government organizations, community members and other sectoral representatives will be invited.

The following presents the various IEC activities of MWSI:

<table>
<thead>
<tr>
<th>Target Sector</th>
<th>Topics of Concern</th>
<th>IEC Strategy</th>
<th>Information</th>
<th>Indicative Timelines</th>
<th>Indicative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGU City</td>
<td>Project description and status</td>
<td>Individual method/meetings, Council meetings</td>
<td>Discussion and consultation, Project presentation, labor requirements</td>
<td>At least 4 months before start of project construction</td>
<td>Cost of IEC materials, meals, site inspection</td>
</tr>
<tr>
<td>LGU Barangay</td>
<td>Project description and status</td>
<td>Individual method/meetings, Council meetings</td>
<td>Discussion and consultation, Project presentation, labor requirements</td>
<td>At least 4 months before start of project construction</td>
<td>Cost of IEC materials, meals, site inspection</td>
</tr>
<tr>
<td>Residents in the primary impact areas</td>
<td>Project description and status</td>
<td>Individual meeting, Council meetings</td>
<td>Discussion and consultation, Project presentation</td>
<td>At least 4 months before start of project construction</td>
<td>Cost of IEC materials, meals, site inspection</td>
</tr>
</tbody>
</table>

4.4 Grievance Redress Mechanism

MWSI created a Grievance Redress Mechanism and has appointed Engr. John Emmanuel Martinez as the Grievance Officer of the project who can be contacted at 981-3484. Engr. Martinez shall coordinate with the responsible units/departments about any possible complaints lodged on the project.

The Grievance Redress Mechanism is divided into complaints lodged during the construction and operation of the project. During the construction phase, an affected person or complainant can approach or call the MWSI or contractor to raise his/her complaints or concerns. Complaints will be immediately relayed to the responsible party for prompt action. If the complaint is not acted on promptly, or if the affected person is not satisfied with the resolution undertaken, he/she can then avail of the formal mechanism, as follows:

Step 1: Affected person lodges the complaint.

Step 2: The General Contractor (during construction) and the Sewerage Operations Department (during operation) will document and register received complaints.
Step 3: A meeting will be called between the affected person and the General Contractor (during construction) and the Sewerage Operations Department (during operation). The affected person will be immediately informed if the grievance is within, or outside, the purview of the mechanism. If the scope is outside, the affected person will be referred to the proper institution and/or proper mechanism for the complaint.

If the complaint is within the scope of the project, the resolution of the complaint shall be discussed during the meeting. Investigation will be immediately scheduled for proper resolution of the complaint. The contractor/Sewerage Operations Department will immediately provide the most suitable interim measure to reduce the magnitude of the impact and to start work on the final measure not later than 5 days from the day of the discussion meeting.

Step 4: If the affected person is satisfied with the resolution of the complaint, MWSI shall obtain a written confirmation of satisfaction from the affected person.

Step 5: For at least a week after closure of grievance, MWSI through the Grievance Officer shall monitor the effectiveness of the resolution.

Step 6: In the event that the issue/impact persists, the affected person can lodge an appeal to the Barangay. The Barangay Chairman shall immediately record the appeal, contact the Grievance Officer and contractor of MWSI, and call for a meeting to review the history of the grievance to discuss the immediate resolution of the issue. If the issue still persists despite the second action, the affected person can seek assistance from the City Government.

4.5 Environmental Compliance Monitoring

The Environmental Quality Performance Level (EQPL) determines the level by which a certain key environmental aspect must be addressed through level of alertness, action/s that need to be executed, and the limit/point where the emergency response measure should be implemented to avoid exceedance on the set standards.

Relevant to the results of the environmental review, the critical parameters that should be addressed by MWSI are outlined below:

<table>
<thead>
<tr>
<th>Regulations</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>PD 1586 (Philippine EIS System)</td>
<td>Compliance with ECC conditions Implementation of the EMP, EmoP</td>
</tr>
<tr>
<td>RA 8749 (Clean Air Act):</td>
<td>Reporting of emission testing on generator set Secure Permit to Operate Maintain emission concentration within standards</td>
</tr>
<tr>
<td>MC 2007-03</td>
<td></td>
</tr>
<tr>
<td>Part VI, Rule XIX</td>
<td></td>
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<tr>
<td>DAO 2000-81</td>
<td></td>
</tr>
<tr>
<td>RA 9275 (Clean Water Act)</td>
<td>Secure Discharge Permit Compliance to effluent standards</td>
</tr>
<tr>
<td>Sec. 14</td>
<td></td>
</tr>
<tr>
<td>DAO 35</td>
<td></td>
</tr>
<tr>
<td>RA 6969 (DAO 1992-29)</td>
<td>Hazardous waste generator registration Hazardous waste inventory in SMR Submit to EMB-NCR a hazardous waste emergency contingency plan, IEC plan for emergency response</td>
</tr>
<tr>
<td>Part 1, Chapter 2-1</td>
<td>Use of manifest system for all hazardous waste transport and treatment Designation of hazardous waste storage facility and inventory of movement of materials in and out of facility</td>
</tr>
<tr>
<td>Part 2, Chapter 4</td>
<td></td>
</tr>
<tr>
<td>Part III, Sec 5-1</td>
<td></td>
</tr>
<tr>
<td>Rule 1090</td>
<td></td>
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</tbody>
</table>
### Regulations

<table>
<thead>
<tr>
<th>Regulations</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA 9003 (Ecological Solid Waste Management Act)</td>
<td>Mandatory waste segregation at source</td>
</tr>
<tr>
<td>DAO 1992-26</td>
<td>Appointment and accreditation of PCO</td>
</tr>
</tbody>
</table>

### 4.5.1 Self-Monitoring Plan

Presented in Table 30 is the action plan for environmental monitoring of the proposed project. An environmental monitoring program should be designed specifically to achieve the following:

- To monitor the changes in key environmental elements so that any long term adverse impact caused by project interventions can be predicted in a cost efficient and timely manner; and
- To provide a tool of the decision making on whether any modification of project conduct or mitigation of adverse impacts is necessary.

The monitoring targets of the STP project include:

- **Unit operations and processes** – in relation to collection, treatment, and disposal facilities. This monitoring activity will determine the efficiency of the STP operation and its compliance with the Effluent Standards of DENR Administrative Order No. 35 and the Philippine Clean Water Act.

- **Beneficiaries** – which includes households and community beneficiaries. This type of monitoring can also help increase awareness of users and enhance public relations strength of the project. Whether the project achieves overall environmental improvement benefits will depend largely on the attitudes and awareness of beneficiaries.

- **Water Quality of Tullahan River** – a monitoring program should be developed on the receiving stream to gauge the effects of the project on the river and identify impacts in a timely manner.

### 4.5.2 Multi-Sector Monitoring Framework

An in-house monitoring program will be implemented by MWSI. The results of the monitoring activities will be submitted to DENR and provided to stakeholders.
The Project Environmental Monitoring Audit Prioritization Scheme (PEMAPS) is presented in Annex F.

<table>
<thead>
<tr>
<th>Table 31. Environmental Monitoring Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Environmental Project Phase</strong></td>
</tr>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td><strong>EQPL Range</strong></td>
</tr>
<tr>
<td><strong>Alert</strong></td>
</tr>
<tr>
<td>CONSTRUCTION PHASE</td>
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<td></td>
</tr>
<tr>
<td>OPERATIONAL PHASE</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
## Key Environmental Aspects per Project Phase

| Odor | Air pollution | Foul odor | Observation | Daily | STP site | PCO | - | Foul odor | Check facilities | - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid waste generation | Solid waste | Vol of solid waste generated | measurement | daily | Waste segregation area | PCO | Php50,000 per yr | Regular collection by hauler | RA 9003 | Contract with hauler | RA 9003 |
| Sludge generation | STP sludge | Volume of sludge hauled by sludge contractor | Weighing / estimation | Weekly / Monthly | STP site | PCO | - | |
| Hazardous waste generation | Hazardous waste | Qty of hazardous waste generated | measurement | quarterly | Waste segregation area | PCO | Php20,000 per yr | Collection by TSD facility | RA6969 | | | | |
4.4.3 Environmental Guarantee and Monitoring Fund

Funds shall be allocated for the implementation of the Environmental Management Plan and Environmental Monitoring Action Plan, as indicated in the EMP and EMoP. An Environmental Guarantee Fund (EGF) will be set up in the extreme event of damage to property and life caused by the project. The amount of the fund shall be determined by the DENR.

4.5 Emergency Response Policy

MWSI promotes health and safety in the workplace. The safety code of MWSI promotes the following:

- Recognition of safety as one of the highest corporate priorities;
- Adoption of safety performance as an integral part of business management;
- Incorporation of all safety consideration at the earliest stages of any project development;
- Demonstration of responsible corporate citizenship by adhering to all safety regulations and laws and anticipation of charges thereof; and
- Assurance that all its operations comply with established international guidelines and requirements on safety.

Safety protocols in the workplace was issued by MWSI for guidance of employees and contractors which includes general construction and safety guidelines, vehicular, personnel accidents and damages, wearing of personal protective equipment, safety in the use of tools and equipment, electrical and underground works safety measures, fire and other natural calamities and first aid treatment.

Under the MWSI Safety Code, each manager/supervisor will be directly responsible for ensuring safety. The Central Safety Committee, with the support of management, will provide guidance and logistical support to all operating units for functions and activities related to safety, health and protection of the environment, including penalties for violations of the safety code.

4.6 Abandonment / Decommissioning / Rehabilitation Policies and Generic Guidelines

The likelihood of abandoning the treatment plant once operational is improbable. However, if abandonment becomes necessary, MWSI would most likely dismantle the removable equipment and demolish concrete and rigid structures to give way for other uses in an environmentally acceptable and safe manner.

4.7 Institutional Plan for EMP Implementation

The policies and supervision of the implementation of environmental management and monitoring plan of MWSI’s various projects rests with the Quality Environment, Safety and Health Division which is headed by SVP Francisco A. Arellano. SVP Arellano supervises the Environment Management Department that is composed of the Environmental Research and Assessment Unit and the Environmental Monitoring and Compliance Unit.

A Pollution Control Officer (PCO) will be appointed at the Valenzuela STP to oversee the implementation of the EMP and EMoP as well as oversee compliance with the environmental laws and permitting requirements of DENR. The PCO shall also prepare the monitoring reports under the supervision of the Environmental Management Department. Figure 13 presents the organizational structure on environmental management of MWSI.
During the construction phase, the Contractor shall fully implement the mitigation and enhancement measures presented. The Terms of Reference (TOR) of the contractor shall stipulate compliance of the project with the requirements in the EMP and EMoP.
5 BIBLIOGRAPHY/REFERENCES

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Sectoral Report – Socio-Economy, Urban Planning, and Environment, KAMANAVA Area Flood Control and Drainage System Improvement Project.
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Wind Rose Analysis (1971-2000) PAGASA Climate Data Section, August 3, 2006
ANNEXES

A. Environmental Screening Checklist
B. Minutes of Public Consultation dated March 21, 2013
C. Contract to Sell
D. Key Informant Interviews
E. Survey Instrument
F. PEMAPS
G. MWSI Safety Code
H. ECC of F.G. Agro Industrial Development Corporation
I. Disposal Site of F.G. Agro Industrial Development Corporation
A. Environmental Screening Checklist
### Annex A: Initial Screening Form for Potential Environmental & Social Safeguards Issues

This form is to be used by the Sub-Borrowers for initial screening of potential environmental and social safeguards issues. It is meant to facilitate the determination of applicable World Bank safeguards policies, as well as those relevant to Philippines legislation. The completed form will be submitted to the Borrower and World Bank task team for confirmation.

<table>
<thead>
<tr>
<th>Sub-project Name</th>
<th>VALENZUELA SEWERAGE SYSTEM PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-project Location</td>
<td>Valenzuela City, Metro Manila</td>
</tr>
<tr>
<td>Sub-project Proponent</td>
<td>Maynilad Water Services, Inc.</td>
</tr>
<tr>
<td>Sub-project Type/Sector</td>
<td>Wastewater management</td>
</tr>
<tr>
<td>Estimated Investment</td>
<td>Php3.8Billion</td>
</tr>
<tr>
<td>Start/Completion Date</td>
<td>2014-2016</td>
</tr>
</tbody>
</table>

#### Screening for Philippines Environmental Regulations

- A full/detailed EIA is required: Yes √ No
- Permit granted with conditions: Yes √ No
- Rejected: Yes No

Note: This is a CATEGORY B Project

#### Screening Checklist for World Bank Environmental and Social Safeguards

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answer</th>
<th>If Yes WB Policy triggered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are the sub-project impacts likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented? Please provide brief description:</td>
<td>√</td>
<td>OP 4.01 Category B</td>
</tr>
<tr>
<td>The sub-project impacts are not considered sensitive, diverse or unprecedented. The environmental impacts during the construction phase which include generation of dust, noise, traffic, soil runoff, and removal of affected trees can be readily mitigated. Impacts to occur during the operational phase such as traffic on existing roads, discharge of wastewater into Tullahan River, odor pollution, changes in flow regime, disposal of sludge, among others, can be controlled by instituting appropriate mitigating measures in the design of the project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the proposed sub-project likely to have minimal or no adverse environmental impacts? Please provide brief justification:</td>
<td>√</td>
<td>OP 4.01 Category B</td>
</tr>
<tr>
<td>The sub-project is projected to cause minimal adverse environmental impacts which can be readily mitigated.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the sub-project neither a Category A nor Category C as defined above? Please provide brief justification:</td>
<td>√</td>
<td>OP 4.01 Category B</td>
</tr>
<tr>
<td>The sub-project is considered as a Category B project because the impacts are less adverse as compared to Category A projects.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the sub-project involve potential conversion or degradation of natural habitats? Please provide brief justification:</td>
<td>√</td>
<td>OP 4.04</td>
</tr>
</tbody>
</table>

2 Projects that do not fall either within OP 4.01 as a Category A or Category C can be considered as Category B. Examples of Category B sub-projects include small scale in-situ reconstruction of infrastructure projects such as road rehabilitation and rural water supply and sanitation, small schools, rural health clinics, etc.
### Questions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answer</th>
<th>If Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The site of the proposed STP is currently vacant. There are a few trees within the site but tree cutting could be avoided by retaining these for landscaping purposes or through tree earth-balling and replanting of affected trees.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the sub-project involve involuntary land acquisition, loss of assets or access to assets, or loss of income sources of means of livelihood? Please provide brief justification:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The proposed site to be occupied by the STP is clean of any habitation, properly enclosed/fenced and is maintained by the security service assigned by Valenzuela City. The Dog Pound Center which was formerly located at the proposed STP site was transferred by the LGU to the City Action Center/Motorpool which is also a government facility. There are no dispute of ownership or any outstanding claims from previous owners.</td>
<td>√</td>
<td>OP 4.12</td>
</tr>
<tr>
<td>Are the sub-project impacts likely to have adverse social impacts that are sensitive, diverse, or unprecedented? Please provide brief description:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are no sensitive social impacts of the project since resettlement will not take place.</td>
<td>√</td>
<td>OP 4.01</td>
</tr>
</tbody>
</table>

### Safeguards Instruments Required:

1. Initial Environmental Examination (IEE) report and EMP
2. Land Acquisition Report (LAR)

Initial Screening Completed by (Sub-Borrower)  
(Original Signed)  
FRANCISCO ARELLANO  
Senior Vice President  
Maynilad Water Services, Inc.  
Date:
B. Minutes of Public Consultation dated March 21, 2013
Minutes of Public Consultation Meeting
Valenzuela Sewage Treatment Plant (STP)
March 21, 2013 / 1:30-2:20p.m.
Eco Center, F. Bautista St. Marulas, Valenzuela City

Attendees:
- Barangay Council of Marulas headed by Chairman Boy De Guzman
- Maynilad Water Services Inc.
- F. Bautista Residents
- World Bank Representative
- Maynilad QESH Consultant

The Public Consultation commenced at 1:30PM with the acknowledgement of Barangay Council and stakeholders. It was followed by an invocation.

Project Presentation and Its Projected Benefits

Engr. Ryan Orillo of Maynilad presented the project by emphasizing its rationale and the sewerage targets of Maynilad. He also introduced the company and the nature of its business, especially the services (e.g. potable water and wastewater) it provides. He further presented the concession area of Maynilad which includes Valenzuela.

Engr. Orillo also gave background of the project by citing the past and present status of Manila Bay and how the untreated wastewater affected the quality of the bodies of water. He also mentioned that provision of the Concession Agreement states that Maynilad should not only provide potable water but as well as wastewater management services. He further anchored the company’s role to the mandates of R.A. 9275 (Clean Water Act) and the Supreme Court Mandamus for the rehabilitation of Manila Bay.

Furthermore, Engr. Orillo introduced the wastewater management strategy of Maynilad- the Combined Sewer System. He discussed the flow of wastewater in the drainage system and how it will be collected for treatment. He also highlighted the importance of the involvement of LGU, NGO’s and the local community to attain the project’s aim to improve the water quality of Tullahan River.

Open Forum

1. **Additional Cost to Water Bill**

   Barangay official Albino Toreja ask if there will be an additional cost to water bills because of the discussed project of Maynilad.

   Engr. Orillo answered yes there will be an additional cost to the customers but that is not abrupt so that it will not be a burden to the customers.

2. **Pipelaying in Mc Arthur Highway**

   Barangay official Albino Toreja asked if there are pipelaying activities in Mc Arthur Highway.

   Engr. Orillo replied that yes there will be pipelaying activities in Mc Arthur Highway but there will be a traffic scheme to be coordinated by LGU, MMDA and DPWH to minimize disturbance to the public.

3. **STP Purpose and Benefits**
A participant asked Maynilad to elaborate the purpose and benefits of constructing a STP. Engr. Orillo answered that the purpose of constructing a STP is to clean the wastewater before it drains in the receiving bodies of water to help reduce water pollution and to comply with the concession obligation of Maynilad. It benefits are mainly for communities cleanliness and health wellness.

4. **Labour Force for the Construction of STP**

Brgy.Captain Boy De Guzman asked if the residents of F. Baustista can be prioritize in hiring labour force for the construction of STP

Engr. Orillo together with Ms. Marither Menia explained that residents will be prioritized and it is specified in the contract of the winning contractor to prioritized hiring of qualified residents near the STP site.

5. **Sludge management**

Barangay official Albino Toreja asked where will Maynilad bring the collected waste/sludge. Engr. Orillo answered that it will be brought in Tarlac and will be used as fertilizers.

6. **Treated water re-use for cleaning of roads when there are flooding**

Barangay official Carreon asked if Maynilad will allow water re-use of treated water for cleaning of roads. Residents had confusion on this matter, interpreting water re-use for household cleaning.

Engr. Orillo responded that Maynilad will study and consider that idea. A participant emphasized that clear water does not mean that it was already safe for water re-use especially in households where it is prone to misidentification with potable water. Maynilad must be cautious if there will be an implementation of water re-use. Maynilad noted that statement.

In addition to that Barangay Chairman Boy de Guzman emphasized that the main purpose STP of Maynilad was to clean wastewater of Valenzuela before it drains to Tullahan River to reduce water pollution and not for water re-use of the households. Residents were enlightened after the discussions and clarifications on the water re-use.

Barangay Chairman Boy de Guzman concluded the forum and said his barangay will cooperate with Maynilad because they are fully aware of its benefits to the community. He also asked the residents to disseminate the information that discussed in the forum to their family members and neighbours

The public consultation meeting formally ended at around 2:20 p.m.
C. Contract to Sell
CONTRACT TO SELL

This Contract to Sell (this “Contract”) is made and entered into this ___ day of December, 2012, in Valenzuela City, by and between:

CITY OF VALENZUELA, a local government unit existing under and by virtue of the laws of the Republic of the Philippines, represented herein by its Sherwin T. Gatchalian, City Mayor, hereinafter referred to as the “SELLER”;

and

METROPOLITAN WATERWORKS AND SEWERAGE SYSTEM, a government-owned and controlled corporation, existing under and by virtue of the laws of the Republic of the Philippines, with principal office at the MWSS Compound, Kalipunan Road, Balara, Quezon City, represented herein by its Administrator, Gerardo A. I. Esquivel, hereinafter referred to as “BUYER”.

(Each, a “Party”, and collectively, the “Parties”)

Recitals:

(a) The SELLER is the absolute and registered owner of that certain parcel of land, situated along F. Bautista Street, Barangay Marulas, Valenzuela City, Metro Manila, with an area of Twenty Five Thousand, Five Hundred Sixty (25,560) square meters only, and covered by Transfer Certificates of Title (“TCT”) Nos. V-65573, V-65574, V-65586, V-65587 (collectively, the “Land”). A copy of TCT Nos. V-65573, V-65574, V-65586, V-65587 are attached hereto as Annexes “A”, “B”, “C” and “D” and made integral parts of this Contract;

(b) The BUYER has offered to buy, and the SELLER has agreed to sell, the Land, subject to the terms and conditions hereinafter set forth;

(c) The authority of the City Mayor to sign and deliver this Contract for and on behalf of the City of Valenzuela, is evidenced by a Sangguniang Panlungsod Ordinance No. 70, series of 2012, approved on ___ December 2012, a copy of which is attached hereto as Annex “E” and made an integral part of this Contract; and

(d) The Parties have agreed that the sale of the Land shall exclude any improvement made thereon, which improvement shall be demolished and removed by the SELLER prior to the delivery of the Land to the BUYER.

NOW, THEREFORE, for and in consideration of the foregoing premises and of the mutual covenants herein contained, the Parties hereby agree as follows:

1. The total consideration for the sale of the Land shall be Eighty - One Million, Seven Hundred and Ninety-Two Thousand Pesos (P81,792,000.00) (the “Purchase Price”), payable as follows:

   (a) Fifty percent (50%) of the Purchase Price, which is equivalent to Forty Million, Eight Hundred Ninety-Six Thousand Pesos (P40,896,000.00) (the “Down Payment”), shall be paid upon the signing of this Contract and submission by the SELLER to the BUYER of the following:

      (i) Original owner’s duplicate title over the Land;
      (ii) Original copies of the tax declarations over the Land;
(iii) Original copies of the latest official receipts for realty tax payment, if any, over the Land; and
(iv) Relocation survey plan signed by a licensed geodetic engineer and duly validated by BUYER’s Engineering-Architectural, Structural & Survey team;

(b) The balance of Forty Million, Eight Hundred Ninety-Six Thousand Pesos (P40,896,000.00) (the “Second Tranche”), shall be payable upon the SELLER’s submission to the BUYER of the following:

(i) Certificate Authorizing Registration (“CAR”) issued by the BIR on the sale of the Land;
(ii) Signed Deed of Absolute Sale over the Land;
(iii) Tax clearance;
(iv) Certificate of no improvement; and
(v) Such other documents and/or certificates as may be necessary to complete the registration of the sale and transfer of title to the Land to the BUYER.

2. The Parties agree that the capital gains tax and documentary stamp tax due on the sale shall be for the account of the SELLER and the BUYER, respectively. Other expenses and/or costs shall be for the account of the BUYER exclusively.

The BUYER shall deduct from the Second Tranche due to the SELLER, an amount equivalent to the capital gains tax, which amount shall be remitted by the BUYER to the BIR. The BUYER shall be liable for any deficiency should the capital gains tax turn out to be more than what was deducted from the Second Tranche by the BUYER.

3. The SELLER undertakes and agrees to execute and deliver to the BUYER such documents and/or certificates as may be required by law for the registration of the sale and transfer of title to the Land to the BUYER.

4. The SELLER warrants that the Land is free from any and all encumbrances of whatever nature as of the date of this Contract, and guarantees the BUYER’s peaceful use, possession and enjoyment of the Land.

5. The SELLER further warrants that it is not engaged, or habitually engaged, in the business of buying and/or selling real properties, and that the Land is not offered for sale or lease to the general public in the ordinary course of business.

IN WITNESS WHEREOF, the Parties have signed this Contract on the date and at the place first written above.

CITY OF VALENZUELA
SELLER

METROPOLITAN WATERWORKS
AND SEWERAGE SYSTEM
BUYER

[Signatures]

Gerardo A. I. Esquivel
Administrator

Page 2 of 3
D. Key Informant Interviews
KEY INFORMANT: Mr. Noel P. Bartolome in behalf of Mr. Ernesto “Boy” de Guzman  
Barangay Secretary  Barangay Captain

Location: Barangay Marulas Hall  
12:30PM to 12:50PM  
July 29, 2013

**Brief Background**

The project will be implemented at F. Bautista Street located at Barangay Marulas, making the barangay within the affected area. They are composed of approximately more than 100 families.

**Environment and Sanitation Perception**

They said that they have the same environment and sanitation programs like the rest of Valenzuela City. Also, they have not experienced any major problem with regards to water related illnesses.

**ISSUES AND CONCERNS**

**Employment opportunities**- They are expecting that the barangay will be blessed with additional employment opportunities when the construction starts. It can give employment to construction workers and more income for “sari-sari” stores.

**RECOMMENDATIONS**

Other than that, they have no other issues or suggestions raised. They just hope that their residents will be the first in line to be involved when there is job hiring or employment opportunities.
KEY INFORMANT: Mr. Melanio D. Vergino  
Officer-in-Charge, Flood Control Department  
Location: Flood Control Department  
Valenzuela City Action Center  
Brgy. Dalandan, Valenzuela City  
11:10 AM to 11:35 AM  
July 29, 2013

Brief Background

The key informant is in charge of the flood control all over Valenzuela City. He does not want divulge any personal information about him though was willing to answer things about the project.

The Flood Control Department is well aware of the project.

ISSUES AND CONCERNS

As a whole, he stated that the project can definitely help the local government of Valenzuela. It will help controlling the flood and will lessen the burden of their department.

Their office believes that there wouldn’t be any issues until the implementation phase.

RECOMMENDATIONS

No further recommendations were made. They trust that the implementing team can handle if any problems arise during construction.
KEY INFORMANT: Arch. Ronald D. Robles
City Planning Officer 4

Location: City Planning and Development Office
3rd floor Legislative Bldg. Valenzuela City Hall
Brgy. Karuhatan Valenzuela City
10:20 AM to 10:45 AM
July 29, 2013

Brief Background

The informant is married and is living with his family consisting of four members at the age range of 15-64 years old. He is a college graduate. He owns a house made out of strong materials is located at Barangay Parada. They have been residing there since the year 1993 and were originally from Bulacan.

Environment and Sanitation Perception

Arch. Robles had a family member, who had been sick for 4 days, that was afflicted with dengue during the past 6 months. This made him concerned of their river. The quality of their river is polluted due to garbage which presents health hazards for the community.

The disposal of their wastes is mainly from the collection of LGU haulers and proper segregation. They also have a septic tank for other wastes.

He had experienced strong typhoons brought by Typhoon “Ondoy” and certain “Habagat” that resulted into a second floor flood level. Other than that, he verbalized his concern for the communities’ sanitation and believed that the local government is solving this problem with the help of their team.

ISSUES AND CONCERNS

Positive effects- The implementation of the new sewerage system can lessen the hazard and bring safety to the people of Valenzuela.

Negative Effects- Traffic and disturbance during the implementation phase can affect the community according to Arch. Robles.

All in all, he states that the project is very timely.

RECOMMENDATIONS

His recommendation is for the implementing team of the project to study well their effectiveness.
KEY INFORMANT: Mr. Raymundo De Guzman in behalf of Arch. Rene Avendan  
Engineering Aide  
Office Head

Location: Traffic Engineering Planning and Design Office  
Valenzuela City Action Center  
Mc Arthur Highway, Barangay Dalandanan, Valenzuela City  
Tel. No. 352-2000 loc. 2101  
10:45AM- 11:10AM  
July 29, 2013

Brief Background

Mr. De Guzman lives with his relative in Barangay Dalandan. He is currently renting a house since the year 2011. They moved in the city for work. He graduated high school and is working at the Traffic Engineering Planning and Design Office as the Engineering Aide.

Environment and Sanitation Perception

He and his relative did not experience any water related disease during the last 6 months though he perceived that their river is murky. The condition of their river can lead to various diseases and an increase in the number of water related disease morbidity.

Just like the other informants, they have their LGU haulers to collect their wastes. They also have a septic tank.

He had experienced strong typhoons that caused flood levels up to the waist that lasted for 5 days. They needed 3 days to recover from the flood.

According to him, the youth can be a concern of their community.

In general, he knows that the local government has different sectors that can help address their problems.

ISSUES AND CONCERNS

In behalf of their office, he stated that they don’t have any concerns regarding the project. Moreover, he said that it can help their current sewerage system.

RECOMMENDATIONS

For his recommendation, he believes that an appropriate budget can provide adequate troubleshooting resources if any problems arise during the implementation phase.
KEY INFORMANT: Ms. Castillo in Behalf of San Miguel Polo Brewery  
Member of the Engineering Department

Location: San Miguel Polo Brewery  
Mc Arthur Highway, Brgy. Marulas, Valenzuela City  
Tel. No. 291-2101  
2:00PM to 2:15PM  
July 29, 2013

Brief Background

San Miguel Brewery Inc. (SMB) is the largest producer of beer in the Philippines. It has a total market share of approximately more than 95% during the year 2008. It has five major breweries located in different strategic areas all over the Philippines. One of which is the San Miguel Polo Brewery. The Valenzuela branch is located beside Tullahan river.

The informant was interviewed via phone patch at the guard house of the said brewery. She was hesitant to give any personal information about herself other than the department she works at.

They are not aware of the project.

Environment and Sanitation Perception

She does not have any insights about their communities’ environment and sanitation.

ISSUES AND CONCERNS

Rising Flood Level- They fear that the water from Tullahan River would go inside their facility. She stated that the day before (dated July 28, 2013) there was a rise of water from the river that caused slight flood at their parking lot. It was just an hour of rain and she verbalized deep concern whether the Sewerage System can actually control the flood. They would be disappointed if it will only worsen the current situation.

Traffic Congestion- A heavy traffic can affect the employees of their brewery according to Ms. Castillo. This can create an added concern for their staffs.

Generally, they are not against the project as long as it would not affect them in a negative note. She said that it would be detrimental for them if the water from Tullahan reaches their machines. It can cause damage and loss of properties.

RECOMMENDATIONS

She recommended that the project’s implementation phase should be quick and precise. In her view, the quality of work in a shorter amount of time can affect greatly the result of the project while lessening untoward effects.
KEY INFORMANT: Mr. Jon Reyes  
Manager of Jollibee, Valenzuela Branch

Location: Jollibee Valenzuela  
Mc Arthur, Brgy. Marulas, Valenzuela City  
http://www.jollibee.com.ph/  
1:47PM to 1:55 PM  
July 29, 2013

Brief Background

With a vast operation of 750 stores, Jollibee proved to be the largest fast food chain in the Philippines. Since the year 1975, Mr. Tony Tan has expanded the franchising and constructions of Jollibee restaurants all over the Philippines. The original taste appealing a Filipino brand has touched the tongues of Filipino consumers.

Mr. Jon Reyes, the informant, is the manager of Jollibee Valenzuela along Mc Arthur Highway. They were not aware of project.

Environment and Sanitation Perception

Their environment and sanitation is likewise same with other Jollibee outlets. They follow certain rules and regulations about proper waste management and disposal.

ISSUES AND CONCERNS

Traffic Congestion- For them, their main concern is the traffic for it can delay the food deliveries. Yet, it can also bring more costumers to them so it is a two way process. There is loss at some point but a gain can also be generated in the situation.

He stated acceptance of the project and was very happy if it will help clean the rivers.

RECOMMENDATIONS

No recommendations were made.
KEY INFORMANT: Ms. Gerlen Fabro  
Registered Nurse

Location: Lying-In Clinic along Mc Arthur Highway  
Mc Arthur, Brgy. Marulas, Valenzuela City  
1:30PM to 1:50PM  
July 29, 2013

Brief Background

The informant resides at #20 F. Bautista St. Barangay Marulas, Valenzuela City. She’s one of the 100 families that will be affected at the proposed location site for the Valenzuela Sewerage System. Her rented house is made out of mixed materials predominantly strong materials. She is single and lives with 3 other relatives in the house.

Environment and Sanitation Perception

During the past 6 months, all of them in the house experienced diarrhea. She thought it was from contaminated drinking water. She is very much concerned about their Tullahan River. The river is murky and polluted with garbage. Although their wastes are collected by LGU haulers, they still experienced flash floods and flood levels up to their first floor.

She said that their house was at the higher side of the barangay and, to their surprise, the flood still reached them which was very alarming.

ISSUES AND CONCERNS

Flood- She worries whether the sewerage system can lessen the flood or add to their concern. The flood can be lessened if the sewerage is successful but if it is otherwise they would be disappointed.

Traffic- A heavy traffic can be a concern for their lying in clinic. She worries for the well-being of the patients.

RECOMMENDATIONS

No recommendations were made.
KEY INFORMANTS: Angelina Salvador  
Ma. Loisa de Nelia  
City Treasurer’s Staffs

Location: Treasurer’s Office  
Valenzuela City Hall  
McArthur Highway, Barangay Karuhatan, Valenzuela City  
http://www.valenzuela.gov.ph/index.php/home  
Tel. No. 352-1000  
10:30 to 10:45 AM  
July 26, 2013

Brief Background

The key informants are government employees, Mrs. Angelina Salvador and Ms. Ma. Loisa de Nelia. They are both attained college education and have partners in life. Also, they both owned a house made of strong materials. Both of them were not aware of the proposed Valenzuela Sewerage System Project.

Environment and Sanitation Perception

Both Mrs. Salvador and Ms. De Nelia denied encountering any water related diseases during the last 6 months. Also, they were not concerned about their river’s condition.

Regarding waste disposal, they said that each of their places have LGU haulers to take care of their garbage. Also, their houses have septic tanks for disposing toilet and kitchen wastes.

Strong typhoons can be alarming for the both of them though they were not able to recall if they had experienced flood from swelling of river waters.

ISSUES AND CONCERNS
Traffic Congestion- The whole stretch of MacArthur Hi-way has traffic worst from 7am to 8am, 11am to 2pm and 6pm. This makes the informants worry because of a possible longer travel time to and from work especially along Tullahan bridge.

RECOMMENDATIONS

They were hesitant to say any suggestions regarding the issue above.
Brief Background

The key informants are City Engineer’s staffs. All are married and lives with their family in a house made out of strong materials. Two out of the five of them have lived since birth in their respective barangays included in the scope of Valenzuela City. Two out of the five of them rented their current houses while the other three own theirs. Generally, they were all well informed of the said project.

Environment and Sanitation Perception

Though all did not experience any threat from water related diseases in their family, most of them agreed that the water in their rivers is polluted by garbage. The said rivers include Lignahan and Tullahan river. Some believed it is polluted due to human and animal feces making it look murky. According to them, the condition of their rivers can cause harm to the people through various diseases.

Strong typhoons and flash floods are the climate related hazards that they have experienced. These hazards caused flood levels from below the knee up to the waist.

All in all, they are concerned of their communities’ employment opportunities and air pollution.

ISSUES AND CONCERNS

Most of them agreed that the project will not encounter any problem during construction. They accepted the project to improve the quality of passing through the rivers affected. Also, they were very vocal of their eagerness to start the project as soon as possible. They believed that there would be no negative effects aside from traffic congestion.

RECOMMENDATIONS

No further recommendations were made.
KEY INFORMANT: Mrs. Armelita Cadorna  
Barangay Marulas Resident

Location: F. Bautista Street Barangay Marulas, Valenzuela City  
10:50 to 11:59 AM  
July 26, 2013

**Brief Background**

Mrs. Cadorna has been staying in Barangay Marulas as a tenant for 5 years. She lives with three other people in their house, two of whom are below 14 years old and one is between 15-64 years of age like her. They migrated to the city of Valenzuela to find jobs that can support their family. Currently, she is unemployed but has her hands full with taking care of their house chores and family.

She was aware of the said project.

**Environment and Sanitation Perception**

No member of their household had any sickness that is water related. She presented concern for the condition of their river. She particularly sees it as murky and odorous. Yet, she denies that it will have any consequences with their community water since they have not had any episode of water related disease.

They dispose their garbage through the collection of local government unit haulers. When asked about their toilet and kitchen wastes, she said that they have a septic tank.

Strong typhoons can be alarming at times when flood level can reach up to their second floor level. Other than that, she does not have any other concerns regarding the environment and sanitation of their community.

**ISSUES AND CONCERNS**

She mainly presents her concern for floods occurring in their barangay during the rainy season. When the project’s overview and objectives were explained in easier terms, she immediately presents acceptance since it will supposedly lessen their burden with regards to flood levels.

