

FEASIBILITY STUDY ON THE SOLID WASTE MANAGEMENT FACILITY FOR THE LOCAL GOVERNMENT UNIT CLUSTER OF REGION IV-B



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ACRONYMS

DENR	Department of Environment and Natural Resources
EMB	Environmental Management Bureau
F/S	Feasibility Study
GHG	Greenhouse Gas
LGU	Local Government Unit
NEC	National Ecology Center
NSWMC	National Solid Waste Management Commission
PDP	Philippine Development Plan
RA	Republic Act
SDG	Sustainable Development Goals
SLF	Sanitary Landfill
SWM	Solid Waste Management
UN	United Nations
WACS	Waste Analysis and Characterization Study
WtE	Waste to Energy

SANITARY LANDFILL LGU CLUSTER SITE ASSESMENT AND SELECTION

I. INTRODUCTION

Republic Act (RA) 90031 also known as the “Ecological Solid Waste Management Act of 2000” provides for the adoption of a systematic, comprehensive, and ecological solid waste management program in the Philippines in support to the United Nation’s (UN) Sustainable Development Goal (SDG); SDG number 12 “Responsible Production and Consumption”².

In support to this, various instruments (policy) were issued which also made way to the creation and institutionalization of the National Solid Waste Management Commission (NSWMC). The commission is tasked to institutionalize a national program that will manage the control, transfer, transport, processing, and disposal of solid waste in the country. NSWMC also oversee the implementation of solid waste management plans by end-users and local governments as mandated by the law while in close coordination with the Department of Environment and Natural Resources (DENR)-Environmental Management Bureau (EMB). The National Ecology Center (NEC) was also established, through the commission’s initiative, which serve as the depot of information, research, database, training, and networking for the implementation on the provisions of the Solid Waste Management Act².

In the past years, the county’s widely used disposal of waste is through dumping in an open site (open dump sites), but the act specifically provides for the closure of open dumps. These sites are only allowed for controlled dump sites until 2006 as temporary remedial measure². The closure of these sites favors the establishment of Sanitary Landfills (SLF)².

The SLF is a waste disposal site that is designed, built, operated, and maintained in such a way that it exerts engineering control over significant potential environmental impacts arising from the facility's development and operation. The act also established criteria for the siting, establishment, and operation of sanitary landfills, which necessitate basic environmental and engineering safeguards².

¹ Republic Act no 9003 – Ecological Solid Waste Management Act of 2000. Retrieved from https://www.lawphil.net/statutes/repacts/ra2001/ra_9003_2001.html (Annex 1)

The DENR Administrative Order (AO) No. 50 series of 1998, AO No. 10 series of 2006, and NSWMC Resolution No. 64 series of 2013, are among other policies providing guidelines, criteria, and suitability assessment procedure for sanitary landfills.

For small LGUs, clustered landfills can be an option. This enables them to pool their resources and set up their common disposal facility helpful to the LGUs to reduce cost.

Two decades have already passed since the act and its corresponding and related policies was institutionalized and enacted, however, compliance is still relatively low. The low level of awareness of the people together with the high cost of investment in the establishment of SLF as the final disposal site for residual waste have been identified by most LGUs as the primary reason for their low compliance.

In this regard, the DENR-EMB pushed for the adoption of the appropriate SLF technologies possibly with the Waste to Energy (WtE) complement. This is also in support to the waste diversion goals indicated in the 2011-2016 Philippine Development Plan (PDP), with the value-added contribution of energy generation and greenhouse gas (GHG) reduction.

II. OBJECTIVES

This project aims to provide a comprehensive basis for establishing, developing, promoting, implementing, and monitoring, SLF technologies appropriate for regions considering the technical, financial, socio-political, legal, and institutional factors.

1. To conduct a feasibility study to determine the most appropriate SLF technology cost-sharing schemes and/or systems for MIMAROPA;
2. To provide a compilation of the complete Waste Analysis and Characterization Study (WACS) from the approved 10-year SWM Plans from the provinces in MIMAROPA;
3. To determine the most appropriate and cost-effective SLF sites, schemes, and system(s) that are economically viable for the cluster(s) of LGUs, in the Region, based on the following: (a) volume and characteristics of wastes, space, and logistical requirements and (b) required operator competencies, LGU capacity, and logistical capitalization, legal and social parameters by utilizing Value Analysis;

4. To provide recommendations that will allow the EMB Regional Office to assist a cluster of LGUs in optimizing the use and application of SLF technologies to improve the health and welfare of the community; and
5. To create a simple and doable methodology to evaluate the sustainable and even profitability of an SLF project for a cluster of LGUs and encourage public-private partnerships as mandated in RA 9003

III. SITE ASSESSMENT AND SELECTION

A Brief Background of the Study Areas

The Region

Region IV-B or the MIMAROPA region, formerly known as the Southwestern Tagalog Region, is an administrative region in the Philippines. It is composed of the provinces of Mindoro (Oriental and Occidental), Marinduque, Romblon, and Palawan. There is a total of 71 municipalities and 1,458 barangays in the region.

Potential LGU Cluster sites for Clustered Sanitary Landfills

The DENR-EMB have identified four (4) host municipality for possible establishment of clustered SLF or four (LGU) cluster. These clusters are Pinamalayan, Baco, San Jose, and Buenavista. Each cluster corresponds to at least two-member municipality that will share the establishment, use, and management of the SLF (See Table 1).

Table 1. Potential sites for Sanitary Landfills

No.	LGU Cluster	Province	Municipality	Barangay Location	Area (ha)	LGU Cluster Members
1	Pinamalayan	Oriental Mindoro	Pinamalayan	Brgy. Maningcol	0.2	Pinamalayan and Socorro
2	Baco	Oriental Mindoro	Baco	Brgy. Bangkatan	3.2	Baco and San Teodoro
3	San Jose	Occidental Mindoro	San Jose	Brgy. San Isidrol	8.2	San Jose and Magsaysay

4	Buenavista	Marinduque	Buenavista	Brgy. Tungib-Lipata	5.0	Buenavista, Boac, Gasan, Mogpog, Sta. Cruz and Torrijos
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B Method of Assessment and Selection

The assessment of the five (5) clustered sites uses various secondary data such as topographic maps, seismic map, geologic map, active fault map, soil map, tectonic map, etc. The cluster site selection process requires consideration of extensive criteria and evaluation steps to identify the best available locations and eliminate subsequent issues. The site evaluation has been made possible by integrating economic, environmental/ hydrologic, and social factors.

There are 13 site selection parameters based on the guidelines on site identification criteria and suitability assessment set by NSWMC through its resolution No. 64 in 2013². The guidelines and criteria set by the commission were used to determine the suitability of each site for a technical and viable SLF. The list of site selection criteria includes the following parameters.

The following parameters were used to assess the five proposed sanitary landfill sites:

1. Proximity to groundwater resources
2. Proximity to perennial surface water
3. Local geological conditions (underlying rock formation)
4. Seismic conditions and ground rupture (proximity to active faults)
5. Soil properties and availability of cover materials
6. Topography (terrain and slope)
7. Vulnerability to flooding
8. Proximity to residential areas and other sensitive land uses
9. Proximity to ecologically sensitive or environmentally critical areas
10. Consistency with current or proposed land use classification

² See Annex 3

11. Proximity to airports
12. Landfill area and lifespan
13. Haul distance, accessibility, and road condition

A matrix was developed with candidate sites on the one axis and selected criteria were grouped into economic, environmental, and social aspects. The parameters are appropriately weighted to reflect their relative importance. Scores are assigned for each parameter and added together to compute the total for each site. Afterwards, the sites are ranked from highest to lowest. Some criteria such as the presence of an active fault, nearness to the airport, flood hazard, stability, and habitat value resulted in total rejection of the landfill site.

Table 2. General criteria in identifying SLF feasibility of the proposed clusters

PARAMETERS	SCORES		
	1	2	3
I. ECONOMIC (30%)			
1. Distance to Road	> 3 km	1 km – 3 km	< 1 km
2. Distance from Waste Generation Source	> 30 km	10 km – 30 km	< 10 km
3. Life span of SLF (with 10 m depth)	1 year to < 3 years	3 years to < 5 years	More than 5 years
II. HYDROLOGIC AND ENVIRONMENT (50%)			
1. Local Geological Characteristics	Sinkholes, Caverns, and porous rock formation	Jointed and Fractured Rock	Massive and Indurated Rock
2. Permeability	High	Moderate	Low
3. Distance from Surface Water	Less than 300 m	300 m to < 1 km	More than 1 km
4. Distance from groundwater source (deep well or water supply wells)	Less than 500 m	500 m to 1 km	More than 1 km
5. Distance from Mining Operations/Tenements	Less than 1 km	1 km to < 3 km	3 km and above
6. Type of Terrain (topography)	30% above	8.1% to 30%	0-8%

7. Distance to Active Fault line (seismic condition, ground rupture)	50 m to 100 m	101 m to 500 m	More than 500 m
8. Vulnerability to flooding	High	Moderate	Low
9. Landslide Susceptibility	High	Moderate	Low
10. Proximity to Ecologically Sensitive or Environmentally Critical Areas	Less than 500 m	500 m to < 1 km	More than 1 km
III. SOCIAL (20%)			
1. Distance to Residual Areas	Less than 1 km	1 km to < 3 km	More than 3 km
2. Proximity to Airport	Less than 13 km	13 km to 15 km	More than 15 km

C Assessment of the Clusters

C.1. PINAMALAYAN CLUSTER

C.1.A. Projected Waste Generation

Pinamalayan cluster consist of the municipalities of Pinamalayan and Socorro in the province of Oriental Mindoro (see figure below). Pinamalayan is classified as 1st class municipality while Socorro is 3rd class municipality. The primary economic activities in the two Local Government Units are agriculture and ecotourism.

At present, the municipality of Pinamalayan has existing ordinance on “No segregation, No collection Policy”. Majority of the generated waste comes from household followed by commercial wastes. Collected wastes are disposed in a controlled dump site located at Brgy. Maningcol. Further, most of the barangays practice composting and open dumping³.

Table 3 shows the five-year projected population of the four municipalities based on the 2015 census and annual growth rate.

Table 3. Projected Population of LGUs within the Pinamalayan Cluster, 2021 to 2025

LGU	2015 POP'N	ANNUAL GROWTH RATE (%)	PROJECTED POPULATION				
			2021	2022	2023	2024	2025
Pinamalayan	86,172	1.03	91,500	92,388	93,276	94,164	95,052
Socorro	39,099	0.37	39,969	40,114	40,260	40,405	40,550

Table 4. Projected waste generation of LGUs within the Pinamalayan Cluster, 2021 to 2025 in kg and tons per day (TPD)

LGU/YEAR		PROJECTED WASTE GENERATION PER DAY (in kg)				
		2021	2022	2023	2024	2025
Pinamalayan		7,616.40*	7,710.80*	7,804.00*	7,904.00*	8,001.60*
Socorro		7,616.40*	7,710.80*	7,804.00*	7,904.00*	8,001.60*
Total Waste Generated	In kg	15,232.80*	15,421.60*	15,608*	15,808*	16,003.20*
	In tons	15.23*	15.42*	15.61*	15.81*	16.00*

Note: * approximation only due to lack of approved 10-year SWM plan

The projected waste generation for the Pinamalayan Cluster for 2021 is estimated at 15.23 tons per day and will increase to 16.0 tons per day in 2025. Based on the DENR AO No. 10 s. 20063, the cluster have a collective waste disposable residual waste greater than 15 tons per day but not less than or equal to 75 tons per day fits in Category 2 of the SLF.

C.1.B. Proposed Location of SLF

The SLF identified for the Pinamalayan cluster is situated in Barangay Maningcol, Pinamalayan, Oriental Mindoro. Barangay Maningcol is located approximately 13.0367, 121.4702 in the island of Mindoro. The elevation of these coordinates is estimated at 9.0 meters or 29.5 feet above mean sea level. Its population as determined by the 2015 Census was 1,866. This represents 2.17% of the total population of Pinamalayan⁴.

The proposed site has an area of 0.2 hectares (see Table 1). Based on a computed depth of 10 meters, it has a life span of 3 years. The proposed SLF land area is considered small for a clustered SLF. The proposed site is approximately 600 m from the road and about 5.9 km on the average from the waste generators of member LGUs. The local geological characteristic is jointed and fractured. It has moderate permeability due to its soil type of clay loam.

The site is about 4 km from the nearest source of surface water and far from the groundwater source (i.e., deep wells or water supply wells). There is no mining operation near the area. The terrain is 3-8% slope, almost flat and far from any fault lines. In terms of vulnerability to flooding, the site is low and moderately susceptible to landslides.

The proposed landfill site is 7.3 km from an environmentally critical area, the Watershed and Mangrove Forest. Further, no airport facility is located within the perimeter of the landfill site.

Table 5. Description of the proposed Sanitary Landfill based on the NSWMC guidelines' parameters, Barangay Maningcol, Pinamalayan, Oriental Mindoro

PARAMETERS	SCORES		
	1	2	3
ECONOMIC (30%)			
1. Distance to Road	>3 km	1km-3 km	< 1km
			600 m
2. Distance from Waste Generation Source	>30 km	10 km - 30 km	< 10 km
			5.9 km
3. Life span of SLF (with 10 m. depth)	1 year to < 3 years	3 yrs. to < 5 yrs	> 5 years
		✓	
HYDROLOGIC AND ENVIRONMENT (50%)			
1. Local Geological Characteristics	Sinkholes, Caverns and Porous rock formations	Jointed and fractured	Massive and indurated
		Jointed and fractured	
2. Permeability	High	Moderate	Low
		Clay Loam	
3. Distance from Surface Water	< 300 m	300m to < 1km	>1 km
			4 km
	Less than 500 m	500 m to 1km	More than 1 km

4. Distance from groundwater source(deep wells, water supply wells)			4 km
5. Distance from Mining Operations	Less than 1 km	1 km to < 3 km	3 km and Above
			No mining
6. Type of Terrain (topography)	30% above	8.1% to 30%	0 - 8%
			3-8% slope
7. Distance to Active Fault line (seismic condition, ground rupture)	50 m to 100 m	101 m to 500 m	more than 500 m
			45 km from Mindoro Fault
8. Vulnerability to Flooding	High	Moderate	Low
		Moderate	
9. Landslide Susceptibility	High	Moderate	Low
		Moderate	
10. Proximity to Ecologically Sensitive or Environmentally Critical Areas	Less than 1 km	500 m to < 1km	More than 1 km
			Approx. 7.3 km to Watershed and Mangrove Forest
SOCIAL (20%)			
1. Distance to Residential Areas, etc.)	less than 1 km	1 km to < 3 km	More than 3 km
	600 m		
2. Proximity to Airport	Less than 13 km	13 km to 15 km	More than 15 km
			✓

Note: All measurement are aerial distances and are approximate

C. 2. BACO CLUSTER

C.2.A. Projected Waste Generation

The Baco Cluster is composed of Baco and San Teodoro municipalities in Oriental Mindoro. In terms of income classification, Baco and San Teodoro are identified as third and fourth-class municipalities, respectively.

Based on 2015 Census, the Municipality of Baco has a land area of 216.23 square kilometers which constitutes 5.10% of Oriental Mindoro's total area. In the 2015 Census, its population was 37,215 which represents 4.41% of the total population of Oriental Mindoro⁴.

Considering the projected population growth of the municipalities (see Table 6), the computed waste generation per capita at 0.4kg/capita/day was projected at 15.23 tons per day in 2021 for the Baco Cluster and is estimated to increase to 16 tons per day in 2025 (refer to Table 7).

Table 6. Projected population of LGUs within the Baco Cluster, 2021 to 2025

LGU/ YEAR	2015 POP'N	ANNUAL GROWTH RATE (%)	2021	2022	2023	2024	2025
Baco	37,215	1.14	39,765	40,190	40,615	41,040	41,465
San Teodoro	17,904	1.24	19,041	19,277	19,517	19,760	20,004

Table 7. Projected waste generation per day of LGUs within the Baco Cluster, 2021 to 2025 in kg and tons/day

LGU/ YEAR		2021	2022	2023	2024	2025
Baco		7,616.40*	7,710.80*	7,804.00*	7,904.00*	8,001.60*
San Teodoro		7,616.40	7,710.80	7,804.00	7,904.00	8,001.60
Total Waste Generated	In Kg.	15,232.80	15,421.60	15,608	15,808	16,003.20
	In Ton	15.23	15.42	15.61	15.81	16.00

*Note: * approximation only due to lack of approved 10-year SWM plan*

C.2.B. Proposed Location of the SLF

Brgy. Bangkatan, Baco in the province of Oriental Mindoro is the proposed landfill site for the Baco Cluster. It is approximately 13.21, 121.6, in the Island of Mindoro¹¹. Elevation at these coordinates is estimated at 12.0 meters or 39.4 feet above mean sea level.

The proposed landfill site has allocated 3.2 hectares and has a computed/projected life span of 3 years (see Annex 6), considering a depth of about 10-meter. It is accessible to the nearest access road by about 250 m. On the average, the LGU cluster members is approximately 1.7 km away from the landfill site. The most immediate residential block is approximately 230 m from the proposed site. Its proximity to an ecologically sensitive area or environmentally critical area (ECA) is 12.3 km from Mt. Halcon. The Tandang Airport is approximately 64 km aerial distance from Barangay Bangkatan.

Barangay Bangkatan is far from the nearest groundwater source and has 2 km aerial distance to an unknown river. The underlying rock formation is bedded sedimentary rock. Soil properties are found to be clay and loam, which means that it has moderate to high permeability. Vulnerability to flooding and susceptibility to landslide was found to be moderate and low, respectively.

The area is rolling to moderately steep or 0-8% slope in terms of topography. No mining operation was found to be within the vicinity of the proposed site. The area is approximately 8.9 km aerial distance from the Aglubang River Fault.