**RECOMMENDATIONS**

Other than that, she does not have any other concerns and suggestions.
E. Survey Instrument
SOCIAL PERCEPTION SURVEY QUESTIONNAIRE
VALENZUELA SEWERAGE SYSTEM PROJECT

Instruction: Please do not leave any item blank. Write N/A if the question does not apply.
Please specify where response is “Others”

Questionnaire
Control No. | Interviewed By: |
-------------|----------------|

Time started | Date: |

Time ended | GPS Coordinates |

Section A. Household Identification

A1. Town/City: ______________________
A2. Barangay: ______________________
A4. NAME of Respondent: ______________________
A5. Relationship of Respondent with Household Head:
   1. HH head
   2. Spouse
   3. Child
   4. Relative

A6. Civil Status: 1 Single  2 Married  3 Separated  5 Others ______

A7. Gender of Respondent: 1 Male  2 Female

A8. Household Composition:
   Number of persons living in the Household: ______
   Number of persons living in the Household who are 14 years old and below: ______
   Number of persons living in the Household who are 15-64 years old: ______
   Number of persons living in the Household who are 65 years or over: ______

A9. Number of Households living in the dwelling unit: ______

A10. Year since the Household first stayed in the barangay: ______ (e.g., 1995, 2005)

A11. Place/Province of Origin: ______________________

A12. Reason for Migration: ______________________

A13. Highest grade completed by the Household Head?
   1. No schooling
   2. Elementary
   3. High School
   4. College and over
   5. Vocational training

A14. What is your current occupation?
   1. Farming or fishing
   2. Own business
   3. Government employee
   4. Private employee
   5. Temporary labourer
   6. Street vendor
   7. Retired/Pensioner
   8. Unemployed

A15. What is the ownership status of your house?
   1. House owner
   2. Caretaker
   3. Rent-free occupant
   4. Renter
   5. Others, specify:________________

A16. Observed materials that make up the dwelling unit:
   1. Strong materials (galvanized iron, tile, concrete, brick stone)
   2. Light materials (cogon, nipa, anahaw, wood)
   3. Mixed but predominantly strong materials
   4. Mixed but predominantly light materials
   5. Salvaged/makeshift materials
   6. Mixed but predominantly salvaged materials

Section B. Environment and Sanitation

B1. Has any member of your household suffered from water related diseases
during the last 6 months (July 2012 to July 2013)? 1 Yes 2 No
   If YES, how many household members were afflicted by water-related diseases
   during the last 12 months and what types of diseases?
   [MULTIPLE RESPONSES]

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>No. of HH members who got sick</th>
<th>Average num of days member(s) were sick</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults</td>
<td>Children</td>
<td></td>
</tr>
<tr>
<td>Diarrhea or bowel movement at least 3x/day</td>
<td></td>
<td></td>
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<tr>
<td>Amoebiasis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastro-enteritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysentery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typhoid fever</td>
<td></td>
<td></td>
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<tr>
<td>Dengue/Malaria</td>
<td></td>
<td></td>
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<tr>
<td>Skin diseases such as scabies, or other types of skin infection</td>
<td></td>
<td></td>
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<tr>
<td>Worms (passage of worms thru bowel movement or any body part)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B2. Are you concerned about the quality of your river water?
   1. Yes  2. No
   If YES, what do you observe in the quality of your river water?
   [MULTIPLE RESPONSES]

1. Murky (Malabo/maputik)
2. Water pollution due to garbage
3. Water pollution due to human/animal feces
4. Water pollution due to hazardous (quarrying, hospital waste, factories)
5. Odorous
6. Bad taste
7. Water color
8. Others, Specify:________________
### Others, specify

1.

#### B3. Do you think the pollution of the river have any consequences for communities downstream?

1. Yes  
2. No  

If yes, what are these consequences? Please describe:  

............................................................................................................

............................................................................................................

#### B4. How do you dispose your garbage?

1. Dispose to the river or waterways  
2. Burning  
3. Collected by LGU haulers and other providers  
4. Open dump site  
5. Others, Specify: ________________________

#### B5. How do you dispose your toilet and kitchen wastes?

1. Dispose to the river or waterways  
2. Open pit  
3. Septic tank (poso negro)  
4. Others, Specify: ________________________

#### B6. Climate-related hazards experienced:

a) Strong typhoons;  
b) Drought;  
c) Flashfloods;  
d) Landslides;  
e) Earthquake  

#### B7. If any, please describe, and corresponding actions:

<table>
<thead>
<tr>
<th>Climate related hazards/extreme events</th>
<th>Dates (Year)</th>
<th>Duration (No. of Days) of Experience</th>
<th>Impacts to household</th>
<th>Coping mechanisms</th>
<th>Length of Time (to Recover)</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

(Take photos of maximum flood level in the property)

#### B8. What is the highest flood level you have experienced from the swelling of the river water:

1. Below knee  
2. Up to waist  
3. First floor level  
4. Second floor level  
5. Others, specify: ________________________

#### B9. Are there other concerns on the community?

1. Employment opportunities  
2. Sanitation  
3. Garbage  
4. Drugs  
5. Youth  
6. Air pollution  
7. Others ________________________

Is your LGU or national government doing something to solve these community problems:

1. YES  
2. NO  

IF YES, please describe:  

............................................................................................................

IF NO, what do you think should be addressed by the government?

---

### Section C Project Perception

C1. If a septage treatment plant project is implemented in the area, what do you think are the positive effects to the community?

________________________________________________________________________

C2. What do you think are the negative effects of the project?

________________________________________________________________________

C3. Do you approve or disapprove the project? Why?

________________________________________________________________________

C4. Any recommendations/suggestions on how to implement the project?

________________________________________________________________________

---

END OF INTERVIEW
F. PEMAPS
PROJECT ENVIRONMENTAL MONITORING AND AUDIT PRIORITIZATION SCHEME (PEMAPS)

Project Name: VALENZUELA SEWERAGE SYSTEM PROJECT
Project Location: Valenzuela City, Metro Manila
ECC Reference No.: 
Proponent: Maynilad Water Services, Inc.
Pollution Control Officer: 
Tel.No.: 
Project Type: Sewerage system
Project Status: For implementation

I. PROJECT CONSIDERATIONS

Size and Type
Size based on number of employees
Specify number of employees: ___

Type
ECP (in either ECA or Non-ECA) _______
Non-ECP but in ECA _______
Non-ECP and Non-ECA ✔

Waste Generation and Management
Enumerate Waste Type and Specify Quantity of Wastes generated in your facility

<table>
<thead>
<tr>
<th>Category</th>
<th>Waste Type</th>
<th>Hazardous</th>
<th>Non-hazardous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>Standby generator</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Liquid</td>
<td>Domestic sewage</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Solid</td>
<td>Biodegradable</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>Non-biodegradable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pollution Control System (PCS)
Enumerate PCS or Waste Management Method Used in your facility. (Identify/Enumerate)

<table>
<thead>
<tr>
<th>Category</th>
<th>PCS/Waste Management Method Used</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>PCS 1, PCS 2</td>
<td></td>
</tr>
<tr>
<td>Liquid</td>
<td>Primary, Secondary</td>
<td>Project will construct sewer lines and a centralized sewage treatment plant to cater to the flows from the Valenzuela catchment</td>
</tr>
<tr>
<td></td>
<td>Tertiary</td>
<td></td>
</tr>
<tr>
<td>Solid</td>
<td>Waste segregation by unit owners and centralized MRF</td>
<td>Waste collection &amp; disposal c/o LGU-recognized hauler</td>
</tr>
</tbody>
</table>

II. PATHWAYS

Prevailing wind towards city? (mark the corresponding point) Yes ✔ No ___
Rainfall (impacts surface and groundwater pathways)
Average annual net rainfall: 2431.9 mm
Maximum 24-hr rainfall: 517.1 mm
Terrain (select one and mark) Flat ✔ Steep ___
Is the facility located in a flood-prone area? No
Groundwater
Depth of groundwater table (meter): 0 to less than 3

III. RECEIVING MEDIA/RECEPTORS

3.1 Air (Distance to nearest community): 0 to less than 0.5 km
3.2 Receiving Surface Water Body: river
3.2.1 Distance to receiving surface water: <500 m
3.2.2 Size of population using receiving surface water: ~1 Million (as of 2010)
3.2.3 Freshwater
3.2.3.1 Classification of freshwater: Class C
3.2.3.2 Size of freshwater body:
3.2.3.3 Economic value of water use: none
   Drinking __
   Domestic __
   Recreational __
   Fishery __
   Industrial __
   Agricultural __

3.3 Groundwater
3.3.1 Distance to nearest recharge area: less than 1 km
3.3.2 Distance to nearest well used: less than 1 km
3.3.3 Groundwater use within the nearest well: drinking/domestic

3.4 Land
3.4.1 Indicate current/actual land uses within 0.5 km radius
   Residential ✓
   Commercial/Institutional ✓
   Industrial
   Agricultural/Recreational
   Protected Area ______
3.4.2 Potential proposed land uses within 0.5 km
   Residential ✓
   Commercial/Institutional ✓
   Industrial ✓
   Agricultural/Recreational
   Protected Area ______
3.4.3 Number of affected Environmentally Critical Areas within 1 km: -
3.4.4 Distance to nearest ECA: <1.0 km

IV. ENVIRONMENTAL PERFORMANCE (FOR EXISTING PROJECTS FOR EXPANSION) - na
Compliance (pls. take note that this will be double-checked with PCD files)

<table>
<thead>
<tr>
<th>Law</th>
<th>Violation (check if any)</th>
<th>Type (pls. specify number of times committed)</th>
<th>Type of Admin Violation</th>
<th>Additional Remarks/Status of Compliance</th>
</tr>
</thead>
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<td></td>
<td>Emission/ Effluent/ Discharge</td>
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<tr>
<td>RA 9275</td>
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<tr>
<td>RA 6969</td>
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<tr>
<td>RA 9003</td>
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</table>

Number of Valid Complaints: na
Citizen and NGOs:
Others (other Govt. Agencies, Private Institutions):

(To be filled up by EMB Personnel)
RECOMMENDATION/S:

Noted By: ___________________________  Assessed By: ___________________________
ACCOUNTABILITY STATEMENT OF PROJECT PROponent

This is to certify that all information in the submitted Project Environmental Monitoring And Audit Prioritization Scheme (PEMAPS) Questionnaire of VALENZUELA SEWERAGE SYSTEM PROJECT located at Valenzuela City, Metro Manila, is true, accurate and complete. Should I learn of any information, which makes this inaccurate, I shall bring said information to the appropriate Environmental Management Bureau Regional Office.

In witness whereof, I hereby set out my hands this ________________ day of 2013

FRANCISCO ARELLANO
Vice President

SUBSCRIBED AND SWORN to before me this ________________ day of 2013 at ________________ Affiant exhibiting to me her Community Tax Certificate No. ________________ issued on ________________

Doc. No. 31
Page No. 66
Book No. XXIV
Series of 2013

DANilo P. CARiAGA
NOTARY PUBLIC
UNTIL DECEMBER 31, 2013
PTR No. 755026A/7/13, Q.C.
ROR No. 838488/1/3/13, Q.C.
ATTY'S ROLL NO. 26085
G. MWSI Safety Code
EMS  Environment Management and Safety

MAYNILAD WATER SERVICES, INC.
Quezon City, Philippines
MEMORANDUM:

FOR : MWSI PRESIDENT

SUBJECT: MWSI SAFETY CODE Series 2005

DATE : July 21, 2005

Submitted herewith is the MWSI SAFETY CODE Series 2005. This is in compliance with the requirements of Occupational Safety and Health Standard (OSHS), Bureau of Working Conditions (BWC), Department of Labor and Employment (DOLE). The established safety and health standards will guide our employees, contractors and suppliers in attaining and maintaining safe and conducive working environment in all MWSI areas.

This document is a compendium of materials from the water industry and related utility sector. Members of MWSI Central Safety Committee (CSC) have discussed/ approved the contents of these code after series of meetings.

For your approval.

Submitted by:

CONRADO P. SORIANO
Chief Safety, MWSI

FRANCISCO A. ARELLANO
SVP, EMD

Recommend by:

ARNULFO R. RAMIREZ
VP, CCPRM

LUCIA C. MAGNO
President, MWSI-PGTNCO

CARLOS C. SALONGA
VP, Administration

ROBERTA R. ESTIMO
President, MWSA

Approved:

FIORELLO R. ESTUAR
President
FOREWORD

Maynilad Water is committed to excellence and leadership in the protection of the environment and in the promotion of health and safety in all its workplaces. Consistent with this environment, safety and health policy, Maynilad Water has formulated this Safety Code (2005). This Safety Code is anchored on the following:

- Recognition of safety as one of the highest corporate priorities
- Adoption of safety performance as an integral part of business management
- Incorporation of all safety considerations at the earliest stages of any project development
- Demonstration of responsible corporate citizenship by adhering to all safety regulations and laws and anticipation of charges thereof
- Assurance that all its operations comply with established international guidelines and requirements on safety

This Code will also apply to all accredited contractors/ service providers and their workers who perform their activities within all MWSI premises and designated work areas.

I encourage everyone to participate in all programs to be adopted in pursuit of this Code. We will religiously monitor our safety performance and continuously review this Code to institute changes in response to emerging concerns and other requirements of the company.

I enjoin all officers and employees of MWSI to adhere to the provisions of this Code.

Let us strive to make Maynilad Water as one of the best water utility firms in the world.

FIORELLO R ESTUAR
President
ACKNOWLEDGEMENT

This code was developed through the joint effort of the following Central Safety Committee members:

- Ruben L. Carandang  Chairman, CSC
- Conrado P Soriano  Secretary/ V-Chairman, CSC
- Rogelio D. Del Rosario Jr.  Operations
- Orlando T. Tabula  SOBA
- Carlos Angeles  Corp. Com.
- Gil O. Matias  Legal Department
- Rolando Maileg  PMG
- Myrna Padrón  PMG
- Leandro Dela Rosa  Corp. Logistics
- Noel D. Villanueva  RED
- Teresita S.A. Lim  HR/ Administration
- Benjamin C. Reyes  CEBA
- Normen P. Kahulugan  NEBA
- Dominador A. Roxas Jr  NWBA
- Amante C. Peralta  Corp. Logistics
- Jose P. Gahol  Corp. Logistics
- Gilbert R. Reyes  Safety Dept.
- Dexter Alister V. Bacani  Safety Dept.
- Emerson B Mendoza  Safety Dept.
- Roberta F. Estimo  MWSA
- Ruben Diaz  KKMK
- Bonifacio De Guzman  KKMK

This is also to acknowledge the comments and inputs from SAVP Francisco A. Arellano of Environment Management Department, AVP Eric O. Montilla of Administration and to Col. Arnulfo R. Ramirez, VP- Customer Care and Public Relations Management for his untiring support.

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CHAPTER I
GENERAL RULES

SECTION 1
STATEMENT OF POLICY

1.01 COMPANY MISSION/ VISION

We are a water utility firm committed to service excellence, improving quality of life of the Filipino and becoming one of the world’s best.

1.02 MISSION STATEMENT

We will provide reliable and high quality water and wastewater services at a fair price to meet the needs and expectations of our customers.

We will protect the environment to conserve our natural resources for future operations.

We will promote efficiency and productivity to enhance shareholder value.

We will enhance the personal and professional well being of our employer.

We will treat our service providers as valued partners to achieve our business objectives.

We will conduct ourselves in accordance with the highest ethical standards because our reason for being is to serve the public.
1.03 ENVIRONMENT, SAFETY AND HEALTH POLICY

MAYNILAD WATER SERVICES, INC. is committed to excellence and leadership in the protection of the environment and in the promotion of health and safety in the workplace.

We will create a work culture that will encourage all our employees, contractors, suppliers and shareholders to support this commitment.

We will protect the environment by minimizing and managing the impact of our operations on the environment, optimizing the use of our resources and increasing operating efficiencies.

We will establish an environmental management system to ensure that protection and sustainability is an integral part of our business management.

We will design and execute systematic programs that eliminate all hazardous acts and conditions to prevent work related injuries, illnesses and accidents at the workplace. We will pursue the establishment of high standards on safety and occupational health awareness, practice and discipline.

In keeping with this policy we will comply with all the regulatory requirements and international standards on environment, health and safety. We will achieve this through the use of appropriate technology and best practice in the pursuit of growth and viability. We call on all employees to ensure that there is consistency in the implementation of this policy.
MAYNILAD WATER SERVICES, INC., a private utility in the service of the public, is committed to protect the life and well being of its people by providing a safe working environment.

The company recognizes people as its most valuable asset. To enable the company to attain its goals, it will rely on every individual’s positive contribution. These goals are best achieved when each individual is healthy in body and mind.

In fulfilling this commitment, the Company will guarantee a safe and healthy work environment in accordance with industrial standards and practices. It will also initiate proactive efforts to eliminate potential causes of accidents in the work place that may result in fire, property damage, injury or illness. Part of the effort is to educate and involve all employees on safety.

The Group Head or Area Manager will guarantee a safe working environment and will be responsible for implementing an effective program on safety.

Each manager/ supervisor will be directly responsible for ensuring safety. It is his duty to inspect the workplace, investigate all accidents, correct unsafe conditions and practices, and promote consciousness on the importance of safety in the workplace.

The Central Safety Committee, with the support of management, will provide guidance and logistical support to all operating units for functions and activities related to safety, health and protection of the environment.

It will be the responsibility of each individual to look after his safety and that of his co-workers and general public and to report situations that compromise safety conditions in the workplace.
1.05  POLICY ON THE CREATION OF CENTRAL SAFETY COMMITTEE

1.5.1  POLICY

It is the policy of Maynilad Water to ensure the health, safety and welfare of its employees at work and the communities it serves either directly or indirectly. The discharge of this responsibility shall be accorded equal priority with those of its statutory duties and commercial objectives.

1.5.2  OBJECTIVES

It is the objective of this policy to organize a Safety Committee to establish and adopt in writing the MWSI Safety Code and other administrative policies on Safety to guide its employees and contractors on how to maintain a safe, accident free and healthy working environment and system of work.

1.05.03  MEMBERSHIP

A representative from the hereunder operating units will be members of the committee:

1. Customer Care and Public Relations Management
2. Customer Services
3. Operations Division
4. Project Management Group
5. Business Areas (CEBA, SOBA, NEBA and NWBA)
6. Administration
7. Customer Management Services
8. Revenue Enhancement Directorate
9. Corporate Logistics
10. Corporate Financial Services
11. MWSA
12. MWSU- PTGWO

1.05.04  DUTIES AND RESPONSIBILITIES OF THE COMMITTEE

1. Assist in developing effective organization responsible for the employees’ safety, health and protection of our company’s assets and properties.
2. Assist in conducting monthly scheduled meetings to assist and review company’s Safety Program and its implementations.
3. Notify the Safety Department of any accidents and incidents in the area of concern immediately. Coordinate with the supervisor concerned and gather all vehicular, personal accidents reports and other data, for submission to the Safety Department.
4. Assist in investigating major accidents and causes and recommends measures to prevent their recurrence.
5. Assist in supervising Safety awards and contest.
6. Assist in establishing safety standards and operating methods for the company.
7. Assist in instituting internal programs to disseminate safety policies and regulations in your workplace.
8. Assist in spearheading mobilization works in case of emergency in their respective area and coordinate said works with Safety Department.
9. Perform other functions assigned or in accordance with the safety policy.
1.06 POLICY ON THE CREATION OF SAFETY SUB-COMMITTEE

1.06.01 OBJECTIVE

The objective of this policy is to strengthen and support the execution of all safety programs, objectives and functions conferred to the CSC.

1.06.02 RULES & REGULATIONS

TITLE

This policy shall be known as the policy on the creation of MWSI Safety Sub-Committees.

1.06.03 DEFINITION OF TERM

Safety Sub-Committee Member – refers to an MWSI employee who is duly selected or appointed by the CSC as Sub-Committee Member, representing his/her Business Area, Division or Department, where he/she is currently assigned.

1.06.04 FUNCTIONS OF A SAFETY SUB-COMMITTEE MEMBER

1. Coordinate with the supervisor concerned to gather all vehicular, personal accidents reports and other needed data and be submitted to CSC member/s in the area.

2. Provide assistance and render support in pursuit to the objectives of CSC on the following:
   a) Planning what has to be done
   b) Organizing the resources
   c) Leading employees towards the set goals
   d) Controlling process efficiency

3. Support CSC directives in the area on all safety related activities and programs.

4. Shall be an advocator in coordination with CSC, in the regulations and enforcement of safety policies in all workplaces.

5. Readily available for mobilization in cases of emergency in coordination with the CSC member in his respective area.

6. Perform other functions assigned or in accordance with the safety policy.
1.06.05 REPRESENTATION

All Divisions or Departments shall be represented by at least two (2) Sub-Committee Members. However, it shall be increased depending on the magnitude of the activities prone to accidents and the number of personnel in the area or department represented.

Medical personnel shall automatically be either CSC members or Sub-Committee members.

1.06.06 SELECTION PROCESS

The incumbent CSC member in the Area, Department or Division in coordination with Area Business Manager/Department Manager shall be responsible in the submission of at least five (5) candidates from their respective offices, from which CSC members may choose qualified Sub-Committee Members.

1.06.07 OATH TAKING AND EFFECTIVITY OF TASK AS A SUB-COMMITTEE MEMBER

a.) The selected Sub-Committee member shall be inducted by the chairman of CSC, preferably on the occasion of monthly CSC meeting.

b.) Effectivity of membership shall be effective upon receipt of notice duly signed by the CSC chairman, even without oath-taking yet.

1.06.08 DISQUALIFICATION

a.) Disqualification of a Sub-Committee member shall be in coordination with his immediate CSC member with the latter’s verbal or written recommendation/s based on legal grounds. Disqualification or expulsion of a sub-committee member shall by a vote of the majority of all the members who are present during the meeting. Fifty (50) percent of the total CSC members present shall constitute a quorum to validate a vote of disqualification. In case of tie, the CSC chairman shall render a vote in order to break the deadlock. In case the latter is absent or unavailable, the vice-chairman shall take his post.

b.) Any written recommendation/s by CSC member or manager for disqualification or replacement of Sub-Committee member shall be taken by CSC in a meeting called for the purpose.
1.06.09 RESIGNATIONS AND REPLACEMENT

Any voluntary written resignation by a Sub-Committee member shall be resolved immediately. Replacement shall be in accordance with Rule 1.06.06.

1.6.10 SAFETY POLICY VIOLATIONS & PERFORMANCE INEFFICIENCY

a) SAFETY POLICY VIOLATION:
Safety violations committed by a Sub-Committee member shall be taken during the meeting. If found guilty, a disqualification letter shall immediately be executed.

b) NEGLECT OR NON-PERFORMANCE
Negligence of duty or non-performance by a Sub-Committee member is a ground for disqualification but it shall be confirmed or tried by CSC members.

For inefficiency, CSC members by a majority vote shall determine causes and grounds and render appropriate measures.
SECTION 2
APPLICATION AND RESPONSIBILITY

2.01 These rules and regulations shall be known as the MWSI Safety Code.
2.2 Every section/unit shall be given a copy of this Code by Safety Department.
2.3 Each employee shall carefully study and observe the rules embodied in this Code, more particularly those performing safety duties. Safety rules shall be strictly observed and ignorance will not be accepted as an excuse for their infractions.
2.4 All employees are encouraged to make suggestions for changes in the rules or working conditions to promote safety in the company. Suggestions should be submitted to Safety or through the Central Safety Committee and Sub-Committee member in your area/division.

SECTION 3
MANAGER’S/SUPERVISOR’S RESPONSIBILITY

3.1 Managers/supervisors are responsible in enforcing and implementing this Code. Each manager/supervisor shall see to it that employees under his direct supervision are aware of the safety rules and its proper observance. (Penalty of managers/supervisors equivalent to the penalty of the rule violated by subordinate)
3.2 The supervisor or the employee acting as such shall undertake other safety precautions as necessary in the performance of a job. He shall ensure safe work operations. Qualifications and competence shall always be observed in assigning workers to a delicate work operation.
3.3 The manager/supervisor, in case of doubt of any employee as the meaning and intent of any part of this Code, shall explain the same to the latter. In case of further doubt, the case maybe referred to the Group Head/Area Manager who may resolve the question or refer same to Safety Department.

SECTION 4
REPORTING PERSONAL ACCIDENTS AND INJURIES

4.1 ON-DUTY ACCIDENTS
a. Any injury sustained by an employee, regardless of gravity, must be reported at once to the employee’s immediate supervisor. In case of major or serious injuries, the manager/supervisor shall promptly report the same to MWSI Call Center (MCC)/Administration-HR which in turn shall notify the following:
   1. During Regular Office Hours:
      Administration-HR, Safety Department, Legal Department.
   2. During Off Office Hour, Saturdays, Sundays and Holidays:
      Safety Engineer on call, personnel on call of Legal Department.
b. The employee, or his immediate superior in case of the former incapacity, should then formally report the accident or injury by accomplishing and submitting to Section Head the Personnel Accident Report Form (Exh. I) within twenty four (24) hours from the time the accident occurred. However when the event occurs on a weekend or holiday, such report should be submitted on the next working day. (A)

4.2 OFF-DUTY ACCIDENTS
a. In case of major or serious injury, the employee shall promptly advice or cause to be advised his immediate superior or Administration-HR.
b. For both serious and minor injuries, the employee or his immediate supervisor/ manager, should then formally report the accident or injury by accomplishing and submitting to the Section Head the Personnel Accident Report Form (Exh. I) within twenty four (24) hours from the time of the accident. (However if in the event occurred on weekend or holidays, such report maybe submitted on the next working day.) (A)

4.3 PUBLIC ACCIDENTS
a. In case of injuries sustained by the public occasioned by the employee’s performance of his assigned work, the latter or his immediate supervisor shall immediately notify about the accident to the MCC which shall in turn, informed the following (A)
1. During regular Office Hours:
   Safety Department, Legal Dept., Administration-HR
2. During Off-Office Hours; Saturdays, Sundays, Holidays
   Safety Engineer on Call, Legal investigation Staff on Call
b. The employee and his immediate supervisor shall jointly prepare a report of the accident through Personnel Accident Report Form (Exh. I) within twenty four (24) hours from the time of the incident. (A)

SECTION 5
PENALTIES

5.01 For purposes of this Code, any employee of the MAYNILAD WATER found to have violated any of the provisions of this Code shall be administratively dealt with and shall be punished in accordance with the schedule of penalties.

The code letter "A", "B", "C", "D" is affixed to each rule to indicate the category of the offense for purposes of applying the appropriate penalty. The penalty or penalties for safety rule violations are as follows:
5.2.1 SCHEDULE OF PENALTIES FOR MWSI EMPLOYEES
(See table # 1)

SCHEDULE OF PENALTIES FOR MWSI EMPLOYEES
(Table # 1)

<table>
<thead>
<tr>
<th>Gravity of Offense</th>
<th>First Offense</th>
<th>Second Offense</th>
<th>Third Offense</th>
<th>Fourth Offense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offense &quot;B&quot;</td>
<td>1 - Working Day Suspension</td>
<td>2 – Working Days Suspension</td>
<td>4 – Working Days Suspension</td>
<td>8 – Working Days Suspension</td>
</tr>
<tr>
<td>Offense &quot;C&quot;</td>
<td>10 - Working Days Suspension</td>
<td>15 – Working Days Suspension</td>
<td>30 – Working Days Suspension</td>
<td>Dismissal</td>
</tr>
<tr>
<td>Offense &quot;D&quot;</td>
<td>30 - Working Days Suspension</td>
<td>Dismissal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.02.02 IMPOSITION OF PENALTIES MWSI EMPLOYEES

I. The penalties for succeeding violation are progressively more severe than the penalty for a first violation. However, this "cumulative" rule applies only when the violations occur within a single 12-month period counted from date of first offense. Any other or further violation occurring after this period shall be considered as first offense.

II. If at the time of the commission of the last offense, the employee shall also have previously committed at least two other violations of a safety rule or rules other than the rule involved in this last offense, all committed within a 12 - month period, such last offense shall be punishable by the next higher step of the penalty prescribed thereof.

III. Where the fourth violation of the same rule is punishable by a penalty less than dismissal the fifth and subsequent violations, if committed within a 12 - month period, shall be meted out the same penalty as that provided for the fourth violation.
IV. When a single act constitutes two or more offenses under this policy, or when an offense is a necessary means for committing the other, the penalty for the most serious offense shall be imposed.

V. All penalties to be imposed, including reprimand, shall be in writing, and shall include a warning (except in case of dismissal) that subsequent violations will be dealt with more severely. Copies thereof shall be furnished.
   a. Safety Department
   b. Administration-HR
   c. Respective Manager
   d. Legal Department

VI. Department Managers shall impose the penalties provided for in this policy after conducting the required investigation. However, where the offense is punishable by dismissal, the Department Manager shall elevate the case to the Legal Department for proper disposition.

VII. Management may impose a penalty graver in degree than what is provided in this code, particularly when the violation resulted to injury upon persons or damage to property, or both, and when the violator/s is habitually delinquent, in which case, it shall be adjudged in accordance with applicable provisions of Maynilad Water Services, Inc. (MWSI) Safety Code and Human Resources and Organization Development (Administration-HR) Policies on Disciplinary Action, and Criminal and Civil Law, if necessary.

VIII. This Code supercedes the Table of Penalties for Safety Violation stated under the MWSI Code of Conduct.

5.02.03 IMPOSITION OF PENALTIES
MWSI CONTRACTORS

5.02.03.01 DEFINITION OF TERMS:
   a. Written Reprimand - a first notice for immediate compliance issued to contractor for violation of Safety requirements of a particular project, stating therein all the circumstances or jurisdictional facts of every violation. Contractor, upon receipt, must comply immediately with the Safety requirement deficiencies without need of further notice. This is a strong categorical reprimand that confirmation of further violation of any Safety requirements for second time, or oftener, on the same or different project would results to Monetary Penalty.

   b. Monetary Penalty – a penalty in the amount of Six Thousand Pesos (P 6,000.00) for every confirmed Minor Safety Violation per day and Twenty Thousand Pesos (P 20,000.00) for every confirmed Major Safety Violation per day for contracts. These
penalties shall be deducted from their project billings. Certified violation refers to the second discovery of Safety Violation of the same project.

c. **Severance Of Contract** – this is a hostile act by MWSI against violating contractor/s that the latter’s ties being a contractor of the former is terminated by reason of complete disregard or non-compliance to MWSI Safety provisions and directives.

5.2.3.2 **SCHEDULE OF PENALTIES (MWSI CONTRACTORS)**

(See table # 2)

**SCHEDULE OF PENALTIES (MWSI CONTRACTORS)**

(Table # 2)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description of Violations</th>
<th>First Offense</th>
<th>Second Offense</th>
<th>Third Offense</th>
<th>Classification of Violation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td><strong>[EARLY WARNING DEVICE SIGNAGES]</strong></td>
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<tr>
<td></td>
<td>a. Failure to install at strategic locations of the construction site/s warning sign/s or Early Warning Device (EWD) which state that the “Work Is Going On” or “Excavation Ahead” or any informative danger signs. (Rule-21.01.a)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td></td>
<td>b. Failure to install sufficient (with, but insufficient) wooden/ steel/ concrete barricades at strategic locations visible or around the construction site/s, with the prescribed distance between each other. (Rule 21.01.b)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td>2.0</td>
<td>Failure to install any single barricade or E.W.D. (completely zero) within the construction area. (Rule 21.01.e)</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td></td>
<td>Major Violation</td>
</tr>
<tr>
<td>3.0</td>
<td>a. If reduction of passable road lane is involved rubber/concrete cones/blocks, painted with black and yellow, shall be used along major thoroughfares and national roads, so as to guide motorists of lane changes and the excavation work being undertaken. (Rule 21.01.e)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td>Item</td>
<td>Description of Violations</td>
<td>First Offense</td>
<td>Second Offense</td>
<td>Third Offense</td>
<td>Classification of Violation</td>
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<td>b. If reduction of passable road line is involved boards-ups painted black and yellow strips, 2.4 m. in length and 1.5 meter in total height shall be placed to enclosed excavation area along major thoroughfares and national road. (Rule 21.01d.)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td></td>
<td>c. Failure to install amber (Red) flashing lights, or in case of breakdown of flashing lights, E.W.D. with reflectorized surface, at equipment parking sites within the motorist passable way. (Rule 21.01.e)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td></td>
<td>d. If reduction of passable lane is involved, flagman/ traffic man equipped with reflectorized vest and other appropriate safety gadgets must be provided along major thoroughfares and national roads/ busy streets, so as to guide motorists of lane changes and the excavation work being undertaken. *</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
</tr>
<tr>
<td></td>
<td>e. Failure to install ample (with, but insufficient) working lights within the construction area during night works. *</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
</tr>
<tr>
<td>4.0</td>
<td><strong>[EXCAVATION]</strong></td>
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<td>a. Road right- of – way to vehicle use, failure to excavate at a time portion by portion of not more than 50% of the road width leaving the remaining 50% satisfactorily passable, except for compelling reason. (Rule 21.02.b)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
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<td>b. Non- observance to excavation by sections of not more than 150 meters at a time measured longitudinally, except for compelling reason. (Rule 21.02.a)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
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<td>c. Unfinished excavation crossing road shall be provided with temporary steel plates with sufficient thickness to allow safe passage of vehicles and pedestrians. (Rule 21.03.b)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
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<tr>
<td>5.0</td>
<td><strong>[CONSTRUCTION EQUIPMENT AND VEHICLES]</strong></td>
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<td>Failure to provide central storage site for all construction equipment and vehicles. (Rule 4.a) Contractors shall ensure that temporary storage and parking sites, if there were any, would not affect traffic flows. (Rule 21.04.b)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<tr>
<td>6.0</td>
<td><strong>[MATERIAL STORAGE]</strong></td>
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<tr>
<td></td>
<td>a. Failure to provide construction material storage site (if necessary) which pose problems on traffic and pedestrian in the construction area. (Rule 21.05.a)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<td>b. Violation of Guidelines on Dumping of waste and excess materials, posing danger to public safety. (Rule 21.05.b)</td>
<td>Severance of contract</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td>7.0</td>
<td><strong>[MAINTENANCE AND CLEANLINESS IN WORK AREAS]</strong></td>
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<tr>
<td></td>
<td>Failure to maintain housekeeping along roadway or passageway (Construction Area), which may pose hazards to the riding public and pedestrians. (Rule 21.06.a)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td>8.0</td>
<td><strong>[DAMAGE TO ADJOINING UTILITY LINES]</strong></td>
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<td></td>
<td>Failure of Contractor to make written report to company concerned of accidental damages to water main lines. (Rule 21.07.a)</td>
<td>Severance of contract</td>
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<td></td>
<td>Major Violation</td>
</tr>
<tr>
<td>9.0</td>
<td><strong>[GAS LEAK]</strong></td>
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<td>Detection by Contractor of Gas leakages on occasion or by reason of the construction shall be immediately reported to the Gas Company while the same (Contractor) is undertaking measures, if appropriate, to prevent ignition of any kind. (Rule 21.08.a)</td>
<td>Written notice for compliance (2nd Notice)</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td>10.0</td>
<td><strong>[DAYTIME WORK STOPPAGE]</strong></td>
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<tr>
<td></td>
<td>a. Failure of contractors to place sufficient steel plates of sufficient thickness for cover of open trenches, when traffic conditions call for a Mgmt. Work schedule. (Rule 21.09.a)</td>
<td>Severance of contract</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
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<td>b. During non-working time, contractor/s must ensure that no materials, equipment and tools shall be parked along roadway that poses problems or danger to the public. (Rule 9-d)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<tr>
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<tr>
<td>11.0</td>
<td><strong>[EXCAVATION &amp; SHORING]</strong></td>
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</tr>
<tr>
<td></td>
<td>a. To prevent possibility of excavation cave-in, sheet piling, cribbing, shoring and other support systems, if necessary, shall be built-in in accordance with Engineering Standards. (Rule 21.10)</td>
<td>Monetary Penalty</td>
<td>Severeance of contract</td>
<td></td>
<td>Major Violation</td>
</tr>
<tr>
<td></td>
<td>b. Failure of Contractor to frequently inspect installed bracing or shoring after heavy rain or typhoon and failure to do necessary repair or adjustment if necessary. (Rule 21.13)</td>
<td>Written notice for immediate Compliance</td>
<td>Monetary Penalty</td>
<td>Severeance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td></td>
<td>c. Failure of Contractors to sufficiently install barricades and Early Warning Devices on open excavations. (Rule 21.18)</td>
<td>Severeance of contract</td>
<td></td>
<td></td>
<td>Major Violation</td>
</tr>
<tr>
<td>12.0</td>
<td><strong>[MACHINE EXCAVATION]</strong></td>
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<tr>
<td></td>
<td>a. No digging, using heavy equipment machines, shall be allowed close to underground water facilities. Proximity of limits for machine operation must be established then completes the excavation by labour digging. (Rule 21. 20a)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severeance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td></td>
<td>b. Failure of contractors to warn workmen about existence of underground water line facilities such that excavation-using driving picks or any other powered tools is done carefully. (Rule 21.20.b)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severeance of contract</td>
<td>Major Violation</td>
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<tr>
<td>13.0</td>
<td><strong>(TEMPORARY WALKWAYS)</strong></td>
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<td></td>
<td>Failure of Contractors to provide temporary walkways to construction area needing the same to prevent accident of any kind on occasion or by reason of the on-going project. (Rule 21.22.a)</td>
<td>Severeance of contract</td>
<td></td>
<td></td>
<td>Major Violation</td>
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<tr>
<td>14.0</td>
<td><strong>[GOOD HOUSEKEEPING]</strong></td>
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<td></td>
<td>Non-observance by contractors of the operating standard procedures in Good Housekeeping in construction sites which greatly affects the image of the company resulting from poor housekeeping. (Rule 21.23.a)</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severeance of contract</td>
<td>Major Violation</td>
</tr>
<tr>
<td>Item</td>
<td>Description of Violations</td>
<td>First Offense</td>
<td>Second Offense</td>
<td>Third Offense</td>
<td>Classification of Violation</td>
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<tr>
<td>15.0</td>
<td><strong>(PERSONAL PROTECTIVE EQUIPMENT AND DEVICES)</strong></td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<tr>
<td></td>
<td>Non-wearing of personal protective equipment (PPE) appropriate for the exposure and the work to be performed.</td>
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<tr>
<td>16.0</td>
<td><strong>(SAFETY PERSONNEL)</strong></td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of Contract</td>
<td>Major Violation</td>
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<tr>
<td></td>
<td>To ensure that a Construction Safety and Health Program is duly followed and enforced at the construction project site, each construction project site is required to have the minimum required Safety Personnel to oversee full time the overall management of the Construction Safety and Health Program as described in Section 7 of Department Order # 13 (Guidelines Governing Occupational Safety and Health in the Construction Industry) of Department of Labor and Employment (DOLE).</td>
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<tr>
<td>17.0</td>
<td><strong>(MEANS OF ACCESS AND ESCAPE)</strong></td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
</tr>
<tr>
<td>a.</td>
<td>Every excavation over 1 m. (3 ft.) deep shall be provided with ladder as an access and egress in case of flooding or collapse of the excavation work.</td>
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<td>b.</td>
<td>Every excavation shall have at least one (1) ladder in every 16.6 m. (50 ft.) of length or fraction thereof, of a length, which shall extend at least 0.83 m. (2'6&quot;) above the top of the excavation to provide a firm handhold when stepping on or off the ladder.</td>
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<tr>
<td>18.0</td>
<td><strong>(SAFETY CHECKLIST)</strong></td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<td></td>
<td>Contractor is required to submit the Safety Checklist on a daily basis fully accomplished by the contractor's Safety Officer/Representative and conformed by PMG Project Engineer of MWSI.</td>
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<tr>
<td>19.0</td>
<td><strong>(UNSAFE ACT)</strong></td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
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<td></td>
<td>Reporting for and or rendering work in a state of intoxication of liquor and/or under the influence of prohibited drugs or narcotics.</td>
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<tr>
<td>Item</td>
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<tr>
<td>20.0</td>
<td><em>(WELDING AND CUTTING OPERATIONS)</em></td>
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<td></td>
<td>a. Welding or cutting operations shall not be permitted in areas containing combustible materials or in proximity to explosives or flammable liquids, dusts, gases or vapors, until all fire and explosion hazards are eliminated.</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Major Violation</td>
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<tr>
<td></td>
<td>b. A portable fire extinguisher shall be provided at the place where welding and cutting operations are being undertaken.</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<tr>
<td></td>
<td>c. All workers or persons directly engaged in welding or cutting operations shall be provided with the appropriate personal protective equipment.</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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<tr>
<td></td>
<td>d. Welding or cutting in confined spaces shall be prevented by the provision of local exhaust and general ventilation system to keep fumes, gases or dusts within allowable concentrations or threshold limit values.</td>
<td>Written Reprimand</td>
<td>Monetary Penalty</td>
<td>Severance of contract</td>
<td>Minor Violation</td>
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</tbody>
</table>

**5.2.3.3 SUBMISSION OF CONTRACTOR’S SAFETY PROGRAM**

The Construction Safety and Health Program to be submitted by the Contractor before the start of the project must be approved by BWC, DOLE / MWSI Safety, shall state the following:

a. Composition of the Construction Safety and Health committee, if one has been formed, otherwise, an understanding to organize such committee and appoint its members before the start of construction work at the project site;

b. Specific safety policies which the General Constructor undertakes to observe and maintain in its construction site, including the frequency of and persons responsible for conducting toolbox and gang meetings;

c. Penalties and sanctions for violations of the Construction Safety and Health Program;

d. Frequency, content and persons responsible for orienting, instructing, training and supervising all workers at the site with regard to the Construction Safety and Health Program under which they operate;

e. The manner of disposing waste arising from the construction.
f. Validity of Construction Safety and Health Program will depend on the duration of every contracted project.