Table 8. Description of the proposed Sanitary Landfill based on the NSWMC guidelines' parameters, Brgy.Bangkatan, Baco, Oriental Mindoro

PARAMETERS	SCORES		
	1	2	3
ECONOMIC (30%)			
1. Distance to Road	>3 km	1km-3 km	< 1km
			250 m
2. Distance from Waste Generation Source	>30 km	10 km - 30 km	< 10 km
			1.7 km
3. Life span of SLF (with 10-meter depth)	1yr. to < 3 yrs.	2yrs. to <5 yrs.	>5 yrs.
		✓	

HYDROLOGIC AND ENVIRONMENT (50%)			
1. Local Geological Characteristics	Sinkholes, caverns, and porous rock formations	Jointed and Fractured rock	Massive and Indurated rock
			Bedded sedimentary
2. Permeability	High	Moderate	Low
		Clay loam	
3. Distance from Surface Water	Less than 300 m	300 m to <1 km	More than 1 km
			2 km
4. Distance from groundwater source (deep wells, water supply wells)	Less than 500 meters	500 m to 1 km	More than 1 km
			>1 km
5. Distance from Mining Operations	Less than 1 Km.	1 km to < 3 km	3 km and above
			none
6. Type of Terrain (Topography)	30% above	8.1% to 30%	0 - 8%
			0-8%
7. Distance to Active Faultline (seismic condition, ground rupture)	50 m to 100 m	101 m to 500m	> 500m
			8.9 km from Aglubang River Fault
8. Vulnerability to Flooding	High	Moderate	Low
		✓	
9. Landslide Susceptibility	High	Moderate	Low
			✓
10. Proximity to Ecologically Sensitive or Environmentally Critical Areas	Less than 1 km	500 m to < 1 km	More than 1 km
			12.3 km from Mt. Halcon
SOCIAL (20%)			
1. Distance to Residential Areas, etc.)	less than 1 km.	1 km to < 3 km	More than 3 km
	230 m		
2. Proximity to Airport	Less than 13 km	13 km to 15 km	>15km
			none

Note: All measurement are aerial distances and are approximate

C.3. SAN JOSE CLUSTER

C.3.A. Projected Waste Generation

The San Jose Cluster is composed of the municipalities of San Jose and Magsaysay in the province of Occidental Mindoro. San Jose municipality, a first-class municipality, recorded a population of 142,430 that represents 1/3 of the provincial population based on the 2015 Census. On the other hand, Magsaysay is identified as 3rd class municipality with a population of 36,016 in the province of Occidental Mindoro, as stated from the 2015 Census.

Table 9. Projected population of LGUs within the San Jose Cluster, 2021 to 2025

LGU/ YEAR	2015 POP'N	ANNUAL GROWTH RATE (%)	2021	2022	2023	2024	2025
San Jose	143,430	1.68	158,509	161,172	163,879	166,633	169,432
Magsaysay	36,016	2.30	40,985	41,813	42,641	43,469	44,297

Table 10. Projected waste generation per day of LGUs within the San Jose cluster, 2021 to 2025 in kg and tons/day

LGU/ YEAR		2021	2022	2023	2024	2025
San Jose		56,587.70	57,538.40	58,504.80	59,488.00	60,487.20
Magsaysay		56,587.70*	57,538.40*	58,504.80*	59,488.00*	60,487.20*
Total Waste Generated	In Kg.	113,175.4	115,076.8	117,009.60	118,976.00	120,974.40
	In Ton	113.18	115.08	117.01	118.98	120.97

*Note: * approximation only due to lack of approved 10-year SWM plan*

Using the projected population growth of the member municipalities for the cluster, the projected waste generation at 113.175.40 kg/capita per day is computed at 113.18 tons per day in 2021 and estimated to reach 120.97 tons by 2025 (Table 10). Compare with the other cluster, based on AO10 series of 2006, the cluster fits the final disposal facility under Category 2.

C.3.B. Proposed Location of the SLF

The proposed landfill site is in Barangay San Isidro, San Jose in the province of Occidental Mindoro. It is situated at approximately 13.3779, 120.8704, in the island of Mindoro. Elevation at these coordinates is estimated at 1,341.1 meters or 4,399.9 feet above mean sea level.

It has a population of 3,941 based on the 2015 Census and represents 10.77% percent of the total population of San Jose. The available land area for the sanitary landfill is 8.2 hectares. The proposed site has a life span of 16 years based on the computed depth of 10 meters. The site is near the residential area by about 190 m and has an average distance from the LGU member cluster of approximately 12.7 km. No airport facility was found near the proposed site⁴.

The site is accessible to the nearest road at 500 m. The underlying rock formation is bedded late oligocene-miocene sedimentary rocks, which makes it favorable for a landfill. The type of soil in San Isidro is silt loam, classified as moderately permeable. It is far from the surface water, which is about 1.8 km away and is also considered far from the groundwater source like deep wells or water supply wells. There was no mining operation near the area, but it was 26.5 km from the Mindoro fault.

In terms of terrain, the proposed site has a slope ranging from 9% to 20%. Vulnerability to flooding is low and landslide susceptibility is moderate. It is 39.4 km from Mt. Iglit-Baco National Park.

Table 11. Description of the proposed Sanitary Landfill based on the NSWMC guidelines' parameters, Barangay San Isidro, San Jose, Occidental Mindoro

PARAMETERS	SCORES		
	1	2	3
ECONOMIC (30%)			
1. Distance to Road	>3 km	1km-3 km	< 1km
			500 m
2. Distance from Waste Generation Source	>30 km	10 km - 30 km	< 10 km
		12.7 km	1.7 km
3. Life span of SLF (with 10-meter depth)	1yr. to < 3 yrs.	2yrs. to <5 yrs.	>5 yrs.
		✓	
HYDROLOGIC AND ENVIRONMENT (50%)			

1. Local Geological Characteristics	Sinkholes, caverns, and porous rock formations	Jointed and Fractured rock	Massive and Indurated rock
			Bedded Late Oligocene-Miocene Sedimentary
2. Permeability	High	Moderate	Low
		Silt loam	
3. Distance from Surface Water	Less than 300 m	300 m to <1 km	More than 1 km
			1.8 km
4. Distance from groundwater source (deep wells, water supply wells)	Less than 500 meters	500 m to 1 km	More than 1 km
			Far
5. Distance from Mining Operations	Less than 1 Km.	1 km to < 3 km	3 km and above
			No mining operation
6. Type of Terrain (Topography)	30% above	8.1% to 30%	0 - 8%
		9%-20%	
7. Distance to Active Faultline (seismic condition, ground rupture)	50 m to 100 m	101 m to 500m	> 500m
			26.5 km from Mindoro Fault
8. Vulnerability to Flooding	High	Moderate	Low
			Low
9. Landslide Susceptibility	High	Moderate	Low
		Moderate	
10. Proximity to Ecologically Sensitive or Environmentally Critical Areas	Less than 1 km	500 m to < 1 km	More than 1 km
			39.4 km from Mt. Iglit-Baco National Park
SOCIAL (20%)			
1. Distance to Residential Areas, etc.)	less than 1 km.	1 km to < 3 km	More than 3 km
	190 m		
2. Proximity to Airport	Less than 13 km	13 km to 15 km	>15km
			None

Note: All measurement are aerial distances and are approximate

C.4 BUENAVISTA CLUSTER

C.4.A. Projected Waste Generation

The Buenavista Cluster is composed of the municipalities of Buenavista, Boac, Gasan, Mogpog, Sta. Cruz, and Torrijos in the province of Marinduque. Among the six Local Government Units, Sta. Cruz recorded the highest population at 55,673 in 2010 and 56,408 in 2015. Boac municipality, a first-class municipality, recorded a population of 54,730 based on the 2015 Census. On the other hand, Mogpog and Gasan recorded an annual population of 34,043 and 34,828 in the 2015 census, respectively. Lastly, Buenavista and Torrijos recorded the lowest among the six Local Government Units with 23,988 and 30,524 according to the 2015 Census, respectively.

Generally, the six municipalities aim to achieve a "zero waste management" direction. It has empowered their barangays, *purok*, and *sitios* on the reduction of waste generation. They have been implementing the "No Segregation No Collection Policy." The segregated waste collection was implemented mostly in all barangays. Residual wastes generated are transferred to the controlled dumpsite.

Table 12. Projected population of LGUs within the Buenavista cluster, 2021 to 2025

LGU/ YEAR	2015 POP'N	ANNUAL GROWTH RATE (%)	2021	2022	2023	2024	2025
Buenavista	23,988	0.71	24,677	24,852	25,028	25,206	25,386
Boac	54,730	0.65	56,861	57,216	57,571	57,926	58,281
Gasan	34,828	0.80	36,497	36,775	37,053	37,331	37,609
Mogpog	34,043	0.37	34,798	34,927	34,981	35,183	35,323
Sta. Cruz	56,408	0.25	57,255	57,396	57,537	57,678	57,819
Torrijos	30,524	0.74	31,880	32,106	32,332	32,558	32,784

Table 13. Projected waste generation per day of LGUs within the Buenavista Cluster, 2021 to 2025 in kg and tons/day

LGU/ YEAR		2021	2022	2023	2024	2025
Buenavista		9,278.55	9,344.35	9,410.53	9,477.46	9,545.14
Boac		9,278.55*	9,344.35*	9,410.53*	9,477.46*	9,545.14*
Gasán		9,278.55*	9,344.35*	9,410.53*	9,477.46*	9,545.14*
Mogpog		12,875.26	12,922.99	12,942.97	13,017.71	13,069.14
Sta. Cruz		12,875.26*	12,922.99*	12,942.97*	13,017.71*	13,069.14*
Torrijos		12,875.26*	12,922.99*	12,942.97*	13,017.71*	13,069.14*
Total Waste Generated	In Kg.	66,461.43	66,802.02	67,060.50	67,485.51	67,842.84
	In Ton	66.46	66.80	67.06	67.49	67.84

Note: * approximation only due to lack of approved 10-year SWM plan

Using the projected population growth of the member municipalities for the cluster, the projected waste generation at 66,461.43 kg/capita per day is computed at 66.46 tons per day in 2021 and estimated to reach 67.84 tons by 2025. (Table 13). Like the other cluster, as per AO10 series of 2006, the cluster fits the final disposal facility as Category 2.

C.4.B. Proposed Location of the SLF

The proposed landfill site is in Barangay Tungib-Lipata, Buenavista in the province of Marinduque. It is situated at approximately 13.2138, 122.0091, on the island of Marinduque. Elevation at the proposed sanitary landfill range from 60-100 meters above mean sea level. It has a population of 2,299 in the 2015 Census that represents 9.58 percent of the total population of Buenavista. The available land area for the sanitary landfill is 5.0 hectares. The proposed site has a life span of 18 years based on the computed depth of 10 meters. The site is near the residential area by about 76 m and has an average distance from the LGU member cluster of approximately 400 m. An airport was found 25 km from the proposed site.

The site is accessible to the nearest road which is 76 m away. The underlying rock formation are volcanic agglomerates and pyroclastics, which makes it favorable for a landfill. The soil cover is very limited. It is neither near nor far from the surface water, which is about 300 m, while it is

considered far from the groundwater source like deep wells or water supply wells. It is also far from the mining operation, but it was 6.3 km from the splay of Marinduque fault in Torrijos area.

In terms of terrain, the proposed site has a slope ranging from 7% to 18%. There is low susceptibility to flooding and landslide. It is 14.6 km from the Boac wildlife sanctuary.

Table 14. Description of the proposed Sanitary Landfill based on the NSWMC guidelines' parameters, Barangay Tungib-Lipata, Buenavista, Marinduque

PARAMETERS	SCORES		
	1	2	3
ECONOMIC (30%)			
1. Distance to Road	>3 km	1km-3 km	< 1km
			76 m
2. Distance from Waste Generation Source	>30 km	10 km - 30 km	< 10 km
			400 m
3. Life span of SLF (with10 m. depth)	1year to < 3 Years	3 years to <5 years	More than 5 years
			✓
HYDROLOGIC AND ENVIRONMENT (50%)			
1. Local Geological Characteristics	Sinkholes, caverns, and porous rock formations	Jointed and Fractured rock	Massive and Indurated rock
			Volcanic lava flows, agglomerates, tuff
2. Permeability	High	Moderate	Low
		Clay Loam, limited exposure	
3. Distance from Surface Water	> 300 m.	300 m to <1 km	< 1 km
			3 km
	Less than 500 meters	500 m to 1 km	More than 1 km

4. Distance from groundwater source(deep wells, water supply)			✓
5. Distance from Mining Operations	Less than 1 Km.	1 km to < 3 km	3 km and above
			None
6. Type of Terrain (topography)	30% above	8.1% to 30%	0 - 8%
		7% - 18%	
7. Distance to Active Faultline (seismic condition, ground rupture)	50 m to 100 m	101 m to 500 m	> than 500 m
			6.3 km from splay of Marinduque Fault
8. Vulnerability to Flooding	High	Moderate	Low
			✓
9. Landslide Susceptibility	High	Moderate	Low
			✓
10. Proximity to Ecological Sensitive or Environmentally Critical Areas	< than 1 km	500 m to < 1 km	> 1 km
			14.6 km from Boac wildlife sanctuary
SOCIAL (20%)			
1. Distance to Residential Areas, etc.)	< 1 km	1 km to < 3 km	> 3 km
	76 m		
2. Proximity to Airport	< 13 km	13 km to 15 km	> 15 km
			25 km

Note: All measurement are aerial distances and are approximate

IV. SELECTED LGU CLUSTER FOR FEASIBILITY STUDY

The four (4) proposed landfill sites were assessed based on the parameters set by NWMC guidelines (i.e., the exclusion or absolute and conditional criteria) and categorized into economic, environmental, and social aspects. The criteria were weighed to reflect their relative importance, and scores are assigned to obtain the best possible sanitary landfill site. The

economic factor was given a 30% weight, including its accessibility to road network, distance to waste generators, and the Sanitary Landfill's life span. Because of the sensitivity to the environment of the sanitary landfill, it was assigned a 50% weight. The parameters included in the environment aspect are rock formation, permeability, distance to surface water and groundwater resources, distance to mining operations, topography, distance to fault lines, vulnerability to flooding, susceptibility to landslide, and nearness to environmentally critical areas. Regarding the social aspect, the distance to residential areas and proximity to the airport were considered.

Table 15 shows the summary of the scored parameters. Based on the weighted scores, Barangay Tungib-Lipata, Buenavista, Marinduque obtained the highest score (90.0%), followed by Barangay Bangkatan, Baco, Oriental Mindoro (86.7%). Barangay San Isidro, San Jose, Occidental Mindoro got the third-ranking score of 85.0% while Barangay Maningcol, Pinamalayan, Oriental Mindoro obtained the 4th ranking (83.3%).

As shown in the summary, the first ranking cluster is the alternate cluster or the Buenavista cluster. One of the many variables that increased the preferability of the cluster for the conduct of the feasibility study is the area available or the initial allocated area for the proposed SLF. The area is considered one of the factors in terms of the lifespan/capacity and structural design, and operation of an SLF. This will also allow flexibility on the design and allocation for the infrastructures and machineries needed for the long-term operation and maintenance of the SLF.

IV. RECOMMENDATION

Based on the given parameters, Barangay Tungib-Lipata is the best landfill site among the four sites assessed. Given the available area of 5 hectares and the projected waste generation by the Buenavista Cluster LGUs and its impacts on the environment, it is recommended to conduct further studies for the technical and financial consideration of the proposed landfill site.

Table 15. Summary of scores per parameter of each sanitary landfill site

LGU Cluster	Location of SLF	AREA (in Hectares)	ECONOMIC	HYDROLOGIC/ ENVIRONMENT	SOCIAL	TOTAL SCORE	RANK
			(30%)	(50)	(20%)		
PINAMALAYAN	Brgy. Maningcol, Pinamalayan, Oriental Mindoro	0.2	26.7	43.3	13.3	83.3	4
BACO	Brgy. Bangkatan, Baco, Oriental Mindoro	3.2	26.7	46.7	13.3	86.7	2
SAN JOSE	Brgy. San Isidro, San Jose, Occidental, Mindoro	8.2	26.7	45.0	13.3	85.0	3
BUENAVISTA	Brgy. Tungib- Lipata, Buenavista, Marinduque	5.0	30.0	46.7	13.3	90.0	1

COST-BENEFIT ANALYSIS FOR THE PROPOSED SANITARY LANDFILL IN BUENAVISTA, MARINDUQUE

I. COSTS

As shown in Table 16, the costs for establishing a sanitary landfill consists mainly of capital cost, operating and maintenance (O&M) cost, and abandonment cost.

- Land cost is estimated to be at PHP 300/ square meter. Since the sanitary landfill is projected to be 5 hectares, the total land cost incurred on Year 0 is PHP 15,000,000.
- Capital costs involves various costing for the major construction activities. The total capital cost for a 5-hectate sanitary landfill is estimated at PHP PHP 18,940,000 which is incurred at Year 0.
- Operating and maintenance (O&M) cost are management and support costs of running a sanitary landfill (e.g., salaries, supplies and materials, and repair and maintenance of facilities). It is assumed to increase 2% annually to account for any increase in salary and in price of supplies, materials, and facility/ equipment repair and maintenance. It based on the premise that maintenance of sanitary landfill is more likely to increase as it accumulates wastes over the years.
- The O&M costs for 10-years is PHP 19,439,852.38
- Abandonment cost is roughly estimated at PHP 16,970,000, which is 50% of the construction cost.
- The overall total cost for sanitary landfill over the 10-year period including the construction and abandonment phase is PHP 70,349,852.38.
- It has a net present value of PHP 44,289,428.05.

Table 16. Estimated costs of sanitary landfill over the 10-year period including construction and abandonment phase, in PHP/year

COSTS	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	OVERALL TOTAL	NET PRESENT VALUE
A. Capital costs														
Land acquisition	15,000,000.00												15,000,000.00	
Landfill construction cost														
a. Excavation/ Earth moving	3,000,000.00												3,000,000.00	
b. Clay Lining and Laying	2,000,000.00												2,000,000.00	
c. Leachate Collection Pipe	2,000,000.00												2,000,000.00	
d. Leachate Evaporation Pond	1,000,000.00												1,000,000.00	
e. Gravel Drain Materials	500,000.00												500,000.00	
f. Weighbridge E. Component Plus Installation	2,300,000.00												2,300,000.00	
g. Storm Drainage	600,000.00												600,000.00	
h. Jute Mat	700,000.00												700,000.00	
MRF Component														
a. Bio-reactor 1-tonner with shredder	1,000,000.00												1,000,000.00	
b. Access Road	3,500,000.00												3,500,000.00	
c. Perimeter Fence	840,000.00												840,000.00	

d. Admin Building Facility	1,500,000.00												1,500,000.00	
Sub-total of Capital Costs	33,940,000.00												33,940,000.00	
B. Operating and Maintenance Costs														
a. Onsite Staffing														
i. Site Foreman @ 13440/mo		161,280.00	164,505.60	167,795.71	171,151.63	174,574.66	178,066.15	181,627.47	185,260.02	188,965.22	192,744.53		1,765,970.99	
ii. 1 Lead man @12480/mo		149,760.00	152,755.20	155,810.30	158,926.51	162,105.04	165,347.14	168,654.08	172,027.17	175,467.71	178,977.06		1,639,830.21	
iii. 1 Gate Keeper @ 300/day		79,200.00	80,784.00	82,399.68	84,047.67	85,728.63	87,443.20	89,192.06	90,975.90	92,795.42	94,651.33		867,217.89	
iv. 1 Clerk Job Order @ 300/day		79,200.00	80,784.00	82,399.68	84,047.67	85,728.63	87,443.20	89,192.06	90,975.90	92,795.42	94,651.33		867,217.89	
v. 6 Job Order Staff @ 300/day		475,200.00	484,704.00	494,398.08	504,286.04	514,371.76	524,659.20	535,152.38	545,855.43	556,772.54	567,907.99		5,203,307.42	
Sub-total		944,640.00	963,532.80	982,803.45	1,002,459.52	1,022,508.72	1,042,958.89	1,063,818.05	1,085,094.42	1,106,796.31	1,128,932.24		10,343,544.40	
b. Supplies and Materials														
i. Enzyme for composting (organic compost activator) @560/1kg		26,880.00	27,417.60	27,965.95	28,525.27	29,095.78	29,677.69	30,271.25	30,876.67	31,494.20	32,124.09		294,328.50	
ii. Used sacks of 25kg @5 each		75,000.00	76,500.00	78,030.00	79,590.60	81,182.41	82,806.06	84,462.18	86,151.43	87,874.45	89,631.94		821,229.07	
iii. Shovel @ 500/unit (12 units/yr)		6,000.00	6,120.00	6,242.40	6,367.25	6,494.59	6,624.48	6,756.97	6,892.11	7,029.96	7,170.56		65,698.32	

iv. Electric Bill For composting (12kwh/day)		33,368.23	34,035.59	34,716.30	35,410.63	36,118.84	36,841.22	37,578.04	38,329.60	39,096.20	39,878.12		365,372.77	
v. Fuel and Oil @15 li/day		189,486.00	193,275.72	197,141.23	201,084.06	205,105.74	209,207.86	213,392.01	217,659.85	222,013.05	226,453.31		2,074,818.83	
vi. Other supplies and materials		300,000.00	306,000.00	312,120.00	318,362.40	324,729.65	331,224.24	337,848.73	344,605.70	351,497.81	358,527.77		3,284,916.30	
Sub-total		630,734.23	643,348.91	656,215.88	669,340.21	682,727.01	696,381.55	710,309.18	724,515.36	739,005.67	753,785.79		6,906,363.79	
c. Maintenance cost														
i. Machines and other facilities		200,000.00	204,000.00	208,080.00	212,241.60	216,486.43	220,816.16	225,232.48	229,737.13	234,331.88	239,018.51		2,189,944.19	
Sub-total of O&M costs		1,775,374.23	1,810,881.71	1,847,099.33	1,884,041.33	1,921,722.16	1,960,156.60	1,999,359.71	2,039,346.91	2,080,133.86	2,121,736.54		19,439,852.38	
C. Abandonment cost													16,970,000.00	
TOTAL	33,940,000.00	1,775,374.23	1,810,881.71	1,847,099.33	1,884,041.33	1,921,722.16	1,960,156.60	1,999,359.71	2,039,346.91	2,080,133.86	2,121,736.54	16,970,000.00	70,349,852.38	44,289,428.05

*Assumptions:

Land cost is PHP 300/sqm

Operating and maintenance costs increases 2% every year

Abandonment cost is estimated to be 50% of the construction cost

II. BENEFITS

Table 17 shows the estimated benefits of establishing a sanitary landfill over a 10-year period.

- The benefits of establishing a sanitary landfill are computed based on the avoided cost of disposing waste in a private-owned sanitary landfill since the host LGU will have its own sanitary landfill.
- Benefits will also come from the disposal fee that nearby LGUs will pay should they wish to dispose at this proposed sanitary landfill.
- The benefit is computed by multiplying the annual waste generated of LGUs (Table 3) to the estimated disposal fee of PHP 200/kg. This is at a discounted price since the disposal fee for a private-owned sanitary landfill ranges from PHP 400-500/kg.
- It is also assumed that only 1% of the annual waste generated of each LGU (Table 3) will be disposed in this proposed sanitary landfill.
- The overall total benefit of establishing a sanitary landfill is estimated at PHP 496,616,285.00
- It has a net present value of PHP 279,248,711.49

Table 17. Estimated benefits of establishing a sanitary landfill over the 1-year period, in Php/year

Benefits	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	OVERALL TOTAL	NET PRESENT VALUE
Avoided cost of hiring contractor of the host LGU due to own SLF		6,773,342	6,821,376	6,869,687	6,918,546	6,967,952	7,017,711	7,067,826	7,118,298	7,169,131	7,220,327	69,944,196	
Disposal/ tipping fee of nearby LGUs (PHP/year)													
Boac		6,773,342	6,821,376	6,869,687	6,918,546	6,967,952	7,017,711	7,067,826	7,118,298	7,169,131	7,220,327	69,944,196	
Gasán		6,773,342	6,821,376	6,869,687	6,918,546	6,967,952	7,017,711	7,067,826	7,118,298	7,169,131	7,220,327	69,944,196	
Mogpog		9,398,940	9,433,783	9,447,711	9,502,928	9,540,472	9,578,164	9,616,006	9,653,996	9,692,137	9,730,428	95,594,566	
Sta. Cruz		9,398,940	9,433,783	9,447,711	9,502,928	9,540,472	9,578,164	9,616,006	9,653,996	9,692,137	9,730,428	95,594,566	
Torrijos		9,398,940	9,433,783	9,447,711	9,502,928	9,540,472	9,578,164	9,616,006	9,653,996	9,692,137	9,730,428	95,594,566	
TOTAL		48,516,844	48,765,475	48,952,194	49,264,422	49,525,273	49,787,628	50,051,495	50,316,884	50,583,805	50,852,267	496,616,285	279,248,711.49

*Assumptions:

Benefits = Annual waste generated x disposal fee

Disposal fee is based on the avoided cost of disposing waste at a private-owned SLF (PHP/kg) = PHP 200/kg

Only 1% of the annual waste generated of each LGU will be disposed in this SLF

Table 18. Projected annual waste generation of Municipalities in Marinduque (2021-2030) in kg/year

Annual Waste Generation	2021	2022	2023	2024	2025	2026*	2027*	2028*	2029*	2030*
Buenavista	3,386,670.75	3,410,687.75	3,434,843.45	3,459,272.90	3,483,976.10	3,508,855.71	3,533,912.99	3,559,149.20	3,584,565.64	3,610,163.57
Boac	3,386,670.75	3,410,687.75	3,434,843.45	3,459,272.90	3,483,976.10	3,508,855.71	3,533,912.99	3,559,149.20	3,584,565.64	3,610,163.57
Gasán	3,386,670.75	3,410,687.75	3,434,843.45	3,459,272.90	3,483,976.10	3,508,855.71	3,533,912.99	3,559,149.20	3,584,565.64	3,610,163.57
Mogpog	4,699,469.90	4,716,891.35	4,723,855.55	4,751,464.15	4,770,236.10	4,789,082.21	4,808,002.78	4,826,998.11	4,846,068.47	4,865,214.18
Sta. Cruz	4,699,469.90	4,716,891.35	4,723,855.55	4,751,464.15	4,770,236.10	4,789,082.21	4,808,002.78	4,826,998.11	4,846,068.47	4,865,214.18
Torrijos	4,699,469.90	4,716,891.35	4,723,855.55	4,751,464.15	4,770,236.10	4,789,082.21	4,808,002.78	4,826,998.11	4,846,068.47	4,865,214.18
TOTAL	24,258,421.95	24,382,737.30	24,476,097.00	24,632,211.15	24,762,636.60	24,893,813.77	25,025,747.32	25,158,441.93	25,291,902.33	25,426,133.26

*Assumptions:

Annual growth rate of waste generation for Buenavista, Boac, and Gasan = 0.71%

Annual growth rate of annual waste generation for Mogpog, Sta. Cruz, and Torrijos = 0.40%

III. NET BENEFIT

Shown in Table 18 is the projected annual net benefit of establishing a sanitary landfill over a 10-year period

- Net benefit = Benefit – Cost
- In Year 0, the net benefit is -PHP 33,940,000. This accounts for the capital costs during the construction phase. No benefit is realized at this stage.
- Starting at Year 1 to Year 10, the annual net benefit is positive, indicating higher yearly benefit than the costs incurred.
- At Year 11, it has incurred a cost of PHP 16,970,000 for the abandonment period.
- The overall total benefit is PHP 426,266,432.82
- It has a high and positive net present value of PHP205,039,776.64, indicating that this proposed sanitary landfill is profitable in the long run.
- The proposed sanitary landfill also has a high and positive benefit-cost ratio (BCR) of 6.31. The BCR compares the present value of all benefits generated from a project/asset/investment to the present value of all costs. A BCR value higher than one means that the benefit from the project is more than the cost of the project, so the project is a good financial consideration.

Table 19. Projected annual net benefit of etsblishing a sanitary landfill over a 10-year period in PHP/year

NET BENEFIT	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	OVERALL TOTAL	NET PRESENT VALUE	BCR
Annual net benefit	(33,94 0,000)	46,741, 469.67	46,954, 592.89	47,105, 094.67	47,380, 380.97	47,603, 551.04	47,827,4 70.94	48,052, 134.92	48,277,5 36.95	48,503,6 70.79	48,730, 529.98	(16,97 0,000)	426,266, 432.82	205,039, 778.64	6.31

*Assumption
Social discount rate = 12%

Important Notes:

- This is an initial cost-benefit analysis and can be updated once actual data are collected and available.
- The values are only estimates and are not actual costs and benefits.
- It does not include other costs such as social costs, environmental costs, and other sources of costs and benefits. Further study be conducted to determine actual costs and benefits.

IV. PROJECT REVENUES

The projected source of revenues of the Project are a) Tipping Fee for the residual wastes for final disposal in the sanitary landfill, b) sales from recyclables, c) Sales from compost fertilizer, d) Garbage fee from households and business establishments. Some waste generators will use biodegradable waste to feed their animals or do composting in their backyard and sell their recyclables. The biodegradable waste will be composted initially in a 1-tonner bioreactor. The bioreactor can produce 200 kg. of compost per day. The sale of the compost will be computed at P20/sack of 25 kg.

V. PROJECT ECONOMIC ANALYSIS

The proposed Buenavista Cluster Sanitary Landfill will have significant economic, environmental, and health benefits to the municipalities and nearby areas. The benefits would accrue to the affected communities regardless of socio-economic status, and not only to the primary beneficiaries of the SWM service. The economic benefits quantified for the Project include reduced natural resources use due to recycling, savings from compost materials instead of commercial fertilizer, and the economic benefits for aggregated environmental values. Other economic benefits that are difficult to monetize are reducing greenhouse gas emissions, pollution, etc., which will consequently reduce impacts on climate and the people's health conditions because of the Project. The proposed MRF and composting components would reduce the volume of wastes disposed at the SLFs and thus extend the SLFs' life span. Recyclable materials would be segregated at the MRF and sold to recycling centers to generate revenues. By substituting recovered scrap materials for the use of new trees, metal ores, minerals, oil, and other virgin materials, recycling would reduce the pressure to expand forestry and mining production, which could be environmentally damaging. The benefit from reduced natural resource use is conservatively valued at 70% of the market price of recycled materials. The compost materials would also be sold and generate revenues. By partially substituting commercial fertilizer with compost materials, it would reduce farmers' costs and minimize environmental degradation.

VI. SOCIAL ASPECT

The Project will generate jobs through the implementation of an integrated solid waste management system within the facility. Job generation among households with low socio-economic status will highly contribute to poverty reduction and increased welfare by providing a safe working environment, better working conditions, and increase in income. Moreover, an effective and efficient implementation of the sanitary landfill will improve the environmental condition in the area.

ENGINEERING GEOLOGICAL AND GOHAZARD ASSESSMENT REPORT OF THE PROPOSED SANITARY LANDFILL IN BRGY. TUNGIB-LIPATA, BUENAVISTA, MARINDUQUE

I. INTRODUCTION

A geohazard assessment of proposed sanitary landfill in Brgy Tungib-Lipata, Buenavista, Marinduque was conducted by Mr. Salvio B. Laserna, Geologist and Mr. Apollo Sarmiento, Forester of Celpa Inc. on July 19, 2021. The objective of the study is to investigate the geologic features of the area such as lithology (rock types), structural geology (presence of faults), hydro-geology (availability of groundwater resources) and to assess its susceptibility to different geologic hazards. The information gathered from different government agencies were used in this report for the planning and implementation of the project and as part of the requisite for the issuance of an Environmental Compliance Certificate (ECC) as stipulated under Administrative Order 2000-28 of the Department of Environment and Natural Resources (DENR).

The EMB-MIMAROPA have selected the municipality of Buenavista to be the host for the construction of sanitary landfill in their area. The cluster municipalities include Buenavista, Gasan, Boac, Mogpog, Sta Cruz and Torrijos. The project coincides with the objective of Municipal Government of Buenavista, Marinduque to resolve the growing problem on waste management and disposal stipulated in Republic Act No. 9003 also known as “Ecological Solid Waste Management Act of 2001” and directed by Department of Interior and Local Government (DILG) pursuant to the continuing Supreme Court “Writ of Mandamus”. In addition, this project shall promote a healthful environment being enjoyed by host communities who are given opportunity to enhance their socioeconomic status and local government that can benefit in tangible and intangible manner such as improvement of their financial position and having complied with provisions of the abovementioned law.

The proposed site for waste disposal facility belongs to category 2 Sanitary Landfill Facility, based on the waste generation capacity of 67.84 tons per day for the Buenavista cluster municipalities.

II. GENERAL INFORMATION

The island province of Marinduque is geographically located at the heart of the Philippines, 170 kilometers southeast of Manila between the Bondoc Peninsula at the southeastern portion of Luzon and Mindoro Island. It is the closest province to CALABARZON, now the blooming industrial and commercial center of southern Luzon. Marinduque extends about 137 nautical miles from Manila and about 29 nautical miles from Balanacan Port to Lucena City with 3-hour travel time by RORO ferries or 2-hour by fast craft vessel and a 45-minute travel time by airplane from Manila. With an aggregate land area of 95,920 hectares, the island province includes four major islets and eight minor ones. Undulating hills and mountain valleys characterize it, sheer seaside cliffs interspersed with patches of flatlands in the different parts of the island.

The total land area of Marinduque is 95, 925 hectares or 959.25 square kilometers. About 7, 737.2 sq. km of the province' area is classified as alienable and disposable lands, and 222.05 sq. km² is classified as forestland. Over two (2) parcels of the forestland containing an aggregate area of 8,827.96 hectares or about 88.27 km² is considered as part of the province' Marinduque Wildlife Sanctuary (MWS) under the Proclamation No. 696 by President Gloria Macapagal Arroyo dated August 17, 2004 declaring the said land as protected area in the province, pursuant to RA No. 7586, otherwise known as the National Integrated Protected Areas System Act of 1992, situated in the municipalities of Boac, Buenavista, Gasan, Sta. Cruz, and Torrijos.

The municipality of Buenavista which has been selected as site for the construction of proposed sanitary landfill has a land area of 81.25 square kilometers which constitutes 8.53% of Marinduque's total area. Its population as determined by the 2015 Census was 23,988 representing 10.23% of the total population of Marinduque province.

Buenavista is located within 13° 15' North latitude and 121° 57' East longitude. It is bounded on the north by the municipality of Gasan; on the south and west by Sibuyan Sea; and on the east by the municipality of Torrijos. It is politically subdivided into 15 barangays namely Bagacay, Bagtingon, Barangay 1, Barangay 2, Barangay 3, Barangay 4, Bicas-bicas, Caigangan, Daykitin, Libas, Malbog, Sihi, Timbo, Tungib-Lipata and Yook.