5.2.3.4 SAFETY SEMINAR

Every MWSI Contractors are required to have at least two (2) personnel that have attended/completed the seminar on Basic Occupational Safety and Health (Forty Hours).

5.2.3.5 FABRICATION OF SAFETY SIGNAGES AND BARRICADES

Every MWSI Contractors are obliged to secure their safety signages and barricades from MWSI designated official fabricator.

5.2.3.6 SEPARABILITY PROVISIONS

a. All applicable provisions of this Code shall apply to all MWSI Accredited Contractors and be a part of their Project Contract with Maynilad Water.

b. In cases where the Safety Violations committed by any Contractor is not defined and penalized under this Code, the Safety provisions appearing in the executed Project Contract with Maynilad Water shall control. If a Safety violation is both penalized by this Code and the Executed Project Contract, the violation with graver penalty shall be imposed.

c. It is incumbent upon every Accredited MWSI Contractor to comply with the requirements being imposed by DOLE Department Order # 13, series 1998: re; Guidelines Governing Occupational Safety and Health in the Construction Industry.
SECTION 6
SAFETY ORGANIZATION

6.1 There shall be a Safety Department, which will be created to oversee the deployment of this code. This department will be composed of the following;

a. Chief Safety Functions:
1. Determines the safety requirements of MWSI.
2. Drafts and recommends the safety policies and reviews safety code for revisions and amendments.
3. Plans, develops and recommends safety programs.
4. Oversees the implementations of all safety programs.
5. Monitors compliance of all operating units and their activities on established safety code and policies through inspections and investigations and submits recommendations, sanctions on violations.
6. Conducts safety meetings of the company.
7. Develops and maintains disaster contingency plan.
8. Plans and develops accident prevention program.
10. Attends to all the safety requirements BWC-DOLE and other government agencies.
11. Undertakes safety contests and awards distinction for outstanding accomplishments.

b. There will be three (3) units on this department with the following functions:

b.1) POLICIES AND DOCUMENTATION UNIT
Functions:
1. Plans, develops and maintains accident prevention program.
2. Formulates safety and other administrative policies in coordination with the CSC and other safety units.
3. Serves as the secretariat of the Central Safety Committee.
4. Initiates, submits and supervises safety and health training for employees.
5. Maintains records and reports covering all aspects of the Safety programs.
6. Represents MWSI on safety seminars, trainings, meetings as required by DOLE-BWC and Government Safety Regulations.
7. Evaluates safety gadgets/equipment of every area/division.
8. Convenes the review committee for accidents and incidents.
9. Oversees the conducts of awards and contests on safety
b.2) EMERGENCY PREPAREDNESS RESPONSE UNIT

Functions:
1. Plans, develops and maintains disaster contingency plan.
3. Conducts safety training for CSC/ Employees and Contractors as needed.
4. Conducts annual emergency preparedness program and other risks management activities.
5. Mobilizes needed resources for disaster relief, evacuation activities and acts as the lead unit in this undertakings. Links the same with establish networks.
6. Liaises with government and other agencies regarding company emergency preparedness programs.
7. Assists in the conduct of awards and contests on safety.

b.3) INSPECTION/ INVESTIGATION MONITORING UNIT

Functions:
1. Plans, develops and maintains safety programs on workplaces.
2. Conducts regular safety inspection on all MWSI areas including constructions activities.
3. Reports violations on safety policies and recommends sanctions for erring violators.
4. Issue non-compliance order and recommends works stoppage.
5. Checks safety and health programs of contractors.
6. Assists in the developing and planning of safety program.
7. Prepares monitoring compliance reports and recommend action programs to enhance performance of the respective units.
8. Identifies training gaps and recommends needed trainings.
9. Attends Safety Seminars/Training as required by DOLE-BWC and other foreign regulatory bodies.
10. Assists in the conduct of awards and contests on safety.
SECTION 7
CENTRAL SAFETY COMMITTEE (CSC)

CENTRAL SAFETY COMMITTEE
ORGANIZATIONAL CHART

CHAIRMAN

VICE CHAIRMAN/ SECRETARY

SECRETARIAT

OPERATIONS DIVISION

QUALITY, ENVIRONMENT, SAFETY and HEALTH MANAGEMENT

ADMINISTRATION

CUSTOMER SERVICE

BUSINESS REGIONS (SOUTH and NORTH)

CORPORATE FINANCIAL SERVICES

CORPORATE MANAGEMENT SERVICES

PROJECT MANAGEMENT GROUP

MWSA

CORPORATE LOGISTICS

ANTI-ILLEGAL TASK FORCE

MWSU-PTGWO
7.01.05 GROUPINGS OF CENTRAL SAFETY COMMITTEE

1. MANAGEMENT GROUP

To advise and assist the Management in implementing a well-organized Safety Program and to recommend as appropriate all changes in the overall program to improve efficiency and encourage employees to increase their safety efforts.

FUNCTIONS:

1. Regular meetings-planned and instructive- for passing on information to other employees.
2. Action of the committee as a clearinghouse for ideas, activities, and follow-ups.
3. Investigation of major accidents and causes, and recommendations to prevent their occurrence.
5. Assistance in establishing Safety Standards and Operating Methods on engineering works.
6. Suggestion for a Safety Education Program.
7. Inspection and suggestions for specific job practices.

2. WORKING GROUP

To create interest in Safety within the work force and to emphasize employee responsibility for the prevention of accidents.

FUNCTIONS:

1. Reporting to Central Safety Committee on unsafe conditions and practices.
2. Instructing and warning fellow workers of dangerous practices.
3. Assisting in the investigation of accidents and making recommendations for accidents prevention.
4. Improving a cooperative spirit between employees and management.
5. Functioning an opportunity for workers to take an active interest in the Safety program.
6. Maintaining interest of all employees in the Safety Program.

3. ACCIDENT REVIEW GROUP

FUNCTIONS:

To review and determine the causes of accidents. Determines the extent of an employee’s responsibility in an accident and makes effective recommendations to prevent occurrence of similar accidents.
CHAPTER II
BASIC SAFETY RULES

FIRE LOSS PREVENTION AND CONTROL

SECTION 8
FIRE LOSS PREVENTION

8.01 The Safety Department/ Facilities Management Department shall check for fire hazards at regular intervals-electrical such as equipment, machinery and processing equipment, housekeeping conditions and other possible sources of fire. (A)

8.02 The Safety Engineer shall regularly check fire fighting equipment to be sure that they are ready for any emergency. Each designated employee must become proficient in handling fire fighting equipment installed at the area or station where he works. (A)

8.03 All concerned employees shall handle gasoline, gases and volatile (low flash point) oils with great care. Open flames, lighted cigars, cigarettes or pipes shall be kept away from them.

8.04 Employees shall eliminate or immediately put out small fires or report to their immediate supervisor any fire hazard, particularly in their work area, which may cause the loss of life or destruction of the System’s property. (A)

8.06 FIRE EXITS

a. All approaches to fire exits shall be cleared of any obstruction and properly marked to make the direction of egress clear. (B)

b. Doors leading into or out of any building or floor shall not be locked or fastened during working/office hours. (B)

c. All doors, in or leading to exits shall be maintained open from the inside without the use of a key or any special knowledge or effort at all times when the building or area served thereby is occupied. (A)

d. Relevant rules and regulations on fire protection and control regarding exits, stairways and fire doors shall be obeyed as per provisions of Rule 1940, OSHS of DOLE and Rule 3, Division 4 of the Philippine Fire Code. (B)

e. Fire exit drills shall be conducted at least once every six (6) months to maintain an orderly evacuation of buildings for major installations. It shall only include evacuation of persons and shall not include salvage operations. (B)
8.07 **HOUSEKEEPING**

a. Oil-soaked and paint–saturated rags, papers, waste and other combustible refuse shall be deposited in non-combustible receptacles having self-closing covers, and thereafter removed daily from the work areas for proper disposal. (B)

b. A procedure on safe collection and disposal of all combustible waste and rubbish shall be a part of the fire prevention-training program. (A)

c. Accumulation of all type of dust shall be cleaned at regular intervals from overhead pipes, beams and machines, particularly from bearings and other heated surfaces. (A)

d. Roofs shall be kept free from sawdust, shavings, and other combustible refuse. No such materials shall be stored or allowed to accumulate inside air shafts, or elevator and stair shafts, tunnels, out-of-the-way corners, near electric motors or machinery, around steam pipes, or within three meters of any stove, furnace or boiler. (A)

8.08 **RUBBISH DISPOSAL**

a. Combustible rubbish, dried weeds and grass shall not be allowed to accumulate in plant yards, particularly near buildings, other combustible materials, or storage tanks containing flammable liquid and gases. (B)

b. Rubbish shall be burned only in designated areas away from buildings, sheds, lumber piles, fences and dried grass or other combustible materials. (B)

c. Wind and weather conditions shall be considered before fires are started. Only controllable quantity of rubbish shall be burned at one time. No fire shall be started on a windy day where there is a possibility of igniting nearby combustible materials. It is required to have a fire hose or other suitable fire fighting equipment near the fire site. (B)

8.09 **ELECTRICAL**

a. Only approved equipment shall be used where flammable gases or vapors are present. (B)

b. Temporary makeshift wiring shall be used unless absolutely necessary, in which case, it shall be adequately protected and properly barricaded, and shall be removed as soon as possible. In no instance shall defective wires be used. (B)

c. Portable electrical tools and extension cords shall be inspected at frequent intervals and repaired or replaced promptly when found defective. (A)

d. Waterproof cords and sockets shall be used in damp places and explosion-proof fixtures and lamps shall be used in the presence of highly flammable gases and vapors. (B)
e. Portable lamp bulbs shall be protected by heavy lamp guards or by adequately sealed transparent enclosures, and left away from sharp objects and kept from falling. Bare bulbs shall never be used when exposed to flammable dusts or vapors. Lamp bulbs shall be considered as potential hazards in areas where flammable dusts or vapors exist; they shall be safeguarded accordingly. (B)

f. All electrical machines/equipment shall be unplugged during lunch hours and at the end of the working day. (B)

g. The use of electrical octopus connections shall be avoided. (B)

h. Employees shall be instructed in the proper use of electrical equipment and shall be prohibited from tampering and blocking circuit breakers and from using improperly rated fuses or bypass wires. (B)

i. Personally owned electrical cooking appliances such as percolators, stoves and the like shall not be plugged into the System's building electric facilities. (B)

j. Electrical installations and all electrical equipment shall be periodically inspected and tested to ensure continued satisfactory performance and to detect deficiencies. (A)

8.10 SMOKING

a. All areas where smoking is prohibited shall be provided with “No Smoking” signs. (B)

b. Employees are prohibited from carrying matches, lighters and other spark-producing devices to areas where flammable and combustible liquids, chemicals, gases and the like are stored or handled. (B)

c. Wastebaskets shall never be used for cigarette disposal. (B)

d. Lighted cigarette butts shall always be totally put out and left in non-combustible ashtrays. (B)

e. Before leaving the office for coffee break, lunch or after office hours, floors, tables, chairs and top of cabinets shall be checked by a designated employee for lighted cigarette inadvertently left behind. (B)

8.11 OPEN FLAMES

a. Open flames using kerosene, liquefied petroleum gas, acetylene or alcohol and other torches shall be placed at least 0.50 meters from wood surfaces. These should not be used close to flammable liquids, papers, excelsior or similar materials. (B)

b. When portable furnaces, blowtorches and the like are used, there shall be an overhead clearance of at least 1.2 meters. Combustible materials shall be removed or protected by a non-combustible insulating board or sheet metal and preferably by a natural draft hood and flue of non-combustible material. (B)
SECTION 9
PORTABLE AND MANUAL FIRE CONTROL

9.01 SELECTION OF EXTINGUISHERS
Extinguishers shall be selected for the specific class or classes or hazards to be protected against in accordance with the following:

a. Extinguishers for Class “A” hazards, such as wood, cloth, paper, rubber and other similar ordinary materials, shall be selected from foam, loaded stream, multi-purpose dry chemical and water types.

b. Extinguishers for Class “B” hazards, fires in flammable liquids, gases and greases, shall be selected from carbon dioxide, dry chemicals, foam loaded stream and multi-purpose dry chemicals.

c. Extinguishers for Class “C” hazards, fires which involve energized electrical equipment where the electrical non-conductivity of the extinguishing media if of importance, shall be selected from carbon dioxide, with non-metallic horn, dry chemicals and multi-purpose dry chemicals.

Before any dry chemical extinguishing equipment is considered for use to protect electronic equipment or delicate electrical relays, the effect of residual deposits of dry chemical on the performance of this equipment shall be evaluated.

9.2 INSPECTION AND MAINTENANCE

a. Fire extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times except when being used, tested, repaired or replaced. (B)

b. Fire extinguishers removed from the premises where they are regularly installed for recharging or repair shall be replaced by spare extinguishers of the same type and capacity, during the period they are serviced. (A)

c. Fire extinguishers shall be inspected monthly, or at more frequent intervals when circumstances require to ensure that they are operable and in their designated places, that they have not been tampered with and are fully charged and pressurized, and to detect any physical damage, corrosions, or other impairments. Extinguishers or parts thereof, which are not in good operating condition, shall be immediately recharged, repaired or replaced by qualified suppliers. (A)

d. Each fire extinguisher shall have a durable identification tag securely attached to show the maintenance of recharge date and the initial or signature of the person who performed this service. (A)

e. Caps shall always be replaced on the same shell from which they were removed to prevent mismatching of threads. A small amount of Vaseline or any other acceptable substitute shall be
applied to cap threads. Caps shall be screwed on tightly, making sure that the threads are properly engaged. (A)

9.03 INSTALLATION
   a. Fire extinguishers shall not be obstructed or obscured from view. In large rooms and in certain locations where visual obstructions cannot be completely avoided, the location of extinguishers shall be indicated conspicuously with a red arrow. (A)
   b. If fire extinguishers intended for different classes of fires are grouped, their intended use shall be marked conspicuously or color-coded to ensure use of the proper extinguisher for the class of fire that occurs. (A)
   c. In situations where fire extinguishers shall be temporarily provided, they shall be installed on portable stands, consisting of a horizontal bar or uprights with feet, or set on shelves unless the extinguishers are of the wheeled type. (A)
   d. Fire extinguishers mounted in cabinets or wall recesses, or set on shelves shall be placed in a position such that the extinguisher operating instructions face outward. The location of such extinguishers shall be marked conspicuously. (A)

9.04 HYDROSTATIC TEST
   Inspection, maintenance, hydrostatic test and recharging of portable fire extinguishers shall be in accordance with the provisions of NFPA No. 10. (B)

9.05 CARE OF FIRE HOSES AND ACCESSORIES
   The care of fire hoses, nozzles, couplings and gaskets shall be in accordance with the provisions of NFPA No. 198. (B)

SECTION 10
VEHICULAR AND TRAFFIC SAFETY GUIDE

GENERAL RULES

10.01 National and local traffic laws and regulations shall be observed at all times. (B)

10.02 When driving along public or private roads, prescribed speed limits and regulations shall be observed. (B)

10.03 No employee shall operate any System’s vehicle unless he is duly licensed, and has been examined and authorized by proper authorities. (B)

10.04 Authority to drive is not transferable. (D)
10.05 No driver shall allow another person to drive the vehicle assigned to him, unless the latter is duly authorized by the System. (B)

10.06 No passenger shall be allowed to ride on the running board, fender, tailboard and/or any other part of the System’s vehicle, except on seats provided or inside the body of walls. (B)

10.07 No part of the human body shall extend outside the vehicle. (A)

10.08 No passenger shall be allowed to board or alight from a moving vehicle or from a stopped vehicle at the traffic side of the road. (A)

10.09 No driver shall drive a vehicle while under the influence of liquor, narcotics, or sleep-inducing drugs, or the like. (D)

10.10 No employee shall drive any private vehicle inside the MWSI compound while under the influence of liquor, narcotics or sleep-inducing drugs, or the like. (C)

10.11 The driver shall conduct daily checks on the following: (A)

B - rake
E - electricity
W - water
A - air
G - gas
O - oil
N - noise (steering)
S - steering

10.12 Regular, contractual and casual MWSI drivers, for purposes of monitoring driving competence and psychophysical fitness, shall undergo the Psycho Physical Test once a year. (B)

10.13 Drivers with test results below the set standards for the Psycho Physical Test shall be reassigned to non-driving assignments to be identified by the Fleet Management. (B)

SECTION 11
LOADING AND UNLOADING

11.01 Overloading the vehicle shall not be allowed. The load shall be properly distributed, secured in place and not piled too high in order to maintain stability and to satisfy required overhead clearances. (A)
11.02 Tailgates and all detachable equipment in the vehicle shall be properly secured before traveling. (A)

11.03 Loads shall be handled at the curbside of the vehicle. Where this cannot be avoided, flagmen should be stationed and/or appropriate warning signs shall be placed at all traffic approaches. (A)

11.04 Trailers shall be provided with proper stop and taillights. (A)

11.05 Vehicles and trailers with loads projecting beyond body lines shall have the extreme projections provided with fully secured red flags and stop lights in the daytime and with red lights and stop lights at night time. When practicable, a marker shall be attached halfway between the truck and end of load projection, such as when poles are being handled. (A)

SECTION 12
PARKING AREA AND GARAGE

12.01 Before moving a vehicle from a parked position, the driver shall check around and under the vehicle for possible hazards. (B)

12.02 The driver shall conduct a brake test before operating a vehicle from the MWSI parking area and garage. In case of any indication of a faulty brake, he shall stop the vehicle, park it properly and report the condition immediately to the MWSI Motor Pool.

SECTION 13
PARKING IN PUBLIC PLACE

13.01 Whenever a driver has to leave his vehicle unattended along a highway, he shall move his vehicle entirely off the traveled portion of the road, turn off the ignition switch, notch effectively the hand brake and keep the ignition key with him. He shall place the early warning device (EWD) at the required distance in front of and behind the vehicle, check traffic before opening the door to get in and out of the vehicle and keep doors securely closed at all times. (B)

13.02 When parking downhill, he shall slightly turn the front wheels to the right towards the curb or side of the road, leave the vehicle in reverse gear and hand brake notched effectively. When parking uphill, he shall turn front wheels towards the curb or side of road and leave the vehicle in low gear and hand brake notched effectively. Wheel chucks shall be used to lock the wheels when parking downhill or uphill and most especially when it is necessary to keep the motor running. (B)
SECTION 14
SAFE DRIVING

14.01 In addition to the provisions of the Land Transportation and Traffic Code, every employee who is authorized to drive the MWSI vehicles shall observe and practice the following defensive and safe driving habits:

a. Signal intentions well in advance at all times regardless of the traffic conditions. (A)

b. To avoid hitting a vehicle being followed, maintain a safe distance of at least one vehicle length for every ten (10) KPH of speed. This required distance should be doubled at night or when road is slippery. (A)

c. To avoid being hit by a vehicle from behind, the driver shall:
   1. Make every stop or reduced speed in a smooth and gradual manner. (A)
   2. Signal intentions well in advance. (A)
   3. Try to keep the vehicle behind from riding your tail, e.g., find means of preventing the vehicle behind from staying too close to your bumper. (A)

d. To avoid head-on or sideswipe collisions, the driver shall:
   1. Always drive as far to the right of the center of the centerline of a highway as much as possible. (A)
   2. Reduce speed and slow down before entering a curve. (A)

e. To avoid angle collisions, the driver shall:
   1. Approach all intersections with the right foot off the accelerator and step on the brake pedal, ready for any eventuality such as pedestrians and other drivers who do not obey the traffic rules. (A)
   2. Bring the vehicle to full stop before entering any through street, highway or railroad crossing. (B)
   3. Check traffic to the left, then to the right, to see if there are vehicles crossing the street. Proceed only when traffic is clear. Do not rely on your having the right-of-way. (A)
   4. Signal well in advance and proceed to the correct turning lane from a reasonable distance. Let approaching traffic clear first before making a left turn. (A)

f. To avoid a sideswipe collision, the driver shall:
   1. Slow down when being overtaken on left or right to make it easy for the other vehicle to pass. (Do not race the other vehicle.) (A)
   2. Check your rear side mirror; make a signal and change lane only when it is safe to do so without disrupting the flow of traffic. (A)
   3. Signal well in advance, slow down gradually and keep as close to the right or curb when making a right turn. (A)
4. Check the rear, signal intentions and wait for a break in traffic before pulling out of a curb or parking space. (A)
g. To avoid head-on-sideswipe and angle collisions, the driver:
   1. Shall not drive to the left side of the centerline of the highway in overtaking or passing another vehicle preceding in the same direction unless the left side is clearly visible and is free of incoming traffic. This is to allow for a sufficient distance ahead to permit such overtaking or passing to be made safely. (A)
   2. Shall not overtake when he himself is being overtaken or when another vehicle tries to tail him in his attempt to overtake another vehicle.
   3. Shall not overtake or pass another vehicle proceeding in the same direction when approaching a crest of a grade, upon a curve in the highway, at any railway grade crossing, at any intersection of highways and at all “no passing or overtaking zones.” (B)
   4. Shall not pass a car that has stopped to permit pedestrians or other vehicles to cross. (B)

14.02 He shall always slow down and be ready to step on the brakes when passing through any busy streets where long lines of cars are parked and where pedestrians may dart across at any moment. (B)

14.03 Vehicles shall always descend steep grades at low gear. (B)

14.04 The driver shall always devote his full attention to driving, anticipating danger in time to avoid it. (A)

14.05 The driver shall be alert for signals from traffic police officers and other drivers, traffic signals signs, etc. (A)

14.06 The driver shall avoid beating traffic stop signals. (A)

14.07 The sounding of horns does not give anyone of the right-of-way. The driver shall use it only as a warning and shall proceed cautiously.

14.08 He shall slow down upon approaching school zones, parks, playgrounds, crowded streets and thickly populated areas and be always on the alert for children. The law gives the right-of-way to pedestrians. (B)

14.09 Headlights shall be put on not later than one half-hour after sunset and until at least one half hour before sunrise and whenever weather conditions so require. Parking lights shall not be used in lieu of headlights. (A)
14.10 At night, the driver shall always dim his light when within 150 meters of oncoming vehicles and when following another vehicle within 60 meters. Glare may cause the other vehicle to swerve his oncoming vehicle toward the other lane. The same rule shall be observed when driving along well-lighted and thickly populated areas. (A)

14.11 After passing through flooded streets, the driver shall check his brakes to make sure that they are working properly before proceeding to normal speed. To dry the brake linings, he shall press his foot brakes slightly several times while his vehicle is in low motion until assured that the brakes are functioning normally before proceeding the normal speed. (B)

14.12 In case of sudden tire blowout, the driver shall not step hard and abruptly on his brakes. This will cause his vehicle to turn turtle or swerve suddenly when driving at high speed. Instead, steer straight and gradually bring the vehicle to a stop by applying slight on and off pressure (fanning) on the foot brakes. (A)

14.13 For trucks with or without trailers, enclosed vans and similar vehicles where the rear view of the driver is limited, a signalman shall be assigned. The foreman, leadman, supervisor, as the case may be, shall designate a signalman for the day. (A)

Any backing motion of the vehicle shall be done slowly with extra care and under the direction of the signalman on the ground that has an unobstructed view of the intended path of the vehicle. The same shall be observed when there is difficulty in maneuvering the vehicle by reason of its position or location. (A)

If backing is to be done, he shall personally make sure that all is clear behind at the time. He shall never assume that the other vehicle has not driven up behind or that pedestrians have cleared off the back area since he last looked. (A)

14.14 The driver shall stay on his own lane of the road at intersections, railroad crossings, no passing zones, hills and curves where his view is obstructed. Right-of-way is better than sight-of-way. (B)

14.15 The driver shall not straddle lane lines. This is inconsiderate and constitutes “hugging”. (A)

14.16 The driver shall not drive a vehicle with his hands and soles of shoes wet and/or greasy. (A)

14.17 The driver shall not be allowed to smoke when looking into the fuel tanks, the cooling water of radiator or the battery. (B)
14.18 The driver shall not keep oil, rags, waste or other flammable objects under the hood or elsewhere inside the vehicle where combustion might occur. (B)

14.19 Safety containers used for fuel handling shall be checked for leaks, excessive rusting and weak spots. (B)

SECTION 15
MOTOR WORKS

15.01 Vehicles jacked-up or hung-on chain hoists shall always be blocked under with stanchions, pyramid, jacks or wood blocks (which have first been carefully inspected). (B)

15.02 When a man is working under a vehicle that is blocked up, other workers shall not work on the car in such a manner that the car will be knocked off from its support blocks. (B)

15.03 Use electric lamps with extension cords, portable electric tools with cords and fittings and safety guards that are all in good condition. (B)

15.04 Always wear goggles or face shields when operating sandblast spark plug cleaners. (A)

15.05 Concrete or clay hollow blocks and other brittle/weak materials shall not be used to support jacked-up vehicles. (B)

15.06 Vehicles with more than three (3) wheels that are jacked-up on two wheels shall be provided with wheel stops on both ends of the other wheels. No chassis repair shall be allowed unless effective wheel stops are provided on these wheels. (B)

15.07 Vehicles under chassis repair shall be provided on all sides with adequate barricades and warning signs to protect protruding legs of workers. (B)

15.08 Never operate an engine in an enclosed room without adequate ventilation. Carbon monoxide is poisonous and may cause death.

15.09 Do not leave gasoline standing around in open containers. Use kerosene or other suitable safe preparations to clean parts whenever possible. (B)

15.10 Keep a pair of safety goggles handy and wear them when performing work in which eye protection is needed. (A)
15.11 Be on guard against flashes or explosion of gasoline vapors and hydrogen from storage batteries. Keep flames and sparks away. (B)

15.12 If your clothes soaked with oil or gasoline, better changed them. Do not take the risk to be caught by fire. (B)

15.13 Make sure all the lock washers and cotter pins are properly in-place. (C)

15.14 Grease and oil spilled on the floor shall immediately remove in order to prevent accidents. (B)

SECTION 16
TIRE OPERATIONS

16.01 Only workmen thoroughly familiar with the hazards and safe methods involved in handling tire equipment shall inspect, install, repair and replace tires and rims. (B)

16.02 Keep in safety cans rubber cement and flammable solvents used for patching inner tubes and casing compounds used for filling tire cuts. (B)

16.03 Tiremen shall inflate tires in steel “cages” or similar devices that shall restrain flying objects during the inflation process. A locking ring shall be seated properly and shall not be yanked free by being twisted. Defective locking rings shall be replaced. (B)

16.04 Electric heating elements used for vulcanizing or branding tires shall be inspected regularly, and defective rings shall be replaced. (B)

SECTION 17
WASHRACKS OPERATION

17.01 The concrete floor of washracks shall have a rough trawled finish to produce a non-slip surface. (A)

17.02 While washing vehicles, workers shall wear rubber boots with non-slip soles and heels, gloves and eye goggles. (A)

17.03 Keep working area clean and free from stray tools and parts. Place tools in their tool box when not in use. (B)

17.04 Washrack water hoses are high-pressured and shall not be directed at persons while in use. (B)

17.05 Workmen shall use the hose carefully in such a way as to avoid being struck by a backlashing stream of water and dirt. (A)
SECTION 18
TOWING

18.01 No person shall be allowed to stay between the towing truck and the towed vehicle whether at stop or in motion. When at stop and work is to be done the towing truck driver shall be warned not to move the vehicle until such work is completed, after-which he shall be given the go signal to move the vehicle. (C)

18.02 The towing vehicle and the vehicles being towed shall be properly fixed before moving them. (C)

SECTION 19
HEAVY EQUIPMENT AND TOOLS

A. HEAVY EQUIPMENT

19.01 Only duly authorized personnel shall operate heavy equipment. (B)

19.02 Drivers of mobile heavy equipment and trainers shall be duly licensed and also authorized by MWSI. (B)

19.03 Operators shall be responsible for the proper condition and cleanliness of the heavy equipment assigned to them, and for making reports of any defect or unusual condition found therein. (A)

19.04 At no time shall the operator allow anybody under a boom except the rigger doing rigging work. (B)

19.05 Booms, forkholders, payloaders and the like shall be kept at a safe distance from overhead-energized lines. If it should be absolutely necessary to cross or work in close proximity with energized lines, the electric company shall be requested for appropriate assistance in the provision of safety measures. (C)

19.06 The operator shall not allow unauthorized persons to operate the equipment assigned to him nor allow such persons to ride on the equipment while same is in motion. (B)

19.07 No operator shall operate any equipment unless he is physically able and mentally sound. He shall not operate a vehicle if he is under the influence of liquor and/or prohibited drugs or any drug that causes drowsiness. (C)
19.08 Operators shall receive directional signs only from duly authorized persons designated for the purpose. (B)

19.09 No operator shall move his equipment with his suspended load except when authorized by the superior. (B)

19.10 All booms shall be lowered after each work shift, except when otherwise authorized by the superior. (B)

19.11 The operator shall determine the safe clearance of overhead obstructions and building openings, and shall proceed only when such clearances meet the requirement. (B)

19.12 Detailed regular inspection of all hoists with special attention to load hooks, ropes, brakes and limit switches, shall be scheduled. (A)

19.13 The safe load capacity of each hoist shall be shown in conspicuous figures on the hoist body of the machine. (B)

19.14 Flanges and hoist drums with single-layer grooves shall be free of projections that will damage the cable. (B)

19.15 All hoists shall be attached to their support (fixed member of trolley) with shacklers, or support hooks shall be placed properly or have safety latches. Latches are recommended also for load hooks. Hoist supports shall also have an adequate safety factor for the maximum loads to be imposed. (B)

19.16 Travelling hoists operating on rails, tracks or trolleys shall have positive stops or limiting devices either on the equipment, rails, tracks or trolleys to prevent over running safe limits, and shall be equipped with over-speed control devices. (B)

19.17 A load shall be picked up only when it is directly under the hoist; otherwise, stresses for which the hoist was not designed shall be imposed upon it. If the load is not properly centered, it will swing (upon being hoisted), and injury could result. Everyone shall stay away from under raised loads. (C)

19.18 **AIR HOISTS**

a. After a piston-type air hoist has been in operation for a time, the locknut that holds the piston on its rod may become loose so that the rod will pull out of the piston, thus letting the load drop. It is recommended that the locknut be secured to the piston rod by a castellated nut and cotter pin. Whenever an air hoist is overhauled, a check shall be made to see that the piston is well secured to the rod. (B)
b. If an ordinary hook is used to hold the hoist from its support, the cylinder may come unhooked if the piston rod comes in contact with an obstruction when lowering. A clevis or other device should be used to prevent the hook from being detached from the hoist support. (B)

c. To prevent the hoist from rising or lowering too rapidly, a choke such as a washer with the correct opening shall be placed in the airline coupling. (B)

d. It is recommended that a rotary air hoist be provided with a closed loadline guide. (B)

19.19 ELECTRIC HOISTS

a. An electric hoist shall have a non-conducting control cord unless a grounding device is provided. Control cords shall have handles of distinctly different contours so that even without looking, the operator shall know which is the hoisting and which is the lowering handle. (A)

b. Each control cord shall be clearly marked “hoist” or “lower”. (A)

c. Control cords, usually made of fiber or light wire ropes, shall be inspected periodically for wear and other defects. (A)

d. On pendant-controlled electric hoists, means for effecting automatic return to the “off” position shall be provided on the control so that a constant pull on the control rope or push on the control button shall be maintained to raise or lower the load. (B)

e. A limit stop should be installed on the hoist motion, and at least two turns of rope shall remain on the drum when the load block is on the floor. (B)

19.20 HAND-OPERATED CHAIN HOISTS

a. Chain hoists shall be of larger capacity than the regular work requires. (B)

b. Supports for the hoists shall be strong enough to carry the load imposed on them. (B)

19.21 CRANES (MOBILE)

a. Open hooks shall not be used to support human loads, loads that pass over workmen or loads where there is danger of relieving the tension on the hook, due to the load or hook catching or fouling. (B)
b. Outside cranes shall be provided with secure fastenings adequate enough to hold the crane against strong winds. When necessary, provide special anchorage. (B)

c. Structural members of the crane shall never be made of cast iron or other brittle material. In the fabrication and assembly of structural work such as girders and frames, operator’s cages, booms and bracket, hot driven rivets or welding shall be used instead of bolts. Where bolts shall be used, they shall be of the “through” type with locknuts or conventional nuts and lock washers. (B)

d. Each controller and operating lever shall be marked with the motion it controls and its direction. These levers shall have spring returns so that they will move automatically into the “off” position and latch themselves there as the operator releases the handle. (B)

e. Operating a crane on soft or sloping ground or close to the sides of trenches or excavation is dangerous. The crane shall always be level before it is put into operation. Outriggers can be relied upon to provide stability on the soil upon which the crane is operated. (C)

f. The use of any makeshift methods to increase the capacity of a crane, such as timbers with blocking or adding counter-weight, is not permitted. (C)

g. If the crane tends to tip when hoisting or lowering a load, the operator shall lower the load as quickly as possible by snubbing it lightly with the brakes. Workers, therefore, are not allowed to ride a load that is being hoisted, swung or transported. (B)

h. Never move the load or the crane unless you are sure you understand the floor signal. (B)

i. When there are several riggers, obey the signal given by the head rigger only. (Obey an emergency stop signal given by anyone.) (A)

j. When filling the fuel tank of a crane, always provide a metallic contact between the fuel container and the tank. (B)

k. Before starting the crane engine, the engine clutch shall be disengaged. Also, before engaging the clutch, all operating levers shall be placed in neutral position. The clutch shall be engaged slowly with the engine idling. (B)

l. The swing brake shall be properly set when traveling the crane. (B)
m. Before the operator leaves the crane, the engine clutch shall be disengaged and the boom hoist pawl engaged. (B)

n. Warm up engine before attempting to operate the crane under load. (A)

o. Brake and clutch linings shall be kept free of oil, grease or water. The operator shall not operate the crane in case of any indication that these linings have been contaminated with such foreign matters. (B)

p. The load shall be lowered to the ground before leaving the crane. (B)

q. Never lift a load with a weight greater than the operating capacity for a given boom angle and radius. Keep lift heights to a minimum when handling close to a maximum load. (B)

r. Start and stop the swinging of the boom smoothly when the load is near or at operating capacity. Fast swinging causes load to extend beyond the boom point, increasing the radius beyond the crane's capacity that might eventually tip the crane over. (C)

s. The crane shall be kept stationary when lifting loads close to maximum, operating capacity. (C)

t. Be sure there is adequate overhead clearance before attempting to move machine under overpass bridges, power lines, or other low overhead objects. When traveling the mobile crane along highways or streets, the boom shall rest on its rack. (C)

u. The crane shall never be positioned nor left unattended near embankments, deep excavations, banks, bridges, etc. or any place where there exists danger of materials falling on it or earth slides. (C)

v. Be sure that the carrier service brakes and outriggers are properly set. (C)

w. Crane boom in operation shall have the minimum clearance of 3.5 meters from high-tension wires. (C)

19.22 CRANES (OVERHEAD)

a. Each crane shall have its safe load capacity indicated on both sides in conspicuous figures readable from the floor or ground. If a crane has hoist blocks, each block shall have its safe load capacity
indicated on both sides. The crane shall not be loaded beyond its rated capacity, except, for testing. (B)

b. Workmen near cranes or those who assist in hooking on or arranging loads shall be instructed to keep out from under loads. (B)

c. All crane machinery, apparatus, and appliances including ropes, chains and slings shall be inspected regularly by a qualified person assigned to this task and the date, findings and action taken must be recorded on a special report form. (A)

d. A crane operator shall never attempt to make repairs himself but shall report to his foreman any condition that will make the crane unsafe to operate. (A)

e. When not in use, the crane shall be parked with the load hook (and the slings if they remain on the hook) raised high enough to clear the heads of the men at work on the floor below, and the operator shall throw all controls into “off” positions and open the main switch. (B)

f. A light or a pilot lamp must be visible from the floor to indicate that the main switch is on. The controller shall be of the spring-return type or momentary contact push button. (A)

g. Precautions shall be taken to prevent other overhead cranes from colliding with a crane under repair. Safety ropes shall be installed. (A)

h. Loads being hoisted shall not be allowed to swing against the rigger or other floor men. (C)

i. When raising or lowering the load, see that it safely clears adjacent stockpiles or machinery. (B)

19.23  MOTOR GRADES

a. Only the operator is allowed to ride a motorized grader. (B)

b. Graders shall be operated at a safe speed under all road and traffic conditions. When obstructions such as roots, large rocks or structures are encountered, speed must be reduced to prevent the grader from being thrown out of control or damaged. (B)

c. When blading a road, the grader shall be operated on the right-hand side in the same direction as traffic. The end of the blade toward the opposite traffic must be marked by a red flag visible to motorists. (B)
d. Blading gravel roads shall be so planned that the blading on a particular section will be completed at the end of the day. Where a stockpile shall be left overnight on the traveled way, appropriate warning signs far ahead, barricades and lights shall be placed to warn motorists. (B)

e. When a motor grader is traveling, the operator shall pull in the blade and locked in place. (B)

f. No one shall get on or off a motor grader unless it is stopped. (C)

19.24 TRACTORS
a. Because of the power, the noise, the necessity of frequent backing and turning movements and the speed of operation, the operator of this type of equipment shall be constantly alert to see that his path is clear of workmen, obstructions and other vehicles. (A)

b. When the machine is left unattended during break time, or overnight, it shall be parked on level ground with the blade landed, ignition locked and brakes set. (B)

c. Bulldozer blades shall be kept close to the ground in going up steep slopes. It shall not be used to brake the tractor by digging into the ground when the tractor is going down steep grades. (B)

d. When attachments are hooked to the dozer, a bar shall be used to steer the eye over the hook to avoid pinching the hands. Safety chains shall be attached in addition to the drawbar. (A)

e. When tractors are used in clearing operations, a canopy shall be installed to protect the operator if there is a hazard from falling tree limbs or branches. (C)

f. Operators shall not wear loose or flowing clothing that might get entangled with machine moving parts. Shoes with hobnails or spike shall not be worn as they enhance the danger of slips and falls. (B)

g. When the tractor is stopped with the engine idling, the transmission shall be in neutral with the clutch disc engaged so the tractor cannot be jarred into motion. Before the engine is started, the tractor shall be out of gear, the master clutch disengaged and the blade down. (A)

19.25 CONCRETE MIXERS, PUMPS AND PAVERS
a. Operators and other men working around mixers and pavers shall wear dust respirators. Goggles shall be worn when chipping hardened concrete from the machine. (A)
b. Only men in good physical condition shall be employed to operate mechanical concrete vibrators. Lowering of vibrators from one level to another by use of air hose or electric cable is not allowed. (A)

c. Skips on large mixers and pavers shall be protected by guardrails on both sides to prevent men from walking into or under the skip. (B)

d. When a truck is backing in to charge a skip, a signalman shall be posted to direct the driver to see that the way is clear and to signal the operator when to raise the skip. (B)

e. Shell-mounted mixers shall be blocked especially when being operated on a grade. (B)

f. Operators shall always be at the control when the skip is being raised or lowered. No one shall ride the skip. (B)

g. When the operator leaves the machine, either temporarily or overnight, brakes shall be set and the skip shall be on the ground. (C)

h. The clutch shall be disengaged before the engine is started. The engine shall be fully warmed up before the clutch is engaged. The mixers shall be checked to see that they are stable and on the level footing. (A)

i. If the pump-concrete method of placing concrete is used, careful consideration shall be given to the design of the scaffold supporting the pipelines. A safety factor of four (4) shall be used in the scaffold design. (A)

j. If and when it is necessary to open a pipe under pressure to clear an obstruction, the work shall be carefully done with precaution so those workmen shall not be injured by concrete when the pipe become clogged. The towers and chutes shall be substantially constructed on sound foundations. (B)

k. Concrete buckets used with cableways or cranes shall be constructed without frames or other projections that may collect concrete which might be dislodged and fall on workmen. (A)

l. No person shall ride a bucket for any reason. When it is necessary to drift a bucket to a place not accessible by the cableway or crane, the drifting shall be done by some mechanical means and not by men pushing or pulling the bucket. (B)
19.26 CONVEYORS
a. Only authorized persons shall operate material conveyors. No person shall be allowed to ride on the conveyor. (B)

b. Material conveyor operators shall wear working gloves to protect their hands. (B)

c. Material elevators shall be provided with cages and properly guarded, and shall not be operated without a signalman. (B)

d. The material elevator shall be regularly inspected and properly maintained. (A)

e. The material elevator shall not be loaded beyond its rated capacity and no part of the load carried therein allowed to extend its cage. (B)

19.27 FORKLIFT
a. The operator shall exercise extreme caution when approaching areas where his view is obstructed or where pedestrians or other vehicles may have difficulty in noticing the approaching forklift. (A)

b. Inspect all loads to be moved to determine proper load position, to maintain stability and to avoid overloading. When moving loads, keep fork or load as close as possible to the ground floor. (B)

c. The load shall be kept below eye level. Where this is impracticable, drive the forklift backward so that the operator can see any obstructions along its way. (B)

d. Do not drive with wet or greasy hands. (A)

e. Slow down on wet and slippery riding surfaces. (B)

f. Never drive high-lift trucks with an elevated platform. (B)

g. Workmen shall not be permitted to ride or work on the platform of high-lift trucks. Where possible, materials shall be unloaded mechanically from a raised platform. (B)

19.28 LIFTING WITH JACKS
Good judgment is required both in selecting and using jacks on any given job.

a. Make sure that the base of the jack is on stable footing. Use boards or blocks placed at right angle to the lift. (A)
b. Center the jack properly for the lift; if there is danger of the head slipping, use board or the wedge on top of the jack to keep it in position. (A)

c. Place the jack so there will be an unobstructed swing of the handle, thus protecting your knuckles. (A)

d. Do not lean over a jack handle or handle socket under the load; the handle might fly up and strike you. (B)

e. Never rely on jacks alone to support any load you have to work under. Use sufficient blocks as an additional support of the load at two or more points. (B)

f. Never leave a jack standing under the load with the handle in the socket; something might strike the handle and knock the jack out of position. (B)

19.29 **POWER MOWER EQUIPMENT**

a. When operating power mower equipment, the operator shall use extra caution to prevent flying objects from striking himself and other persons in the vicinity. Pick up loose objects when this is practical and clear the area of other people when possible. (A)

b. Keep handle and feet from under the machine and away of discharge chute while engine is running. (A)

c. When mowing a terrace, slope or incline, mow lengthwise (across the face of the slope) instead of up and down. (A)

d. Stop engine (or motor) and disconnect spark plug wire(s) on power mowers before adjusting, repairing, or replacing cutting blade(s). If the equipment being used is of the rotary type, the blade mounting bolt or nut shall be always inspected to prevent its loosening and removal of the blade. (A)

e. Mower engines shall be allowed to cool off before the unit is refueled. (A)

19.30 **MACHINE GUARDING**

Guarding is necessary to prevent injuries on or around machines. Specifically, machine guarding prevents injury from the following sources:

a. Direct contact with the moving parts of the machine.

b. Work in process (kickbacks on a circular rip saw, metal chips from a machine tool, splashing of non metal or chemicals, etc.)

c. Mechanical failure.
d. Electrical failure.

e. Human failure resulting from such things as curiosity, zeal, distraction, fatigue, worry, anger, illness and deliberate chance-taking.

19.31 Mechanical guards, which must be made use of by the workmen at all times, shall be provided for the following:

a. Rotating mechanism

b. Cutting or shearing mechanism

c. Screw or worm mechanism

d. Compressing and tensioning mechanism

19.32 Interlocking devices may be mechanical, electrical pneumatic or a combination of these types. The operator of the machine shall be sure that the interlocking device:

a. Acts to guard the dangerous part before the machine is operated. (B)

b. Keeps the guard closed until the dangerous part is at rest, or stops the machine when the guard is opened. (B)

c. Prevents the operation of the machine if the interlocking mechanism is not in place. (B)

The machine shall never be operated when the interlocking device is not working. (B)

19.33 Machine guards shall not be adjusted or removed for any reason by anyone unless.

a. The supervisor gives specific permission.

b. The person concerned is specifically trained.

c. Machine adjustment is considered a normal part of his job. (B)

19.34 Machines shall not be started unless the guards are in place and in good condition. Defective or missing guards shall be reported to the foreman immediately. (B)

19.35 Where oiling shall be done while a machine is in operation, extension fittings shall be used to place the operator out of danger. (B)
19.36 Whenever safeguards or devices are removed for repair, adjustment, or servicing of equipment (lubrication and maintenance), the power for the equipment shall be turned off and the main switch locked and tagged. (B)

19.37 **SCAFFOLDS AND LADDERS**
Scaffolds and ladders shall be inspected as required. Loose or missing parts, cracks, splinters, or knots in uprights, braces, steps or rungs shall be noted and repaired. (A)

19.38 Scaffolding shall be constructed of sound materials, securely fastened and supported. Wooden materials called for in the plans for scaffolds shall be free of knots and other imperfections of not less than five (5) cms. In thickness, painted red on both ends for identification and shall not be used for any other purpose. (B)

19.39 Never use a substandard scaffold. (B)

19.40 Only experienced employees shall erect or construct and dismantle scaffolds. Scaffolds shall be dismantled and returned to stock when not in use. Nails shall not be left in dismantled scaffolds. (B)

19.41 Scaffolds and ladders built by others shall be carefully inspected before use. (B)

19.42 Scaffolds shall not be overloaded beyond their working capacity. (B)

19.43 Timber supports or braces of scaffolds erected and in use shall not be removed unless permitted by the supervisor. (B)

19.44 Scaffolds shall be provided with a protective roofing made of light lumber, heavy canvass or heavy wire screen, when other men are working overhead. (B)

19.45 Do not allow men to jump on or to, or hang tools on any part of, nor heavy materials to be dropped on, or anything to be thrown from, the scaffold. (B)

19.46 Workmen shall be provided shall not work on a scaffold installed outdoors during a storm or high wind. (A)

19.47 A safe means of access to the scaffold, either by stairs or permanent ladder, shall be provided. If a ladder is used, it shall be in good condition and its upper end securely fastened to prevent tipping or slipping. (A)
19.48 Scaffold shall be protected from being struck by trucks or wagons or from materials being dumped. (B)

19.49 When hoisting a load, do not let it swing against or catch on scaffolds. (B)

19.50 Good housekeeping shall be observed on scaffolds at all times. (A)

19.51 **BUILT-IN SCAFFOLDS**
   a. Uprights of built-in scaffolds shall rest on a solid foundation to prevent settling and shall be plumbed and securely fixed at the bottom to prevent shifting. (A)
   
   b. Toeboards of a least 50 mm in height shall be installed at the outer edges of the platform to prevent tools and other materials from falling off. In spite of this protection, however, precautions shall be taken especially during the process of raising the platform to a new elevation, to prevent objects from falling on the men below. (B)

19.52 **OUTRIGGERS SCAFFOLDS**
   a. Outrigger scaffolds shall not be used if another type of scaffolds can be utilized. When used, they shall be limited only to cornices and light work and shall be carefully inspected before such use by the superintendent or his duly authorized representative. (B)
   
   b. When used at heights of over three stories, outrigger scaffolds shall be at least one meter wide. (C)

19.53 **PIPE SCAFFOLD**
   a. Pipe members shall be of GI pipe, painted and kept free of scales. Use only appropriate joints such as bolts, clamps, welded joints and quick openings. (B)
   
   b. Pipes of not less than 80 mm. diameter shall be used where the scaffold has a span of not more than 3.6 m. and with a width not exceeding 1.8 m. For a longer span, the size of the pipe shall be determined by design. Hangers shall be provided for the pipe beam at least every 2.5 m. interval.
   
   c. Supporting ropes shall be securely fastened to prevent slip-off in the ends of the pipes. (B)

19.54 **STRUCTURAL STEEL SCAFFOLDS**
   a. Flooring, made of solid 75 mm. thick planks, shall cover the entire floor area of the building under construction at most within two stories below the riveter and four stories below the erectors. (B)
b. Permanent gratings, where required, and forms for concrete flooring, shall be installed without delay. (C)

19.55 SUSPENDED SCAFFOLDS
a. Outriggers of suspended scaffolds shall be well secured to the frame or structure with clamps or “U” bolts of good condition. (B)

b. Shackles or beam clamps holding the cable shall be well fastened to the outrigger and a stop shall be placed on the outside end of the outrigger. (B)

c. Only experienced men shall be assigned to operate the winches controlling the scaffold; they shall also see to it that the scaffold platform is kept well. (C)

d. Guardrails, toeboards, overhead roofs and other protections shall be inspected daily and made sure to be in good condition before use. (A)

19.56 SWINGING SCAFFOLDS
a. Blocks, anchors and outriggers of swinging scaffolds shall be securely fastened. (B)

b. Before going on or off a swinging scaffold, the workmen shall lower it to the ground or securely leashed to the building or structure. (B)

c. A platform used on swinging scaffolds shall be provided with ample guards and where necessary, with safety lines. (B)

d. Ropes used for swinging scaffolds shall be protected from acid and other substances, which might affect their strength and usability. When scaffolds are taken down, the ropes shall be properly rolled and tagged to indicate that they are for swinging scaffold use only. (B)

19.57 LADDERS
a. Ladders shall be built of strong materials and fillers shall be nailed between rungs. (A)

b. If ladders are used for two-way traffic, provide one for ascending and another one for descending. (A)

c. The upper ends of the side rails of ladders shall project no more than 1.2 m. above the point where it is resting and with lower ends set on stable footing. (B)
d. When using a ladder mounted or placed on a vehicle, the brake of the vehicle should be engaged and the vehicle properly chucked. (B)

e. In placing a ladder, the distance from the foot of the ladder to the building against which it is leaning, shall be approximately one-fourth the length of the ladder. In other words, the foot of a 12-foot ladder shall be placed about three feet away from the building. (B)

f. Wooden ladders with across-grained members or weak rungs shall not be used. (A)

g. Whenever possible, grip side rails while using ladder. If it is not practical to grip side rails, then grip rungs securely with both hands while descending or ascending. (B)

h. Do not work on a high ladder in a strong wind. (B)

i. When using a folding ladder, make sure it is fully spread before climbing. (B)

j. Always carry a ladder with the anti-slip device (rubber) towards the rear and the front and pointing upward. Be extra careful when approaching doorways and corners. When two men are carrying a long ladder, each man shall be close to his end of the ladder. (A)

k. Never place a ladder in front of a door without first locking the door or placing a man on guard. (A)

l. Keep both hands free for climbing or descending. (B)

m. Do not carry tools in your hands. (B)

n. Always face a ladder when climbing or descending. (B)

o. Keep eyes on rungs while climbing. There might be a broken rung. (B)

p. If shoes are slippery, clean them before you climb. (A)

q. Use ladders with an anti-slip device to prevent slipping. On extra slippery surfaces, or insecure contact at top or bottom of the ladder, tie the ladder at the base or have a man hold it. (A)

r. Do not permit more than one person on a ladder at one time. (B)

s. Never lean too far to one side of the ladder. (B)

t. Do not paint ladders as paint may conceal defects. Use linseed oil, clear varnish or white shellac instead. (A)
u. Defective ladders shall be repaired or otherwise destroyed. (A)

v. Untreated portable ladders shall not be left exposed to the elements when in use, but shall be kept in a sheltered place to avoid warps and cracks. (A)

w. Ladders stored horizontally shall be supported at both ends and in between to prevent sagging of the middle section, which tends to loosen rungs or cleats and warp the rails. (A)

CHAPTER III
SAFETY IN THE OFFICE

SECTION 20
OFFICE BEHAVIOUR

20.01 Running and horseplaying in work area are prohibited. (A)

20.2 Doors should not be pushed abruptly when opening or slammed when closing. Do not stay within the path of the door swing. (A)

20.3 When carrying a stack of materials, be sure you can see over and around it when walking through the office. Employees should not carry stacks of materials on stairs; they should use the elevator. When the elevator is not available, employees carrying such materials shall not have both arms loaded when using the stairs; one hand should be free to use the handrails. (A)

20.04 Employees shall not crowd or indulge in horseplay on stairs. Falls on stairs commonly occur when the person is talking, laughing and turning to friends while going downstairs. (B)

20.5 Do not congregate on stairs or landings and do not stand outside doors at the head or foot of stairs. (A)

20.06 Scooting across the floor while sitting on a chair is prohibited. Avoid leaning out from the chair to pick up objects on the floors. (A)

20.07 When a floor-mounted telephone or electrical outlet box is exposed after moving furniture, mark the box with tripping hazard sign until it is removed. The outlet shall be removed and if needed relocated. An authorized person such as one from Facilities Management –
Electrical Unit should be called to fix such thing. It is far cheaper to do this than to pay for a fall. (A)

20.08 Do not read while walking. (A)

20.09 Do not place pencils in any container with point’s outward. (A)

20.10 Keep in a safe place any pointed or bladed instrument immediately after use. Do not hand any such instruments to someone with the point towards him. (A)

20.11 Do not leave the knife blade of the paper cutter in the raised position. Do not leave breakable objects on the edge of desks or tables where they can easily be pushed off. (A)

20.12 Office machines and equipment must be operated only by authorized persons. Nobody shall be allowed to tinker with interlocks on the guards. Machines or equipment shall not be cleaned or serviced while they are in operation. (B)

20.13 Dart playing in all offices and work areas at all times, is prohibited. Dart playing shall be allowed only in places specifically designated for the game at the Company’s recreational facilities/areas. (B)

20.14 Employees must wear goggles or Personal Protective Equipment issued, if there is any, suited for the job to be performed to protect their eyes from the following hazards:
   a. Flying objects and hot metals.
   b. Injurious light and heat rays.
   c. Gases, fumes or chemicals.
   d. Dust and wind, as when boring a hole on a piece of brick. (B)

20.15 Corrective spectacles or eyeglasses may never be used as a substitute for safety goggles. (B)

20.16 A prescribed face shield shall be worn by the workers as required. (B)
CHAPTER IV
GENERAL CONSTRUCTION AND SAFETY GUIDELINES

SECTION 21
SAFETY GUIDES ON EXCAVATION ALONG HIGHWAYS

21.01 INFORMATIVE/WARNING SIGNS

a. Informative warning signs, including danger signs, shall be install at strategic locations around the construction site. Warning signs which states “Work is Going On” or “Excavation Ahead” shall be located at sidewalks and center islands along the major thoroughfares and national roads, 350 meters and 150 meters respectively, before the actual construction site. (B)

b. Standard wooden/steel barricades, painted striped black and yellow and 0.80 meter in height and 1.20 meter in length, shall be placed at strategic locations visible or around the construction site to separate the construction area from the passable areas of the right-of-ways. Along or parallel to the stretch of the excavation area with a maximum distance of 3.00 meters between each other. (B)

c. All major thoroughfares and national roads, Board-ups painted with black and yellow, 2.4meters in length and 1.5meters in total height shall be placed to enclose the stretch of the excavation area when reduction of passable road lanes is involved. (B)

d. Rubber cones, painted black and yellow, shall be used along major thoroughfares and national roads, particularly when reduction of passable road lanes is involved, so as to properly guide motorists of lane changes and the excavation work being undertaken. (B)

e. Red and/or amber flashing lights shall be installed at a height of 1.20 meters and spaced at 3.00 meters around the construction area during nighttime. These flashing lights shall be provided at material storage areas and equipment parking sites within the motorist’s passable way. Early warning devices with reflectorized surfaces may also be used as warning signs in case of breakdown of flashing lights. (B)

f. Failure to install any single barricade or EWD (completely zero) within the construction areas is a grave violation.
21.02 EXCAVATION
a. Excavations shall be done in sections of not more than one hundred fifty (150) meters at a time measured longitudinally. The remaining sections shall at all times be made passable to vehicles and pedestrians. (B)
b. No excavations shall be done which will completely close the right-of-way to vehicle use. Excavations shall be done portion by portion of not more than 50 percent of the road width at a time, leaving the remaining portion satisfactorily passable. Complete closure to vehicular passage may only be resorted to if there is a compelling reason. (A)
c. Before another section is excavated, the excavated portion (with completed utility installation) shall have been properly backfilled with appropriate filling materials, the sub-base leveled and graded, the surfaced covered with steel plates, the work area clean or loose soil or dirty stones and passable to vehicles and pedestrians prior to surface restoration. (A)

21.03 EXCAVATION CROSSINGS
a. Excavation in crossing alleys, streets, roads and passageways shall be done in half-sections; on major thoroughfares, highways and national roads, work shall be done during nighttime. (A)
b. Unfinished excavation crossings shall be provided with temporary steel plates with minimum thickness of ¾” or sufficient thickness depending on the expected traffic loads to allow safe passage of vehicles and pedestrians. (B)

21.4 CONSTRUCTION EQUIPMENT AND VEHICLES
a. There shall be specific contractors central storage site for all construction equipments and vehicles. (A)
b. Temporary storage and parking sites shall be located at the most appropriate areas in such a way that they do not affect excavation work and traffic flows. (A)
c. Work requiring the use of large equipment which may obstruct or interfere with the safe and normal flow of traffic, like concrete pouring by transit mixers and hauling/transport of materials, shall be done preferably during nighttime from 9:00 P.M. to 4:00 A.M. or when traffic volume is at light. (A)
d. Survey construction areas for existing overhead electric wires. (B)
e. Keep booms and cables of crane from power lines by at least 3.5 meters. (C)
f. Any crane or truck using a boom or derrick near electric wire shall have the chassis grounded before the boom or derrick is raised. (C)

21.05 MATERIAL STORAGE
a. Construction materials shall be piled, stored or parked in strategic places designated on the worksite in such a way that passage of
vehicles along the road and pedestrians on the sidewalks are not constricted or closed. (A)
b. Excess materials, excavated or otherwise, shall be transported immediately by the excavators to a specified or designated dumping site. No excess materials are to be dumped into adjacent areas without the approval of authorities concerned. (B)
c. Construction materials, whether excavated or otherwise, shall be stored and prevented from causing to roll, flow or wash upon passable road pavements. If and when the same are caused to roll, flow or wash upon passable road pavements, they shall be removed from the street within twenty-four (24) hours, preferably during least traffic volume or nighttime. (B)

21.06 MAINTENANCE AND CLEANLINESS IN WORK AREAS
a. The roadway or passageway shall always be maintained clean and clear of loose stones and earth materials from the excavation work which may pose hazards to the riding public and pedestrians. (A)
b. Storage location of construction materials, equipment, parking and depot shall not obstruct or block passageways unless otherwise permitted. (A)
c. No materials shall be stored that may block free passage of surface water to the storm drainage. (A)
d. Water from excavations shall be discharged to the nearest gutters and canals. Drainage pipes and canals shall be properly maintained and unclogged during construction period. (A)

21.07 DAMAGE TO ADJOINING UTILITY LINES
Accidental damage to adjoining utility lines shall be reported immediately to the agency concerned for prompt repairs to minimize service interruption and to avoid construction time delays. (A)

21.08 GAS LEAKAGE
a. Gas leakage shall be reported immediately to the gas company while measures are undertaken by the excavator to prevent ignition of any kind. (B)
b. Upon confirmation of any gas leakage, construction work shall be stopped until such time that the leakage has been properly corrected, sealed, and tested. Construction work shall be resumed only after official notification from the Gas Company concerned has been received. (B)

21.09 DAYTIME WORK STOPPAGE
a. When traffic conditions call for a night schedule, flat steel plates with minimum thickness of ¾” or sufficient thickness depending on expected traffic load shall be placed to cover the trenches or the excavated portions of the right-of-way during non working time in
order to make the areas passable to pedestrian and vehicular traffic. Steel ribs shall be welded on under the steel plates if necessary. (B)
b. Roadways and sidesways shall be cleared of any debris and/or earth materials so as to ensure safe vehicular and pedestrian use. (B)
c. Before the resumption of the excavation work, necessary signs, barricades, electric flashing lights, etc. shall be installed at strategic locations at all times. (B)
d. No materials, equipment and tools shall be stored, parked, or piled along the roadway during non-working time, which pose problems or danger to the public. (B)

EXCAVATION AND SHORING

21.10 Excavations 1.20 meters or more in depth, unless in a stable soil, rock, shale or cemented sand and gravel, shall either be sloped to the angle of repose and be supported by sheeting, sheet piling, cribbing, shoring or other support systems built in accordance with engineering standards to prevent the possibility of a cave-in. (C)

21.11 Conduct of study on pre-excavation conditions in order to evaluate changes that might occur, or situations that might develop, and in order to plan the job ahead based on these findings shall be done accordingly. (C)

21.12 Determine the location of underground water pipes using existing plans. When the excavation approaches the estimated level of such an installation, careful probing and digging shall be observed. (B)

21.13 Bracing or shoring shall be inspected frequently particularly after heavy rain or typhoon and any necessary adjustments shall be made immediately. (A)

21.14 Men who work in ditches are in danger of being hit by objects thrown into the ditch. Tools and materials lying near it shall be moved back several feet away. (B)

21.15 Use closely placed plank shoring to guard against a cave-in by soil that is saturated with water, subject to vibration, in a refill area or excavated to a depth of over 1.8 meters. (A)

21.16 In hard clay, rock or stable soil, use vertical planking braced at intervals against the walls to shore the trenches. (B)

21.17 Shoring built in accordance with standard engineering practice or procedure shall be provided on an excavation where the possibility of a cave-in exists. (B)
21.18 All open excavations shall be barricaded to warn the public and to prevent anyone from falling into them. When an excavation shall remain open for the duration of the construction work, barricades, fences and warning signs are necessary. In cases where watchmen and flagmen are needed, flares, lanterns or flashing lights at night, shall always guard the construction or working areas. (C)

21.19 Unless the men working underground are protected by roof, materials or tools shall not be passed over their heads. (A)

21.20 **MACHINE EXCAVATION**

a. No digging machines shall be allowed to excavate close to underground water facilities. Establish proximity limits for machine operation and complete the excavation by hand digging. (C)

b. When excavation is being done, workmen shall be warned of underground waterline facilities, for a careful operation of driving picks, pavement breakers or other powered tools. (C)

c. Materials excavated by machine shall be thrown at least 60 cms. from the edge of the excavation. (A)

d. Pick and shovel men working in an excavation shall be kept far apart enough to prevent injury to one another. (B)

e. Excavated materials shall be placed at least 35 cms. from the wall of the excavation unless boards are installed to prevent fallback. (A)

21.21 **TRENCH EXCAVATION**

a. A trench of 1.2 meters deep or more shall be provided with portable ladders to facilitate safe entrance and exit. The ladders extend from the bottom of the trench to at least 0.90 meters above the surface of the ground. The horizontal distance in between ladders shall be eight (8) meters. (A)

b. In hand-excavated trenches, the end of braces to stringers shall be secured to prevent the braces from being knocked out of place. (A)

c. Workers shall wear hard hats when they are inside a trench. (B)

d. Workers shall wear eye and foot protection when they are using a jackhammer or when they are exposed to flying particles or falling objects. (B)

e. Employees shall not go under an overhanging bank when working near one. (B)
21.22 **TEMPORARY WALKWAYS**

a. Temporary walkways at least two planks wide, shall be created to construction areas, if necessary, to prevent any hazard or accident to passing public. (B)

b. The span between bearing points of two (2) planks, 5 cms. thick and 20 cms. wide, shall be over 2.5 meters and the planks shall be tested before being placed in use. (B)

c. Aisles and walkways shall be kept clear of obstructions. (A)

21.23 **GOOD HOUSEKEEPING**

a. Materials shall be piled and stored in an orderly manner and properly secured from falling over. Employees and/or contractors shall observe the standard operating procedures on materials handling and good housekeeping applicable to the job or type of work in the construction site, which procedures affect the image of the company. (B)

b. Materials shall be stored in such a way as not to obstruct fire exits, fire protection systems, vehicular traffic, electrical boxes and stairways. (B)

c. Remove or bend all protruding nails. Cracks, splinters, ruts and breaks in the floor shall be reported and/or repaired as soon as they are discovered. (A)

d. It shall be the responsibility of the Safety Engineer/Authorized representative to see to it that the working place is kept clean and orderly. (A)

e. Oil, grease or other slippery substances on floors, rumps, pathways, shower rooms, etc., shall be wiped off or removed. (B)

f. Leftovers or cuttings on the job, such as lumber, rebar, steel, welding butts, etc., shall not be left around where they will pose as tripping and falling hazards. They shall properly dispose of or stored if still usable. (A)

g. Waste or trash drums/cans shall be placed in strategic places in the work areas. (A)

h. Aisles and passageways shall be properly lighted, marked and kept clean of obstructions. (B)

i. Lockers shall be cleaned out and inspected periodically to prevent unhealthful or unsanitary accumulation. (A)

21.24 **MATERIALS HANDLING AND STORING**

a. Gas cylinders shall be transported in a special handcart. A cylinder cage shall be used when hoisting or lowering oxy-acetylene or any other compressed gas cylinders. (A)

b. When using compressed gas, see to it that the cylinder tank is upright position, properly secured and well protected from any falling objects and slag. (B)
c. Cylinders shall not be allowed to come in contact with energized conductors or ground wires from electrical equipment. (B)

d. Special wrenches of non-sparkling materials shall be used to remove cylinder bungs. Steel chisels and hammers shall never be used to remove bungs. (A)

e. Employees shall never tamper the safety relief devices of cylinders nor shall they force connections that do not fit. (B)

f. Oil or grease shall not be used for lubricating valve gauge connections or other parts of the oxygen system. (B)

g. All oxygen and acetylene cylinder shall be closed when the cylinders are empty. (A)

h. Workmen with greasy hands shall never change pressure regulators. (A)

i. A leaking cylinder shall never be used. (B)

j. A flame shall not be used to detect flammable gas leaks. Use soapsuds. (D)

k. The recessed top of cylinder shall not be used as a place for tools. (A)

21.25

MANUAL HANDLING

a. the safe limits for frequent lifting is fifty (50) pounds for the average male worker and twenty-five (25) pounds for the average female worker with the object in compact form. If the worker is in doubt as to the weight of an object, test lift will indicate whether or not it is within the workmen’s lifting power. (A)

b. When lifting heavy objects, make sure that your footing is secure. Assume a squatting position with your back erect and raise the object by straightening the legs. This method brings leg muscles into use and lessens back strain. (A)

c. Get firm grip of the object to be lifted. It is important before lifting to have the hands as well as the object free of oil, grease or other slippery substances. (A)

d. When one man has to handle long materials, such as pipes, lumber or ladders, he shall keep the prong end high and the rear end low especially at corners or other places where vision is obstructed. (A)

e. When a worker is to lift a heavy or bulky object and carry it to another point, he shall first inspect the route to be taken, making sure that there is no obstruction or spilled substance on the floor that might cause him to trip or slip. Make sure clearance is sufficient. If there are obstructions, look for a safe route. (A)

f. When moving heavy objects, including tanks, pipes or steel drums in an inclined direction, ropes or other tackles shall be used to control their motion. In no case shall anyone be permitted to stay on the downhill side. (B)
g. Before an object is taken from a pile of stock, see to it that the object is not supporting another that might fall when the support is removed. (A)

h. Wear prescribed leather working gloves when lifting or handling materials with rough surfaces, sharp edges and those with sliver (A)

i. Wear chemical gloves or their equivalent when handling corrosive chemicals such as acids, alkaline, etc. Have plenty of clean water close at hand. (B) 

j. Wear prescribed asbestos hand gloves when handling hot objects or materials. (B)

k. When storing and handling pressurized gases such as oxygen acetylene, hydrogen, etc., the cylinder tank shall be properly and tightly capped, placed in an upright position and stored away from heat and firmly fastened to prevent it from falling or tripping over. (B)

l. When handling pipes with the use of winch or cable, be sure that the pipes are securely tied and balanced to avoid slippage. Taglines shall be used when maneuvering or positioning the pipes. When it becomes necessary to use the hands directly to maneuver the pipes, extra care shall be exercised to prevent them from being pinched. Also, when setting materials down, keep fingers away from points. (B)

21.26

MECHANICAL HANDLING

a. For lifting heavy loads, wire rope slings are preferable than chains. Either chain or wire rope, the working capacity shall not be exceeded. At points where rope slings passes around sharp corners of steel, padding shall be provided. (A)

b. A steel member shall not be hoisted to its structural position until it is ready to fasten in place. (B)

c. Suspended loads shall be controlled by a tagline. (B)

d. Each piece of steel shall be securely bolted before the hoist line is removed. (C)

e. CABLE

1. Inspect all cables regularly and replace those that are worn out, frayed or with broken strands. Kinking and twisting of the cable shall be carefully avoided. (B)

2. A separate wire rope shall be used to secure coiled cables. (A)

3. Cables shall be lubricated only with the prescribed lubricants. (A)

4. All cables strung less than three (3) meters from the floor shall be properly guarded. (A)

5. In attaching cable clamps, it is important to have the “U” bolt over the short end of the cable. (B)
6. In determining the number and sizes of “U” bolts to be used, refer to standard instructions. (A)
7. Cables and slings shall not be stored in an open area. (A)
8. Wire rope removed from service due to defects shall be cut up or plainly marked as being unfit for use. (A)

f. CHAINS
1. Chains shall be carefully and regularly inspected for cracks or flaws. Chains break is without warning. The competent shop shall only do heat-treatment and repair of chain link. (B)
2. Check for elongation and shearing out of chain links. If a chain has been stretched three percent or more or found with defects, it shall never be used. (B)
3. Engine drive chains shall have a steel guard extending from headboard following contour of line-shaft sprocket to derrick floor behind drum. The guard shall be fitted to allow not more than ten (10) centimeters. Clearance between sprocket and guard. (B)
4. Chains shall not be subject to sudden shock while in use. Loads shall not be lifted with a kinked or knotted chain. (C)

g. HOOKS
1. Hooks shall be inspected regularly. Those found straightened or deformed shall never be used. (B)
2. The hook’s working capacity shall not be exceeded. (B)
3. In the absence of the spring action claw lock, hook opening shall be properly tied to prevent cable slings from slipping or jumping out of the hook. (B)

h. PULLEYS
1. Sheaves of the largest practical diameter shall be used for all cable installations, regularly inspected, particularly there pins and kept well maintained. Worn-out sheaves shall not be used. (A)
2. Maintain proper alignment of sheaves and drums to avoid wear and tear of their sides as well as of the cable. (A)
3. Blocks or pulleys intended for hemp ropes shall not be used for cables. (B)
4. Blocks or pulleys shall be well anchored. When located near the floor or in other exposed places, they shall be properly guarded. (A)

i. ROPES
1. Rope shall not be used beyond their working capacity. (B)
2. Wet ropes shall be properly dried before use. (A)
3. Ropes shall not be dragged over sharp-edged objects, rough surfaces, or over other ropes lying on the ground. (A)

4. Ropes shall be regularly inspected for kinks, and weak portions, such as worn-out fibers, cuts, burns, etc. Defective ropes shall be turned in for replacement. (A)

5. When load does not ride “ride” properly when being raised with a rope, lower the load and readjust the sling. (A)

6. No person shall ride on the load or hook while it is being moved. (C)

7. Loads being raised with ropes shall never be swung over the heads of people. (C)

21.27 TEAM LIFTING AND CARRYING

a. When two (2) or more men shall carry a single object, they shall adjust the load in such a way that each person has an equal share of the weight. Test lifts shall be made before proceeding. (A)

b. When two men carry long sections of pipes or lumber, they shall carry this on the same shoulder and walk in step. Shoulder pads will prevent cutting of the shoulders and help reduce fatigue. (A)

c. When a gang of men carries a heavy object like a beam or pipe, the foreman shall direct the work and special tools such as tongs shall be used. (B)

21.28 STORAGE

a. Both temporary and permanent storage areas shall be neat and orderly. (A)

b. When planning materials storage, make sure that materials do not obstruct fire alarm boxes, fire extinguishers, first aid equipment, light, and electric switches and fuse boxes. All exit and aisles shall be kept clear at all times. (B)

c. There shall be at least a half-meter clearance below sprinkler heads to reduce interference with water distribution. This clearance shall be increased if the material being stored is very flammable. (A)

d. Highly toxic substances, such as cyanides and soluble exalates, shall be kept in containers of distinctive shapes if they shall be handled manually. (A)

e. Storage of flammable liquids in containers shall not be permitted. Approved containers for flammable liquids shall be closed after each use and when empty. Warning levels shall be removed from flammable liquid containers when empty. (B)

f. Stocks of gaseous materials shall always be stored in bottle racks. (B)
g. Smoking is strictly prohibited inside or within the vicinity of the storeroom containing flammable liquids or gases. (C)

h. Barrels and kegs shall be piled one atop the other. A plan shall be laid on top of each row of kegs or barrels before others are placed above them. (A)

i. Safe floor load capacity and maximum heights to which specific materials may be piled shall be posted conspicuously. (A)

j. Aisles and unloading areas shall be clearly marked in accordance with the National Standard Safety Color Code. (A)

k. Aisles leading to fire-extinguishing equipment and electrical panel boards shall be kept clear. (B)