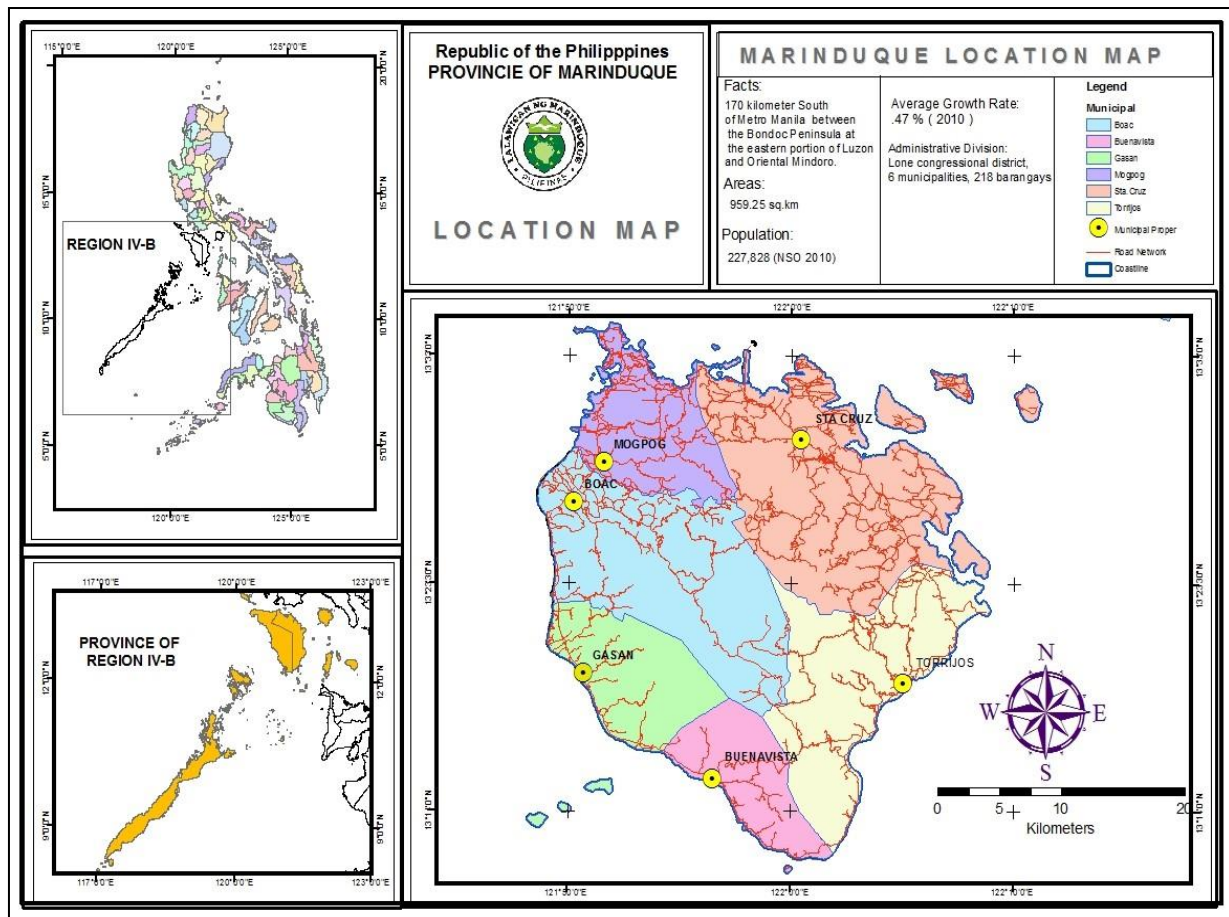


Figure 1. Map of Marinduque Province

A. Project/ Property Description

The proposed sanitary landfill is located at Barangay Tungib-Lipata and covers a land area of five (5) hectares. It is centered at geographic coordinates 13° 12' 36.20" North latitude and 122° 01' 52.5" East longitude and situated on the southern portion of Marinduque island. The site is bounded on the south by the national highway, to the east by a creek that flows to the south and to the north and northeast by hills with peak elevation of 220 and 300 meters above sea level. A maximum of three to four hectares will be used as landfill base while the remaining portion will be allotted for buffer zone, administrative building, material recovery facility, leachate treatment facility, and parking area for trucks and equipment. The sanitary landfill has a plan of constructing four (4) cells with an initial area ranging from 8,000 to 10,000 m². The leachate treatment tank will consist of three (3) chambers and an access road of about 10 meters wide. Surface canals will be provided at the periphery of the landfill to

prevent the flow of run-off towards the landfill area. The flow of surface run-off will be diverted towards an intermittent creek at the eastern boundary of the landfill.

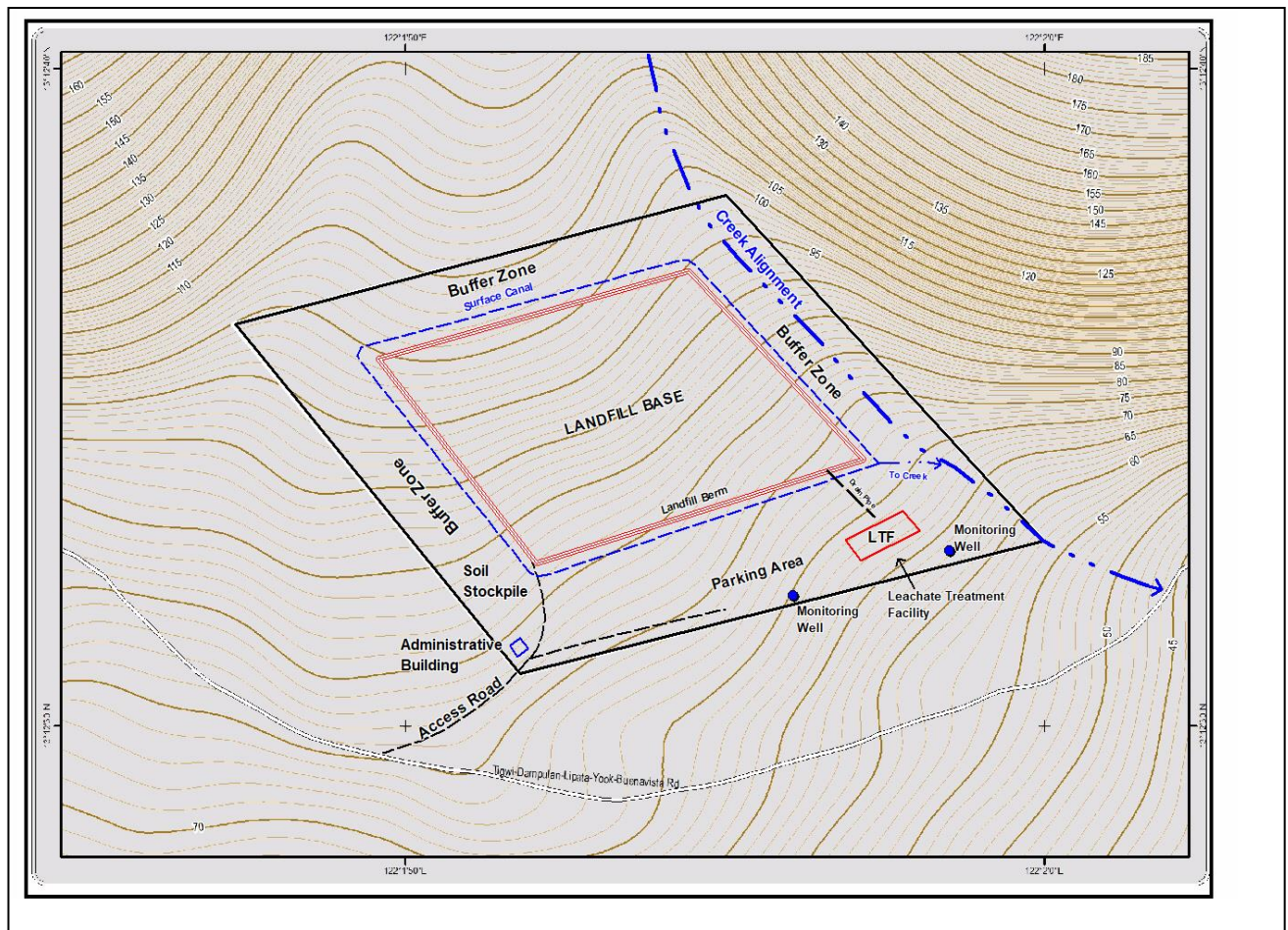


Figure 2. Site development Plan

B. Location and Accessibility

The proposed landfill project is located at Barangay Tungib-Lipata. It is approximately 100 meters from the national highway. The site is centered at geographic coordinates 14° 21' 0" North latitude and 121° 22' 4" East longitude and situated on the southern slope of two topographic mounds with elevation of 253 and 325 meters above sea level. The site is about 14 kms southeast from Buenavista proper via Gassan- Torrijos road (see Figure 3).



Figure 3. Vicinity Map

C. Methodology

Before the initial phase of the field investigation, available geological, seismological, and climatological data concerning the proposed site and vicinity were collated from the offices of the Mines and Geosciences Bureau (MGB), Philippine Institute of Volcanology and Seismology, and the Philippine Atmospheric and Astronomical Services Administration.

The field survey was concentrated mainly on the proposed landfill site and its immediate vicinity. It consists of geological mapping along the creeks near the site, on the exposed outcrops within the area and on the subsurface data gathered from excavations along road cut. This is to establish the stratigraphic sequence of the different lithologic units, the primary and secondary discontinuities and the natural hazards that might affect the ground stability around the project site.

Geotechnical studies include auger drilling of the ground to show the depth of bedrock and thickness of overburden/soil. Soil samples were collected for laboratory analysis (physical and engineering properties).

D. Nature/ Source of information

The geological assessment commenced with literature research of available geologic, seismological, and hydrological reports and maps covering the project area previously conducted at the Mines and Geo-Sciences Bureau, the PHIVOLCS, and National Water Resources Board. Topographic maps of Buenavista and its vicinity were acquired from the National Mapping and Resource Information Agency (NAMRIA) and from the processing of data from IFSAR. Climatological data covering the project area was gathered from the Philippine Atmospheric Geophysical and Astronomical Services Administration.

III. REGIONAL GEOLOGIC SETTING

A. Stratigraphy

Marinduque is a marine intra-arc basin located in the Sibuyan Sea. It is part of the Southwest Luzon Tectono-Stratigraphic group that includes southwestern Luzon, Bataan, Northern Mindoro, and Lubang Island. It is predominantly underlain by Neogene to Cretaceous age rock formations described below: a) Malindig

PERIOD	EPOCH	AGE	Ma	MARINDUQUE	BONDOC PENINSULA
NEOGENE	HOLOCENE				
		3 Late	0.0115	Malindig Volcanic Complex	Malumbang Formation
		2 Middle	0.126		
	1 Early	0.78			
	PLEISTOCENE	3 Late	1.81	Boac Formation	Vinas Formation
		2 Middle	2.59		Hondagua Formation
		1 Early	3.60		
	PLIOCENE		5.33	Gasan Formation	Canguinsa Formation
		-----3-- Late ----	7.25	Porvado Conglomerate	
		-----2-- Middle ----	11.61		
MIOCENE		13.65	Cebu Quartz Diorite Torrijos Formation	Vigo Formation	
	-----1-- Early ----	15.97			
		20.43			
		23.03			
PALEOGENE	OLIGOCENE	2 Late	28.4	San Antonio Formation	Unisan Formation
		1 Early	33.9		
	EOCENE	4 Late	37.2	Tuluntunan-Tumicob Formation	
		3			
		----- Middle ---- 2	40.4		
	PALEOCENE	1 Early	48.6		
		3 Late	55.8		
		2 Middle	58.7		
		1 Early	61.7		
	CRETACEOUS	Upper	Late	65.5	Magapua Limestone
99.6				Marinduque Formation	
Lower		Early			
JURASSIC	Upper	3 Late	145.5		
		2 Middle	161.2		
			175.6		
	Lower	1 Early	199.6		

Equivalent Ma values for boundaries of periods, epochs and ages adopted from Geological Time Scale 2004 (Gradstein and others, 2004)

MGB 2004

Equivalent Ma values for boundaries of periods, epochs and ages adopted from Geological Time Scale 2004 (Gradstein and others, 2004)

MGB (2004)

Volcanic Complex b) Boac Formation c) Gasan Formation d) Porvado Formation e) Torrijos Formation f) Labo Quartz Diorite g) San Antonio Formation h) Tuluntunan-Tumicob Formation i) Magapua Limestone and j) Marinduque Formation.

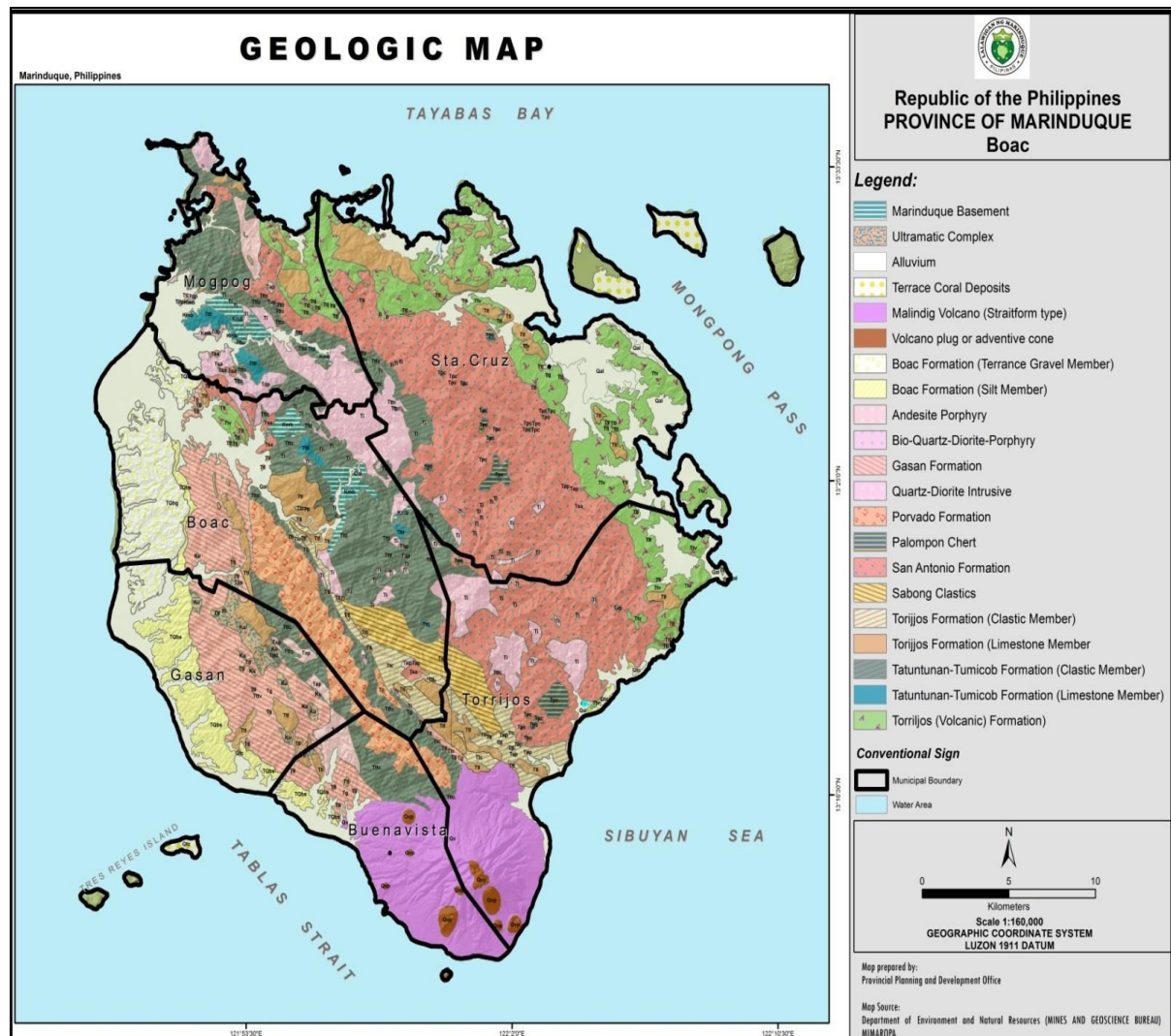


Figure 4. Geologic Map and Stratigraphic Table of Marinduque Province

The **Malindig Volcanic Complex** consist of andesite, tuff and agglomerates, which constitutes the slopes of Mt. Maindig (formerly Marianga), an inactive volcano at the southern extremity of Marinduque Island. The volcano is considered Pleistocene in age. Hot and sulfur springs are found about 2 km from the western foot of the volcano.

Boac Formation was originally named Boac Silt by Corby and others (1951). It is a sequence of low dipping marine siltstone and sandstone with conglomerate at the base. It unconformably overlies the Gasan Formation and is confined to the northwest coastal areas.

The formation contains abundant shells and foraminifera which indicate a rather young geologic age. Nannozones NN15 have been mentioned by Aurelio (1992) indicating an age ranging from early Pliocene to Pleistocene. Its thickness is about 400 meters.

Gassan Formation consist of light gray laminated tuffaceous siltstone and shale and unconformably overlies truncated quartz diorite bodies. The base of the formation is a thick conglomerate layer with serpentine clasts. The formation is previously dated Middle Miocene is now dated Late Miocene. Its estimated thickness is 1,400 meters. Along the southwestern flank of the island are upper Miocene pyroclastic sedimentary rocks called **Tabionan Formation**.

Capping the wedge-shaped horst block of Marinduque is the **Porvado Conglomerates** consisting of conglomerate with minor sandstone and shale. It unconformably overlies truncated diorites and has an age of Late Miocene.

The **Torrijos Formation** was named by Corby and others (1951) for the well bedded volcanic and sedimentary rocks at Torrijos. The unit consists of volcanic sedimentary rocks, including conglomerate and sandstones, shales, intercalated volcanic flows, and agglomerates. Exposure of the unit extend from the vicinity of Torrijos to Mt. Malindig. Gervacio (1951) includes as part of the formation, the reef limestone and basaltic flows exposed largely at the western and northwestern parts of Marinduque Island. Clast in the conglomerate of the basal section often include cobbles of chert and volcanic rocks similar and probably belonging to the San Antonio formation. The formation also includes the Sayao Volcanics considered as upper member consisting of volcanic rocks intercalated with shale, sandstone, and conglomerate exposed in Barangay. Sayao at Mogpog. Andesite porphyry dikes cut the basal section of the Torrijos formation. The age of the formation is Early Miocene and has a thickness of 2,300 meters.

The **San Antonio Formation** are exposed in an arcuate belt from north of La Mesa to Marianga Bay with the major part occupying the northeast flank of the island. Its type locality is San Antonio located about 8 km south of Dolores. The unit consist principally of minor volcanic wacke, including the Sabong clastics. Its upper part is capped in many places by volcanic chert and silicified pyroclastic rocks. The associated chert called Palaompon Chert is massive, pinkish to buff, and occur as small bodies and float. The formation unconformably overlies

the Eocene Taluntunan-Tumicob formation and is intruded by diorite and andesite porphyry. The formation is broadly warped, faulted, and fractured and small exposure occur as erosional windows underneath the Upper Miocene Gassan formation. Nannofossil zone NP21 (Early Oligocene) was reported which is equivalent in age of the San Antonio Andesite of Motegi (1975).

The **Taluntunan-Tumicob Formation** is a broadly folded and faulted thick sequence of volcanic wackes, shales, and fine turbidites with intercalated limestone and minor andesite/andesite flows. The limestone is marbleized and occur as lenses in the clastic rocks. Exposures of the formation can be traced from Silangan Point in the northwest to midway between Buenavista and Malibago in the south and occur as inliers along the northwest-southeast trending belt about 16km wide that constitute the core of the island.