21.29

CLEANING STORAGE TANKS

a. A tank shall be gas-freed before any work is performed inside it. (B)

b. A worker shall not be allowed to enter a gas or oxygen deficient tank unless absolutely necessary with the appropriate respiratory protective attire. Another worker shall be assigned outside the tank for possible assistance to the man inside the tank. (B)

c. To have an accurate estimate of amount of flammable or toxic vapor present in the tank, a gas detector shall always be used. (B)

d. Workers shall always have a clear path of escape from a tank and shall bear in mind that they may have to use it in a hurry. A ladder shall always be used when a tank shall be entered from above and it shall be left secured in place until the last man is out of the tank. Under severe conditions, a lifeline is recommended to assist with the rescue work. (B)

e. Burning, welding, cutting and spark-producing operations shall not be permitted in a tank until the area has been thoroughly cleaned and its atmosphere has been determined free from flammable or toxic vapors. Where any vapor is present, further ventilation will be required to remove the vapor from the tank. (C)

f. Gas tests shall be made frequently if the presence of gas is suspected. (C)

21.30

STORAGE OF CYLINDERS

a. Cylinders shall not be placed or stored in a place where sparks from welding or cutting operations could reach them. (B)

b. Cylinders containing acetylene or oxygen shall not be stored in a general storeroom. They shall be stored separately in a well-ventilated fireproof area. (B)

c. Compressed gas cylinders shall be stored vertically with the shipping or protection caps on. All cylinders shall be chained or otherwise fastened firmly against a wall, post or other solid objects. (B)
d. Extremely corrosive gases like chlorine shall be stored in small quantities only, unless it is used in a relatively short time. (B)

e. Empty cylinders shall be stored apart from full or loaded cylinders. (B)

**21.31 PIPE WORK**

a. When opening a pipe joint, either to disconnect a section or to insert a “blind”, loosen the bolt and crack joint slightly first to make sure there is no pressure on the line. Be careful to keep yourself clear on escaping gas or liquid. (B)

b. If there is a possibility that liquid or acid might escape due to pressure when the flange is opened, a chisel (or an effective tool to open) shall be used first. Drive the chisel in small sheet of lead or rubber that shall be allowed to remain on the chisel to shield the worker from any emission. (B)

c. Consult the supervisor on the right material to be used for gaskets or packing for various temperatures, chemicals and pressures. (A)

d. Do not stand on pipelines. If there is a need for a worker to work overhead where the footing is insecure, a scaffold or ladder shall be provided. Use safety belts and lifelines if necessary. (B)

e. To avoid getting your fingers mashed or your hand cut by frayed thread projections, avoid handling pipes or other materials inside it. (B)

f. When several men carry pipes or other materials, lifting and lowering shall be done at a given signal and their feet in clear. (B)

g. When unloading pipes from trucks, lower individual pieces by snubs all the way down the skids. Do not stand between the skids while the pipes are being lowered. (B)

Tanks, towers or vessels shall not be entered unless there is an instruction from the supervisor. (B)

h. Push pipe tools away from your face or head. If it is necessary to pull on the tools, pull it gradually so that your face will not be struck if the wrench slips. (A)

i. Use a wire brush or rage to remove cut off pipes. Do not wipe them with your bare hands or jar loose with a hammer. (A)

j. Pipelines shall not be left suspended in the air as there is danger of dropping or someone might walk on them. All incomplete lines shall be properly braced and capped. (C)

k. If lines are laid down close to the ground, ramp shall be built over the pipe to serve as a makeshift runway. (B)

l. When aligning a pipe in the trench with either manual or mechanical power, keep hands and fingers away from the ends of the pipe and other substructures that may cause injury by crushing. (B)
m. Rubber gloves, goggles and suitable clothing shall be worn while working near and other toxic chemicals. Have plenty of clean water nearby. (B)

n. If tongs (panipit) are temporarily left on a pipe, one man shall hold them so they will not fall. Falling tongs have caused many foot injuries. (A)

o. Place pipe supports firmly under the line so a heavy weight cannot be easily thrown to one of several workmen as this may cause sprained backs or mashed feet if the pipe falls. (B)

p. Bolt holes in flanges shall be lined up with a drift pin. Keep fingers off flange holes as they might be cut off. When connected line pipe is being lined with a drift pin with the use of pry holes, the pipe shall be pushed and not lifted to avoid sprained back.

q. If tongs are used as back-ups while fittings are being set or while coupling is being pulled, operators and other persons shall stay away from the area. (A)

r. Be alert to unsafe conditions of trench sides when measuring, testing or inspecting pipes in place on a trench bottom. (B)

s. When cutting sections of a pipe, keep your feet off the danger zone, and use adequate blockings, chocks or pipe vises to prevent pipe movement during the process. (B)

t. No attempt shall be made to weld on a line with oil by the use of the oxyacetylene method. (D)

u. Never make electric welds on gravity lines. The lines might contain air and gas with explosive properties. (D)

v. Air should never be used in clearing or testing pipelines that contain oil or gas, unless the contents have been completely displaced with water. Before water is introduced, nevertheless, a swapper or rubber plug shall be placed between the water and the gas or oil which is being displaced. (D)

w. Anytime a line is being constructed, reconditioned or repaired and is left open to the atmosphere, one end shall remain open when oil or gas is injected into the line so that the air inside the pipe may be blown out to prevent excessive pressure of the combustible mixture. (B)

x. Keep tools and appliances in good condition for the handling, cutting, threading or treatment of pipes. Always be sure the tool for the right job. (B)

21.32 PIPE STORING

a. Small pipes shall be stored in racks according to lengths and sizes. (A)

b. Pipes shall always be blocked to prevent it from rolling or falling. (B)

c. Threaded pipes shall be handled with care for threads are sharp and can cause injury. (A)
d. Pipes larger than 5 cm., in diameter, shall be stocked in storage with spacing strips placed between each row. (B)
e. Each row of stock pipes shall be arranged by block to prevent rolling from the pile. (A)
f. Pipes shall never be withdrawn from a lower row. (B)
g. Pipe yards and walkways shall be maintained in a clean and orderly manner at all times. (A)
h. In pipe storage areas or where a crane handles allied pipe materials, men shall be conversant with the signals used by the operator and shall stay clear of the load/s path. Standard signals shall be used only. (A)

21.33

**PAINTING**
a. No smoking on an open flame shall be permitted in the immediate area of the paint of operation. (B)
b. When painting indoors or in closed areas, care shall be taken and necessary provides sufficient ventilation. (A)
c. Paint-soaked rags shall not be left in lockers. They shall be spread out in proper place to dry or be placed in a metal container. (A)
d. Workers shall wash paint off their hands before handling food to avoid poisoning. They shall never eat in workrooms or other places where food may be exposed to lead dust fumes or toxic chemicals. (A)
e. Paint in which turpentine has been used, as thinner shall not be applied on hot surfaces as this might cause vapor to ignite or worker might be suffocated by the fumes emitted (B)
f. Provide grounding devices for paint guns when painting an area where flammable gas is present. (B)
g. Spray hoses shall be securely fastened to a scaffold so it cannot come loose and drag the man off. (B)
h. Never used suds or caustic solutions in spray-painting equipment. (A)
i. Reenergize switchboards, transformers and electric equipment before painting them. (C)
j. Spray painting shall not be done around lights that are not vapor-proof unless current is cut off. (B)
k. Never exceeds the pressure on spray-painting equipment as prescribed by its manufacturer. (A)
l. When using pressurized containers, see that release valves are functioning and equipped with pressure gauges. (B)
m. Workers shall wear the prescribed air respirators or gas masks, as their work requires. (A)
n. Workers shall cleanse their skin thoroughly of any coating materials. Do not use thinner to remove paint from hands or skin. Use only the recommended creams and cleansers. (A)
WOODWORK

a. Only experienced and authorized workmen shall operate woodworking machines that have the responsibility for their proper care and of reporting any defect or damage thereto.

b. The supervisor or foreman-in-charge of the unit shall conduct periodic inspection of woodworking machines, tools and other equipment and to see to it that such tools, machines and equipment are in good working condition. (A)

c. Good housekeeping shall be practiced in and around the working area. (A)

d. Smoking is strictly prohibited inside the woodworking shop. (B)

e. Under no circumstances shall machine guards, gauges or guides be adjusted while the machine is running. (B)

f. Never leave a woodworking machine with power on. (B)

g. All portable electrically driven tools shall be provided with grounding devices before use. (B)

h. Workmen shall wear prescribed and issued (if there is any) personal protective equipment while at work. (B)

i. Never reach anything over a power saw. (B)

j. When operating a power saw, do not stand in line with it. Stand on one side to avoid being hit by a possible kickback. (A)

k. When sawing board with a handsaw, hold board with your hand on the long end. Your body shall be perpendicular to the motion of the saw. Do not crowd or twist saw. (A)

l. Discontinue using a warped or dented saw. Do not use a saw having its teeth filed to a backward pitch. (A)

m. Do not allow sawdust to accumulate on the floor. (A)

n. Shut off power saw when not in use. (B)

o. Avoid using saw facing the direction of the wind or with head below the level of the board. Sawdust will get into your eyes. (A)

p. Drill a hole with an awl, auger, drill, boring bit or drive a nail when starting a screw. On rough work, it is advisable to drive a screw halfway with a hammer. (A)

q. When carrying a window glass, it shall be outside of your arm with palm of one hand facing outwards and the other reaching across the body grasping the glass top. Keep sleeves rolled down and cuffs buttoned around wrists. (A)

r. When a large amount of glasswork is being done, protect fingers and wrists by wearing leather gloves and cuffs. (B)

s. When one blade is removed from planner spindle for sharpening or for some purpose, all other blades shall also be removed at the same time. This is to prevent blades from being hurled from the spindle when the machine is started accidentally. (B)

t. Woodworking machines shall have a master switch that can be locked. (A)
u. Every machine shall have a “stop” switch conveniently located within easy reach so the operator can shut off the power in case of emergency. (A)
v. Conversation shall be avoided while an operator is running the woodworking machine. Employees shall not interfere with or distract the operator’s attention. (A)
w. Saw shall not be stopped too quickly, so that not a piece of wood shall be thrust against the cutting edges when power is shut off. (B)
x. When fabricating pieces where several kinds of wood are to make up the same piece, that is both soft and hard wood tendons together, care shall be taken when forming a circle or making a deep cut. Stock is likely to jerk away from the operator. Unless held firmly, this might cause serious injury. (B)

21.35 MASONRY
a. If concrete is being chipped in an area where combustible gas is present, that part of the slab being chipped shall be kept under a constant stream of water or the slab itself shall be kept underwater. (B)
b. Do not backfill against newly constructed walls. (A)
c. Never put guys or stays through brickwork until they have set firmly. (B)

21.36 DEMOLITION OF STRUCTURES
a. Keep the public and unauthorized personnel at a safe distance away from structure by the use of barricades and signs, or protective temporary walls as the case may be. A watchman may be assigned when necessary. (D)
b. Disconnect utility services (gas, steam, electricity) outside the building. Maintain water lines as long as possible, or install a temporary water source for fire protection and for wetting down the site to reduce dust. (C)
c. Before start of demolition, all stored materials and all glass doors and windows throughout the structure should first be removed. (B)
d. Structure being supported by part of the building to be demolished should first be temporarily supported before demolition work commences. (D)
e. When demolishing walls, workmen shall use scaffolds supported independently of the walls. (C)
f. Debris should be removed promptly. (A)
g. Barricade any area where material is being dumped, and place screens where necessary to protect workmen from flying pieces. (B)
h. Employees shall not work below each others. (C)
CHAPTER V
GUIDELINES ON HANDLING OF VEHICULAR, PERSONNEL
ACCIDENTS AND DAMAGES

FLOWCHART

Receive cases of accidents and advise the Safety Engineer to conduct investigation.

Conduct preliminary investigation and evaluate the degree of accident.

Conduct further investigation on the reported accident, if necessary.

Is it the employee's fault?

No

Prepare the Investigation Report and forward to ADMIN for claims processing.

Yes

Gather all information related to the cause of accidents.

A

RESPONSIBILITY

Department Head

PROCEDURE

Receives cases of accidents either from Sector/Branch Manager or from the personnel involved and advises the Safety Engineer to conduct investigation.

Conducts a preliminary investigation and evaluates the degree of the accident.

Based on the result of the evaluation, conducts further investigation on the accidents, as necessary.

If employee is not at fault, prepares the Investigation Report and forwards to ADMIN for claims processing after review and approval of Department Head of Safety.

Gathers all the information related to the cause of accident, e.g. police/barangay report, notarized sworn statement and report of supervisor. These shall form part of the evidences against the erring employee.
FLOWCHART

A

Prepare Investigation

Initially review the Investigation Report

Review the Investigation Report

Investigate and determine the cause of accident

Confirm and sign on the investigation report

To HROD

RESPONSIBILITY

Safety Engineer

Head, Safety Section

Department Head of Safety

CSC-Accident Review Committee

SAVP-EMS / VP-CCFRM

PROCEDURE

Prepares the Investigation Report.

Performs initial review of the reports prepared by the Safety Engineer pertaining to the accident that occurred.

Review the Investigation Report.

Confirms the result of the investigation and signs on the report. The investigation report will be forwarded to HROD for appropriate action.
SECTION 22
GUIDELINES COVERAGE

22.01 The guidelines shall cover the following:

1. Identification of responsibilities and functions of all concerned in the timely and thorough on-site investigation of the accident or incident.
2. The review of the accident or incident and the rendition of decision and recommendation by the Central Safety Committee and its Sub-Committees.
3. The preparation of various reports pertinent to the accident, i.e., Accident report, Decision and Memorandum, etc.
4. The imposition of corresponding penalties shall be in accordance with the provisions of the Safety Code, and Human Resources and Organizational Development (Administration-HR) Policies on Disciplinary Action, whichever is applicable,
5. including Labor Code of the Philippines, Civil and Criminal Law, if necessary.

SECTION 23
DEFINITION OF TERMS

23.01 Vehicular Accident- an accident in which a company vehicle and/or mobile equipment is involved.

23.2 On-duty Personnel Accident- an accident in which an employee sustains injury while in the performance of his duty.

23.03 Off-Duty Personnel Accident- an accident in which an employee sustains injury while off-duty.

23.4 Major Personnel Accident- an accident which is fatal or which results to severe injury as determined by the attending physician / hospital. Or the patient is advised to rest or recuperate for more than seventy-two (72) hours.

23.5 Minor Personnel Accident- an accident, which results to superficial injury as, determined by the attending physician/hospital. Or the patient is advised to rest/recuperate for not more than seventy-two (72) hours.

23.6 Public Accident-an accident involving Company personnel and /or facilities and the public wherein injury is sustained or property is damaged.

23.09 Fire Incident- an incident in which Company property is endangered or damaged due to fire.
23.10 **Vehicle Damage** – is any harm or injury to company (MAYNILAD WATER) vehicle or equipment that lessens value or usefulness done either intentionally or unintentionally and by accident or negligence.

**SECTION 24**

**GENERAL RESPONSIBILITIES**

24.01 The Safety Engineer/ authorized representative shall conduct a thorough safety investigation of an accident or incident that involves a company vehicle or personnel of an organization. He shall ensure that the required Vehicular Accident or Personnel Accident Report and Investigation Report is prepared and submitted within the prescribed period. For expediency, concerned Department Manager or supervisor shall also conduct initial investigation of vehicular accidents within his jurisdiction.

24.02 Central Safety Committee Base Radio stationed in Safety Department Office shall serve as coordination/communication link during the incident and its immediate aftermath. On duty personnel manning the base radio shall coordinate with MAYNILAD WATER Call Center from time to time to verify any report of accident coursing through them.

24.03 Legal Department shall attend to all legal aspects of the incident.

24.04 MAYNILAD WATER medical clinics shall attend to the medical or first aid needs of the employee involved in the accident, as appropriate. They shall also supply the necessary medical information on the accident reports.

24.05 The Central Safety Committee shall review the cause of the accident/incident, render a decision and recommend appropriate action to management.

24.06 Employee involved in the incident/accident shall be responsible for informing the concerned offices, preparing the necessary reports and cooperating with the personnel handling the investigation.

24.07 The Department Head or Division Head of the employee involved in the accident/incident shall ensure that the accident/incident is reported and investigated as prescribed in these guidelines. The enforcement of corresponding penalty must be imposed in accordance with the provisions of the Safety Code or Administration-HR policy on Disciplinary Action whichever is applicable.
The Safety Department and/or Central Safety Committee and its Sub-Committees shall follow up all decisions on accidents/incidents to ensure its implementation. They shall keep a file of the accident reports and analyze the possible causes of the accident and make the recommendations when advisable.

The immediate Supervisor and/or Team Leader shall prepare the Accident Report, if the employee concerned is incapacitated, or an investigation report on the accident in the absence of the Safety Engineer.

Division Head/Line Manager and Supervisor shall check compliance or implementation of this policy.

Central Safety Committee, under concurrent authority, shall oversee implementation of the penalties and the corresponding compensation/assistance in rehabilitation to be accorded to our employees who suffered injuries in accordance with existing policy or law.

Administration/ HR shall update the employee’s 201 file to reflect the penalty/ commendation due him.

Fleet Management Department shall ensure that all MAYNILAD WATER company Vehicles have at all times their xeroxed current Car Registration (CR), Official Receipts (OR), and copy of certificate of insurance.

All types of report of company vehicle damages of any kind shall be documented by Fleet Management, copy furnished SaSD or the Central Safety Committee.

SECTION 25
GUIDELINES AND PROCEDURES

The following are the guidelines and procedures in handling Vehicular, Personal Accidents and damages to company vehicle. A.) Vehicular Accident

1. Vehicular Accident Reporting
   1.1 In cases of accident involving Company Vehicles, the employee-driver should report the accident at once to his supervisor and to MAYNILAD WATER Call Center giving details of the accident. MCC, in turn, shall
advise the Safety Department or Central Safety Committee and the Legal Department regarding the matter. The property Management Section, Treasury Department and the Fleet Management should also be informed immediately by the supervisor with regard to company vehicles involving accidents for insurance coverages. The Fleet Management shall document, after inquiry or investigation, any damages to the company vehicle/s, copy furnished Safety Department or Central Safety Committee for the latter to determine violations of company policy of erring employee.

1.2 Any company vehicle/equipment damage report from Security Agency (e.g. Goldlink) shall be forwarded to Administration-HR for Adhoc investigation, copy furnished Fleet Management for documentation or further inquiry, then the latter will copy furnished Safety Department or the Central Safety Committee for review and evaluation.

1.3 The employee-driver should ensure that the Company vehicle is equipped with updated Car Registration (CR)/ Official Receipt (OR) at all times, including copy of Certificate of Insurance.

25.2 VEHICULAR ACCIDENT INVESTIGATION

a.) As a general rule, the concerned Safety Engineer or Legal Investigator shall investigate any vehicular accident/s. In the absence of the Safety Engineer or Legal Investigator, the immediate supervisor of the latter involved in the accident shall conduct the investigation copy furnished Division/Area Manager, Safety Department, and Central Safety Committee. However, after the initial investigation conducted, he shall then coordinate with and turn over the responsibility to the concerned Safety Engineer or Legal Investigator for final disposition and render/submit investigation report. CC: Division/Area Manager, Safety Department and Central Safety Committee.

When proceeding to the scene of accident, the Safety Engineer/Legal Investigator shall always make available the necessary forms; such as Undertaking, Waiver, other pertinent documents for the said purpose.

b.) In case the Legal Investigator is not available at the scene of the accident and the third party admits fault for the accident or waives claim for damage, the Safety
Engineer and/or supervisor may, after proper clearance from Legal Department, have an Undertaking or Waiver (as the case maybe) accomplished and signed by the third party. c.) In case the Legal Investigator cannot respond within reasonable time, and neither the employee nor the third party admit fault, then the Safety Engineer and/or supervisor shall, upon clearance from Legal Department, bring the matter to the nearest police headquarters/precinct to file a police report.

c.) In case the accident caused no damage to Company property but a third party suffered minor injuries/damage and the third party agrees not to claim for damage, the employee-driver, in the absence of both the Safety Engineer and Legal Investigator and upon proper clearance from Legal Department, may have a Waiver accomplished and signed by the third party.

d.) Any report (documented or undocumented) of any source of damages to company vehicle, the Administration-HR, Safety Department or Central Safety Committee shall have a copy for further conduct of thorough inquiry, if necessary, to determine the following:
  1. Cause of accident.
  2. Determination of culpability and appropriate penalty.
  3. Remedial step to avoid future occurrences.
  4. As an aid of policy making.

25.3 PREPARATION OF VEHICULAR ACCIDENT REPORT

1. The employee concerned shall accomplish the Vehicular Accident Report (VAR, See Exhibit II) accurately and completely within 48 hours from the time the accident occurs. The VAR shall be signed by the employee and noted by his immediate supervisor and Department Head.

2. The available Safety Engineer or Legal Investigator, after conducting investigation of the accident, shall accomplish the Vehicular Accident Investigation Report (See Exhibit II). This report shall be routed to the concerned Department and Division Heads within 24 hours (or the next working day) from the time the accident was reported to him.

3. In the absence of the Safety Engineer or Legal Investigator, the employee’s Supervisor who conducted the investigation shall prepare the investigation report.

25.4 REVIEW OF ACCIDENT/ RENDERING OF DECISION

1. The Central Safety Committee Chairman shall create the Accident Review Committee and schedule their reviews for
decision/action. This committee shall consist of the Chairman or vice Chairman, the concerned Safety Engineer, two other members of the Central Safety Committee and the Department Head of the employee involved. The Department Head shall remain with the Committee only during the review of the accident involving the employee under him.

2. The presence of at least three members, namely, the Chairman or Vice-Chairman, the Safety Engineer and the Department Head of the employee involved shall constitute a quorum and may proceed with the deliberation of the case.

3. The Safety Engineer shall furnish each member of the Accident Review Committee a copy of the Vehicular Accident Report/s and his Investigation report/s before the scheduled date of deliberation.

3. The Accident Review Committee shall complete the review of the accident and render decision within 15 calendar days from the date of its occurrence. The committee members shall indicate their remarks and individual decision on the Vehicular Accident Decision Form (Exhibit III). The decision of the Accident Review Committee shall be final and executory.

5. The available/assigned Safety Engineer shall then prepare a Decision Memorandum containing pertinent information regarding the accident (see sample, Exhibit IV) addressed to the concerned Department Head. A copy of each of the Vehicular Accident Report, Vehicular Accident Decision form and Decision memorandum shall be furnished to Safety Department.

6. The Department Head concerned shall impose, if applicable, the corresponding penalty in accordance with the provision of the Safety Code, within three (3) working days from the receipt of the Decision memorandum. The Department head shall furnish Safety Department, Fleet Management Department, Administration-HR and Legal Department with copies of the memo-imposing penalty.

SECTION 26
PERSONNEL ACCIDENTS

26.01 MAJOR PERSONNEL ACCIDENTS

1. Accident Reporting

Any major injury sustained by an employee must be reported at once to the employee’s immediate supervisor or superior who shall promptly
report it to MAYNILAD WATER Call Center. MCC, in turn, shall notify the following: Division/Business Area Manager, Safety Department, Legal Department, Administration-HR, and Fleet Management Department.

26.02 **ACCIDENT INVESTIGATION**
1. The supervisor may conduct an initial investigation of the accident and prepare a preliminary report citing the employee involved and circumstances surrounding the accident. He shall submit the report to the Division/Business Area Manager within 24 hours from the time of accident.
2. The available/assigned Safety Engineer shall further conduct a detailed investigation and prepare a final report indicating his findings and conclusion. The report shall be routed to the Division/Business Area Head and Department Head within 15 calendar days, copy furnished the chairman, Accident Review Committee.
3. The Legal Investigator shall proceed to the scene if a third party is involved or if the accident caused serious physical injury to the employee.
4. In the absence of the Safety Engineer, the immediate Supervisor of the employee involved shall conduct the investigation and prepare the report.

26.03 **PREPARATION OF PERSONNEL ACCIDENT REPORT**
1. The employee concerned, or in his incapacity, his immediate supervisor, shall accomplish the personnel Accident Report (PAR, Exhibit I) citing the account of the accident. The employee concerned and noted by his immediate Supervisor shall sign the report. If the personnel accident is the result of a vehicular accident, a VAR shall also be prepared as prescribed in these guidelines (Item V-A.3)

26.4 **REVIEW OF MAJOR ACCIDENT/RENDERING OF DECISION**
1. The Accident Review Committee shall review the circumstances surrounding the accident and render a decision within 24 hours from the time the accident occurred.
2. The Accident Review Committee may also recommend a penalty for other company employee/s or contractor’s employee/s who may be involved in the accident based on its findings.
3. The available/assigned Safety Engineer shall route a copy of the Decision to the Division/Business Area and Department Heads. A copy of the decision report shall be furnished to Safety Department, Legal Department, Administration-HR and Fleet Management Department.
4. The Department Head shall impose the penalty /give commendation whichever is applicable, to employee/s involved in the accident within three (3) working days from the receipt of the decision by preparing a memo which shall be signed by the employee/s involved, a copy
furnished to Safety Department, Administration-HR and Legal Department and Fleet Management Department.

26.05 MINOR ACCIDENT

1. Accident Reporting
   The employee shall report minor accidents to his supervisor and the concerned Safety Engineer, particularly if the cause of the accident represents a potential safety hazard for prompt action.

2. Accident Investigation.
   Investigations on minor accidents shall be undertaken by the concerned Safety Engineer.

3. Preparation of Personal Accident Report
   3.1 The employee concerned shall, after seeking medication from MAYNILAD WATER Clinic or nearest hospital, accomplish the Personnel Accident Report.
   3.2 The attending doctor/nurse shall fill-up the medical report portion indicated in Personnel Accident Report.
   1.3 The employee concerned shall then submit the Personnel Accident Report to the Safety Engineer.
   1.4 The Safety Engineer shall indicate the pertinent information in the report, including his recommendation. A copy of the report shall be routed to the Division/Business Area and Department Heads, copy furnished to Administration-HR, Safety Department, Legal Department and Fleet Management Department.

SECTION 27

27.1 OFF-DUTY PERSONNEL ACCIDENT
   Follow the same procedures applied to Minor Accident.

27.02 ACCIDENTS TO PUBLIC
   1.) Accident Investigation
      1.1 The Legal Investigator shall respond in due time and immediately proceed to the scene, conduct an investigation and submit the report to management (Administration-HR).
      1.2 The Safety Engineer may also conduct his own investigation, as required, to check compliance with existing safety rules and regulations.

27.3 PREPARATION OF ACCIDENT REPORT
   a.) The employee concerned shall prepare a report citing the circumstances of the accident. The report shall be submitted to the Department Head through his immediate supervisor.
   b.) The Safety Engineer shall prepare an investigation report.
27.4 Review of Public Accident/Rendering of Decisions, Guidelines, and Procedures No. 26.04 (1-4) shall be followed, except the decision shall be rendered within 24 working days.

SECTION 28
CRITERIA FOR COMMITTEE INVESTIGATION
(ACCIDENT REVIEW GROUP)

- Representation at the committee hearings should include the CSC member in the area and his/her superior representing the employee involved in the accident. Generally, the Committee convenes and acts on the accidents in the following categories.
- Review existing policies based on accident investigation.

1. Where the employee has had two or more occupational accidents in any twelve months period recon from the first accident. Succeeding accidents shall be investigated as necessary.
2. Where the employee has been involved in an occupational injury requiring hospitalization.
3. Where the employee has been charged by the Police Department.
4. When the employee has been involved in a vehicular accident in the damage exceeded P50,000.00. The committee uses information from Police reports, employee statements, witnesses and supervisors and prepares reports its findings and recommendations.

CHAPTER VI
SAFETY MEASURES IN THE WORKPLACE

SECTION 29
A. METAL WORKS

MACHINE SHOPS

28.01 Follow accordingly the operational specifications of the machine to avoid both accidents and improper machine wears or trouble. (B)

28.02 All necessary precautions shall be undertaken before the machine will be placed in operation. (B)

28.3 Machines shall never be left running unattended. (B)
28.04 No repair shall be done while the machine is running. (B)

28.05 Observe the regular inspection for lubrication and maintenance of machine.

28.06 Before a repair starts working on a machine, make sure that the power is off and the main switch is properly blocked and tagged. (B)

28.07 Machine operators shall wear the prescribed personal protective equipment and shall not wear jewelry or loose clothing, especially loose sleeves, cuff of shirts or jackets and neckties as required in the work area to avoid any accidents or physical injuries. (A)

28.08 Stop the machine, if necessary, before doing any gauging work, use the prescribed tools not the hand. (A)

28.09 Operators shall not wear jewelry or loose clothing, especially loose sleeves, cuff of shirts or jackets and neckties. (A)

**WELDING:**

28.10 Welders-cutters and welders-helpers shall wear the prescribed personal protective equipment on the job. (B)

28.10.1 Hot Work Permit must be issued and a Fire Watcher must be available on site. (B) (See exhibit # VII)

28.11 Flammable and matches/combustible materials shall be removed from the welding areas. (C)

28.12 Be sure that the place of work is adequately ventilated. Tin, Brass and Lead fumes are particularly dangerous and shall be ventilated. (B)

28.13 Welders and cutters shall not weld or cut any container, tank, plate or pipe before its status or content is ascertained. (A)

28.14 When doing electric and arc welding works, stand on a dry floor ground, platform or rubber mat. Wet gloves shall not be used in any case. (A)

28.15 Electric Welding machines shall be placed in a safe area. Commutator sparks are dangerous. Welding cables shall be regularly inspected for defects or insulation damage, and those found defective or damaged should be turned in for repair or replacement. (A)
28.16 For Gas Welding and Cutting, extreme care shall be taken to protect oxygen and acetylene from mixing in the hose, as it will explode. Always purge both hoses before lighting. Never attempt to transfer oxygen or acetylene from one cylinder to another or mix different gases in a cylinder. (B)

SECTION 30
B. CHEMICALS AND GASES

LABORATORY WORKS

29.01 HOUSEKEEPING: The chemical laboratory shall be kept clear, orderly and well maintained. (A)

29.02 Know the materials or chemicals you are handling. Anticipate results; do not proceed without caution and forethought. (B)

29.03 Always read labels and directions on bottles or containers of chemicals before handling. (A)

29.04 Never open bottles or containers of highly volatile flammable chemicals, liquids or gases in a room where there are open flames. (B)

29.05 Never tastes any chemical. Smell a chemical only when necessary and then only by wafting a small amount of vapor with the hand toward the nose. (B)

29.06 Learn the location of fire hoses, fire extinguishers, fire blankets and stretchers. (A)

29.07 STORAGE: - Laboratory heavy items shall be stored on or as near the floor as possible. Apparatus and glass tubing shall not project beyond front shelf limits. (A)

29.08 Chemicals which might react together to produce dangerous fumes, fire and explosion demand storage space remote from each other. Volatile liquids shall be kept away from heat sources, sunlight and electrical switches. (C)

29.09 Flammable liquids not mixable with water, corrosive chemicals or compounds which are likely to give off toxic vapors (such as hydrochloric acid) shall never be poured into the sink. (B)

29.10 In handling of chemicals always wash your hands and face before drinking after you have handled any industrial chemical. Containers
and bottles containing hazardous chemicals shall be properly labeled. Highly poisonous ones shall carry the standard poison label. (A)

29.11  BULK CHEMICALS: Bulk chemicals such as those in the category of liquid chlorine, sodium carbonate, aluminum sulfate, sodium hydroxide and sodium sulfate primarily shall be stored in a clean, dry and well-ventilated section of the store room or preferably in a chemical storage room if available. (B)

29.12  CHLORINE: Keep chlorine cylinders away from heat or open flames. Store in a safe, dry and well-ventilated place. (A)

Store chlorine containers and cylinder in a cool place and protect them from exposure to external heat sources. Never permit the temperature of the contents to approach 140 °F. (B)

SECTION 31
HANDLING OF CHEMICALS

30.01  In jobs where industrial and laboratory chemicals are used, the following safety and health measures shall be observed:

a. Workers shall be fully instructed on the hazards of chemicals and the necessary precautionary measures required in handling them. (A)

b. Work forms, floors and machinery’s shall be properly cleaned daily. (A)

c. Obtain prompt first aid medical treatment in case of any kind of body contact with acids. (A)

d. Always wash your hands and face before drinking after you have handled any industrial chemical. (A)

e. Containers and bottles containing hazardous chemicals shall be properly labeled. Highly poisonous ones shall carry the standard POISON label. (B)

30.02  BULK CHEMICALS
a. Bulk chemicals such as those in the category of liquid chlorine, sodium carbonate, aluminum sulfate, sodium hydroxide and sodium phosphate primarily shall be stored in a clean, dry and well-ventilated section of the storeroom or preferably in a chemical storage room if available. All containers shall be kept closed and
any containers such as bags that have been broken shall be discarded. (B)
b. Breakage or spillage shall be avoided and any chemical deposited on the floor shall be removed. (B)
c. When handling sodium carbonate and aluminum sulfate during the process of charging chemical feeders, wear goggles, proper filters, respirators and prescribed gloves. (B)
d. Alkali burns can be of a serious nature; hence, when handling large quantities of caustic soda or slightly milder alkalies, rubber gloves shall supplement the use of goggles. (B)

30.03

CHLORINE

a. Keep chlorine cylinders away from heat or open flames. Store in a safe, dry and well-ventilated place. (A)
b. Only experienced and properly trained persons shall handle chlorine. (B)
c. Chlorine and small tanks shall be transported on special handcarts. If possible, hoisting shall be avoided. If necessary, clamps or girdles are more preferable than slings. Magnetic lifting devices shall never be used. Chlorine containers shall never be dragged or handled roughly. (A)
d. Store cylinders weighing up to 70 kg. (150 lbs.) in an upright position where heavy materials cannot fall on or against them. See that the cylinders are supported so that they cannot fall over. Select storage places where containers shall be shielded from mechanical disturbances especially by moving objects. Do not store containers below ground level or in the chlorine feeding room. Store 1-ton cylinders on their sides on a level rack or platform with adequate safety blocks to prevent rolling. (B)
e. Always keep protective caps in place when the cylinders or containers are not in use and are being handled, because the discharged valves and fusible plugs are not designed to take shocks. As soon as a cylinder or container is empty and disconnected, replace the protective caps. Always tag or mark empty cylinders or containers at once. It is advisable to store full and empty containers or cylinders in different sections of the storage area to avoid confusion in handling. (B)
f. Store chlorine containers and cylinders in a cool place and protect them from exposure to external heat sources. Never permit the temperature of the contents to approach 140 °F. Keep containers and cylinders that are stored outdoors away from direct exposure to the sun and the weather. Maintain them in a clean condition and inspect them regularly for leakage. (B)
g. Do not store containers or cylinders near flammable materials or where continuous exposure to dampness will result. (C)
h. Make certain that the storage area is well ventilated and that containers or cylinders are so arranged that a leaking unit could be removed with the least possible handling of other containers. Arrange to use a fireproof or storage room equipped with an exhaust ventilating system. (B)
i. Place containers and cylinders in the order, which they are received so that the oldest can be used first. (A)

30.04 CHLORINE LEAKS AND CONTROL
a. The slightest odor of chlorine may indicate a leak and shall receive immediate attention because small leaks can grow rapidly. (A)
b. Two men shall be assigned to the repair of a chlorine leak, one acting as a safety observer. (A)
c. Connections to the cylinder valve shall be made carefully. When threaded connections are used, it shall be ascertained that the threads on appliances and unions are the same as those on the container valve outlets. (B)
d. Containers or valves shall never be altered or repaired by the consumer, except for stopping gas leaks around valve stems by tightening the packing nut. The safety devices on containers shall never be tampered with. The valve cannot control the fusible plug on cylinders below the valve seat. (A)
e. Container valves shall be opened slowly. No wrench longer than 6 in. shall be used as the employment of large wrenches or pipe wrenches will damage the valves. One complete turn of the valve sufficiently to permit maximum discharge. (A)
f. To test for chlorine leaks, a small cloth or swab shall be attached to one end of a stick and the material must be soaked with ammonia water (10 percent NH3) and applied to the suspected area. A white cloud of ammonium chloride will result if there is any leakage. (A)
g. When a leak develops on chlorine lines and containers, the area subject to contamination shall be first cleared of personnel until the danger is removed. Only highly trained and equipped men shall be permitted in the area. All personnel shall keep upwind of and on higher elevation than the chlorine leak. (B)
h. If the container has a chlorine leak, turn it, if possible, so that gas instead of liquid can escape. Water shall not be sprayed on a chlorine leak to reduce the amount of chlorine gas. (A)
i. Emergency leak kits shall be on hand at all times and kept in good condition. (B)
j. The chlorine supplier shall be contacted immediately if the leak cannot be controlled. (A)
k. Employees who handle chlorine shall be provided with gas masks especially designed for chlorine-contaminated atmosphere and shall use them. (B)
l. Workers who find themselves in a contaminated area without masks shall try not to breathe until they reach safety. If this is
impossible, they should be taught to breathe only with the top of the lungs (short, shallow breaths). This will lessen any lung damage.
m. When chlorine leaks occurs the chlorine room ventilating system shall be turned on immediately. (B)
n. When a leak occurs in equipment in which chlorine is being used, the chlorine container valves shall be closed first. Then the cylinder is taken outdoors and the gas released slowly until the tank is empty. (A)
o. Water shall never be applied to a chlorine leak because this creates a hazardous condition with the leak being made worse by the corrosive action of chlorine and water. (B)
p. Grease or oil shall never be used on fittings that will be in contact with chlorine. Certain types of silicone greases may be used sparingly on valve stems and hard-rubber fittings. (B)
q. Before disconnecting the flexible leads from container to gas headers, the cylinder valve shall be closed first and then the gas under pressure shall be drawn from the header and flexible leads before the header valve is closed. The exhaust system shall be turned on and operated while the cylinders are being disconnected and repairs are being made on the chlorine lines and equipment. (A)
r. If fire breaks out, every effort shall be made to protect the chlorine cylinders or containers or to remove them from the danger area. Firemen shall be informed of their location and poisonous nature. (A)
s. An adequate supply of ammonia solution (10 percent) shall be kept on hand at all times to test for chlorine leaks. (A)
t. The chlorinating plant or room shall be provided with an adequate ventilating system that is designed for the removal of chlorine gas resulting from leakage. (A)
u. If the chlorine scale room is separate from the chlorine feeder room, the air temperature in the latter shall be about 5 °F higher than that in the former. (A)
v. Temperatures in the chlorine equipment rooms or buildings shall be maintained between 70 °F and 80 °F. (B)

30.05 FIELD CHLORINATION

a. Know the rules and regulations for the safe handling of chlorine and first aid treatment for chlorine gassing. (B)
b. Check and make sure that the gas masks and all other safety equipment are present. (B)
c. If possible, set up equipment for water main disinfections at a safe distance at least 100 m. from the nearest occupied building. (A)
d. Observe all safety precautions in connecting apparatus and equipment and use approved fittings. (B)
e. Make certain that hoses are in good condition before connecting them to the cylinder and the main. (B)

f. Be sure that the water in the main is flushing before the chlorine is added. (B)

g. After the equipment is connected, open the chlorine valve of the cylinder and test for leaks. (B)

h. Open the Rota meter or gas header valves and again test for leaks. (A)

i. To avoid water backup into the chlorine apparatus and the cylinder when a vacuum chlorinator is not being used, make sure that the chlorine tank pressure is approximately 25 psi more than the operating pressure desired. Be certain that the operating pressure is approximately 5 psi more than the backpressure from the water main. (B)

j. After all equipment has been tested for pressure and leaks, proceed to open the discharge valve and adjust the feed for proper operation. Continue testing for leaks while disinfecting. (B)

k. Never attempt to repair a chlorine hose with tapes or clamps. Always use a new replacement. The hose shall be pressure-tested with CO2 and kept dry. Obstructions or kinks in a hose line may cause it to burst. (B)

l. Make sure that field-chlorinating equipment have the proper pressure gauges so that hose lines and lightweight connections are not subjected to excessive pressures. The procedure of connecting a chlorine cylinder directly to a chlorinating cock is very unsafe. (B)

m. During chlorinating, check a hydrant or a suitable sampling place ahead of the point of chlorinating for possible backup of chlorinated water in the main. (A)

n. When using high-test hypochlorites for solution feeding, wear rubber gloves and aprons, a dust mask and goggles or a face shield. If a considerable amount of dust arises, wear a chlorine gas mask. (A)

o. Use caution in handling high-test hypochlorites, both dry and liquid. Protect the eyes and do not breathe in hypochlorite dust. Remove clothing immediately if it becomes contaminated with these materials. (B)

p. Use proper warning devices to keep unauthorized persons away from the area. (A)

30.6 ALUM AND FERROUS SULFATE

a. Workmen shall wear dust masks and chemical-resistant goggles when they are handling or are exposed to aluminum sulfate or ferrous sulfate dust. (B)

b. The material shall be stored in a clean, dry place because moisture has a tendency to cause caking. (A)

c. Electric equipment subject to exposure to ferrous sulfate dust shall of dust proof construction. (B)
d. Compressed air shall not be used to clean dry-feed machines and appurtenances. An industrial water chamber vacuum is much safer. (A)
e. A mechanical dust-collecting apparatus shall be used at handling points to minimize dust. Covers on equipment and connection shall be as tight as possible. (A)
f. Solutions (chemicals) shall be equipped with anti-splatter shields around the stuffing box for protecting personnel against splashes. (B)

30.07 ANHYDROUS AMMONIA

a. Handle cylinders and containers carefully. Never drop cylinders or permit them to collide with each other. Move cylinders on light handcarts equipped with safety chains. (A)
b. Avoid hoisting containers. If lifting is necessary, do so with safety-tested clamps or cradles. Do not use rope, cables and chain slings. (B)
c. Store cylinders where heavy articles cannot fall on them and cause damage. Shield the containers from mechanical disturbance or contact with moving objects. (B)
d. Do not store ammonia near chlorine or in the same room with chlorine cylinders. (B)
e. Place cylinders in an upright position with the valve end up and support them by clamps on guard chains to prevent falling. (A)
f. Store cylinders and containers in a cool dry place away from heat and protect them from continued dampness. Do not keep them outdoors in the direct sunlight where they may become overheated. (B)
g. Always keep the cylinders and container caps in place until they are ready to be connected because the unloading valves are not designed to withstand accidental shocks. (B)
h. Ventilate the storage room and arrange the cylinders so that a leaking container can be removed with a minimum of handling. Use fireproof storage and equipment rooms that are equipped with an exhaust ventilating system. (B)
i. The exact location of a leak may be detected by the application of soapsuds on the suspected area. (B)
j. Only authorized persons equipped with ammonia gas masks shall investigate leaks and make repairs. All others shall be kept away from the affected area. Such work shall be done by at least two employees, with one acting as a safetyman in case of an accident. (B)
k. Self-contained oxygen respirators shall be used in instances of serious leaks where oxygen may be deficient. (B)
l. Use extra heavy steel piping and ammonia valves for service lines. Copper and copper alloys shall never be used. (A)
AMMONIUM SULFATE
a. Ammonium sulfate shall not be stored in damp or humid places because ammonia fumes will evolve and the material will cake. (A)
b. Ammonium sulfate shall not be stored near stream pipes, hot walls and other sources of heat. The chemical shall not be placed where it can come in contact with chlorine. (B)
c. Ammonium sulfate shall never be allowed to mix with quicklime or lime dust because such combinations can produce sufficient heat to explode. Ammonium sulfate by itself is not explosive. (B)
d. Persons allergic to ammonia compounds shall wear sufficient protective clothing to avoid bodily contact and shall apply an ointment or petroleum jelly to exposed skin surfaces. (B)
e. Eyes shall be protected against splashes of ammonium sulfate solutions. If the dust or liquid gets into the eyes they shall be washed immediately with a large amount of water. Ammonium sulfate is mildly acidic and a strong solution can cause skin irritation. (B)

MATERIALS TESTING LABORATORY
a. Only trained laboratory technicians who have learned the applications and limitations as well as the specific potential hazards peculiar to the laboratory apparatus, specimens and test procedures, shall be assigned to perform the laboratory tests. (B)
b. Technicians selected to operate or use laboratory equipment shall be free from physical defects that might interfere with their duties. They shall be mentally alert, not easily excited and capable of carrying out instructions in compliance with standard test procedures and safety measures. (B)
c. All electrical equipment and appliances shall have proper grounding and shall be verified that they are in place before starting. (B)
d. Provide suitable enclosures for moving parts of machines. Like gears, belts and vibrating screens. (B)
e. Keep wearing apparels, gloves, rags or hands out of moving machine parts like gears, belts or shafts, etc. (B)
f. A protective screen or curved shield of perforated metal shall be used to surround concrete test specimens that are expected to shatter under increasing heavy loads. (B)
g. Use safety goggles when chipping caps used at the ends of concrete cylinder specimens to recover the capping compound. (B)
h. Use respirators to avoid inhaling toxic vapors produced during melting coal tars and sulfur capping compounds. (C)
i. Follow proper hand lifting procedures in moving cylindrical concrete specimens, aggregate in boxes, bags of cement and other heavy loads encountered during testing. (B)
j. Proper ventilation shall be provided to remove dust, toxic vapors from sulfur compounds or bituminous heating humidity, etc. (C)
k. First aid kits shall be made available. Also, there shall be a trained person to apply first aid in case of emergency. (C)
l. A telephone shall always be available and in working order, particularly when any operator is working alone in the laboratory. The phone numbers of the fire department, medical office and police shall be posted conspicuously. (B)
m. Practice good housekeeping, tool and equipment maintenance and calibration and safety-device maintenance. (B)
n. An occasional inspection of the laboratory by an appropriate member of the staff shall learn whether additional hazards exist that need to be remedied. (B)

30.10 COMBUSTIBLE GASES
a. Keep sparks and flames away from cylinders. (B)
b. Connections to piping, regulators and other appliances shall always be kept tight to prevent leakage. Where a hose is used, it shall be kept in good condition. (A)
c. When cylinders are not in use, keep valves tightly closed and valve caps installed. (B)
d. Do not use a cylinder of compressed gas without the pressure-reducing regulator attached to the cylinder valve except when cylinders are attached to manifold, in which case, the regulator will be attached to the manifold header. (A)
e. After removing the valve cap, slightly open the valve an instant to clear its opening of particles of dust or dirt, except in the case of a cylinder of hydrogen. (A)
f. If the valve is difficult to open, point the valve opening away from you and use greater force. (Do not, however, use a wrench on valves equipped with hand wheels nor hammer the valve wheels in attempting to open or close the valve). If it still cannot be opened, return the cylinder to the suppliers for replacement. (B)
g. After attaching the regulator and before opening the cylinder valve, see to it that the adjusting screw of the regulator is released. (A)
h. Never permit the gas to enter the regulator suddenly. Open the cylinder valve slowly. (A)
i. Before a regulator is removed from the cylinder, close the cylinder valve and release all gas from the regulator. (A)
j. Never interchange combustible gas regulators, hose or other appliances with similar equipment intended for use with other gases. (B)
k. Store all cylinders containing combustible gases in a well-ventilated place. (B)
l. Do not store reserve stock of cylinders containing combustible gases with cylinders containing oxygen. They shall be grouped separately. (B)
30.12 FLAMMABLE AND COMBUSTIBLE LIQUIDS
a. Accidental mixture of flammable liquids shall be prevented. Warning devices shall be installed or posted in areas where potentially explosive/flammable liquids are kept. (B)
b. Smoking and carrying of “strike anywhere” matches, lighters and other spark-producing devices shall be prohibited in a building or area where flammable liquids are stored, handled or used or where loading and unloading operations are performed. (B) Appropriate prohibition signs to this effect shall be posted conspicuously in such a building or area. (A)
c. Above ground tank installation used for storage of flammable liquids shall be properly grounded. Ground wire shall be bare so it can be easily inspected for mechanical damage. (B)
d. Only an experienced person shall use a combustible gas indicator and the operator shall follow the manufacturer’s instructions on balancing the unit. (B)
e. Storage of gasoline or other flammable liquids in glass or open containers is prohibited except for laboratory use or in obtaining samples for laboratory use or in testing at operating units. Gasoline shall be stored in closed metal containers painted red. If gasoline is used, it shall be in approved cans. (B)

CHAPTER VII
PERSONAL PROTECTIVE EQUIPMENT

SECTION 32
HEAD PROTECTION

32.01 Prescribed safety helmets shall be worn while on duty as required. In trench operations with more than 1.80 meters depth and in vertical constructions where workers assigned to work under the crane boom, such protective aids are required. (A)

32.02 Before each use, helmets should be inspected for cracks, signs of impact or rough treatment and wear that might reduce the degree of safety originally provided. Those found damaged should be replaced. (A)
SECTION 33
FACE AND EYES PROTECTION

33.01 Employees shall wear goggles suited for the job to be performed to protect their eyes from the following hazards:
   a. Flying objects and hot metals.
   b. Injurious light and heat rays.
   c. Gases, fumes or chemicals.
   d. Dust and wind, as when boring a hole on a piece of brick or concrete. (B)
   e. Dirty/infectious water from septic tanks sewerage facilities, manholes,
   f. particularly during illegal connections excavations. (B)

33.02 Corrective spectacles or eyeglasses shall never be used as a substitute for safety goggles. (B)

33.03 A prescribed face shield shall be worn by the workers as required. (B)

SECTION 34
RESPIRATORS

34.01 Respirators of the prescribed type should always be worn when handling or coming near toxic materials like gases, dusts, paints, etc. (B)

34.02 Anyone who is physically weak should be prevented from entering areas with respiratory hazards unless he wears the approved emergency Breathing Apparatus for protection. (B)

34.03 Knitted face lets and dirty or oily elastic bands should be washed in warm soapy water, rinsed and dried before reuse. The water should be warm to remove perspiration and hair oil from the elastic fabric. (A)

34.04 If a canister is used, it should not be left attached to the mask. It should be removed every after use. When the respirator is worn in a toxic atmosphere containing gas or vapor that has little or no warning properties, like carbon monoxide, it is recommended that a fresh canister be used. (A)

34.05 Canisters should be replaced not more than one year after the date when the seal is removed. Canisters stored with seals intact should be replaced on or before “use before date” stamped on each canister. (A)

34.06 Gas masks shall be kept easily available for emergencies. (B)

34.07 Gas masks shall be stored away from moisture, heat and direct sunlight and shall be regularly inspected. (A)
34.08 A card shall be set up for each mask to indicate the date of the latest inspection and replacement of the canister. (A)

34.09 Supervisors shall be responsible for making daily inspections, particularly of functional parts such as exhalation valves and filter elements. They shall see that the edges of the valves are smooth and clean. Inhalation and exhalation valves shall be replaced periodically. (A)

34.10 Respirators shall be marked to indicate whom they are assigned. The method of identification shall be permanent so that the marking cannot be changed inadvertently nor without effort. (B)

34.11 Before being stored, a respirator shall be carefully wiped with a damp cloth and dried. It shall be stored without sharp folds or creases. It shall never be hung by the elastic headband or put down in a position that will stretch the face piece. (A)

34.12 Since heat, air, light and oil cause rubber to deteriorate; respirators shall be stored in cool, dry place and protected from light and air as much as possible. (A)

SECTION 35
SAFETY SHOES

35.01 Safety shoes shall be worn while on duty as required. When doing concrete pouring work, however, safety rubber boots may be used. (A)

35.02 If shoes are greasy or muddy do not attempt to climb a ladder etc. Clean them first. (A)

SECTION 36
SAFETY BELTS, HARNESS, LIFELINES AND SAFETY NETS

36.01 All persons working on elevated structures without permanent scaffolding (steel erectors, painters, masons etc.) shall always wear safety harness and lifelines required. (C)

36.02 Harness and lifelines shall be securely fastened on rigid and firm braces, framing and the like. (C)

36.03 Carefully inspects safety harness and lifelines before using. Those that are defective must not be used. (A)
36.04  Foremen shall schedule the regular inspection of safety harness and lifelines.

36.05  Lifelines shall not be less than 9 cm. (3/4 in) diameter made of good quality Manila rope or its equivalent material and shall be of sufficient strength to support a weight of 1140 kgs. and shall be free from cuts and fiber defects. (B)

36.06  Steel cable shall not be used as lifelines where a free fall is possible, unless some shock absorbing devices are also used because the rigidity (of steel cables) greatly magnifies the impact loading. Cables are dangerous when used around electrical wirings. (C)

36.07  Lifelines shall be tied so as to permit little slackening as possible, thus allowing a minimum freefall. (B)

36.08  Leather belts shall be cleaned and oiled with neat’s-foot, castor, soybean or an oil compound. Never use mineral oil. (A)

36.09  Leather belts shall not be exposed to excessive heat, such as from radiator. Any heat harmful to man can damage leather. (A)

36.10  Body belt is use only as positioning device. (B)

36.11  Steel cable lines shall be kept clean and dry. They shall be lubricated frequently. Before using in acidic atmosphere, steel cables shall be washed thoroughly and recoated with oil. (A)

36.12  Rope lifelines shall not be used for any other purpose. These ropes shall be properly marked or labeled as such. Store them properly. (B)

36.13  Safety nets shall not be less than .94 cm. (3/8 in.) diameter mesh ropes and not less than 1.90 cm. (3/4 in) diameter border ropes (perimeter) made of manila rope or other materials that can absorb the impact of falling body. The mesh shall be arranged not to exceed 15.25 cm. (6 in.) on centers positively and securely attached to avoid wear at each crossing point and at points of contact with the border. (B)

36.14  Safety nets must be installed as close as practicable under the walking/working surface in which employees are working and never more than 30 feet (9.1 meters) below.
SECTION 37
WELDING ATTIRE

37.01 In addition to the abovementioned safety equipment/clothing, for employees performing welding jobs, shall wear:
   a. Flameproof gauntlet, aprons and leggings. (A)
   b. Welder’s mask. (B)

SECTION 38
WORKING ATTIRE

38.01 Wear the proper protective shields for a particular job. Neckties, scarves bracelets and the like shall not be worn when working on or near moving machines or energized lines of equipment. On duty Fieldsman shall always wear duly prescribed/issued MWSI Fieldsmen’s attire. This is not only for safety reasons but also to generate general public’s positive impression and respect for our every fieldsman. (A)

38.02 Clothing saturated with oil shall be removed at once and affected parts of the body should be washed with soap and water. Oil irritates the skin and is dangerous in case of fire. (B)

38.03 Sewer divers shall be equipped with the appropriate diving gear, which consists of a diving suit and a diving headgear to which a waterproof radio is attached for a direct communication with the other person on ground level. (B)

SECTION 39
HAND AND ARM PROTECTION

39.01 Working gloves shall be worn as required. (A)

39.02 Wear prescribed leather gloves when lifting or handling materials with rough surfaces, sharp edges and those with slivers. (A)

39.03 Wear chemical gloves or their equivalent when handling corrosive chemicals such as acids, alkaline, etc. Have plenty of clean water close at hand. (B)

39.04 Wear protective asbestos gloves when handling hot objects or materials. (B)

39.5.1 Gloves torn during use shall be replaced immediately. (A)
SECTION 40
EVALUATION AND INSPECTION OF REQUESTED SAFETY GADGETS

40.01 All Purchase Request (PR) of safety gadgets coming from various MWSI offices/department must be evaluated by Safety Department to verify if it is based on the MWSI Standard Specification of Safety Gadgets before its procurement.

40.02 Upon delivery of requested safety gadgets at the MWSI Main Warehouse, Safety personnel should conduct random inspection of delivered items coming from accredited supplier to verify if the said items were based on the specifications indicated in the Purchase Order.

CHAPTER VIII
TOOLS AND EQUIPMENT

SECTION 41

41.01 HAND TOOLS

a. Select the right tool required for the job and used it properly. (A)

b. Regularly inspect tools, and use only those are in good condition. (A)

c. Keep keen-edged tools and use only those are in good condition. (A)

d. Use wrenches of the right size for the job. Face the jaws on an adjustable wrench in the direction of the pull. (A)

e. Never use a hand tool on or very close to any moving part of a machine. Stop the machine first and remove all the tools before re-starting. (B)

f. Never place or leave tools where they might fall on persons or properties, trip or otherwise cause injuries to someone. Tools shall be stored properly. (B)

g. Exercise care when handling or transporting tools, particularly pointed or sharp-edged ones, to prevent damage to them or other properties, as well as injuries to persons. (B)
h. Carry sharp or pointed tools in covers, or be sure they are pointed away from the body in case of a fall. (B)

41.02 PNEUMATIC TOOLS

a. Only the right pneumatic tool, which is in good condition, shall be used for the job. (A)
b. Use protective equipment as required. (A)
c. Make sure that the air hose is properly connected to the tool before opening the pressure valve. Connectors shall be properly secured when air hoses of more than one length are used. (A)
d. Grip the handle firmly with both hands when operating the tool. Never lean your body against it. When using a heavy pneumatic tool (such as jackhammer, clay digger, etc.) in a horizontal position, vertically suspended ropes shall support the tool. (B)
e. If the tool bit sticks, do not try to forcibly pull it out. Loosen it out by a steady rocking movement of the tool. (A)
f. When laying the pneumatic tool down, it shall always be placed in a position such that it can do no harm in case the tool is accidentally started. Do not leave the pneumatic tool standing when not in use. (B)
g. If the tool is detached from the air hose under pressure, turn off the air by closing the base control valve, never by kinking the hose. (A)
h. After using the pneumatic tool, turn off the air valve. (A)
i. Compressed air when misused can be extremely dangerous. Under no circumstances shall a worker aim an air hose at anyone. (C)

41.03 TOOL KEEPERS

a. Permit no tool with a mushroomed head to leave the tool room. Have all cold chisels, chisel bars, cutters or shock tools with bad heads dressed before they are issued. (B)
b. Keep the jaws of wrenches in good condition. Warn workers against misusing them. (A)
c. Keep all sharp-edged tools sharp. Keep the edges protected while in storage. (A)
d. If any tools show signs of being improperly tampered with, withdraw it from service. Try to find the trouble and have it corrected. (A)
e. Portable electric and pneumatic tools shall be kept in the best possible condition. Check frequently the condition of switches and control valves, electric cords and hose connections. (A)
41.04 REPAIRS

a. All “out of order” equipment shall be shut down for repairs. Suitable signs shall be posted and not removed until repairs have been completed. Mobile equipment shall, if possible, be move to a safe location where operations will not interfere with the repair work. Equipment suspended in slings or supported by hoists or jacks for repairs shall be blocked or cribbed before men are permitted to work underneath. (B)

b. When repairs on equipment such as conveyors and cableways are made remote from the sources of power, use chains, blocking or similar devices to prevent injury in case of accidental starting. (B)

c. Before repairing electrically powered equipment, lock the main switch in the open position. The repairman shall retain the key to the switch lock. If there is more than one repairman on a circuit, each shall lock the main switch, the key of which shall be retained by only one repairman. Switch boxes shall have this provision. (C)

CHAPTER IX

ELECTRICAL AND UNDERGROUND WORKS

SECTION 42

42.01 ELECTRICAL SAFETY

a. Safety inspection of all electrical installations shall be done regularly. (C)

b. Warning signs shall be displayed near exposed current carrying parts, especially high-voltage transformer installations. (C)

c. Barriers, like metal covers, guard rails, etc. shall be maintained to prevent accidental contact with electrical equipment like booster or well pump motors, high voltage equipment, and installations. (C)

d. Explosion-proof motors shall be used in hazardous locations where possible fires due to flammable gas or liquids are handled or stored. Switches shall also be of the enclosed type design. (B)

e. Metal frames of electrical equipment operating at more than 150 volts shall be properly grounded. (B)

f. Ground for personnel protection shall be installed in the receptacles supplying current to cord connected appliances or equipment specially ungrounded equipment use out of doors and wet places, etc. (B)

g. Worn-out electrical insulation become porous, brittle and absorbs moisture. They shall be replaced immediately when discovered. (C)
42.02 BATTERY SHOP

a. Battery charging installations shall be done in a well-ventilated area and shall be performed by trained and authorized personnel. (B)
b. When it is necessary to do work in battery rooms, which require an open flame, the battery shall not be on charge and the room shall have adequate ventilation. (C)
c. Smoking is strictly prohibited inside battery-charging rooms. (C)
d. When making up an electrolyte for storage batteries, employees shall always pour the acid into the water. Reverse method of pouring may cause spattering. (C)
e. Provisions shall be made for flushing and neutralizing spilled electrolytes. (A)
f. Acid-proof gloves, sleeves, aprons, face shields and/or goggles shall be used when working on batteries. (B)
g. Battery terminals shall be clean and connections shall be tight. (A)
h. Tools or metal parts shall never be laid on a battery.
i. Wood slate floorboards shall be used and kept in good condition to prevent slips and falls and to protect against electric shocks from charging equipment. (A)
j. Battery charging rooms shall be isolated preferably with fire doors from other areas, particularly where flammable liquids are handled or stored. (A)
k. Workers shall always lift and carry batteries vertically to prevent spillage. Proper lifting procedures should be followed to prevent back injury and hernia. (B)

42.03 GROUNDING LINES

a. After an electrical line or equipment has been de-energized for the purpose of working thereon, it shall be checked as being “dead” by testing it with the use of an approved potential indicator. (D)
b. Before any work is done on a line, which is to be worked “dead”, it shall be grounded and short-circuited on at least each side of the location where the work is to be done. (D)
c. The grounding conductor shall first be attached to the ground connection and then securely attached to the line or equipment to be worked on. (C)
d. The use of chains for grounding lines on equipment shall not be permitted. Standard grounding conductors shall be used. (C)
e. The removal of grounding devices shall be handled in the reverse order of Item c. (C)
f. The combined resistance of the grounding wire and the connection with the ground should not exceed 3 ohms for water pipe connections or 25 ohms for artificial ground. (C)
g. Sizes of grounding wires shall comply with the National Electrical Code recommendations. (B)
42.04 WORKING IN MANHOLES/VAULTS
Manholes/chambers/vaults – refer to water/drainage septic tank chambers and other vaults where the only access through it is a manhole.

42.05 SAFEGUARDING MANHOLES/VAULTS
a. Before the manhole covers or gratings are removed or before work or operation begins, warning devices, barricades or guardrails shall be installed to protect the work area from traffic hazards. (C)
b. Defective manholes/service box covers/frames and covers should be replaced with that of Maynilad Water approved design and specifications. (A)
c. Trucks and other equipment shall be placed before the work area along the traffic line to prevent the least impediment or hazard to the work. (B)
d. Proper shoring and bracing shall be used to prevent cave-in while vaults or similar excavations are under construction. (B)

42.06 ENTERING MANHOLES OR VAULTS/CONFINED SPACES
a. Manhole and service box covers should always be removed and replaced by means of approved hooks or hoists to prevent foot and back injuries. (C)
b. Mechanical lifting aids should be raised, lower or suspend heavy or bulky materials to men working in manholes or vaults. (A)
c. A ladder should always be used for entering or leaving a manhole, vault or pit. (A)
d. Smoking shall not be allowed inside the manhole unless it is definitely known to be free from flammable gases. (B)
e. A helper should be stationed at the manhole entrance at all times. (B)
f. The helper should know how to apply artificial respiration. He must have an immediate access to such reserve apparatus as respiratory equipment and a lifeline of three meters longer than twice the depth of the manhole and strong enough to support the weight of two (2) men. (B)
g. Suitable measures shall be taken to prevent surface water or debris from accidentally entering the vaults or subsurface area while work is in progress. Subsurface workers shall always wear hard hats. (B)
h. Do not enter any confined space unless it is tested for oxygen deficiency or gas content. The following shall be observed:
   1. In compliance with the Occupational Safety and Health Administration guidelines for oxygen deficiencies, at 19.5% oxygen level, no person is allowed to enter any manhole
unless he is provided/wearing a SCBA or the manhole is ventilated thoroughly to bring the oxygen levels within the acceptable range of 21%. To determine the acceptable range, testing is again required. (B)

2. When concentration of flammable or poisonous gas exceeds 15% in air, the mixture is over the upper explosive limit (UEL) and too rich to support combustion. At this point, no person shall be allowed to enter the manhole unless ventilation is applied to displace the gases. When using a blower, circulate the flammable or poisonous gas back into the manhole or vault. A blower driven by gasoline or diesel engine shall be placed at distance of three (3) meters away from the manhole and the discharge end shall be placed near the bottom of the manhole to force the air up and out. (B)

3. In extreme emergency cases when it is necessary for a person to enter a manhole or vault where poisonous vapors and gases are present, he shall wear an approved gas mask/SCBA and safety harness to which a lifeline is attached, attended by another person wearing a gas mask/SCBA stationed at the manhole or vault opening. (B)

4. Gases in very low concentration, such as sulfur dioxide (SO2) or hydrogen sulfide (H2S), are mildly irritating to the respiratory and nervous systems. In high concentration, it causes inflammation of the mucous membranes. It causes death in a very short time. (B)

5. Do not enter until a proper entry permit is completed. (See exhibit # VI)

42.07 DISPOSAL OF SLUDGE AND MAINTENANCE OF WET PITS

DISPOSAL OF SLUDGE

a. Sludge removed from sewer manhole/septic tank/Imhoff tank or any digesting changer tank shall be disposed in any of the following areas after stabilization: (A)
   1. Sanitary land fill site
   2. Isolated lagoons
   3. Spread on cultivated field
   4. Drying beds

b. Tank trucks equipped with a vacuum pump and sludge tank trucks shall be used for transporting wet sludge. For dried sludge, dump trucks shall be used to the point of disposal. (A)

c. Chlorination facilities used in treating sewage shall be operated on a continuous basis with sufficient chlorine dosages to maintain residual chlorine content of 0.5 mg/l in the plant effluent.
Application of chlorine may be suspended only during periods of high stream flow. (A)
d. Composite samples from influent and effluent shall be taken monthly and laboratory analysis for BOD, Suspended Solids, PH, DO and other parameters shall be performed. Chlorine residual tests shall be performed daily by the operator. Record of flow, reversal of flow, level of sludge blanket, chlorine residual and other data shall be properly logged. The physical plant and its surroundings shall be kept clean at all times. (B)

MAINTENANCE OF WET PITS/IMHOFF TANKS/SEDIMENTATION TANKS/COMPARTMENTS, ETC.
a. Bar screens shall be either cleaned by means of screening machines or by hard-raking method. (A)
b. When a wet pit is about to be dewatered, the exhaust blower shall be operated to disperse accumulated fumes and flammable gases. (B)
c. Plastic bags shall be used in storing scum and debris taken from the wet pit/Imhoff tank. (A)
d. Debris and scum shall be removed from scum chambers several times each day as accumulation arises. (B)
e. Debris and scum shall be treated with lime when needed.

42.08 SAFETY RULES FOR BOOSTER AND DEEPWELL PUMPING STATIONS
a. The fence around the substation shall always be kept in good condition to prevent access of unauthorized persons and stray animals from the high voltage equipment. (B)
b. Two or more warning signboards “Danger: High Voltage” shall be conspicuously displayed at the enclosure of the substation. (C)
c. Large plants and trees shall not be allowed to grow near the periphery of the substation. Grasses and weeds shall not be allowed to flourish inside the substation area. (C)
d. The substation shall not be used as storage for lubricating oil, diesel fuel and other flammable materials. (C)
e. Batteries of the rectifier kept in an enclosed area shall be properly ventilated to prevent accumulation of hydrogen gas. Smoking and use of open flame and electric tools producing sparks shall be avoided in such enclosed areas to prevent explosion of hydrogen gas. (B)
f. Capacitors shall be safely enclosed or protected so that persons cannot come into accidental contact or bring conducting materials into accidental contact with exposed energized parts. (C)
g. Motor control panel boards shall always be secured to prevent accidental contact with live electrical conductors and exposure to arcing contacts and circuit breakers. (B)
h. The panel board shall not be used as support for any heavy object and its interior shall not be utilized as storage. (B)
i. Only qualified persons are allowed to open the panel board for inspection and maintenance. (C)
j. Clothes and other flammable materials shall not be hanged/placed at the enclosure of the panel board. (B)
k. Guards of rotating parts of electrical and mechanical equipment shall not be removed except for repair or inspection. Guards shall be placed back after completion or repair work. (B)
l. Maintain working area, equipment floor space clean and clear from obstructions and free from grease and oil spills. (B)
m. All manholes within the pumping stations shall always be kept closed. (C)
n. Operators shall observe extreme caution and wear the recommended protective equipment in handling acid and chlorine used for treating water wells. (B)
o. Operators of the deep well pumping stations shall always operate the chlorinators and apply the correct dosage of chlorine to ensure the portability of water sent to their respective areas of influence. (C)
p. Operational multipurpose fire extinguishers of appropriate capacity shall always be available. (C)
q. Rules for the Pumping Station Operators:
   1. Operators shall be provided an enclosed noise-reducing room to minimize their exposure to noise. (B)
   2. Operators shall wear all necessary personal protective equipment while on duty. (B)
   3. Threshold Limit Values for noise are as follows:

   **PERMISSIBLE EXPOSURE**

<table>
<thead>
<tr>
<th>Duration Per Day (Hour)</th>
<th>Sound Level (decibels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>90</td>
</tr>
<tr>
<td>6</td>
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<tr>
<td>4</td>
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<tr>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>105</td>
</tr>
</tbody>
</table>
CHAPTER X

FIRE AND OTHER NATURAL CALAMITIES

SECTION 43
OBJECTIVE AND PURPOSE

The objective of this policy is to ensure the Security and Safety of all MWSI personnel in case of fire and other related calamity accidents. To protect the company property against destruction and damages before, during and after fire, earthquake, floods and other natural calamities.

SECTION 44
DEFINITION OF TERMS

FIRE BRIGADE TEAM – a team organized by MWSI management, with strong manpower of 45-50 members, from Safety Department, Central Safety Committee Members, Security and Auxiliary personnel. This team is readily available at all times in cases of Fire, Earthquake and other severe convective storms, with the following missions:
1. To secure the Security and Safety of MWSI personnel in case of Fire, Flood, Earthquake and other natural calamities.
2. To protect the company property against destruction and damages before, during and after the above-mentioned calamities.

FIRE DRILL – an execution exercise adopted by the Team aimed to instil and maintain fire awareness and preparedness in case of fire. Personnel are being taught of proper and safe manner in exit and evacuation procedures.

FIRE EXIT – portion of the structure, which can be utilized for a safe egress & ingress during fire. It is a fire proof and enclosed portion that is the safest to exit in case of fire.

EVACUATION AREA – an area or compound away from the scene of fire, the place where employees are directed to stay during the fire and wherein body counting is to be done by the Fire Brigade Team.

FIRE ALARM – is a distress sound, which is heard throughout the building indicating that a smoke of fire was detected posing the building, properties and personnel in danger of fire.
SECTION 45
SAFETY RULES AND GUIDELINES

FIRE:

45.01 When the Fire Alarm sounds, it means fire was detected. Under such situation, all employees, under “No Exemption Rule”, are directed to immediately evacuate the building and proceed immediately to the designated evacuation area. See attached Annex E.M. Only the Fire Brigade Team, Bureau of Fire Protection personnel, MWSI Security, CSC / Sub Committee members, or employees allowed by the President, are allowed to stay in the building during the drill. (C)

45.02 Employees shall obey all the commands of the Fire Brigade team members and the deputies in the execution of the drill, from the time the Fire Alarm sounded up to the time of declaration of completion. (A)

45.03 Exiting employees are required to pass through the designated exit lanes and door without panic. (A) See attachment A – D

45.04 While exiting, observe discipline and conduct one by helping one another. (A)

45.05 All employees must exit and be at the evacuation area within 3-8 minutes from the time the Fire Alarm sounds. (A)

45.06 Members of the MWSI Fire Brigade Team are oblige to perform all their defined functions in times of drills and other emergencies. (C)

45.07 The Fire Brigade Team, Safety Department personnel and CSC/Sub-Committee members shall be in active participation in the resolution of the aftermath of the fire and other calamities. (A) See chart No. 1 & 2

EARTHQUAKE:

45.08 Felt of mild tremor (earthquake) every MWSI employee is required to vacate the building carefully, in accordance with the given instructions and without panic. With or without alarm no one is allowed to stay in the building. (A)

45.09 At the evacuation area, employees are enjoined to stay therein and wait for the instruction by Chairman of CSC, his assistant or the MWSI President. (A)

45.10 When necessity requires, every employee has the duty to make proper coordination with proper offices regarding the aftermath of the tremor. (A)
45.11 During disaster situation, MWSI different Departments or Section Heads, which have the capability to render assistance of any kind, shall render service and logistical support. (C)

45.12 The CSC/Sub-Committee member in the involved area shall be in active participation or cooperation in addressing the calamity. (B)

**FLOOD:**

45.13 In times of floods which post danger or loss to MWSI properties and employees, every office or Department/Division Heads is responsible to oversee the welfare of his/her subordinates and make coordination with proper MWSI office or government agency for a centralized or Departmental management of such crisis. (C)

45.14 Every employee or office, thru the leadership of the head, is responsible to perform Departmental defined functions, which are related to and in connection with the effective solution for the given situation. (B)

45.15 The CSC/Sub-Committee member in the involved area shall be in active participation or cooperation in addressing the calamity. (A)

45.16 In times of fire, earthquake, flood and other calamities, all members of the CSC shall be activated or mobilized to perform all defined functions for easy address of the problematic situation. (A) See Section 8, for CSC composition and functions.

**SECTION 46**

**MWSI FIRE BRIGADE & FIRE EXIT DRILL CHART**

Figure # 1

**MWSI FIRE BRIGADE**

**ORGANIZATIONAL CHART**

```
    FIRE MARSHALL
       /       \
  ASST. FIRE MARSHALL
       \       /
     ELECTRICIAN TBN  FIRE CAPTAIN TBN  PIPE FITTER TBN  PLUMER MAN TBN
       \       /     \     /     \     /     \     /
     NOZZLE MAN TBN  NOZZLE MAN TBN  NOZZLE MAN TBN  NOZZLE MAN TBN
       \       /     \     /     \     /     \     /
     FIRE E.O.P. OPERATORS (THREE)  FIRE E.O.P. OPERATORS (THREE)
```

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Figure # 2

FIRE EXIT DRILL CHART

EVACUATION CHIEF

FLOOR CHIEF

ROOM CAPTAINS

EXIT GUARDS

MONITORS

INSPECTORS

SEARCHERS
SECTION 47
DUTIES AND RESPONSIBILITIES OF MWSI FIRE BRIGADE TEAM

FIRE MARSHAL
1. Responsible in maintaining the Brigade roster and the recruitment of new members whenever necessary.
2. Conduct Fire Drill Training.
3. Coordinate with the Fire Brigade Department as regards to related activities.
4. Personally direct fire-fighting force until the arrival of the Fire Fighting Departments.
6. Direct Salvage Operation on company assets after fire.