A limestone unit that was previously included as part of the Marinduque Basement of Gervacio (1958) and Motegi (1975) as part of the Eocene Taluntunan-Tumicob and Binunga Formation was consider as a separate unit by Tumanda et. al. (1986) and named it **Magapua Limestone**. The formation consists primarily of gray micritic limestone that is marbleized in places. Outcrop of this formation was observed along Mangamnam, Mogpog, and Boac rivers near Barangay Binunga. A Late Cretaceous was considered age of this formation due to the presence of species of Globotruncana and Heterohelix fossils.

The basement rocks called **Marinduque Formation** consist of undifferentiated metamorphosed volcanic rocks and minor graywackes and siltstones. The volcanic rocks are primarily andesitic but also includes basaltic, spiliic, and fragmental members. The andesite is usually chloritized and in places schistose. Epidotization is often pronounced. Gervacio (1970) included serpentine and greenschists in this formation. Distribution of this rock are in the west-central section of the island.

B. Geologic Structures

There was no visible geologic structure such as faults, joints, and bedding planes on the proposed sanitary landfill site and its immediate vicinity since the area is covered by thick deposits of loose volcanic material.

C. Geomorphology

Approximately 83% of the total land area is hills and mountains while 17% are built-up areas, coastal, swamp and marshy areas. The highest peak of the island is Mt. Malindig with elevation of 1,157 meters above sea level located in the southern tip of the island. The landscape of the province is classified with the following six (6) categories of slope: 0%-3%, 3%-8%, 8%-15%, 15%-18%. The land is suitable to paddy cultivation with slope less than 3% which is about 10% of the total. The topographically steep land with slope over 8% accounts for 38% of the whole land would remain as reserved land for soil conservation and water retention.

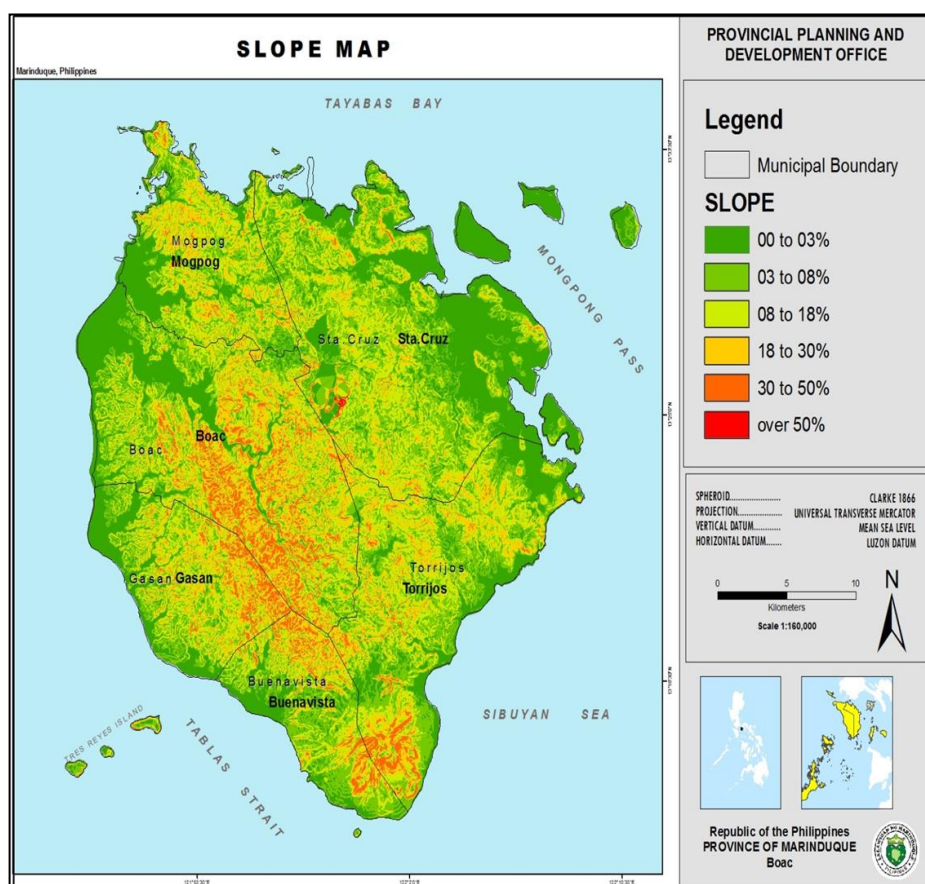


Figure 5. Slope Map of Marinduque Province

Marinduque having 17 islets occupied the area of 959.35 sq. km. The main island having an area of 935 km² is divided into 32 rivers basins of which three (3) river basins occupy about 49% of the total drainage area, the Boac river basin being the largest is about 227 sq. km. the Mogpog river basin with 58 sq. km. and the Tawiran river basin of 99 sq. km. The slope of a river in the province is steep, only three rivers: the Boac River, Mogpog River and Tawiran

River which are usually tidal and meandering. Other rivers forming the 29 river basins have steep sections.

D. Climate and Vegetation

Marinduque is categorized as Type III climate having not very pronounced maximum rain period, with a short dry season lasting only from one to three months, either during the period from December to February or from March to May. This climate type resembles type I since it has a short dry season. The annual mean, maximum and minimum temperatures were calculated at 27.0, 32.9 and 22.3 degrees centigrade, respectively. Humidity average 78% year-round and average annual rainfall totals of 2, 034.6 millimeters.

Type I (Red) Two pronounced seasons, dry from November to April and wet during the rest of the year.

Type II (Blue) No dry season with a very pronounced maximum rainfall from November to January.

Type III (Yellow) Season is not very pronounced, relatively dry from November to April and wet in the rest of the year.

Type IV (Green) More or less evenly distributed rainfall throughout the year.

Table 20. Climate data of Buenavista, Marinduque

MONTH	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	26 (79)	28 (82)	29 (84)	31 (88)	31 (88)	30 (86)	29 (84)	29 (84)	29 (84)	29 (84)	28 (82)	27 (81)	29 (84)
Average low °C (°F)	22 (72)	22 (72)	22 (72)	23 (73)	25 (77)	25 (77)	25 (77)	25 (77)	25 (77)	24 (75)	23 (73)	23 (73)	24 (75)
Average precipitation mm (inches)	115 (4.5)	66 (2.6)	55 (2.2)	39 (1.5)	164 (6.5)	282 (11.1)	326 (12.8)	317 (12.5)	318 (12.5)	192 (7.6)	119 (4.7)	173 (6.8)	2,166 (85.3)
Average rainy days		9.4	10.4	10.5	21.1	26.0	29.0	27.6	27.5	23.1	16.7	16.1	231

Source: Meteoblue

The mean annual temperature in Buenavista is 29°C with January as the coldest month (26°C) while April and May are the warmest (31°C).

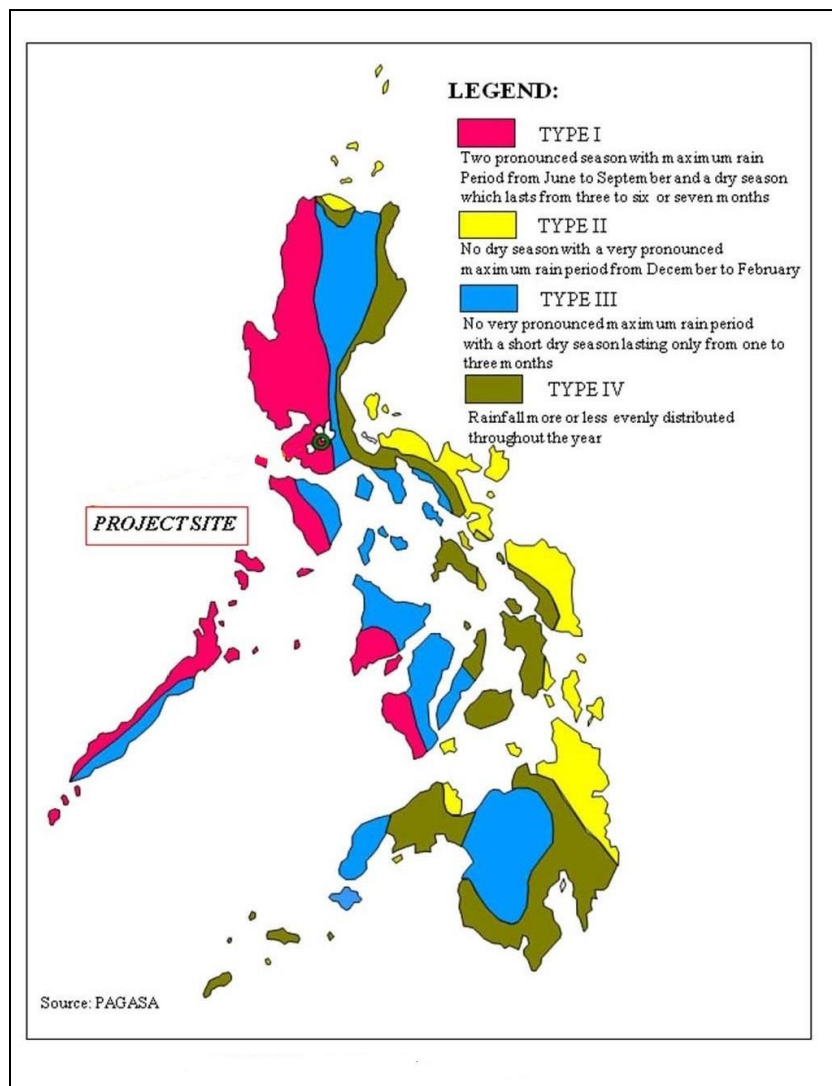


Figure 6. Climate Map of the Philippines

IV. SITE GEOLOGY

A. Topography

The proposed landfill site lies on the southern slope of two topographic mounds with elevation of 325 and 253 meters above sea level (see Figure 7). The slope occupying the project site has an elevation ranging from 60-100 meters above sea level (Ifsar generated topographic map). The slope angle varies from a minimum of 2% to a maximum of 15%. The area has undulating topography with low relief. The landfill site is bounded to the east by

intermittent creek that flows south towards Sibuyan Sea. The area is characterized by radial drainage pattern.

B. Hydrology

The occurrence of groundwater reservoir or aquifer in the area depends largely on the sub-surface condition of the underlying lithologic units, topographic relief, and the climatic condition prevailing in the area. In the event of the rainy period, large proportion of the rain that falls into the ground flows directly into the drainage canal whereas a minor portion seep into the ground. A very small portion evaporates to the atmosphere before it touches the land surface. A portion of the water that infiltrated into the ground is again lost by evaporation or absorbed by the roots of plants and transpired into the atmosphere. The rest continues to percolate to replenish the zone saturation.

Municipality of Buenavista is underlain by five (5) lithologic units, but most of its water sources are hosted by clastic rocks such as conglomerate and sandstone. These rocks have moderate to high porosity and permeability and can contain water due to its large pore spaces. Shale has low permeability because of its smaller pore spaces and not all its voids are interconnected, thus the water does not easily flow through the rock. Groundwater movement within loose, unconsolidated rocks such as in areas underlain with Alluvium are dominantly intergranular. In these areas, the aquifer is unconfined. For limestone hosted areas, groundwater flows through secondary permeability like fractures and dissolution because of its enlarged openings or dissolution holes and interconnected caverns, more infiltration from the rainwater's percolates but also because of the same factors. Some of the groundwater may easily flow out from the aquifer.

The site being underlain by agglomerates, pyroclastic, and volcanic flows have limited source of groundwater. Source of groundwater depends primarily on the secondary porosity formed through faulting, fracturing, and jointing. There are no existing wells within the vicinity of the proposed sanitary landfill.

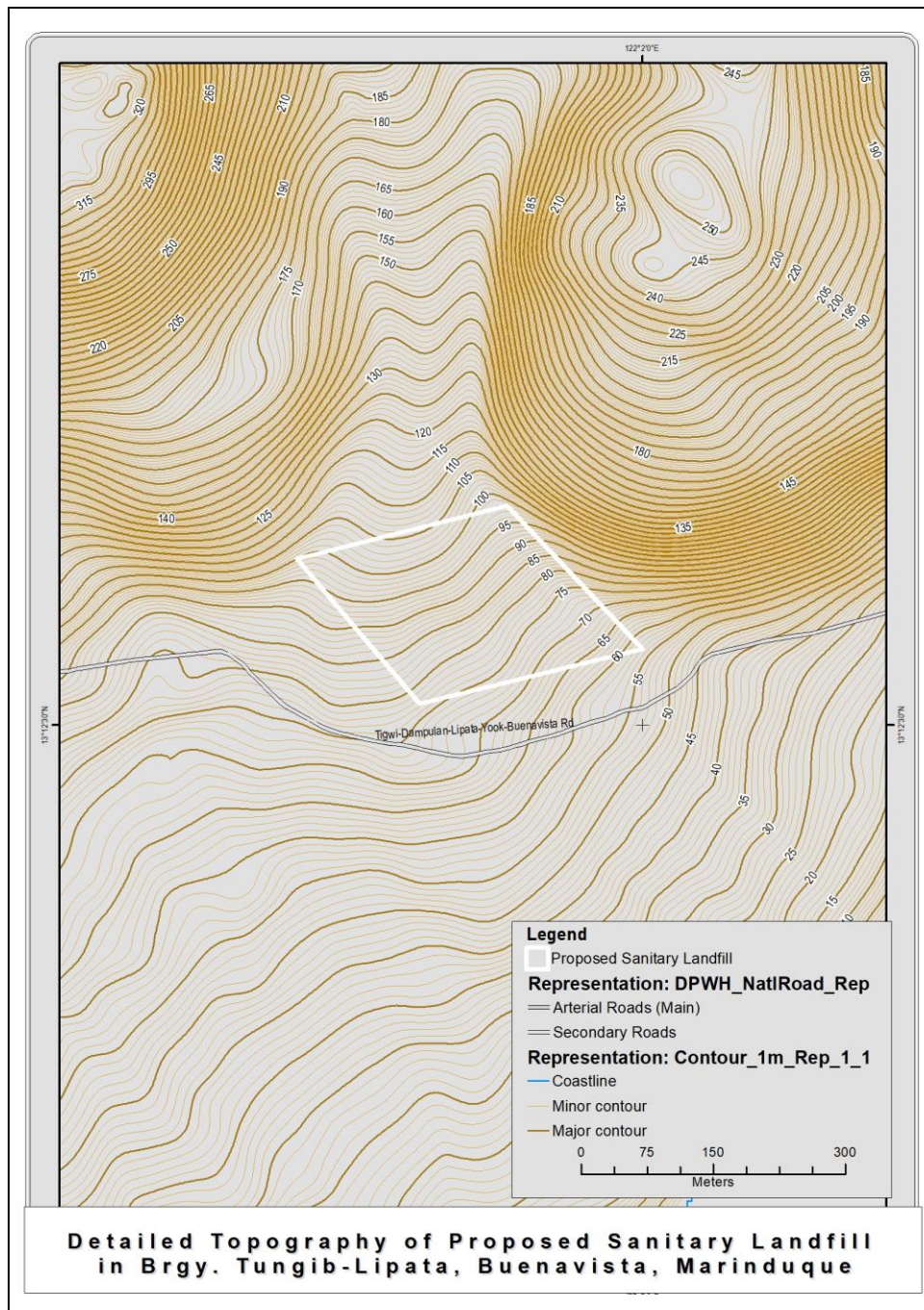


Figure 7. Detailed Topographic Map of the proposed Landfill Site

C. Bedrock Lithology

The proposed site and its immediate vicinity are chiefly underlain by Pleistocene andesite, tuff, and agglomerates of Mt. Malindig. The rocks were not exposed in the area since they are covered by loose and unconsolidated mixture of sand, pebbles, cobbles, and boulder of rocks along the slopes, creeks, and road cuts. Very thin soil cover or nothing at all have been observed in the area.

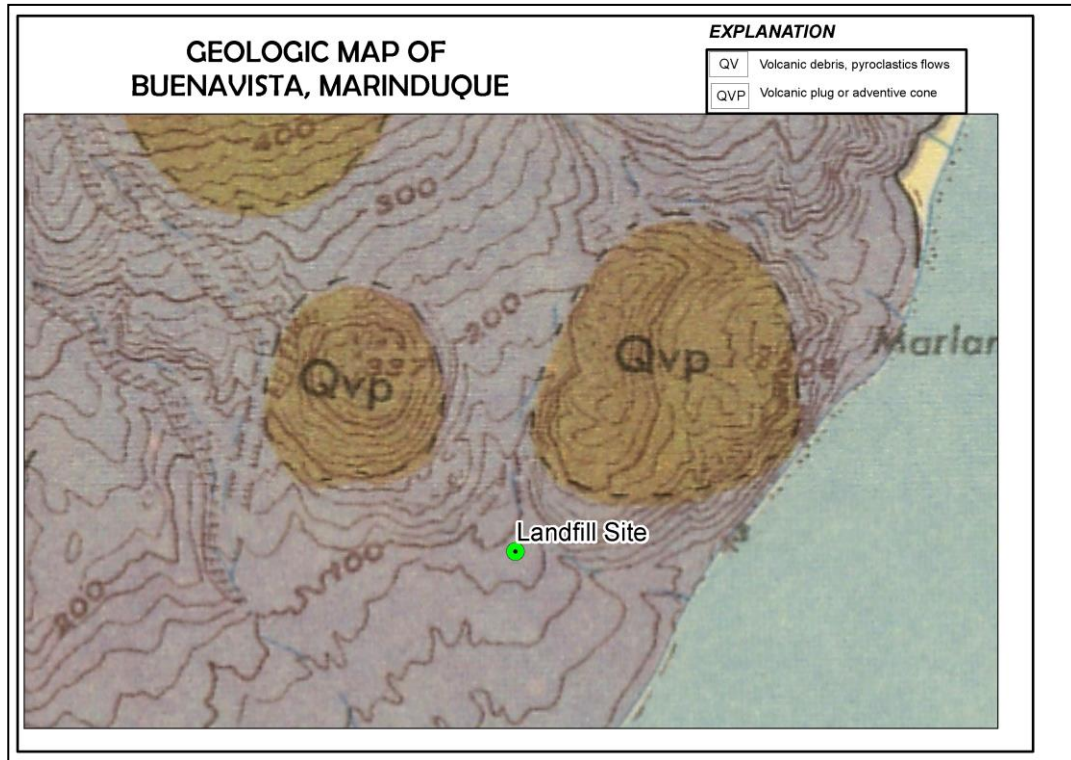


Figure 8. Geologic Map of Brgy. Tungib-Lipata, Buenvista



Figure 9. Outcrops of loose cobble to boulder size andesite and tuff along the landfill site

D. Surficial Deposit

There are no soil cover overlying the volcanic debris and pyroclastic flows in the area. Survey was conducted within the vicinity of Buenvista and Torrijos area to locate possible sources of clay for use as liner in the proposed sanitary landfill. Two clay samples (MB-1 and MB-2)) were gathered at Brgy. Malibago in Torrijos area at coordinates North latitude and 122° 00' 15.7" East longitude (MB-1) and 13° 17' 34.5" North latitude, and 122° 00' 24.2 East longitude

(MB-2). Samples were brought to Astec Laboratory to determine its physical and engineering properties. From the result of the laboratory, the clay samples have medium to high plasticity index ranging from 15 to 34 with liquid limit ranging from 29 to 58. It has a specific gravity of 2.3 to 2.5. (Attached report of soil samples). MB-1 belongs to CH soil classification (Light brown Ft clay) while MB-2 as CL soil classification (Sandy loam clay). Grain size analysis of the samples shows its components are mostly clay. Below is the typical permeability of soil sample which range from 10^{-5} to 10^{-7} cm/sec.