ASSISTANT FIRE MARSHAL
1. Assist the fire Marshal (or shall act as Fire Marshal in case the latter is not around) in the conduct of training, recruitment, fire drill, etc.
2. Make certain that gate guards are notified for them to direct fire Trucks to the Scene of fire.

PIPEFITTER
1. Must be familiar with the operation of Automatic Sprinkler, piping, flammable gas and liquid control valves system. To fully open firefighting control valves and shut-off flammable gas and liquid control valves when fire occurs.

ELECTRICIAN
1. Shut-off electrical power on areas affected by fire.
2. Provide emergency lightings, and introduce repairs on faulty electrical wirings.

PUMP MAN
1. Ensure that the Fire Pump is of top condition at all times.
2. Start the Fire Pump at the first blaze of fire.

FIRE CAPTAIN
1. Provide effective methods and techniques in the fire fighting execution.
2. To lead the fire fighters in the proper and diligent fire fighting techniques.
3. Make assessment and evaluation on the progress of fire fighting management.

EVACUATION CHIEF
He must be a responsible, competent and with leadership ability in order to insure compliance with all orders and instructions to exit drills to wit:
1. In charge in all matters pertaining to exit drill organization.
2. Schedule exit drills at least twice a year.
3. Supervises the building Fire Alarm/Fire Detectors as to workability.
4. Notify members of his organization and the employees of their assignments and duties.
5. Enforces disciplinary measures for uncooperative employees pursuant to MWSI policies.
6. Determines the list of employees and average number of visitors in the building.
7. Assigns at least a two-way exit for use of employees in each room during exercise/emergencies.

**FLOOR CHIEF**

Floor Chiefs must be able to communicate to all occupants/employees in his assigned floor and performs the following:

1. Responsible for the enforcement of Fire Exit Drill and report infractions to The Evacuation Chief.
2. Personally supervises the sounding of alarm on his floor.
3. Supervises the movement on his floor for prompt and proper execution.
4. Designates the exits to be used by the occupants on his floor.
5. Responsible for the condition of aisles and passageways.

**ROOM CAPTAINS**

He must insure that movement in his room is properly executed correspondingly with the signal. He shall report and coordinate with the Floor Chief.

**EXIT GUARDS**

He shall oversee that the march from rooms to stairways, corridors, aisles, etc. is already without overcrowding and at uniform speed while observing spacing between files.

He shall be positioned:
1. At the room, side of exit doors until occupants have left the room.
2. At the horizontal exit doors, in corridors and on stairway landing or turn.
3. To follow the rear of the exit column.

**SEARCHERS**

Shall be a combination of man and woman searchers on each floor/room and shall be strong and cool-headed and shall perform the following:

1. Visit toilets of each sex where there may be occupants who cannot hear the alarm.
2. Look for people who may have fainted or become hysterical.
3. Leave as soon as possible after the last squad leaves.

**MONITORS**

In charge of the squads of occupants and shall be leaders or disciplinarians. He shall oversee that the squad is quickly formed and maintained in line, two abreast and lead the march through corridors, stairways etc, as directed by exit guards, to safe distance away from the building.
INSPECTORS
Shall be Technical personnel knowledgeable about buildings and its Fire Fighting Equipment attached to it for ensuring the worthiness of the following

1. Doors
2. Stairways
3. Fire Escape
4. Fire Alarm System
5. Fire Equipment
6. Floor Exit Layout, Exit signs
7. Room Exits

FIRST AID EQUIPMENT OPERATORS
1. “Fire Squad” utilizing fire extinguishers and small hoses for immediate action.

SECURITY SUPERVISOR
1. Inform the different Fire Departments and lead the Fire Brigade to use the available Fire Fighting Equipment.
2. Instruct the Detachment Commander to deploy guards around the perimeter as well as to the gates or area of interest.

DETACHMENT COMMANDER
1. Deploy guards around the perimeter of the building as well as the gates or company premises.
2. Personally supervise that all guards are utilized during the fire.

COMPANY DOCTOR/NURSE
1. Render medical attention to all victims of the disaster and assist in the transfer/evacuation of the same to the nearest hospital if necessary.

SECTION 48
DRILL INSTRUCTIONS

During drills, the following are the significant instructions to be familiar with;

1. Know at least two ways out (exits) of the building.
2. Do not use elevators.
3. Monitors shall take charge in forming and leading occupants into line. Form a squad of thirty (30) persons or less, two abreast or double line.
4. All visitors shall join the squad.
5. Floor Chiefs shall designate the exits to be used by the occupants/employees on his floor and shall give instruction to march.
6. Exit guards shall maintain orderly march at uniform speed and spacing between files.
7. Marching speed shall not exceed two (2) steps per second.
8. Attempting to salvage property during fire exit is forbidden.
9. ARM SIGNALS; to be given by respective monitors.

FORWARD - right hand vertically raised above head.
MARCH - right hand lowered in the direction to be followed by the line
HALT - both hands extended horizontally across the line of march.
SECTION 49
EXECUTION

A. EXECUTION (In Case of Fire)

1. In case of Fire, the Fire Marshal shall automatically act as the Head and in case of his absence his Assistant shall automatically assume the responsibilities. If both are absent, the Evacuation Chief shall assume the responsibilities. See Charts 1 & 2.

2. Fire Marshal shall immediately access and assess the situation if necessary and inform the Security Supervisor that a Fire is in progress. The Security Supervisor, with his Detachment Commanders, shall call the different Fire Stations and lead the Fire Brigade to use the available Fire Fighting Equipment. Immediately coordinate to the Electrician/Maintenance Engineer of the building to shut off the Main Breaker to avoid spreading of fire in order to minimize damages.

3. The Detachment Commander shall deploy guards around the perimeter of the building as well as to the gates in order to prohibit entry of looters and to clear all entrances for the route of Fire Trucks.

4. The Evacuation Chief in coordination with the Security Supervisor to give the order to vacate the area and to ensure that all employees must leave their places of work. Other occupants of the building will join the exit movement of the employees and will be instructed to stay outside MWSS fence near Katipunan Road.

5. Medical Team/First Aid Team will render first aid /medical attention to victims affected prior to their evacuation to the nearest hospital.

Upon arrival of responding Fire Trucks, the Security Supervisor/Detachment Commander will accompany them to where the Fire is in progress.

After the Fire, Earthquake or Flood, the Fire Marshal and the Security Supervisor shall assist the Arson Investigation Team in the collection of Evidences in determining the cause of fire. Photographs should be taken from the fire scene for future references.

6. The opening of the building or its normal operation shall be the discretion of the Management.
**B.) EXECUTION** (In case of Earthquake, Flood and other Natural Calamities)

1. ORGANIZATIONAL CHART (Groupings)

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**Figure # 3**

- **ASST. DISASTER MARSHAL**
  - B.) RESCUE TEAM
    - RESCUE CAPT.
    - RESCUE TEAM MEMBERS
    - SAFETY ENGINEERS
    - MWSI SAFETY OFFICERS
    - ELECTRICIAN
    - PIPE FITTER
    - DRIVERS
  - C.) MEDICAL TEAM
    - COMPANY DOCTORS
    - COMPANY NURSE
    - MEDICAL AIDS
  - D.) ADMINISTRATION AND CONTROL
    - SAFETY COMMITTEE MEMBERS
    - FUNCTIONS:
      - First Aid Treatment
      - Nearest Hospital Coordination & Administration
    - FUNCTIONS:
      - Coordination & Contacts for Support & Logistics, and Administration and Control
  - E.) MWSI'S SECURITY AGENCY
    - OPERATIONS OFFICER (MWSI)
    - DETACHMENT COMMANDER (Agency)
    - GUARDS (Agency)

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b.) **GROUP FUNCTIONS:**

**A. DISASTER MARSHAL**

- COMMAND CONTROL CENTER: Safety Department
- LOCATION: Ground Floor Main Office

**ASST. DISASTER MARSHAL**

**B. RESCUE TEAM & CO.**

- CHAIN OF COMMAND:
  ① Disaster Marshal (or the Assistant in case Disaster Marshal is not around) is the overall Head of the four (4) teams (Rescue Team, Medical Team, Administration and Control Team and Security Team).

  ② Direct instructs, thru the Team Head, all teams on the on-going disaster what to do, or as needed.

  ③ Assess situation, based on respective reports given by Teams’ Head, and communicate to management (MWSI)

- The Rescue Captain shall act as head of the rescue Team.
② Lead/head the Team for all types of Rescue Operations.

③ Instructs/Directs all group members to execute their respective duties and responsibilities.

④ Performs other acts relative to Disaster Rescue Operations.

① Administers needed first aid treatment to victims, especially MWSI personnel and interests.

② Make reports on all medical matters.

① All Safety Committee Members are mobilized and to execute all administration works including support and logistics, etc.

② The most senior member shall act as the Team Leader, responsible to lead the Team’s functions.

③ Assessment and report on the situation.

① The Chief Security Officer shall head the Security Team, in coordination with Detachment Commander of Security Agency.

② Tasks to undertake all security matters in the areas and interests affected by the Tropical Cyclones or Storms.

SECTION – 50
ATTACHMENTS

1. Map of Route to Nearest hospital (See Annex H)
2. MWSI-Assembly Point (See Annex E. M.)
3. Engineering Building Floor Plans (Basement to Third Floor) showing the Fire Exit Points. See Attachment annexes A to D.

SECTION – 51
ADMINISTRATIVE CONTROLS

1. The Evacuation Chief shall document what transpired during the Drill, and submit it to the Fire Marshal.
2. Concerned employee/s will be issued corresponding memorandum regarding lapses or errors committed by them during drills. Constructive advises will be contained in these letters. Succeeding drills will indicate application of corrections on previous errors.

3. In case of employee’s failure to attend the drill/training despite confirmation of attendance, he/she shall be required to submit a written valid explanation duly signed by the immediate supervisor explaining the reason/s for such failure and the following penalties shall be accorded to him/her:

<table>
<thead>
<tr>
<th>First Offence</th>
<th>Written Reprimand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second Offence</td>
<td>five (5) days Suspension</td>
</tr>
</tbody>
</table>

4. The Internal Audit, Administration-HR, Safety Department and the Safety Committee in general shall from time to time review/update the applicability of this policy.

**CHAPTER XI**

**FIRST AID TREATMENT**

**SECTION 52**

52.01 Training and re-training of an eight (8) hour course conducted at least once a year on First Aid is highly recommended for updates on new methods/skills focusing more on frequently encountered cases.

52.2 First Aider should be properly identified and employees in general are made aware of work shift schedule and site assignment.

52.3 Emergency services by at least one well trained first aiders for every work shift is a must.

52.4 A complete First Aid Kit should be strategically distributed in all MWSI satellite offices.

52.5 A regularly replenished kit should contain a properly labeled and segregated medicines and paraphernalia.

52.6 First Aid Pocket Manual should:
   a. be understandable to the layman/users.
   b. include first aid procedures of frequently encountered illnesses/accidents.
   c. specifically be on hand all the time by the first aider and strategically accessible to everyone.

52.7 First Aider should keep on record of all the incidents encountered for monitoring and documentation purposes.
Ideally the First Aid Kit should contain the following:

1) 70 % Isopropyl Alcohol (Green Cross)  60 ml
2) Hydrogen Peroxide     120 ml
3) Betadine Antiseptic Solution    15 ml
4) Normal Saline Solution     250 ml
5) Cotton Balls                50pcs/pk.
6) Sterile Gauze Pads 2 x 2
   3 x 3
7) Roller Gauze                 51.75
8) Adhesive Strips/Band aids  100pcs./box
9) Elastic Bandage 2 x 5
    3 x 5
10) Triangular Bandage
11) Sterile Rubber Gloves
12) Ice Packs (gel type)
    (ice bag)
13) Forceps
14) O.R. Scissors
15) Bandage Scissors
16) Tongue Depressors 100 pcs./box
17) OTC drugs
   a) Biogesic
   b) Diatabs
   c) Dolfenal 500mg
   d) Plasil
   e) Bonamine (Adult)
   f) Buscupan
   g) Histacort
   h) Cohistan
   i) Kremil-S
   j) Neozep No Drowse
   k) Decolgen No Drowse
   l) Mucosolvan 30mg
   m) Tuseran Forte
18) Salbutamol (Ventollin) Metered Dose Inhaler

SECTION 53

First aid is the immediate temporary treatment given in case of accident or sudden illness before the services of a physician can be secured. After first aid is given, the injured or sick employee should be brought to the medical unit.

General Instructions:

1. A first aid kit, which should be readily available at all times. First aid kits must be properly maintained and inspected at frequent intervals by the foremen or others in charge.
2. Stop and think, Keep calm in all emergencies. If you are familiar with first aid methods, do not hesitate to take charge of the situation. Direct
the action of others and do everything in your power to preserve the life and comfort of the injured. If you are not familiar with first aid methods, ask someone.

3. In any case, except very minor injuries, lay the patient down in a comfortable position, examine for all injuries and see that a doctor is called for at once. Do not excite or frighten the patient- a word of encouragement is always helpful.

4. If alone, treat first for stoppage of breathing needing artificial respiration; second, severe bleeding; third, for internal poisoning; fourth, for open wounds; fifth, for burns; sixth, for fractures and dislocation. Other less serious injuries can be taken care of.

5. If patient is unconscious and is not breathing or if you are uncertain of his action, start artificial resuscitation at once.

6. Handle patient gently but firmly.

7. Loosen tight clothing at neck and waist.

8. Do not slip clothing over injured part. Rip it at the seams with knife or scissors.

9. If the patient is vomiting, turn his head to one side so he will no choke.

10. Patient should always be kept warm.

11. Never give unconscious person water or any liquids to drink.

12. Do not move an injured person unless absolutely necessary. Do not be in a hurry to transport the patient. Much harm may be done when jarring and shaking the patient.

SHOCK OR FAINTING
This condition is present in many cases of minor or major injury.

Fainting is a mild form of shock.

1. Lay the patient flat on his back with his head low.

2. Keep the patient comfortably warm with blankets, robes, coats, etc. External heat, such as hot water bottles, hot pads, etc., should not be applied unless the covering appears to be inadequate or the patient complains of being cold. In applying heat to the body, great care must be exercised to prevent burning the patient.

3. Provide plenty of fresh air,

4. Have the patient inhale aromatic fumes from ammonia ampule. If patient is conscious, give him a glass of water or a hot drink (tea, coffee or water) as a stimulant. Administer frequently in small doses. (Inhalants must be carefully used. Do not hold too close to nose. Try them on yourself first.)

WOUNDS
Any break in the skin is a wound and is likely to become infected. All wounds, no matter how small, must receive first aid attention.

A. Wounds Without Severe Bleeding:

1. Wash the wound with soap or water.
2. Dry it with cotton balls or let it dry.
3. Apply antiseptic solution, e.g. alcohol etc.
4. Cover it with sterile gauze compress and bandage.
5. Puncture wounds from nails, long sprinters, etc. should receive the immediate attention of a physician.
6. Do not disturb blood clots or scabs.
7. Do not remove foreign bodies, except small splinters from wounds. These maybe carefully remove from tweezers, the points of which have been scorched in a flame sterilized with antiseptic.

B. Wounds With Severe Bleeding:
1. Secure medical aid at once. Apply direct pressure by using compress or bare hand.
2. Place patient in a lying position and elevate the injured part if possible, above the heart.
3. Apply pressure with fingers on arterial pressure points, if known. Apply digital pressure by pressuring the artery that supplies blood to the wounds.
4. Place large scales gauze compress over wound and bandage tightly in place.
5. As a last resort to check bleeding from an injured limb, a tourniquet may be applied close to the wound. There should be unbroken skin between the tourniquet and the wound. If the wound is near a joint, make the wrap at the nearest point above the joint. Attached a note on the victim’s body indicating the hour of tourniquet application. The tourniquet should not be released except by a physician who is prepared to control the hemorrhage and replace blood volume adequately. Improvised tourniquets should be made of flat material about two inches wide (i.e., cravat bandage, stocking or a belt). Do not use rope, wire, or sash cord: they may cause injuries to the underlying tissues and blood vessels.
6. Do not give stimulants in case of severe bleeding. Cold water may be given in small doses.

INFECTED WOUNDS
There is no first aid treatment for infection. A physician must always be consulted promptly.

BURNS:
1. Do not break blisters.
2. Carefully cut away clothing from the burned area and apply sterile burnt solution or ointment. Never use iodine.
3. Cover lightly with several thickness of sterile gauze and bandage. Never use cotton for burns.
4. In all cases of chemical burns on the skin, thoroughly flush the burned area with plenty of clean water. Then treat as directed above.

5. For chemical burns to the eye, see section on Eye Injuries.

6. Creosote burns—when skin surfaces contact with creosoted poles, wash parts thoroughly with soap and hot water. Apply Isopropyl Alcohol (Creosote burn solution). Never use this solution in or near the eyes.

INJURIES TO BONES

Injuries to bones are sometimes difficult to detect. If a fracture or dislocation is suspected, treat as such.

Falls or other accidents involving injury to the neck or back may result in very serious after-effects if the spinal cord is injured.

Unless there is an imperative need to move an individual suspected of having a spinal cord injury to a zone of safety, the injured is best not moved or lifted, until medical aid is obtained.

FRACTURES:

1. Avoid unnecessary handling of patient and injured part. (Great damage may be done by sharp edges of bone puncturing blood vessels and tissues).

2. Place the patient at rest in a comfortable position. Call a doctor at once. It is not necessary to splint broken bones unless the patient must be move. However, never move the patient until the broken bone is splinted.

3. When to splint:
   Cover the joints above and below the fractured member. Splints must be thoroughly padded and carefully applied.

4. In compound fractures where bone protrudes through skin, treat the wound first as directed under the section on WOUNDS.

DISLOCATION:

A bone out of position at a joint is called a dislocation.

1. Treat dislocation by the application of cold or hot compresses.

2. Secure medical aid promptly. It is always advisable to have a doctor to put the dislocated joint back in place.

SPINAL CORD INJURIES

Never lift an injured person or his head until he is sure he can move his legs or fingers. If the victim cannot move his legs, his back may be broken. In both cases, the spinal cord is injured.

If the patient must be moved, proceed as follows:
BROKEN BACK

In case of a broken back, fold a blanket lengthwise and place it beside the patient. Hold him at the shoulders and hips and gently roll the patient over into the blanket with the head turned to one side. One arm may be folded so as to lie beneath the patient’s head. By pulling at the shoulders and hips, the trunk is moved as a unit. The blankets should be lifted by grasping it at the level of the patient’s shoulders and knees. This permits the patient’s back to sag slightly downward on a stretcher or a similar support and must be transported in this position.

Do not permit the patient to sit up.

BROKEN NECK

If a person with a broken neck must be moved, a board or shutter should be placed lengthwise beside the patient so that it is at least four (4) inches beyond the patient’s head. The board should be five (5) feet or more in length and at least (15) inches wide.

The neck is steadied by holding the head between the two hands. One or more persons shall slide the patient onto the board so that he rests with his face upward, arms at side, head, trunk and extremities on the board. The body, head and neck are moved as one.

Fold and secure the arms over the chest. Strap the patient to the board to prevent him from falling off during transportation. No pillow shall be placed under the head or neck.

Under no circumstances shall the head be tilted forward or sideways.

If the injured person is found lying face downward, the board shall be placed beside the patient in the same manner as described above. The head and neck are then steadied between the two hands while another person gently rolls the patient onto the board, holding the patient at the shoulders and hips so that he lies face up. The head and trunk must be turned at the same time.

Although there may be no symptoms, if a broken back or neck is suspected, transport as if the back or neck were broken. When the victim is unconscious, handle him as though his neck is broken.

POISONING:

FOR NON-CORROSIVE POISONING (WITHOUT ACID CONTENT)

1. Dilute the poison with water. Let the victim drink as much water as he can.
2. Induce vomiting.
3. Administer antidote (anti-poison) or milk to neutralize the poison inside.
4. If breathing stops, give artificial respiration.

FOR CORROSIVE POISONING (POISON WITH ACID CONTENT, E.G. MURIATIC ACID)

1. Dilute with water.
   Note: Don't let the victim vomit. It can enhance further tissue damage.
2. Administer antidote:
   1 part strong tea
   1 part milk
   2 parts charcoal

POISON VINES-IVY, SUMAC, OAK, ETC.:
Learn to identify these plants and avoid contact with them.
1. If portions of the skin are exposed, wash thoroughly several times with hot water and soap and then apply rubbing alcohol liberally.
2. If rash develops, wash again, apply rubbing alcohol and saturate with 5% solution of ferric chloride, calamine or other approved poison ivy lotion. Cover lightly with sterile gauze.
3. Always consult a doctor if the wound is severe.

BRUISES, SPRAINS AND STRAINS
1. Bruises are not usually serious. However, other internal injuries should be suspected. Apply cold or hot applications which will reduce swelling and pain.
2. Sprains are injuries to joints. Place the patient at rest and elevate the injured limb. Cold applications will reduce pain and swelling.
3. Strains are injuries to muscles. Rest injured muscles. Cold application and gentle massage of the injured part will help ease the pain. If strain is in the abdominal region, rupture should be suspected and a doctor consulted.

EYE INJURIES:
All cases except the most trivial ones MUST BE ATTENDED BY A DOCTOR

FOREIGN BODY IN THE AREA
1. Never probe or dig the eye for removal of embedded particles. If an object is floating on the surface, it may be brushed off with a clean cotton application or the corner of a sterile gauze compress.
2. Do not allow the patient to rub his eye. This will cause great irritation and do little good.
3. If the particle cannot be readily removed or if irritation continues, the eye should be flooded with a 10% solution of boric acid ointment. A couple of drops of clean olive oil or castor oil should then be applied.
4. Do not remove splinters from the eye.

**BURNS TO EYE**
In all cases of burns to the eye, the patient must be sent to a doctor.
1. Chemical burns—Never neutralizes chemical burns of the eye. It is too risky for a novice to attempt this. Thoroughly flush the eye with clean water, then drop olive oil, castor or boric acid ointment into the eye.
2. Electric flush burns or fire burns of the eye should be treated with clean olive oil, castor or boric acid ointment. Do not use water.
3. Cover eye with a soft gauze compress. Iodine must never be used in or near the eye.

**BITES**
Dog or Cat Bites
1. Wash the wound thoroughly with soap and water. (This is the only exception where the use of soap and water on a wound is permissible.) This is done to eliminate the animal’s saliva.
2. Treat as any open wound.
3. Always consult a doctor. (If possible, identify the owner of the animal).

**INSECT BITES**
1. Treat as an open wound.
2. Watch closely for the development of infection.

**SNAKE BITES**
If you work in a snake-infested area, insist on a special snake first aid packet for your use and familiarize yourself with the special instructions on the treatment of snakebites found in the packet.

**FIRST AID FOR NON-VENOMOUS SNAKE BITES:**
Treat as an ordinary wound.

**FIRST AID FOR VENOMOUS SNAKE BITES:**
1. Immobilize the injured patient.
2. Apply a constricting band.
3. Make an incision on the bitten part.
   Note: Incision should be along the vein, not across the vein.
4. Suck the incised area to remove the venom.
5. Transport the victim to the hospital.

GENERAL INSTRUCTIONS:
1. Don’t get excited. Keep quiet or don’t move to avoid increase in the circulation of the venom.
2. Don’t take a slug of whisky.
3. If bitten on a limb, let it hang down. Don’t do more harm to yourself than the bite would have done if you hadn’t treated it, particularly if you are not sure you have been bitten by a poisonous snake. Some have been so slash-happy with the knife, tied the lymph constrictor so tight, or left it on so long that infections, ulcers, gangrene and other complication result.
4. Sit where you are and carry out the first part of this treatment.
5. If you think you are bitten by a rattlesnake but can find no fang marks and have no pain or swelling within fifteen (15) minutes of the bite, you are probably mistaken in the identity of the snake or the snake injected very little venom.
6. Make no incisions but get to a doctor promptly.
7. Kill the snake, if possible, without undue excitement or exercise, to know whether it is really a poisonous snake. If practical, take the dead snake to your doctor so that he may know its size and identity.
8. Paint knife blade and fang marks with antiseptic. Make cross (x) incisions at the fang marks ¼ ” long and 1/8 ” to ¼ ” deep. (Do not make incisions if the bite is on fingers, toes or over large visible veins). Squeeze air out of the cup and place over incisions. Steady gentle suction is better than strong suction. The cups hold on best if the skin is moistened with antiseptic (alcoholic beverages may be used but antiseptics from first aid bites are much preferred.) If the patient can be taken to a hospital within fifteen (15) minutes, don’t do anything-just get to the hospital and have someone call ahead so that they can be prepared and have anti venom ready.

CONVULSIONS OR FITS:
1. Place the patient flat on his back and insert a padded stick between teeth to prevent the patient from biting tongue.
2. Do not restrict convulsion action but try to prevent the patient from inflicting self-injury, especially to the head.
3. After a convulsion, the patient must be kept warm and quiet. A doctor must be called.

SUNSTROKE:
Sunstroke is caused by prolonged exposure to the direct rays of the sun. Condition comes on rapidly. Face is flushed, skin is dry and hot and
breathing is heavy. A high fever is present. Treat this condition by reducing fever as quickly as possible by sponging head and the entire body with cold water. Never give patient stimulants (cool water may be given). Keep patient lying down with head and shoulders slightly elevated. Get medical help at once. Quick action is important. Do not use ordinary treatment for shock.

HEAT EXHAUSTION:
Heat exhaustion usually occurs in hot places where the circulation of air is not good. It is entirely different from sunstroke. It causes collapse from the effect of heat. The patient is very pale, skin is covered with clammy perspiration, pulse is weak and breathing is shallow. Treat by moving the patient to a cool place with good air circulation. Place the patient on his back with head low and then cover him with blankets or coats. If the patient is unconscious, give him aromatic spirit of ammonia dipped in a cotton ball as stimulant. Get medical aid at once and keep the patient quiet. Treat for shock.

HEAD INJURIES
Every head injury should have the attention of a doctor. Fractured skull or concussion should be suspected and treated for.
1. Lay the patient down.
2. Give no stimulants.
3. Keep the head slightly raised and apply cold compresses to forehead and back of neck and heat to the rest of the body.
4. Treat any wound if present.
5. Transport these cases very carefully.

ARTIFICIAL RESUSCITATION:
In case of accident involving electric shock, the following action shall be taken immediately:
1. Breaking the contact- the victim must be freed from contact with the live conductors as promptly as possible. Use a long dry stick or pole or another non-conductor. Interrupt the current supply if this can be done safely and quickly.
2. Begin rescue breathing (mouth to mouth to nose method) at the earliest possible second after the action under Item I has been taken. Remember: the brain has only 4 minutes to live without oxygen.
3. While rescue breathing is in progress, have someone examine the heartbeat of the injured by feeling the pulse on his wrist or on his neck, just at the side of the Adam’s apple.
4. (a) If the heart of the injured is still beating, rescue breathing should be continued uninterrupted until normal breathing of the injured is restored or rigor mortis has begun. This may be four
(4) to six (6) hours longer or place for care and treatment until after normal breathing has been restored. He may be lowered from the pole, but must not be otherwise moved.

5. If the heartbeat of the injured has stopped, the injured should be lowered as soon as possible and both the rescue breathing and the closed chest heart massage performed simultaneously.

(a) As soon as possible, an ambulance should be called. Continue an uninterrupted artificial respiration and closed chest heart massage until normal breathing and normal heartbeats are restored.

(b) If a second person is not available, the rescuer may interrupt massage every thirty (30) seconds to fill the chest two (2) or three (3) times (rescue breathing). Mouth to mouth ventilation and chest massage do not have to follow the same rhythm.

(c) As soon as the ambulance arrives, the injured shall be taken to the nearest hospital that has facilities for cardiac treatment.

During the trip to the hospital, artificial respiration and heart massage shall be continued in the ambulance. At the hospital, the injured shall be turned over to the attendants of the Medical Staff who must be immediately informed that the injured was a victim of electric shock and that his heartbeat has stopped.

6. Keep the injured warm at all times during treatment and during the trip to the hospital.

7. (a) These rules should be called to the attention of a doctor in attendance whose order is not in agreement, the doctor should be requested to assume full responsibility.

(b) A doctor in attendance may give the injured an injection of adrenalin, render first aid treatment for surface wounds and burns and take such action as he may deem necessary. All the while, artificial respiration must never be used in cases of electric shock.

The MWSI employee present who is senior in position shall be held responsible for complying with these instructions. In case of an accident involving a non-employee, he should not insist that these instructions are followed, but it shall be his duty to recommend and urge that the instructions be followed.

CLOSED CHEST HEART MASSAGE:

In an accident such as drowning, suffocation, gas poisoning, heart attack, overdose of drugs or electric shocks, one or two things can happen. Breathing may stop while the heart still beats or both breathing and heartbeat may stop. In either case, death is just a matter of minutes if no decisive and immediate action is taken. Rescue breathing and closed chest heart massage should be given immediately as the case may be.
The following actions should be taken immediately when the heartbeat of the victim has stopped:

1. Lay the victim on his back (supine position) on a firm or rigid surface.
2. Locate the breastbone by feeling the notch where the collarbones meet at the top end and the cartilage located in the middle of the breast below the ribs at the bottom.
3. Place the heel of the palm of one hand on the lower third of the breastbone and the other hand on top of the first. Palms should be parallel to and not touching the ribs.
4. Pressure is applied vertically downward and forcefully at least once per second. Pressure must be strong enough to move the breastbone \(1\frac{1}{2}-2\)″ toward the spinal column.
5. At the end of each stroke, the hands are completely relaxed to permit full expansion of the chest.
6. Repeat operation continuously at one (1) second intervals until normal beating is restored.
7. If beating has been restored, the patient must be watched, and if natural beating stops, closed chest heart massage should be resumed at once.
8. While the closed chest massage is in progress, send for an ambulance.
9. The injured shall be taken to the nearest hospital. During the trip to the hospital, artificial respiration and closed chest heart massage shall be continued in the ambulance.

**MOUTH TO NOSE METHOD OF ARTIFICIAL RESPIRATION:**

1. The victim should be laid on his back with his head tilted as far as possible so that his neck is extended. If there is a slope, placing the victim’s body with the head slightly downhill is advisable.
2. The operator closes the victim’s mouth by placing the palm of one hand on the victim’s jaw with continued pressure applied.
3. After taking a deep breath, the operator places his mouth completely over the victim’s nose with airtight contact.
4. The operator then breathes or blows into the victim’s nose forcefully for adults and gently for children. The victim’s chest should be watched and as soon as it rises, the blowing should be stopped and the operator’s mouth quickly removed from the nose of the victim, allowing him to inhale passively.
5. If the chest does not rise, the position of the head should be improved and the blowing done more forcefully. If the victim’s lungs are still not ventilated, his airways may be obstructed. He should be placed in a face down, head down position, his
tongue pulled forward and patted firmly on the back to dislodge any foreign object.
6. The cycle of inflation and exhalation should be repeated approximately 12 times per minute for infants and small children.
The mouth to nose method is recommended for use on pole top resuscitation.

MOUTH-TO-MOUTH ARTIFICIAL RESPIRATION (Rescue Breathing)

Basic steps: a) Opening the airways
           b) Restoring breath

Causes of Stoppage of Breathing:
1. Anatomical Obstruction- e.g. the tongue falls backward due to unconsciousness; tonsillitis.
2. Mechanical Obstruction- presence of foreign materials in the airway passage, e.g. choking, cave-in, electrocution.

Proper Steps in Giving Artificial Respiration:
1. Check for unconsciousness (5 sec.)
2. If unconscious, tilt the head (5 sec.) While tilting, check the mouth for the presence of any obstruction like un-chewed food or any prosthesis.
3. Look, listen and feel for breathing in order to recognize respiratory arrest. (5 sec.)
   Look- at the rise and fall of the chest
   Listen- for air escape during exhalation by placing your cheek near the victim’s nose
   Feel for the carotid pulse at the side of the Adam's apple.
4. If the victim is not breathing, give full, slow breaths.
5. Check again for pulse and breathing.
6. If still not breathing, give one (1) per five (5) seconds until the victim has revived.
   Ratio: I blow per five seconds
   Normal respiration-16-20 respiration per minute

POLE TOP RESUSCITATION:

After a person has received an electric shock, it is very important that he receives the application of resuscitation immediately.

The time elapsed between the electric shock and the application of resuscitation may make the difference between life and death.
The pole top method of resuscitation was developed with the sole purpose to cut down this elapsed time to give the victim a greater chance for survival.

POLE TOP RESUSCITATION RESCUE BREATHING (MOUTH TO NOSE METHOD):

Calling Alarm:
1. Anybody who sees the victim first should call the alarm.
2. He should call out the location of the victim and his name.
3. He should give out noticeable details as to the victim’s position.

A. Going to the Rescue:
1. The man nearest the victim should immediately start to go to the rescue of the victim.
2. The rescuer should take all necessary precautions to prevent injury to himself.
3. He should have his rubber gloves on and must not rush to the scene of the accident without quickly planning a safe means of rescuing the victim as quickly as possible.

B. Releasing the Victim from Contact:
The rescuer, after reaching the victim, should immediately release the victim from all contact with live parts, taking caution not to make any body contact with the victim or the live parts except with rubber gloved hands.

Administering Resuscitation:
1. The person who will administer artificial respiration takes a position on the pole a little higher than the victim.
2. The head of the victim is tilted backward, as far back as possible, in a face-up position. The rescuer’s rubber gloves should not be removed.
3. The operator closes the victim’s mouth by placing the palm of one hand on the victim’s jaw with continued pressure applied.
4. After taking deep breath, the operator places his mouth completely over the victim’s nose and blows forcefully. The victim’s chest should be watched and as soon as it rises, the blowing should be stopped and the operator’s mouth quickly removed from the nose of the victim, allowing him to exhale passively.
5. If the chest does not rise, the position of the head should be improved and the blowing done more forcefully. If the victim’s lungs are still not ventilated, his airway may be obstructed. He should be placed in a face down position, his tongue pulled forward and patted firmly on the back to dislodge any foreign object.
6. The cycle of inhalation and exhalation should be replaced 12 times per minute.
C. Rescuer’s Assistant:
   1. Another man should go up to the pole to aid the rescuer. He should bring with him a hand line with a diameter of not less than ½ inch.
   2. After reaching the victim, the second man shall immediately determine whether the heartbeat of the victim has stopped. He can do this by feeling the pulse at the victim’s wrist or at the neck alongside the Adam’s apple. Another check would be to open the victim’s eyes. If the pupils of the eyes are dilated (wide open), it indicates that no blood is reaching the victim’s brain.

D. The following actions should be taken after the examination of the heartbeat of the victim:

Heart Still Beating:
   1. The rescue breathing shall be continued uninterruptedly until normal breathing is restored.
   2. The second man shall look carefully for hazards and use additional protective rubber equipment as necessary to make certain that the lives of both rescuer and the victim are not endangered by live conductors.
   3. He should remove the victim’s climbers to prevent possible injury to him and his rescuers.
   4. The second man then places his safety straps between the legs of the victim and moves up the pole. He then lets the victim’s back rest on his breast to relieve the victim’s waist from strain caused by his body belt.
   5. Rescue breathing shall be continued as long as necessary on the pole or structure.
   The second man shall assist in lowering the victim to the ground when the need arises to wit:
   a. Where artificial respiration is impossible to perform on the pole.
   b. When the victim has been revived or rigor mortis has set in.
   Note: the second man should be very careful in doing his job so that it will not interrupt the artificial respiration being performed by the rescuer.

Heartbeat Stopped:
   1. The rescuer shall announce to the men below that the heartbeat of the victim has stopped. The foremen shall then assign one of his men to call an ambulance.
   2. The second man shall then prepare, as quickly as possible, the hand line for lowering victim and shall stand by to assist in the lowering operation.
3. The victim shall be lowered as soon as possible.
4. As soon as the victim reaches the ground, he shall be held on his back on a firm and rigid surface.
5. Mouth to nose or mouth-to-mouth resuscitation and closed chest heart massage shall be administered immediately and simultaneously.
6. As soon as the ambulance arrives, the injured shall be taken to a hospital with cardiac defibrillators. During the trip to the hospital, artificial respiration and heart massage shall be continued in the ambulance. At the hospital, the injured shall be turned over to the attention of the medical staff who must be immediately informed that the injured was a victim of electric shock and that his heartbeat has stopped.

F. Should there be any difficulty in administering the mouth to nose method, then the mouth-to-mouth method shall be administered.

SECTION 54
LIST OF CHEMICALS INCLUDED IN MATERIAL
SAFETY DATA SHEET

1. Acetic Acid Glacial
First Aid measures:
   A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
   B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
   C. Inhalation: Expose to fresh air, give oxygen or artificial respiration, preferably mouth to mouth
   D. Ingestion: (Antidote) Do not give emetics, give tap water, milk or milk of magnesia, give whites of egg beaten with water

2. Acetone
First Aid measures:
   A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
   B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
   C. Inhalation: Expose to fresh air, give oxygen or artificial respiration
D. Ingestion: (Antidote) Induce vomiting immediately by giving 2 glasses of water and sticking finger down throat

3. Ammonium Chloride
First Aid measures:
A. Eyes: Flush eyes or skin with plenty of water
B. Skin: Wash thoroughly with plenty of water for at least 15 minutes
C. Inhalation: Get plenty of fresh air
D. Ingestion: (Antidote) Give large amount of water

4. Ammonium Hydroxide
First Aid measures:
A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing
B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing
C. Inhalation: Expose to fresh air, give oxygen or artificial respiration
D. Ingestion: (Antidote) Do not give emetics, give tap water, milk or milk of magnesia, give whites of egg beaten with water

5. Ammonium Iron (II) Sulfate
First Aid measures:
A. Eyes: Not classified as hazardous
B. Skin: Not classified as hazardous
C. Inhalation: Not classified as hazardous
D. Ingestion: Not classified as hazardous

6. Barium Chloride Dehydrate
First Aid measures:
A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes
B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes
C. Inhalation: Expose to fresh air. If not breathing, give artificial respiration
D. Ingestion: Call Physician, if swallowed, induce vomiting

7. Calcium Chloride Dehydrate
First Aid measures:
A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes
B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes
C. Inhalation:
D. Ingestion:

8. DPD Frea Chlorine Reagent
First Aid measures:
A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes. Call physician. Remove contaminated clothing.
B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes. Call physician. Remove contaminated clothing. Wash skin with soap and plenty of water.
C. Inhalation: Remove to fresh air.
D. Ingestion: Give large quantities of water. Call physician immediately.

9. Ethanol, absolute
First Aid measures:
A. Eyes: Data not available
B. Skin: Data not available
C. Inhalation: Data not available
D. Ingestion: Data not available

10. Ferrover Iron Reagent
First Aid measures:
A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes. Call physician.
B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes. Call physician. Remove contaminated clothing. Wash skin with soap and plenty of water.
C. Inhalation: Remove to fresh air. Give artificial respiration. If necessary, call physician.
D. Ingestion: Do not induce vomiting. Give large quantities of water and at least 1 ounce of milk of magnesia in 1 ounce of water. Call physician immediately.

11. Hydrochloric Acid
First Aid measures:
A. Eyes: Rinse immediately with plenty of water and contact doctor.
B. Skin: Rinse immediately with plenty of water and contact doctor.
C. Inhalation: Get plenty of fresh air, give oxygen if there is difficulty in breathing
D. Ingestion: (Antidote)

12. Hydrozine Sulfate
First Aid measures:
A. Eyes: Flush eyes including under eyelids with large amount of water
B. Skin: Flush skin with plenty of water while removing contaminated clothing
C. Inhalation: Move to fresh air, if not breathing give artificial respiration
D. Ingestion: (Antidote) Induce vomiting, give large amount of water, call physician

13. Isopropyl Alcohol
First Aid measures:
A. Eyes: Immediately flush eyes or skin with plenty of water for at least 15 minutes
B. Skin: Immediately flush eyes or skin with plenty of water for at least 15 minutes
C. Inhalation: Remove to fresh air. Give artificial respiration or oxygen
D. Ingestion: Give water to drink, induce vomiting, seek medical help

14. Lauryl Tryptose Broth
First Aid measures:
A. Eyes: Rinse immediately with plenty of water and seek medical help
B. Skin: Rinse immediately with plenty of water and seek medical help
C. Inhalation: Victim must be exposed to fresh air or given CPR if breathing stops
D. Ingestion: (Antidote) No data

15. Methanol (Methyl Alcohol)
First Aid measures:
A. Eyes: Immediately flush with plenty of water for at least 15 minutes
B. Skin: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing/ shoes
C. Inhalation: Expose victim to fresh air or oxygen/ artificial respiration
D. Ingestion: (Antidote) In conscious, give large amount of water, induce vomiting

16. Nitric Acid
First Aid measures:
A. Eyes: Holds eyes open, flood with water for at least 15 minutes and see a doctor
B. Skin: Remove contaminated clothing/ shoes and wash thoroughly
C. Inhalation: Get plenty of fresh air
D. Ingestion: (Antidote) Do not induce vomiting, give a glass of water, contact a doctor

17. Phosphoric Acid
First Aid measures:
A. Eyes: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing/ shoes
B. Skin: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing/ shoes
C. Inhalation: Expose victim to fresh air, give oxygen/ artificial respiration if there is difficulty in breathing
D. Ingestion: (Antidote) Do not induce vomiting, give a glass of water, call a physician

18. Sulfaver
First Aid measures:
A. Eyes: Immediately flush with plenty of water for at least 15 minutes. Call physician. Flush skin with plenty of water.
B. Skin: Immediately flush with plenty of water for at least 15 minutes. Call physician. Flush skin with plenty of water.
C. Inhalation: Remove to fresh air. Give artificial respiration if necessary.
D. Ingestion: (Antidote) Induce vomiting by sticking finger down throat, then give 1 tablespoon of Epsom salt in a glass of water. Call physician immediately. Never give anything by mouth to an unconscious person.

19. Sulfuric Acid
First Aid measures:
A. Eyes: Immediately flush with plenty of water for at least 15 minutes.
B. Skin: Immediately flush with plenty of water for at least 15 minutes. Remove contaminated clothing.
C. Inhalation: Remove to fresh air. Give artificial respiration if necessary.
D. Ingestion: (Antidote) Do not induce vomiting, give large amount of water

20. Triethanolamine
First Aid measures:
   A. Eyes: Wash with plenty of water
   B. Skin: Wash with plenty of water
   C. Inhalation: Remove to fresh air. Give artificial respiration if necessary.
   D. Ingestion: (Antidote)

SECTION 55  
EFFECTIVITY CLAUSE

This Code shall take effect immediately from date of approval.
EXHIBIT FORMS

EXHIBIT I. Personal Accident Report
EXHIBIT II. Vehicular Accident Report
EXHIBIT III. Vehicular Accident Decision Form
EXHIBIT IV. Decision Memorandum
EXHIBIT V. Vehicular Accident Investigation Report
EXHIBIT VI. Work Permit (Confined Space)
EXHIBIT VII. Hot Work Permit
EXHIBIT VIII. Work Accident/ Illness Report
EXHIBIT IX. Contractor’s Project Safety Checklist
EXHIBIT X. Pre-Departure Checklist
EXHIBIT XI. Working Area on Two-way Lane Traffic
   (Day Time with Caution Tapes)
EXHIBIT XII. Working Area on Two-way Lane Traffic
   (Night Time with Caution Tapes)
EXHIBIT XIII. Working Area on Two-way Lane Traffic
   (Day Time with Board-Ups)
EXHIBIT XIV. Working Area on Two-way Lane Traffic
   (Night Time with Board-Ups)
EXHIBIT XV. Working Area on Intersection
   (Night Time with Caution Tapes)
EXHIBIT XVI. Working Area on Intersection (Day Time with Caution Tapes)
EXHIBIT XVII. Working Area on Intersection (Night Time with Board-Ups)
EXHIBIT XVIII. Working Area on Intersection (Day Time with Board-Ups)
EXHIBIT XIX. Environment, Safety and Health Policy
EXHIBIT XX. Safety Policy
EXHIBIT XXI. Policy on the Creation of Central Safety Committee and Safety Sub-Committee
MEMORANDUM:

FOR : FEDERICO C ALLUSO JR.
Manager, Safety Department

SUBJECT: ACCIDENT REPORT re: EARL C OCAMPO

DATE : March 10, 2001

This is to inform you that Mr. Earl C. Ocampo, Mechanic Driver, under Work and Resource Management Section, met an accident yesterday, March 11, 2001 at around 11:00 AM on his way for work. He resides at Calamba, Laguna and uses a motorcycle as his service to and from work.

According to him, while traversing the left service road of the South Super Hiway (going to Makati somewhere in Bicutan), he was sideswiped by a 20 footer closed van and was thrown from his motorcycle that resulted to bruises and bone fractures. He is now confined at the South Super Hiway Medical Center room 434 for proper medical treatment and possibly an operation.

ARNEL M. CABANGAN
Manager, Novaliches Sector
**VEHICULAR ACCIDENT REPORT**

**DATE:** ________  **TIME:** ________

**NAME**_________________________________  **EMPLOYEE NO.**__________  
(MWSI Authorized Driver)

**DIVISION/BUSINESS AREA**________________________  **DESIGNATION**________________________

**ADDRESS**_________________________________  **MARITAL STATUS**__________  **AGE**________

**LICENSE NO.**_________________  **EXPIRY DATE** (mm/dd/yy)________________________

---

**DRIVER'S NAME**_________________________________  **TYPE OF ACCIDENT**

(2nd Party)

**ADDRESS**_________________________________  __**FIXED OBJECT**

**LICENSE NO.**_________________  **EXPIRY DATE**_________________  __**VEHICLE TO VEHICLE**

**OWNER'S NAME**_________________________________  __**VEHICLE-PEDESTRIAN**

**ADDRESS**_________________________________  __**OTHERS (SPECIFY)**

---

**COMPANY VEHICLE (V-I)**  **VEHICLE (V-2)**  **VEHICLE (V-3)**

**VEHICLE CO. NO**_________________  **TYPE**_________________  **TYPE**_________________

**MAKE**_______  **PLATE NO**_______  **MAKE**_______  **PLATE NO**_______  **MAKE**_______  **PLATE NO**_______

**C.R. #**_________  **DATE**_______  **C.R. #**_________  **DATE**_______  **C.R. #**_________  **DATE**_______

**PLACE**_________________  **PLACE**_________________  **PLACE**_________________

**DAMAGES:**

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<table>
<thead>
<tr>
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<th>NAME</th>
<th>ADDRESS</th>
<th>INJURIES</th>
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<td>V-2</td>
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<tr>
<td>INJURIES</td>
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<thead>
<tr>
<th>WITNESSES:</th>
<th>NAME</th>
<th>ADDRESS</th>
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<th>LEGAL:</th>
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<tr>
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<table>
<thead>
<tr>
<th>DRIVER’S ACCOUNT OF ACCIDENT: (Use Separate sheet if needed)</th>
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<tbody>
<tr>
<td>DATE OF ACCIDENT:</td>
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<tr>
<td>TIME OF ACCIDENT:</td>
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</table>

Prepared by: ____________________________________________

MWSI Employee

NOTED:

Immediate Supervisor/ Dept. Head
# VEHICULAR ACCIDENT DECISION FORM

Name of Driver: ___________________________ Employee No. _____________

Designation: ___________________________ Division/Business Area: ____________

Vehicle No. ______ Expiration Date: ______ Date of Accident: ________________

Type of Accident: ______ Place of Accident: ______ Time of Accident: ______

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<thead>
<tr>
<th>Analyses/Remarks</th>
<th>Decision</th>
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<tbody>
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<td>( ) Preventable</td>
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<td></td>
<td>( ) Non-Preventable</td>
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<td>( ) Reportable</td>
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Committee Member

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<thead>
<tr>
<th>Analyses/Remarks</th>
<th>Decision</th>
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<tr>
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<td>( ) Preventable</td>
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<td>( ) Non-Preventable</td>
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Committee Member

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<td>( ) Non-Preventable</td>
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<td>( ) Reportable</td>
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Committee Member
ANALYSES/REMARKS

__________________________________________________________________________

( ) PREVENTABLE

__________________________________________________________________________

( ) NON-PREVENTABLE

__________________________________________________________________________

( ) REPORTABLE

COMMITTEE MEMBER

FINAL DECISION: _______________________________________________________

VIOLATION/S: ___________________________________________________________

PAST ACCIDENTS

<table>
<thead>
<tr>
<th>DATE</th>
<th>VEHICLE NO.</th>
<th>TYPE OF ACCIDENT</th>
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PENALTY: ________________________________________________________________

ATTESTED BY:

____________________________
CHAIRMAN, ACCIDENT REVIEW COMMITTEE
MEMORANDUM

FOR:             MR. ALBERT V VALOGO
Manager, Sampaloc Sector

THRU:           MR. JULIUS C TAN
Manager, Central Business Area

FROM:           MR. RAMMEL BOCOBOC       DATE: March 10, 2004
CHAIRMAN, Accident Review Committee

SUBJECT:        Vehicular Accident of Antonio Serapio

This refers to the vehicular accident of Mr. Antonio Serapio, driver of Vehicle No. A-114 which happened last February 28, 2004 at/along Sampaloc Sector. The accident was adjudged PREVENTABLE by the Accident Review Committee.

Type of Accident: BACKING ACCIDENT
Violation/s: Rule 10.1, p. 45 Chapter V of Safety Code

DAMAGES INCURRED/INJURIES:
V-1 Broken left taillight lens.

He has had accident/s in the past as listed below:

<table>
<thead>
<tr>
<th>DATE</th>
<th>VEH. NO</th>
<th>TYPE OF ACCIDENT</th>
<th>DECISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-1-97</td>
<td>A-113</td>
<td>COLLISION</td>
<td>NON-PREVENTABLE</td>
</tr>
<tr>
<td>1-2-98</td>
<td>A-128</td>
<td>BACKING ACCIDENT</td>
<td>PREVENTABLE</td>
</tr>
</tbody>
</table>

REMARKS/COMMENTS:
V-1 DRIVER FAILED TO PROPERLY CHECK CLEARANCE WHILE BACKING. He should have requested the help of a signalman who has an unobstructed view of the rear.

For your appropriate action.

MR. RAMMEL BOCOBOC
CHAIRMAN, ARC
### Vehicular Accident Investigation Report

**Date:**

**Time:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Employee No.</th>
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<tr>
<th>Division/Business Area</th>
<th>Designation</th>
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<thead>
<tr>
<th>Address</th>
<th>Marital Status</th>
<th>Age</th>
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<thead>
<tr>
<th>License No.</th>
<th>Expiry Date (mm/dd/yy)</th>
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<tr>
<th>Driver’s Name</th>
<th>Type of Accident</th>
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<th>License No.</th>
<th>Expiry Date</th>
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<thead>
<tr>
<th>Owner’s Name</th>
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### Injured Persons

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<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Nature and Extent of Injury</th>
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<tr>
<th>Name</th>
<th>Address</th>
<th>Nature and Extent of Injury</th>
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### Witnesses

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<th>Name</th>
<th>Address</th>
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</table>
DAMAGED TO VEHICLES:
V-1
_______________________________________________________________________
_______________________________________________________________________
V-2
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
SAFETY INSTRUCTION OR RULE VIOLATED: (IF ANY)
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
BRIEF DESCRIPTION OF THE ACCIDENT:
_______________________________________________________________________
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REMARKS/FINDINGS:
_______________________________________________________________________
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______________________________
INVESTIGATING OFFICER/SAFETY ENGINEER
• PERMIT TO WORK •

Permit No.: _____________
Date: _________________

LOCATION OF WORK AREA: ________________________________

PURPOSE OF ENTRY/WORK: ________________________________

EMPLOYEES ASSIGNED: NAME & DESIGNATION
____________________________________________
____________________________________________
____________________________________________
____________________________________________

ESTIMATED TIME & DATE TO START WORK: ______________
ESTIMATED TIME & DATE OF COMPLETION: ______________

• ISOLATION CHECKLIST

  1. Disconnection/Blanking  YES  NO
  2. Electrical
  3. Mechanical

• HAZARDOUS WORK

  1. Burning
  2. Welding
  3. Open Flame
  4. Other

• HAZARDS EXPECTED

  1. Corrosive Materials
  2. Hot Equipment
  3. Flammable Materials
  4. Toxic materials
  5. Drains Open
  6. Spark Producing Operations
  7. Spilled Liquids
  8. Pressure Systems
  9. Other

• VESSEL CLEANED

  1. Deposits
  2. Method
  3. Inspection

• FIRE SAFETY PRECAUTIONS:

________________________________________________________________________
• PERSONAL SAFETY
  1. Ventilation Requirements
  2. Respirators
  3. Clothing
  4. Head, Hand & Foot Protection
  5. Shields
  6. Lifelines and Harness
  7. Lighting
  8. Communications
  9. Employee Qualified
  10. Buddy System
  11. Emergency Egress Procedures
  12. Others

ATMOSPHERIC GAS TESTS

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<tr>
<th>TEST PERFORMED</th>
<th>LOCATION</th>
<th>READING</th>
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<tbody>
<tr>
<td>EXAMPLE</td>
<td>(Oxygen)</td>
<td>_______</td>
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TEST PERFORMED BY: ______________________  TIME: ________
Name & Signature

AUTHORIZATIONS:

SUPERVISOR ________________________________________________

SAFETY SUPERVISOR/ENGINEER ________________________________

ENTRY & EMERGENCY PROCEDURES UNDERSTOOD:

STANDBY PERSON ____________________________________________

RESCUE ____________________________________________________

TELEPHONE ________________________________________________

PERMIT EXPIRES_____________________________________________
• HOT WORK PERMIT •

Date: ___________
HWP No.: ___________

ISSUED TO ____________________________________________
(Name and Designation of Worker, Foreman, Welder)

WORK DESCRIPTION: ____________________________________________

WORK LOCATION: ____________________________________________
ESTIMATED DURATION OF WORK: ___________
DATE/TIME ISSUED: ___________ DATE/TIME COMPLETED: ___________

REQUESTED BY: ________________________ APPROVED & ISSUED BY: ________________________
SUPERVISOR SAFETY OFFICER
(Print Name & Signature) (Print Name & Signature)

OBSERVATIONS DURING HOTWORK OPERATION
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Fire Watcher

CLEARING HOTWORK PERMIT

REQUESTED BY: ________________________ CLEARED BY: ________________________
Supervisor Safety Engineer
MAYNILAD WATER SERVICES, INC.

MWSS Complex, Katipunan Road, Balara, Quezon City
Tel. No. 433-69-58 to 59 or 920-55-21 loc. 3031 / 3032

WORK ACCIDENT / ILLNESS REPORT

1. Name of injured ___________________________________________ Age ___________

2. Unit ___________________________________________ _______________

3. Date of Accident / illness ________________________________ Time _________________

4. Length of service prior to accident or illness ____________________________

5. Occupation / trade ______________ Experience at trade ____________________________

6. WORK SHIFT _______ 1ST _______ 2ND _______ 3RD _______

7. Date of Accident / illness ________________________________ Time _________________

8. The accident involved: Personal injury ______ Property damage ____________

9. Description of accident / illness (Give full details on how the accident occurred):

______________________________________________________________________

10. Was injured doing regular part of job at the time of accident? ___. If not, why?

11. Extent of disability: Fatal _____ Permanent Total _____ Permanent Partial __

   Temporary Total _____ Temporary Partial _____ Medical Treatment ______

12. Nature of injury / illness __________ Part of the body __________

13. Days lost ________________ or Days charged _____________________

14. The Agency Involved ____________________________________________

15. The Agency Part Involved ____________________________________________

16. Accident type __________________________________________________

17. Unsafe Condition _________________________________________________

18. The Unsafe Act _________________________________________________

19. Contributory factor ______________________________________________

20. Mechanical guards, Personal Protective Equipment provided _____________

21. Are all safeguards in use? _____ If not, why? _________________________

22. Preventive measures taken or recommended _________________________

______________________________________________________________________

I hereby certify on my honor to the accuracy of the foregoing information.

________________________     ____________________
INVESTIGATING OFFICER                       DATE

____________________________________
EMPLOYER
## CONTRACTOR’S PROJECT SAFETY CHECKLIST

**General Contractor:**

**Authorized Sub-Contractor:**

**Date:**

**Project No./ Contract No:**

**Location/s:**

**Description of Work:**

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<th>PROVIDED</th>
<th>NOT PROVIDED</th>
<th>REMARKS</th>
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<td><strong>1. SAFETY SIGNS</strong></td>
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<td>a.) Conspicuously installed all safety signages</td>
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<tr>
<td>b.) Barricades/Bollards</td>
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<tr>
<td>c.) Traffic Cones</td>
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<td></td>
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<tr>
<td>d.) Lights (flasher)</td>
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<tr>
<td>e.) Caution Tapes</td>
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<td>f.) Board-ups</td>
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<td>g.) Others (specify)</td>
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<td><strong>2. PUBLIC SAFETY</strong></td>
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<tr>
<td>a.) Walkways cleared</td>
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<tr>
<td>b.) No construction debris on site</td>
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<tr>
<td>c.) Materials stockpile proper</td>
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<td></td>
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<td>d.) Signages installed</td>
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<td>e.) Others (specify)</td>
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<tr>
<td>f.) Traffic Man/ Flag Man</td>
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<td><strong>3. EXCAVATION AND OTHERS</strong></td>
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<tr>
<td>a.) Excavation w/ safety requirement</td>
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<tr>
<td>b.) Open excavation w/ steel plate/s</td>
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<tr>
<td>c.) Shoring -necessary -not</td>
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<td>d.) Ladder -necessary -not</td>
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<tr>
<td>e.) Sandbagging</td>
<td></td>
<td></td>
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<tr>
<td><strong>4. HOUSEKEEPING</strong></td>
<td><strong>GOOD</strong></td>
<td><strong>POOR</strong></td>
<td><strong>REMARKS</strong></td>
</tr>
<tr>
<td>a.) Construction Debris</td>
<td></td>
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</tr>
<tr>
<td>b.) Materials Storage/ Stockpiling</td>
<td></td>
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<tr>
<td>c.) Walkway and Aisles</td>
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<tr>
<td>d.) Presence of Unwanted Materials</td>
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<tr>
<td>e.) Field Office and Bunkhouse</td>
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<td>f.) Others (specify)</td>
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<td><strong>5. PERSONAL PROTECTIVE EQUIPMENT</strong></td>
<td><strong>COMPLIANCE</strong></td>
<td><strong>NON-COMPLIANCE</strong></td>
<td><strong>REMARKS</strong></td>
</tr>
<tr>
<td>a.) Hard Hat or Safety Helmet</td>
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<tr>
<td>b.) Safety Shoes/Foot Protection</td>
<td></td>
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<tr>
<td>c.) Safety Belts with lanyard</td>
<td></td>
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<td></td>
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<tr>
<td>d.) Respiratory Protection</td>
<td></td>
<td></td>
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<tr>
<td>e.) Face Protection</td>
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<td>f.) Hands Protection</td>
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<tr>
<td>g.) Hearing Protection</td>
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</tr>
<tr>
<td>h.) Fall Protection/Lifeline/ Safety Harness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i.) Reflectorized Traffic Vest and Gloves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. FIRE PROTECTION &amp; CONTROL</td>
<td>PROVIDED</td>
<td>NOT PROVIDED</td>
<td>REMARKS</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>a.) Fire Extinguishers/Equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.) No Smoking Signs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.) Designated Smoking Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.) Fire watching Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.) Others (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. EQUIPMENT FOUND AT PROJECT SITE</th>
<th>COMPLIANCE</th>
<th>NON-COMPLIANCE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.) Truck/s properly parked</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.) Dump truck/s safe operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.) Backhoe at safe operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.) Compressor parked/placed properly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.) Pay loader properly placed/operational</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.) Others (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. MEDICAL/EMERGENCY CAPABILITIES</th>
<th>PROVIDED</th>
<th>NOT PROVIDED</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.) First Aid Kit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.) First Aider on Site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.) Others</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. NUMBER OF EMPLOYEES ON SITE</th>
<th>ENGINEER</th>
<th>FOREMAN/LEAD-MAN</th>
<th>LABORERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.) Engineer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.) Foreman/Lead-man</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.) Laborers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONTRACTORS REPRESENTATIVE Acknowledgement:</th>
<th>MWSI INSPECTOR Acknowledgement:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature, Name and Designation</td>
<td>Name &amp; Signature/CSC Member/Sub-Committee</td>
</tr>
</tbody>
</table>
MAYNILAD WATER SERVICES, INC.

PRE-DEPARTURE INSPECTION CHECKLIST

Driver’s Name: ___________________________  Date: ___________________
Vehicle Type/ Model: ______________________  Plate No. __________________
ETD: ____________________  ETA: __________________
Cargo Description: __________________________

<table>
<thead>
<tr>
<th></th>
<th>Conditions:</th>
<th>Poor</th>
<th>Mild</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIRES:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLUIDS:</td>
<td>Level:</td>
<td>Low</td>
<td>Mild</td>
<td>High</td>
</tr>
<tr>
<td>BELTS:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>BATTERY:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>RADIATOR:</td>
<td>Level:</td>
<td>Low</td>
<td>Mild</td>
<td>High</td>
</tr>
<tr>
<td>WIPER:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>OIL:</td>
<td>Level:</td>
<td>Low</td>
<td>Mild</td>
<td>High</td>
</tr>
<tr>
<td>INSTRUMENT PANEL:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>BRAKES:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>ACCESSORIES:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>LIGHTS:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
<tr>
<td>SEAT BELTS:</td>
<td>Conditions:</td>
<td>Poor</td>
<td>Mild</td>
<td>Good</td>
</tr>
</tbody>
</table>

Others: (Specify)

Remarks:

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
Working Area on Two-way Lane
Day Time with Caution Tapes

Legend

- Keep Left/Right Lane
- Traffic Cone
- Caution Tapes
- Bollards
- Road Narrows
- Men At Work
- MWSI Safety Signage

EXHIBIT XI
Working Area on Two-way Lane
Night Time with Caution Tapes

EXHIBIT XII

Legend

Keep Left/Right Lane
Traffic Cone
Caution Tapes
Bollards
Road Narrows
Men At Work
MWSI Safety Signage
Warning Light
Working Area on Two-way Lane
Day Time with Board-ups

Legend
- Keep Left/Right Lane
- Traffic Cone
- Board Ups
- Road Narrows
- Men At Work
- MWSD Safety Signage

EXHIBIT XIII
Working Area on Two-way Lane
Night Time with Board-ups

Legend
- Keep Left/Right Lane
- Traffic Cone
- Board-Ups
- Road Narrows
- Men At Work
- MWSI Safety Signage
- Warning Light

EXHIBIT XIV
Working Area on Intersection
Night Time with Caution Tapes

Legend
- Keep Left/Right Lane
- Traffic Cone
- Bollards
- Caution Tapes
- Road Narrows
- Men At Work
- MWST Safety Signage
- Warning Light
Working Area on Intersection
Day Time with Board-ups

Legend:
- Keep Left/Right Lane
- Traffic Cone
- Board-ups
- Road Narrows
- MWST Safety Signage
- Men at Work
ENVIRONMENT, SAFETY AND HEALTH POLICY

MAYNILAD WATER SERVICES, INC. is committed to excellence and leadership in the protection of the environment and in the promotion of health and safety in the workplace.

We will create a work culture that will encourage all our employees, contractors, suppliers and shareholders to support this commitment.

We will protect the environment by minimizing and managing the impact of our operations on the environment, optimizing the use of our resources and increasing operating efficiencies.

We will establish an environmental management system to ensure that protection and sustainability is an integral part of our business management.

We will design and execute systematic programs that eliminate all hazardous acts and conditions to prevent work related injuries, illnesses and accidents at the workplace. We will pursue the establishment of high standards on safety and occupational health awareness, practice and discipline.

In keeping with this policy we will comply with all the regulatory requirements and international standards on environment, health and safety. We will achieve this through the use of appropriate technology and best practice in the pursuit of growth and viability. We call on all employees to ensure that there is consistency in the implementation of this policy.

(Original Signed)
RAFAEL M ALUNAN III
President
SAFETY POLICY

MAYNILAD WATER SERVICES, INC., a private utility in the service of the public, is committed to protect the life and well being of its people by providing a safe working environment.

The company recognizes people as its most valuable asset. To enable the company to attain its goals, it will rely on every individual’s positive contribution. These goals are best achieved when each individual is healthy in body and mind.

In fulfilling this commitment, the Company will guarantee a safe and healthy work environment in accordance with industrial standards and practices. It will also initiate proactive efforts to eliminate potential causes of accidents in the workplace that may result in fire, property damage, injury or illness. Part of the effort is to educate and involve all employees on safety.

The Group Head or Area Manager will guarantee a safe working environment and will be responsible for implementing an effective program on safety.

Each manager/ supervisor will be directly responsible for ensuring safety. It is his duty to inspect the workplace, investigate all accidents, correct unsafe conditions and practices, and promote consciousness on the importance of safety in the workplace.

The Central Safety Committee, with the support of management, will provide guidance and logistical support to all operating units for functions and activities related to safety, health and protection of the environment.

It will be the responsibility of each individual to look after his safety and that of his co-workers and general public and to report situations that compromise safety conditions in the workplace.

(Original Signed)
RAFAEL M ALUNAN III
President
POLICY ON THE CREATION OF CSC AND SAFETY SUB-COMMITTEES

CREATION OF SAFETY COMMITTEE
POLICY NO. A-503-99 DATE: JUNE 28, 1999

I. POLICY

It is the policy of Maynilad Water to ensure the health, safety and welfare of its employees at work and the communities it serves either directly or indirectly. The discharge of this responsibility shall be accorded equal priority with those of its statutory duties and commercial objectives.

II. OBJECTIVES

It is the objective of this policy to organize a Safety Committee to establish and adopt in writing the MWSI Safety Code and other administrative policies on Safety to guide its employees and contractors on how to maintain a safe, accident free and healthy working environment and system of work.

III. PROCEDURES/ GUIDELINES

In compliance to Occupational Safety and Health Standards (Rule 1040), a Health and Safety Committee shall be organized within one (1) month upon approval at MWSI Main Office to draft the MWSI Safety Code and other Administrative Policies on Safety with the following composition to wit:

Chairman:
Co-chairman/ Secretary:
A representative from the hereunder operating units will be members of the working committee:

1. Office of the President
2. Business Areas
3. Engineering Division
4. Corporate Services Division
5. Finance
6. Operations Division
7. Comptrollership
8. HROD
9. Corporate Logistics Division

DUTIES AND RESPONSIBILITIES OF THE COMMITTEE

1. Recommends the adoption of the MWSI Safety Code and other administrative policies and procedures on Safety in conformity with the provisions of the OSHS.
2. Monitors and evaluates the accident prevention efforts of the establishment in accordance with the safety programs, safety performance and government regulations in order to prevent accidents from occurring in the workplace.
3. Conducts safety meetings at least once a month to promote, implement its project.
4. Review reports on inspection, accident investigations and implementation of program.
5. Develops and maintain a disaster contingency plan and organizes such emergency service units as maybe necessary to handle any disaster situation.

APPROVED:

(Original Signed)

JOSE GABRIEL D. OLIVES
President, MWSI
REFERENCES


5. **Occupational Safety and Health Administration (OSHA)**, U.S. Department of Labor, 2004

6. **Philippine Fire Code**
Maynilad Water Services, Inc.
Environment Management and Safety
Quezon City, Philippines
H. ECC of F.G. Agro Industrial Development Corporation
ENVIRONMENTAL COMPLIANCE CERTIFICATE
(Issued Under Presidential Decree 1586)
R03-1003-0129

THIS IS TO CERTIFY THAT F.G. AGRO INDUSTRIAL DEVELOPMENT CORPORATION is granted this Environmental Compliance Certificate (ECC) for the proposed F.G. Agro Drying and Composting Facilities to be located at Brgy. Telabacan, Concepcion, Tarlac, by the Department of Environment and Natural Resources (DENR), through the Environmental Management Bureau, Region III.

SUBJECT ONLY to the conditions and restrictions set-out in this ECC and in the attached document labeled as Annex A. Recommendations have been provided in Annex B as guidance to concerned government agencies and local government units for consideration in their decision making.

It shall cover the operation of a drying and composting facility (Group II-R.1) with capacity of eleven thousand (11,000) cubic meters per year in an area of twenty five thousand four hundred thirty seven (25,437) square meters the boundary of which is defined under TCT No. 11461.

Project Geographical Coordinates/Location:
North Latitude - 15°17'10.7"
East Longitude - 120°37'35.2"

This certification is issued in compliance to the requirements of Presidential Decree No. 1586, in accordance to Department Administrative Order No.30-2003. The Bureau, however, is not precluded from reevaluating, adding, removing, and correcting any deficiencies or errors that may be found after issuance of this certificate.

Issued at City of San Fernando, Pampanga, this 04 MAY 2010

Recommendation Approval:

DENNIS O. CELESTIAL
Chief, Environmental Impact Assessment & Management Division

Approved by:

LORMELYN E. CLAUDIO
Regional Director
I. CONDITIONS

A. ENVIRONMENTAL MANAGEMENT and MONITORING PLAN (EMMoP)

1. All mitigating measures in the submitted Initial Environmental Examination (IEE) Checklist shall be implemented;

2. Planting of trees shall be undertaken either within the project site and/or in other areas as part of the proponent's social and environmental program;

B. GENERAL CONDITIONS

3. The proponent shall comply with the requirements of other environmental laws, i.e. Republic Act (RA) 8749 or “The Clean Air Act of 1999”, RA 6969 or “Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990”, RA 9003 or “Ecological Solid Waste Management Act of 2000” and RA 8275 or “Clean Water Act of 2004”, among which are:
   - Secure Permit to Operate Air Pollution Source Control Installations (APSCI) and Discharge Permit Water Pollution Source Control Facilities (WPSCF)
   - Designate Pollution Control Officer (PCO)
   - Submit quarterly Self Monitoring Report
   - Submit semi-annual Compliance Monitoring Report

4. An Abandonment Plan shall be submitted to this Office ninety (90) days prior to the project's abandonment. The plan shall include remediation, clean-up and rehabilitation measures of contaminated areas and proposed alternative project of activity suitable in the area.

5. Copy of Environmental Compliance Certificate (ECC) shall be posted in a conspicuous area in the administrative building;

6. The proponent shall formulate and implement Information Education Campaign (IEC) programs incorporating recommended environmental management practices through but shall not be limited to various advertising media (i.e., posters, billboards, etc).

7. Adequate measures shall be instituted to prevent spillage/leakage and possible generation of obnoxious odor during transport of dried sludge/sewage;

8. That should there be any complaint from the community related to environmental sanitation problem brought about by the facility's operation, the proponent shall be held responsible to address such problem;

9. The proponent shall allow inspection or monitoring that will be conducted by this Office anytime in coordination with concerned groups;

II. RESTRICTIONS

10. Any expansion or modification of the approved project shall be subject to new EIA requirement; and

11. In case of transfer of ownership of this project, these same conditions and restrictions shall apply and the transferee shall be required to notify this Office within fifteen (15) days as regards to the transfer of ownership.

Non-compliance with any of the provisions of this certificate shall be a sufficient cause for the cancellation or suspension of this certificate and/or imposition of a fine in an amount not to exceed Fifty Thousand Pesos (50,000.00) for every violation thereof.

OR No. : 1493090
Proposed fee : P4,000
For the assistance of the Proponent and government agencies concerned in the management of the project and for better coordination in mitigation of the impact of the project on its surrounding areas and to the environment.

By way of recommendation, the following have been taken notice by the undersigned and are forwarding these recommendations to the parties and authorities concerned for proper appreciation and action.

<table>
<thead>
<tr>
<th>RECOMMENDATIONS TO CONCERNED GOVERNMENT AGENCY/LGUs</th>
<th>CONCERNED GOVERNMENT AGENCIES/ENTITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. That proper storm drainage canal, concrete culverts, and other flood control measures needs to be provided to adequately receive and channel the run-off of silt-laden rain water to the nearby receiving body of water.</td>
<td>City/Municipalities Engineers Office</td>
</tr>
<tr>
<td>2. Need for the provision of a segregation, collection, recycling, and disposal mechanism for solid waste.</td>
<td>LGU</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL PLANNING RECOMMENDATIONS FOR THE PROPOSENT

The following are recommendations for the Proponent for the protection of the project area and the affected environment. It is strongly recommended that the same be strictly complied by the Proponents.

1. Close monitoring of the project should be undertaken by the proponent to maintain a high level of safety and efficiently and immediately address any environmental hazard that may take place.
2. Donate collectible recyclables to the LGU concerned.
3. Ensure efficient use of energy, water and other resources.

For dissemination and proper action of the parties concerned.

DENNIS O. CELESTIAL  
Chief, EIAMD

LORMELYN E. CLAUDIO  
Regional Director
I. Disposal Site of F.G. Agro Industrial Development Corporation
Disposal Site of F.G. Agro Industrial Development Corporation

Barangay Telebanca, Concepcion, Tarlac
ACCOUNTABILITY STATEMENT OF PREPARER

This is to certify that all the information and commitments in this Environmental Impact Statement (EIS) for the proposed VALENZUELA SEWERAGE SYSTEM project located at Valenzuela City, Metro Manila are accurate and complete to the best of our knowledge, and that an objective and thorough assessment of the Project was undertaken in accordance with the dictates of professional and reasonable judgment. Should I/we learn of any information which would make this EIS inaccurate, I shall immediately bring the said information to the attention of the DENR-EMB.

I hereby certify that no DENR-EMB personnel was directly involved in the preparation of this EIS other than to provide procedural and technical advice consistent with the guidelines in the DAO 03-30 Revised Procedural Manual.

I hereby bind myself to answer any penalty that may be imposed arising from any misrepresentation or failure to state material information in this EIS.

In witness whereof, I hereby set my hand this SEP 2 7 2013 day of ______________________ at ___________________________, Philippines.

CHERRY B. RIVERA
Environmental Engineer/Consultant

Subscribed and sworn to before me this SEP 2 7 2013 day of ___________ , ______ affiant exhibiting to me her Community Tax Certificate (CTC) No. __________________________ issued on __________________________ at __________________________, Philippines.

SALVADOR B. BELARDO JR.
Notary Public, ROLL NO. 9008 (1985)
ACCOUNTABILITY STATEMENT OF PROPONENT

This is to certify that all the information and commitments in this Environmental Impact Statement (EIS) for the proposed VALENZUELA SEWERAGE SYSTEM project located at Valenzuela City, Metro Manila are accurate and complete to the best of our knowledge, and that an objective and thorough assessment of the Project was undertaken in accordance with the dictates of professional and reasonable judgment. Should I/we learn of any information which would make this EIS inaccurate, I shall immediately bring the said information to the attention of the DENR-EMB.

I hereby certify that no DENR-EMB personnel was directly involved in the preparation of this EIS other than to provide procedural and technical advice consistent with the guidelines in the DAO 03-30 Revised Procedural Manual.

I hereby bind myself to answer any penalty that may be imposed arising from any misrepresentation or failure to state material information in this EIS.

In witness whereof, I hereby set my hand this 19 day of
_________________, Philippines.

FRANCISCO ARELLANO
Vice President

Subscribed and sworn to before me this 19 day of June, 2014, affiant exhibiting to me his Tax Identification No. (TIN) ___________ issued on ___________ at ___________, Philippines.

Francisco A. Arellano 118-324-024

Notary Public