Typical Permeability of Soils

Soil or rock formation	Range of k (cm/s)
Gravel	1 - 5
Clean sand	10^{-3} - 10^{-2}
Clean sand and gravel mixtures	10^{-3} - 10^{-1}
Medium to coarse sand	10^{-2} - 10^{-1}
Very fine to fine sand	10^{-4} - 10^{-3}
Silty sand	10^{-5} - 10^{-2}
Homogeneous clays	10^{-9} - 10^{-7}
Shale	10^{-11} - 10^{-7}
Sandstone	10^{-8} - 10^{-4}
Limestone	10^{-7} - 10^{-4}
Fractured rocks	10^{-6} - 10^{-2}



Figure 10. Outcrops of cobbles to boulder size andesite flows, tuff, and agglomerates



Figure 11. Soil samples collected at Barangay Malibago, Torrijos, Marinduque



Figure 12. Soil exposure along the road in Brgy. Malibago, Torrijos



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- Field Density Test / CBR Test
- Tensile Test of Steel Materials
- Quality Test of Portland Cement
- Verification / Calibration of Testing Equipment
- Ultrasonic Thickness Gauge
- Determination of Steel Materials
- Structural Load Test

Client : **CELPA**
 Attention : **Mr. S. Laserna**
 Project : **Landfill**
 Location : **Maridique**
 Sample Delivered : **1 Bag - Soil (MB-1)**
 Delivered By : **Mr. S. Laserna**
 Sampled By : **Mr. S. Laserna**
 Source : **Maridique**

Test Report No : **SA-7140-81-21**
 Test Request Form No : **54530**
 Date Received : **23-Aug-21**
 Date of Test : **Aug. 25-27, 2021**
 Date of Report : **31-Aug-21**
 Tested By : **SAEteban**
 Encoded By : **MGHachuela**
 Checked By : **JMLegaspi**



REPORT OF TEST ON SOIL

Sample Result

A. SIEVE ANALYSIS (ASTM D 422)

3/8"	100
No. 4	100
No. 10	99
No. 40	98
No. 200	88

B. ATTERBERG LIMIT (ASTM D 4318)

Liquid Limit	58
Plastic Limit	24
Plasticity Index	34

C. SPECIFIC GRAVITY OF SOIL (ASTM D 854)

2.387

D. SOIL CLASSIFICATION (ASTM D 2487)

CH - Light Brown Fat Clay. High Plasticity

***** Nothing Follows *****

Remarks:

1. This report give the result carried out as sample submitted to the laboratory
2. This report shall not be reproduced except in full, without the written approval of the Laboratory
3. n/r - no request ; n/s - not specified

Authorized Signatory

JUNE M. LEGASPI
LABORATORY MANAGER

For and On Behalf of ASTEC Materials Testing Corporation



Form revised 03/22 Not valid without ASTEC dry seal

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 Calamba Laboratory (BT) - Km 54.80, Marikina, Calamba, Laguna. Tel: No. (049) 545-2008; (049) 736-3799
 Cavite Laboratory (BZ) - 102 Sampaloc 1, Palapala, Dasmariñas, Cavite. Tel: No. (046) 437-7470; (046) 781-7080; (046) 407-2627
 Pampanga Laboratory (B3) - Unit A Genesis Building, Mt. Arthur Hwy, San Isidro, San Fernando, Pampanga. Tel: No. (029) 781-7080; (0998) 410-0261; (0915) 880-3733
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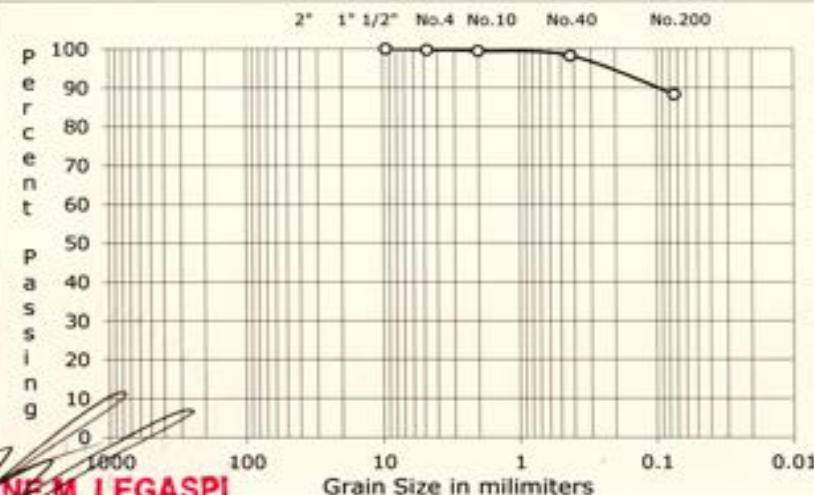


Client : **CELPA**
 Attention : **Mr. S. Laserna**
 Project : **Landfill**
 Location : **Mariduque**
 Sample Delivered : **1 Bag - Soil (MB-1)**
 Delivered By : **Mr. S. Laserna**
 Sampled By : **Mr. S. Laserna**
 Source : **Mariduque**

Test Report No. : **SA-7140-B1-21**
 Test Request Form No. : **54530**
 Date Received : **23-Aug-21**
 Date of Test : **Aug. 25-27, 2021**
 Date of Report : **31-Aug-21**
 Tested By : **SAEsteban**
 Encoded By : **MGHachuela**
 Checked By : **JMLegaspi**

SIEVE ANALYSIS TEST ASTM D 422

Sample Identification		MB-1		
Tare No.		S-22		
Weight of Tare, grams		210.4		
Weight of Sample with Tare, grams		811.6		
Weight of Sample w/o Tare, grams		601.2		
Sieve Size		Weight Retained,g	Percent Retained	Percent Passing
Inches	mm			
3/8"	9.52	0.0	0.0	100
No. 4	4.75	1.6	0.3	100
No. 10	2.00	1.5	0.2	99
No. 40	0.425	7.5	1.2	98
No. 200	0.074	59.5	9.9	88



JUNE M. LEGASPI
 LABORATORY MANAGER

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ASTEC

Materials Testing Corporation

A Geotechnical and Materials Testing Laboratory

BRS/DPWH Accredited: Member ASTM International

- Compressive / Flexural Strength of Concrete
- Three Edge Bearing Test for Concrete Pipes
- Concrete Coring
- Rebound Hammer Test
- Density Test of Soil & Aggregates
- Field Density Test / CBR Test
- Tensile Test of Steel Materials
- Quality Test of Portland Cement
- Verification / Calibration of Testing Equipment
- Ultrasonic Thickness Gauge
- Determination of Steel Materials
- Structural Load Test

Client : **CELPA**
 Attention : **Mr. S. Laserna**
 Project : **Landfill**
 Location : **Mariduque**
 Sample Delivered : **1 Bag - Soil (MB-2)**
 Delivered By : **Mr. S. Laserna**
 Sampled By : **Mr. S. Laserna**
 Source : **Mariduque**

Test Report No : **SA-7141-B1-21**
 Test Request Form No. : **54530**
 Date Received : **23-Aug-21**
 Date of Test : **Aug. 25-27, 2021**
 Date of Report : **31-Aug-21**
 Tested By : **SAEteban**
 Encoded By : **NGHachuela**
 Checked By : **JMLegaspi**



REPORT OF TEST ON SOIL

Sample Result

A. SIEVE ANALYSIS (ASTM D 422)

1/2"	100
3/8"	99
No. 4	97
No. 10	92
No. 40	79
No. 200	53

B. ATTERBERG LIMIT (ASTM D 4318)

Liquid Limit	29
Plastic Limit	14
Plasticity Index	15

C. SPECIFIC GRAVITY OF SOIL (ASTM D 854)

2.500

D. SOIL CLASSIFICATION (ASTM D 2487)

CL - Brown Sandy Lean Clay trace of Siltstone. Medium Plasticity

***** Nothing Follows *****

Remarks:

- 1- This report give the result carried out as sample submitted to the laboratory
- 2- This report shall not be reproduced except in full, without the written approval of the Laboratory
- 3- n/r - no request ; n/s - not specified

Authorized Signatory:

JUNE M. LEGASPI
LABORATORY MANAGER

For and On behalf of ASTEC Materials Testing Corporation

Form revised 07/22

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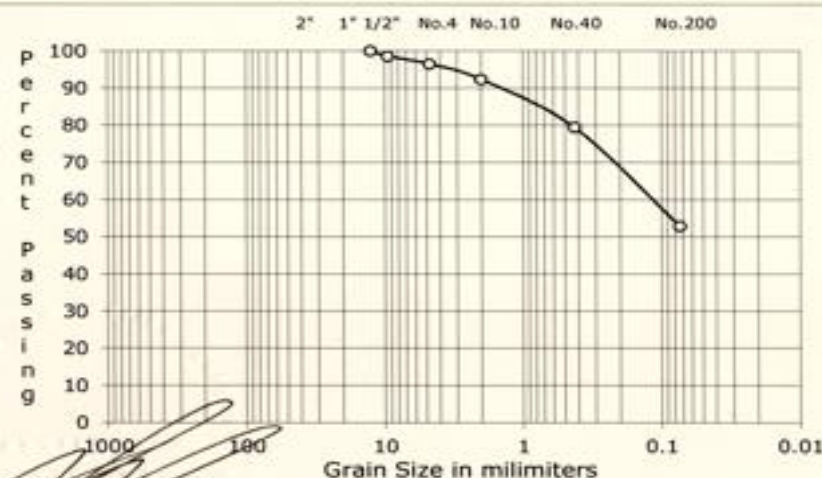
THIS LABORATORY IS RESPONSIBLE FOR THE QUALITY OF ITS TESTS

Client : **CELPA**
 Attention : **Mr. S. Laserna**
 Project : **Landfill**
 Location : **Mariduque**
 Sample Delivered : **1 Bag - Soil (MB-2)**
 Delivered By : **Mr. S. Laserna**
 Sampled By : **Mr. S. Laserna**
 Source : **Mariduque**

Test Report No. : **SA-7141-B1-21**
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 Tested By : **SAEteban**
 Encoded By : **MGHachuela**
 Checked By : **JMLegaspi**

SIEVE ANALYSIS TEST ASTM D 422

Sample Identification		MB-2		
Tare No.		S-11		
Weight of Tare, grams		161.5		
Weight of Sample with Tare, grams		807.8		
Weight of Sample w/o Tare, grams		646.3		
Sieve Size		Weight Retained,g	Percent Retained	Percent Passing
Inches	mm			
1/2"	12.7	0.0	0.0	100
3/8"	9.52	9.3	1.4	99
No. 4	4.75	13.3	2.1	97
No. 10	2.00	26.7	4.1	92
No. 40	0.425	83.8	13.0	79
No. 200	0.074	171.7	26.6	53



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 LABORATORY MANAGER

E. Structural Features

Field observations does not confirm any geologic structures within the vicinity of the landfill site. Thick deposits of mix sand, pebble, and cobble to boulder size rocks are scattered along the slope of the proposed landfill site and covers the tuff, agglomerates, and andesite flow bedrock.

V. HAZARD ASSESSMENT

A. Seismic Hazard/ Fault, Ground Rupture, Ground Acceleration

Since the Philippine Archipelago lies within the Circum-Pacific belt, the region including the project site is susceptible to ground shaking or movement of varying magnitude and intensity attributed to the shallow and deep-seated earthquakes of tectonic or volcanic origin.

Based on the available seismic data, the Philippine seismicity is brought about by the under thrusting along subduction zone and due to the strike-slip movements along trans-current faults. Some of these identified earthquake generators or seismic zones so far identified that could trigger a major ground acceleration in the area are the Philippine Fault Zone (Sibuyan Sea Fault), Central Marinduque Fault, Lubang Fault, and the Manila Trench (see Figure 9).

In the above-mentioned seismic zones, the Malindig Fault at Buenavista is considered the nearest seismic generator to the project site. This southwest-northeast trending fault is very visible on aerial photographs and can be traced for several kilometers along its strike length traversing the southern portion of Marinduque Island and merge with the main Central Marinduque Fault in Torrijos area.

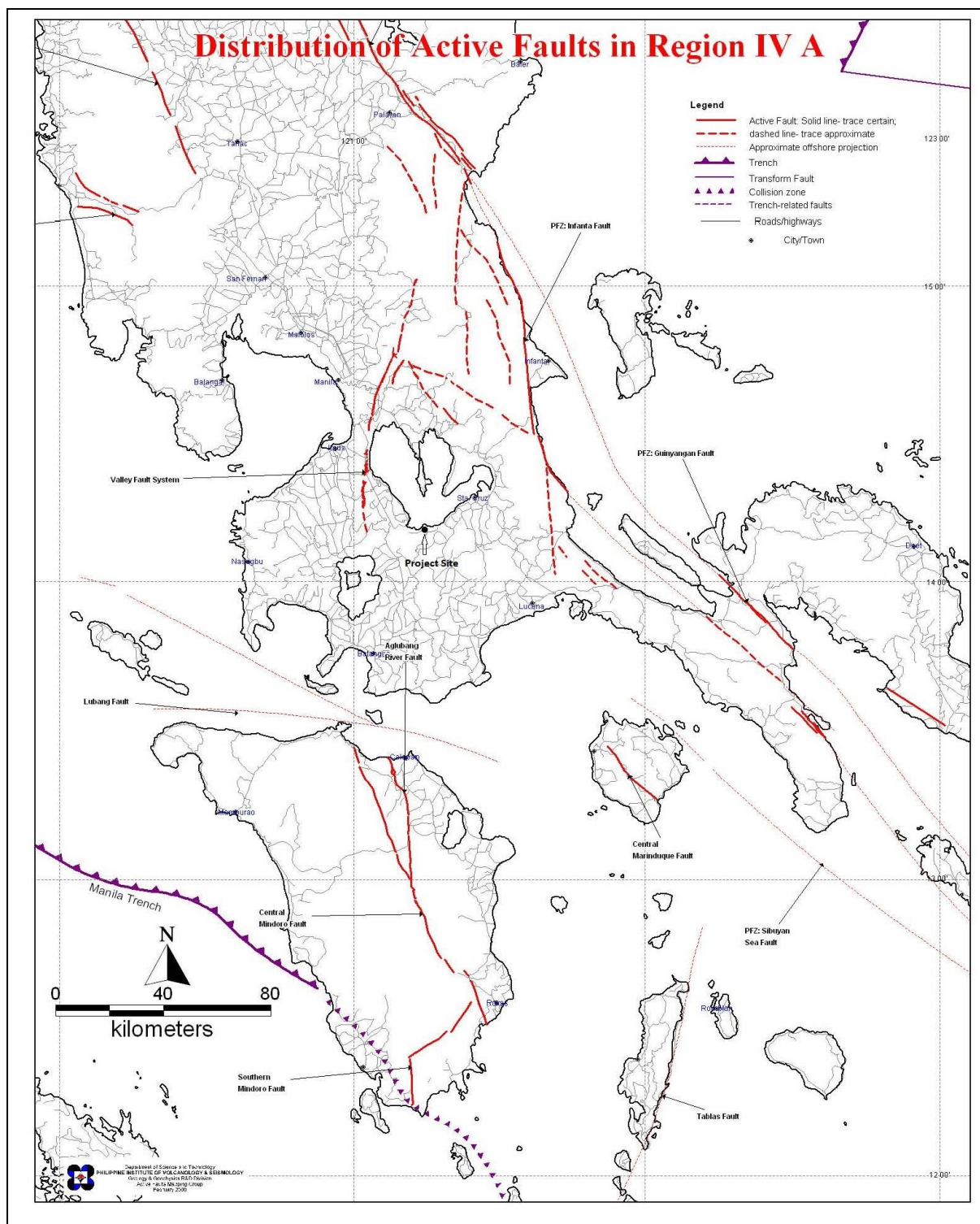


Figure 13. Distribution of Active Faults in Region IVA

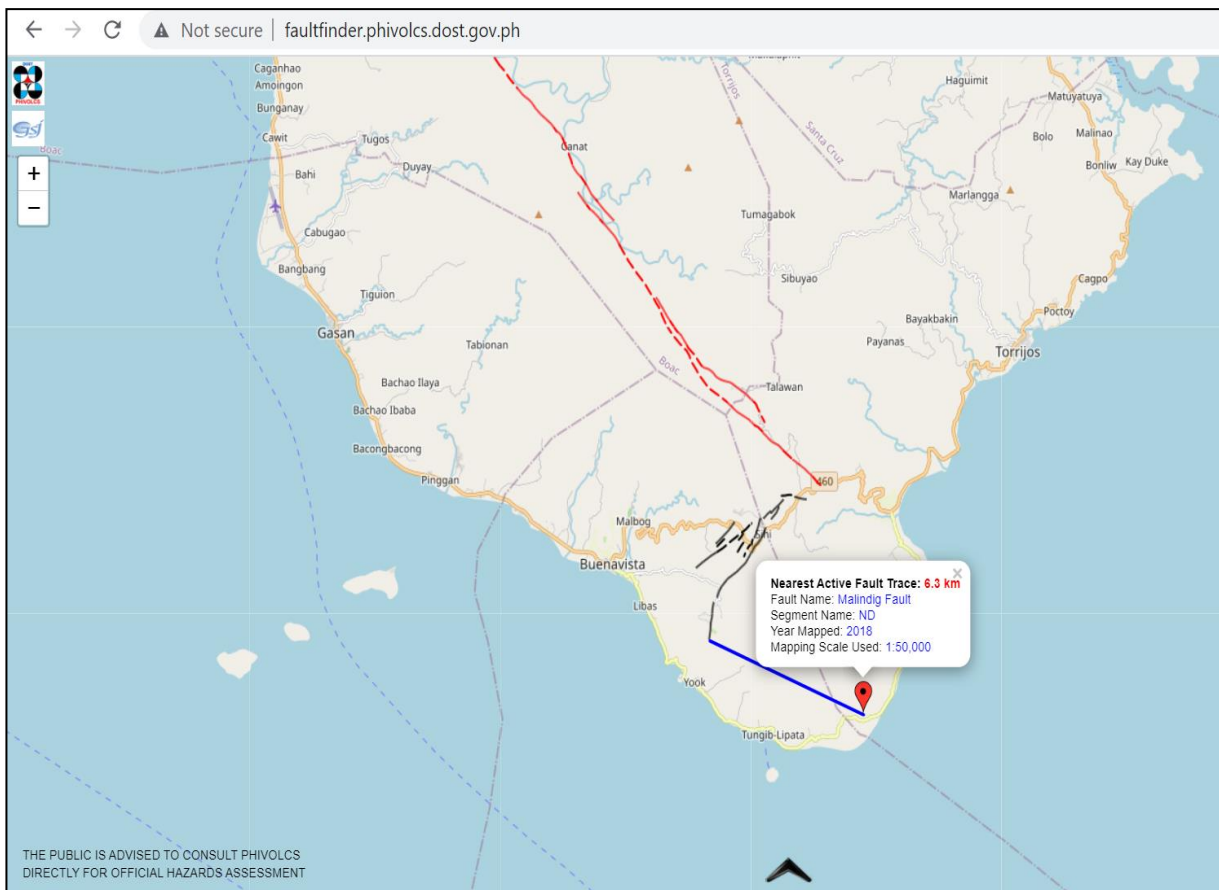


Figure 14. Map showing distance of nearest active fault to the project site

Should there be any movement along this fault, the effect of the ground rupture may not pose serious threat of failure in the housing foundation considering the fault is at 6.3 kilometers distance from the site (see Figure 9). If the movement along the Malindig Fault has a magnitude of 8.0 the computed Peak Ground Acceleration (PGA) from Fukushima and Tanaka, in this site will be 0.329 since the area is underlain by pyroclastic and agglomerates (see Figure 8). To mitigate the possible disastrous effect of these types of disturbances, the design of the structures in the site must withstand at any time the ground acceleration produces from this seismic generator.

B. Settlement

Differential settlement occurs when the soil beneath the structure expands, contracts, or shifts away. This can be caused by drought conditions, the root systems of maturing trees, flooding, poor drainage, broken water lines, vibrations from nearby construction or poorly compacted fill soil.

The proposed landfill site occupying a sloping section and underlain by agglomerates and pyroclastic rocks is not prone to differential settlement. The area being covered by loose and unconsolidated volcanic rocks should be bulldozed to expose the bedrock.

C. Liquefaction

Liquefaction occurs when the structure of a loose, saturated sand breaks down due to some rapidly applied loading. As the structure breaks down, the loosely packed individual soil particles attempt to move into a denser configuration. It is more likely to occur in loose to moderately saturated granular soils with poor drainage, such as silty sands or sands and gravels containing impermeable sediments. The site is underlain by pyroclastic flows agglomerates and volcanic breccia therefore is not prone to liquefaction.

D. Volcanic Hazard/Ashfall

The nearest active volcano is Taal Volcano situated around more or less 70 kilometers northwest of the project site (Figure 15). This volcano lies at the center of a large depression known as Taal Caldera presently occupied by deep freshwater body called Taal Lake. Based on the records of PHIVOLCS, Taal Volcano had 33 mild and violent eruptions from 1572 to 1977. These intermittent eruptions were accompanied by earthquakes, shock waves, seiches, acid rains, tephra fall projectiles, and base surges. Based on these recorded events, the probable volcanic hazard that could affect the site is the deposition of ashfall. The damage, however, would depend primarily on the intensity and trajectory of eruption and the direction of the prevailing wind during the time of eruption. Other active volcanoes that could deposit ashfall in the proposed sanitary landfill are Mt. Banahaw (140 km), Mt. Iriga (160km), Mt. Isarog (162km), and Mt. Mayon (185 km).

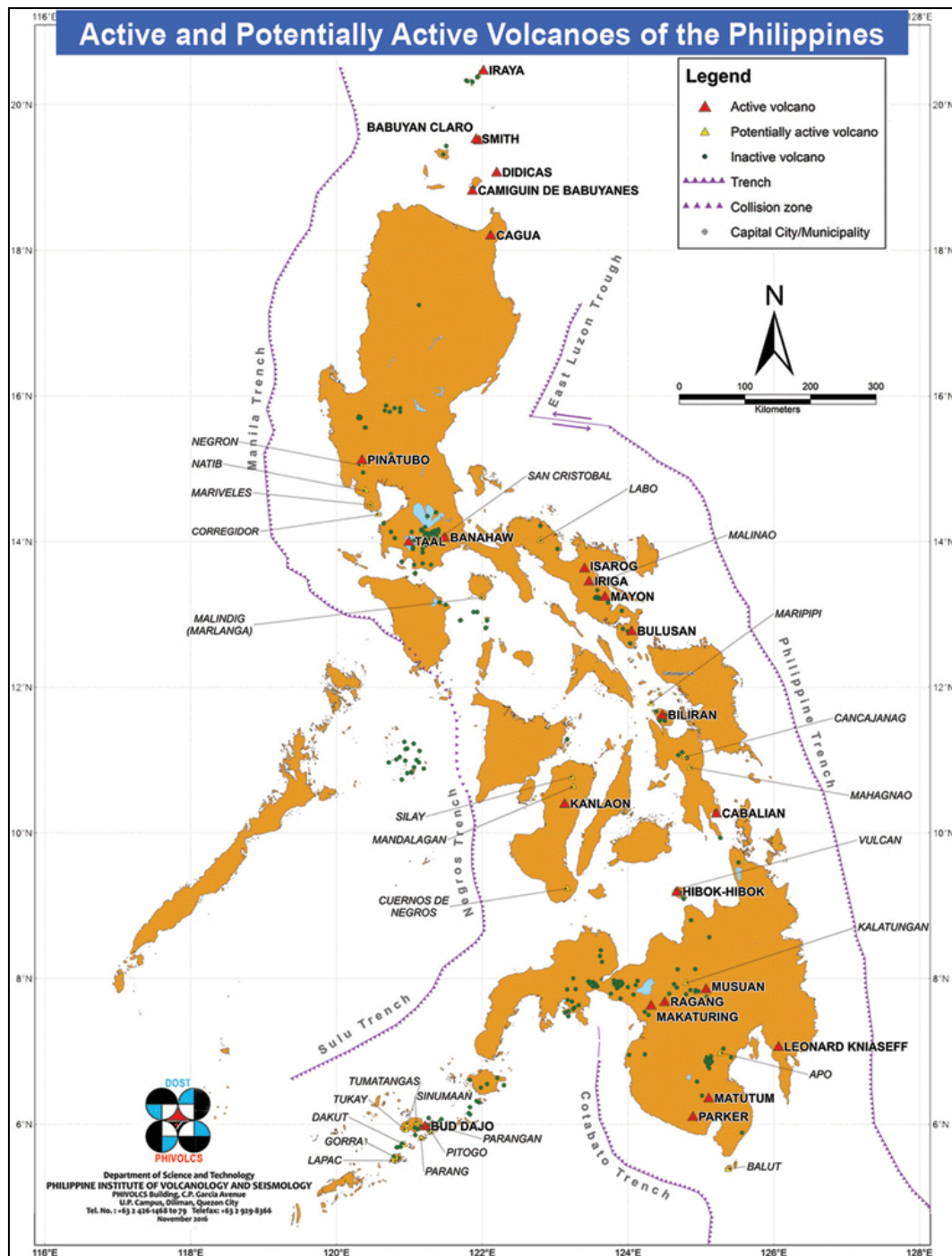


Figure 15. Distribution of Active and Potentially Active Volcanoes in the Philippines

E. Hydrologic Hazard/Flooding

Flooding is considered as one of the major geohazard problem that the country faces today and which oftentimes resulted into the heavy losses of human and animal lives, properties, and agricultural crops. Floods usually occur during or after heavy rainfall wherein the river channels are saturated with water resulting to river swelling and overflowing on floodplains.

The low-lying areas with poor drainage system are susceptible to this hazard. The site occupying sloping portion of the two topographic mounds has an elevation ranging from 60 to 100 meters above sea level. There were no immediate perennial stream or river within the vicinity of the landfill site hence, the area is not susceptible to flood hazard.

F. Tsunami

A tsunami is a series of sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than 5 meters. It is erroneously called tidal waves and sometimes mistakenly associated with storm surges. Tsunamis can occur when the earthquake is shallow-seated and strong enough to displace parts of the seabed and disturb the mass of water over it. The coastal areas in the Philippines especially those facing the Pacific Ocean, South China Sea, Sulu Sea and Celebes Sea can be affected by tsunamis that may be generated by local earthquakes. The site occupying an elevation of 60 to 100 meters and its shoreline protected by Bondoc Peninsula and Mindoro Island is not prone to tsunami (see Figure 12).

G. Storm Surge

The Philippines, an island surrounded by bodies of water, is vulnerable to storm surges. Storm surge is the abnormal rise in sea level that occurs during tropical cyclones or typhoons. It is caused by strong winds and low atmospheric pressures produced by tropical cyclones. As the tropical cyclone approaches the coast, strong winds push the ocean water over the low-lying coastal areas, which can lead to flooding. Storm surge becomes more dangerous when it arrives on top of a high tide. On top of the storm surge, big and strong waves generated by powerful winds also comes with it.

The coastline of Marinduque is prone to storm surges. However, the location of the proposed sanitary landfill which is about 2 kilometers from the coast and occupying a high elevation at 60 meters above sea level is safe from storm surges.

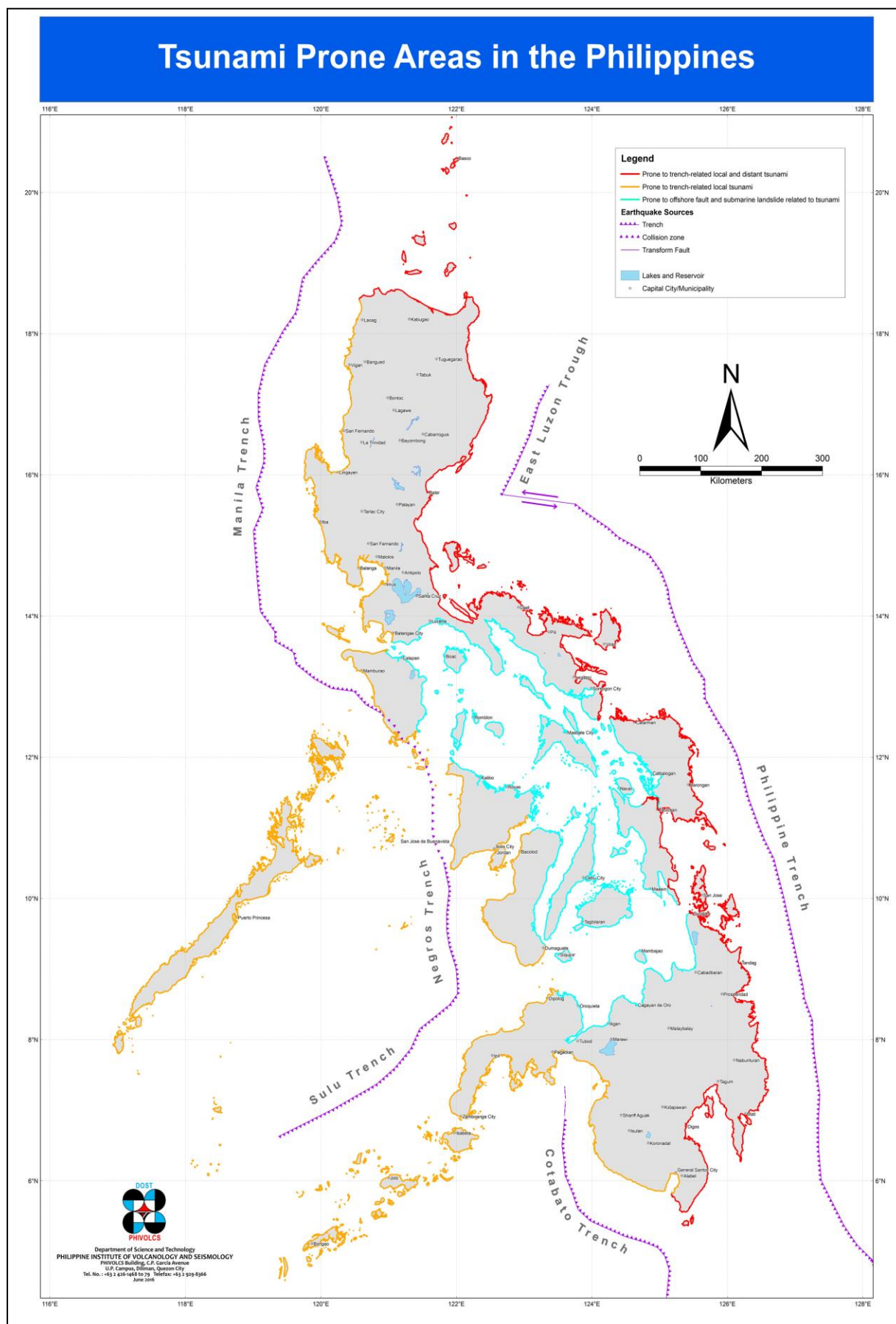


Figure 16. Tsunami Prone Areas in the Philippines

H. Rain Induced Landslide

Slope is the degree of inclination of a given area. It is expressed as the number of feet the land rises or falls over 100 feet and written in terms of percentage. The degree of slope affects soil moisture and the erosional potential of a given area. Slopes of 15% to 20% may be erosion prone depending on the type of bedrock and thickness of soil cover. The proposed sanitary landfill which has a slope gradient of 2 to 15% and underlain by tuff, agglomerates, and andesite flows with thin soil cover at the slopes has low susceptibility to landslide (Figure 17). However, heavy precipitation could trigger slides of loose rocks at the upper slopes towards the upper portion of the proposed landfill. Berm should be constructed along the periphery of the proposed landfill to divert the flow of loose volcanic materials into the landfill base.

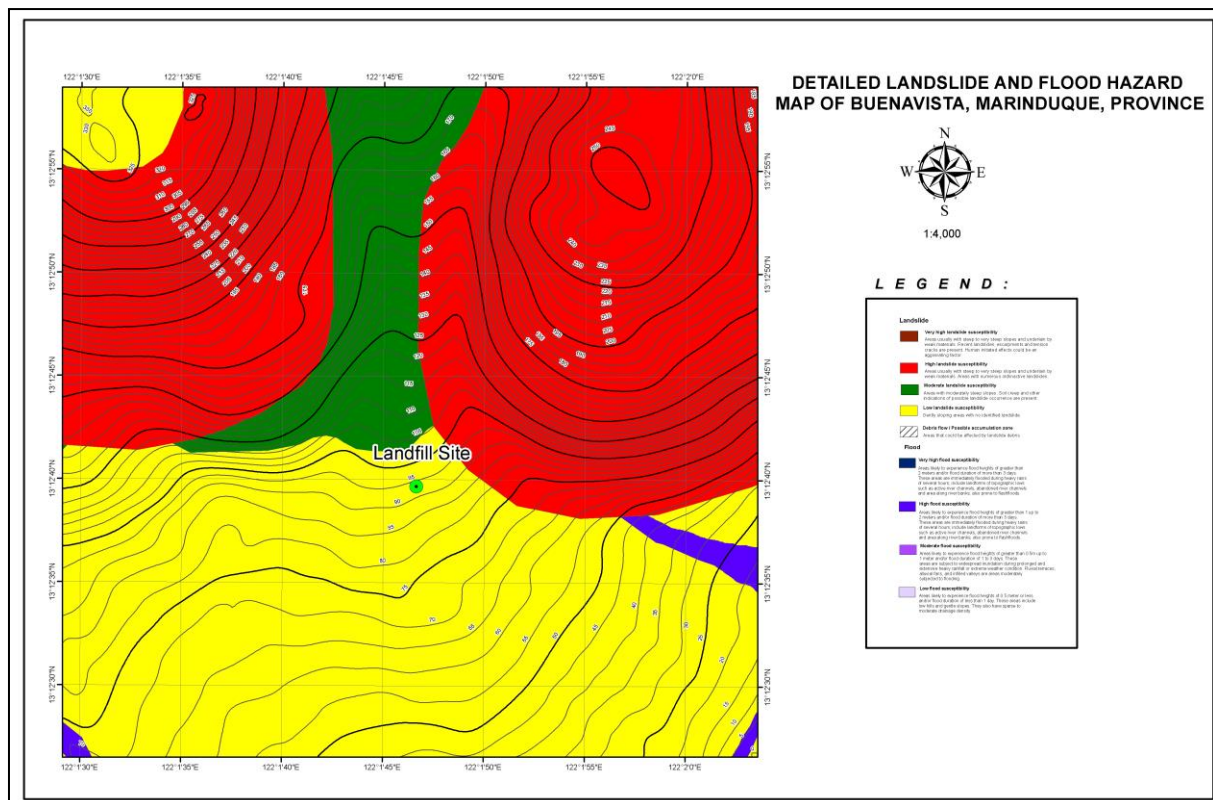


Figure 17. Geohazard Map of Barangay Tungib-Lipata, Buenavista, Marinduque

VI. CONCLUSION AND RECOMMENDATION

The sanitary landfill site of Buenavista occupies a sloping portion to the south of two topographic mounds is underlain by agglomerates, pyroclastic, and andesite flows. The nearest structural feature mapped in the site is the Malindig Fault that connects with the Central Marinduque Fault at Torrijos area. The project site, due to its elevation (60-100 meters) is not susceptible to flooding. However, due to its sloping terrain that varies from 2% to 15%, has low to moderate susceptibility to rain induced landslide. Possible ground settlement and liquefaction is remote since it is underlain by bedrock of tuff, agglomerates, and andesite flows.

The proposed site, after a thorough field assessment was found to be suitable for the development of category 2 sanitary landfill provided the following remedial/mitigating measures are properly instigated.

1. The site should include building for office space, employee facilities, drainage design and buffer zone for landfill protection. It should also have electrical, water and sanitary services.
2. Peripheral and litter fences should be provided along the boundary of the landfill. The area should also be planted with trees to serve as part of the buffer zone along the boundaries of the landfill.
3. The outer slopes of the landfill should be equipped with crest walls and storm water channels to prevent water from cascading down the slopes toward the landfill operational area.
4. The top cover material should be graded to allow runoff of rainwater and prevent ponding of water within the landfill.
5. Initial cell should start on the lower slope for better landfill operation and management.
6. Sub-surface drainage system should be provided within the operating cell. Springs and seepages could emanate during the cell construction and this drainage should be incorporated on the design of the landfill.

7. Berm of about 1 meter should be placed along the periphery of the proposed landfill especially on the upper boundary of the landfill
8. Soil used for a compacted soil liner must have a minimum Plasticity Index of 10 and a maximum that will not result in excessive desiccation cracking. A minimum clay liner of 300mm thickness is required with soil particle size of not more than 25mm and a minimum permeability of 10^{-7} cm/sec. In the absence of soil liner, a 1.5mm thick High-Density Polyethylene (HDP) membrane liner could be use over a 60 cm. compacted clay with permeability no more than 10^{-6} cm/sec.
9. Soil cover for dumped garbage should be readily available at the site. Stockpiling of cover material is recommended.
10. Inclined surface covered by a membrane/liner should be graded to achieve a factor of safety against slippage of at least 1:3 to prevent interlayer slippage.
11. Surface and groundwater sampling upstream and downstream of the creek should be done before and after the landfill operation. The sampling point upstream will provide ambient background values while the sampling downstream will indicate any pollution resulting from the operation.
12. Monitoring well should be placed downstream of the landfill site. Water on the well should be sampled before the operation of the landfill to serve as baseline for water quality. As the operation goes, water quality monitoring should be done regularly.
13. Gas monitoring probe and gas collection well should be constructed to prevent gas build-up that could result to explosion.

VII. WARRANTY AND CLOSURE

This geohazard assessment report of the proposed sanitary landfill project in Buenavista, Marinduque province was prepared using geological procedures in conducting the geological assessment and geo-hazards investigation. Its scope is limited to the project and location described here in and represents my understanding of the surface and sub-surface conditions of the site at the time of the assessment. The contents of this report are valid as of the date of the preparation, however, should there be appreciable changes in the site as a result of

man-made or natural activities, the geologist undersign should be immediately notified so that supplemental recommendations can be provided. Consequently, this report should not be relied upon after an elapsed period of three years without the review of the geologist for verification and validity. This warranty is in lieu of all other warranties, either expressed or implied.

BUENAVISTA SANITARY LANDFILL DETAILED DESIGN OF FACILITIES FOR DEVELOPEMENT

The designing of a sanitary landfill calls for developing a detailed description and plans that outline the steps to be taken to provide for the safe, efficient disposal of the quantities and types of solid waste that are expected to received. The design outlines volume requirements, waste categories, site improvements such as clearing the land, construction of access road, lay- out of facilities, preparation/design of landfill base and leachate pond and construction of initial cell.

I. VOLUME REQUIREMENT

If the rate at which solid wastes are collected and the capacity of the proposed site is known, its useful life can be estimated. The ratio of solid waste to cover material usually ranges between 4:1 and 3:1 which can be influenced by the thickness of soil cover and the cell configuration. The number of tons to be disposed of at the proposed sanitary landfill can be estimated from the data recorded when solid waste will be delivered to disposal sites. The daily volume of compacted solid waste can be easily determined using the ratio of volume of compacted solid waste against the daily solid waste collection. The volume of soil required to cover each day's waste is then estimated by using the appropriate solid waste to cover ratio. Solid waste density is the weight of a unit of solid waste in place while the landfill density is the weight of a unit volume of in place solid waste divided by the volume of solid waste and its cover material. The ideal compacted fill should have a density of 900 -950 kg/m³. The maximum thickness of waste is from 8 to 10 meters and should maintain a slope of not more than 30 degrees to prevent waste slide.

II. WASTE CATEGORIES

Buenavista sanitary landfill must be designed with consideration of preserving the living environment by preventing undue incidents such as overflowing of the waste and leachate seepage, propagation of vectors, scattering of wastes and emission of unpleasant odor. Waste comes from residences, commercial establishments, institution, municipal operations, industries and farms. Some may require special methods of handling and burial and others

should be totally excluded or prohibited from disposal at the landfill. The waste entering the landfill should have undergone segregation in the barangay or in municipal material recovery facility (MRF). Waste to be accepted are only residual waste. Waste may be categorized as follows:

General Waste (Acceptable waste) – Domestic and commercial solid waste

Difficult acceptable waste – Tyres and mattresses, fridges, freezers, stoves

Special Waste – Asbestos, toxic liquid waste, medical waste, pathogenic waste, biological sludge, acids and biocides, contaminated soil, batteries. This type of waste are not acceptable and should be segregated and brought to a designated hazardous landfill in the area. Due to the pandemic caused by COVID-9 surge, the volume of medical waste like face shield, face mask, cottons etc. have increased tremendously. This type of waste can be accepted in the sanitary landfill provided they have been segregated, autoclaved or pre-treated. A separate cell with an area of 200 sq. meter designed specifically for this type of waste could be used. The waste should be buried by 0.5 m thick of soil material. Bunds must be constructed to separate the special waste cell from general waste.

Prohibited Waste (Unacceptable) - Hot loads (greater than 50 degrees temperature), pressure cylinders, fire extinguisher, radioactive waste, chemical waste, untreated medical waste

III. SITE IMPROVEMENTS

The design plan for a sanitary landfill should prescribe how the site will be improved to provide an orderly sanitary operation. Necessary design facilities for the land filling area are described hereafter and is subject to a more detailed engineering design during the development stage.

1. Excavation/ Earth moving/ Soil Provision for Cover Material

Earthwork in excavation and in filling should be done for the purpose of preparing proper liner basement for the clay liner in slope, line and level. The excavation of the sub-soil should be from the existing ground level to a depth of 2 to 4 meters and compacted in-situ to a proctor

density of Dpr-95%. An initial of 3 to 4 hectares is planned to undergo excavation, grading and levelling for landfill base preparation. The excavated surficial cover could be used for daily covering to ensure easy spreading and compaction of the solid wastes and stabilize the landfill waste layers by not hindering the waste decomposition process. Clayey soil is suitable for intermediate covering to prevent gases from dispersing or rainwater from seeping into the waste layers. The material should be stored at any point just outside the basement area, so that it can be easily used at the tipping area currently in operation.

2. Liner System/Clay Liner

The proposed sanitary landfill has been categorized as Category 2 disposal facility as per the waste generation per day of Buenavista cluster. Under the implementing rules and regulations of DENR Administrative Order No. 10 for Category 2 disposal facility, the clay liner must be at least 75 cm thick (3-layer x 25cm) with a permeability of 10^{-7} cm/sec or better. Soil samples collected from auger drilling and sent to laboratory for analysis shows the clay samples has medium to high plasticity index ranging from 15 to 34 with liquid limit ranging from 29 to 58. It has specific gravity of 2.3 to 2.5. The soil samples are classified as fat clay and sandy lean clay and could be used as liner due to its high plasticity index and low to moderate permeability. The clay liner system is sufficient for bottom sealing of the landfill area for the disposal of municipal waste (i.e. general waste of non-hazardous type). Clay liner is preferable to the plastic liner (HDPE geo-membrane) mainly for the reasons of relatively difficult joining / lining technique, more cautions to be taken against damage during operation and relatively higher cost of the geo-membrane which has to be imported. An estimated volume of 8,000 cubic meters of clay liner is needed per hectare of landfill base.

3. Preparation of Liner Basement and Laying of Clay Liners

Liner basement should be prepared by excavating the sub-soil to the depth required to attend the design level after compacting (compacted in-situ) to a proctor density of Dpr-95%, giving a longitudinal slope of 3% and two-way cross slope of 4% to the central line of the valley. Over this compacted liner basement, bottom layer of clay liner should be laid properly, compacted in-situ to a proctor density of $Dpr \geq 95\%$ with a compacted thickness of 25 cm. Over this “bottom layer” with uniformly defined density, a second layer of clay (top layer) should be brought and compacted similarly for another compacted thickness of 25 cm and

then another third layer of 25 cm clay liner to conform with the DENR's requirement of 75 cm thick clay liner for Category 2 disposal facility. It is to be noted that before bringing the third and the second layer on top of the first layer, the compacted surface of the bottom layer is to be made rough enough for its good adhesion with the coming top layer of the clay liner.

4. Laying of Jute Mat and Drainage Carpet

A layer of jute mat of standard quality is placed over the top layer of the clay liner to protect its top surface. The surface of jute mat is then covered with a 30cm thick layer of gravel (river bed shingles/ pebbles of grain size 30-50 mm) forming a drainage carpet.

5. Leachate Collection Pipes

The general function of leachate collection facility is to quickly collect and channel the leachate generated from the rainfall on the land filled waste layers to the leachate treatment facility. For the proposed site, the system for proper and quick leachate collection at the landfill basement should consist of main leachate pipes and branch leachate pipes, which are to be hydraulically big enough to allow the maximum leachate flow and structurally strong enough against maximum static and dynamic loads coming over from ultimate height of waste filling and equipment in operation. Besides, they are also to be big enough to maintain permanent semi-aerobic condition within the waste layers for the proposed landfill system (Fukuoka method of semi-aerobic system).

a. Main Leachate Collection Pipe

Perforated NP3 hume pipe of internal diameter 600 mm should be selected for the main leachate pipe. The pipe should be perforated in upper 2/3 part with circular holes of 25 mm diameter and in distance interval and pattern. The lower 1/3 part should be non-perforated to allow smooth flow of the leachate collected without leaking out from the pipe. The laying of main leachate collection pipes longitudinally over the prepared top layer of compacted clay liner and along the gutter of basement prepared (sloped at 3%) deserves special attention for technical perfection. It is to be noted that laying of the main leachate pipe over the jute mat should be such that the top of its lower 1/3 part (i.e. the part without perforation) should be in level with the finished level of the top clay liner. The leachate pipe is then covered longitudinally with 30 cm well-compacted filter

material of riverbed shingles/ pebbles (grain size: 50 – 150 mm). The proposed width and thickness of the packed filter material should not only facilitate the filtration of leachate entering into the pipe perforation, but also increase the bearing capacity of the pipe under static and dynamic loading coming over it during operation at critical conditions.

b. Branch Leachate Collection Pipe

With due consideration of design calculations (i.e. hydraulic and structural design as well) and adequate sizing for the very important circulation of fresh air coming from main leachate pipe through the connected manholes to maintain the permanent semi-aerobic condition within the waste layers, branch leachate pipe of diameter 250 mm should be selected. The pipe should be perforated in upper 2/3 part with circular holes of 10 mm diameter. The lower 1/3 part should be non-perforated to allow smooth flow of the leachate collected without leaking out from the pipe. The laying of branch leachate collection pipes over the prepared top layer of compacted clay liner and cross to the main leachate pipe deserves special attention for technical perfection. They should be laid laterally (at intervals of 20m) inclined on both sides of the main leachate pipe over the prepared top layer of clay liner (sloped at 4% cross to the longitudinal direction of the valley). It is to be noted that laying of the branch leachate pipe over the jute mat should be such that the top of its lower 1/3 part (i.e. the part without perforation) should be in level with the finished level of the top clay liner.

6. Gas Vent System

Various types of gases are generated by decomposition of organic materials in the landfill sites, which may cause fire disasters or affect the surrounding environment and human health. Therefore, it is necessary to carry out gas venting facility at landfill sites in order to prevent the adverse impacts of these gases. Besides, the gas venting facility also has an effect on accelerating the decomposition process of organic materials and promoting the stabilization of waste mass within the sanitary landfill site. Collection and utilization of landfill gas is usually not cost-effective under normal condition. But however, it is necessary to carry out gas venting facility at landfill sites in order to prevent the adverse impacts caused by the accumulation of these gases within the waste mass. Besides, the gas venting facility also has an effect on accelerating the decomposition process of organic materials and promoting the

stabilization of waste mass of the sanitary landfill site. The proposed simple but effective system for quick and effective gas venting system is to be described as follows.

a. Gas Vent System (Over Main Leachate Pipe)

The main gas vent system should be built over each and every main manhole that connects the main leachate pipe with the two lateral branch leachate pipes. Perforated PVC vent pipe of diameter 160 mm should be vertically fixed at the centre of the RCC manhole cover. This vent pipe should be surrounded by gravel/boulder filled in cylindrical gabions (size 750 mm diameter and height 2.5 m) of strong mesh wire. Five numbers of MS rods (diameter 12 mm) fixed vertically on the side of the mesh wire should help not only held the gabion in vertical position but also ease the further extension for every 2 m of waste filling. For installation of the first gabion over the manhole, fixing of 5 MS rods in the manhole slab while concreting is highly recommended. During operation, on top of every 2 m of compacted waste layer, placing of a 30 cm thick horizontal gas drain of length 3 m around each and every gas vent is recommended, which should facilitate better venting and aeration through several waste layers inside the waste mass. Use of limestone for boulder/stone filling in gas vent is to be avoided.

b. Gas Vent System (over Branch Leachate Pipe)

The gas vent system over branch leachate pipe that ends at the foot of steep slope should be built by using perforated used oil drums of diameter 600 mm. The branch leachate pipe (HDPE pipe of 250 mm diameter) at the bottom should be connected to the perforated PVC vent pipe of 160 mm diameter and 6 kgf/cm² strength. The perforated vent pipe is surrounded by gravels/ boulders filled and packed in the oil drum. Four number of 12 mm dia. MS rods, welded on the interior side of oil drum, should ease further extension of the gas vent system for every 2 m of waste filling. However, the gas vent system to be built over branch leachate pipe, that has to be extended laterally at the bottom, should have a manhole similar to that to be built over main leachate pipe.

7. Leachate Collection Pond

For collection of leachate flowing out of the landfill site through the main leachate pipe, a leachate retention pond of 408 cum. capacity (more than 7-days retention for design leachate quantity of 45 cum./d) should be constructed immediately outside the landfill area and along the existing waste retaining dam in length. The collection pond should have a surface area of 334 sqm and a maximum depth of 1.25 m with the maximum leachate retention level at a depth of 1.25 m below the invert level of leachate outlet pipe, so that fresh air can easily pass through the pipe opening into the waste layers. The leachate collection pond should be of excavated grub, well compacted at the bottom and slopes in line and level. The well-compacted bottom and slopes should be lined with 2 layers of 350 micron HDPE sheet covering all surfaces. The pond should be bordered at the top of its embankment along all four sides with stone masonry work. This should not only increase its retaining capacity beyond the overflow level, but should also fix the plastic sheet in position. The closing of overflow valve (at the manhole outlet) should retain additional volume of about 2 days more. This additional volume for retention may be of importance in monsoon period when there is more rain and accordingly more leachate generation than expected.

8. Leachate Aeration and Recirculation System

Leachate re-circulation is a method using the landfill site itself as bioreactor. It collects leachate from the leachate control facility, then recirculates the leachate by sprinkling it over to the surface of the landfill waste layers. Collection of leachate by the leachate collection pipes and storage of leachate in leachate collection pond are prerequisite for leachate. As pre-treatment, supplying oxygen to leachate by aeration process will accelerate the decomposition process by micro-organisms, and it will be effective in reduction of offensive odor from the landfill site.

9. Storm Water and Groundwater Drainage

Proper storm water and groundwater drainage system of any landfill site is of utmost importance to minimize all possible water inflows into the landfill area. In general, storm water drainage facility is installed to reduce the amount of leachate generated from landfill sites. In other words, it functions to prevent storm water from surrounding areas to enter the landfill sites. An approximate length of 200 meters drainage canal with 0.5 meters depth and

width will be constructed at the initial stage of landfill development. The following conditions are generally required for the construction of storm water drainage facility:

- Drains should be constructed surrounding the landfill site to prevent the outside storm water from flowing into the landfill site.
- Dikes or embankments should be installed if necessary to prevent the storm water from landfill areas where land filling activities have not started to flow into the waste layers.
- Drains should be constructed on the surface of landfill final soil cover at completed landfill areas to separate the storm water from leachate and drain off the storm water from the landfill areas.

10. Weighbridge

Weighbridge is the basic requirement at a landfill site to record the quantity of incoming wastes to the landfill site. Weighbridge should be installed at the entrance of the landfill site to measure and record the incoming wastes. The proposed weighbridge should have a weighing capacity of 40 ton. The weighing platform should be of size 9 m x 3 m and is connected by two ramps (in and out) of length 5.5 m. Total size of the weighing bridge (including ramps) should be 20 m x 3.5 m. The incoming waste-loaded vehicles with pre-recorded empty weights should be weighed out only once while entering the site. These vehicles, while leaving the site after unloading of wastes, should use other gate. It is to be noted that the steel structure of the weighbridge should be of flexible type, so that after the closure of landfill operation at the site, it can be dismantled and re-installed at another site for its reuse.

11. Landfill Berm

The initial construction also includes the construction of the landfill berm. The landfill berm is intended to continue the first lift of the landfill and act as watertight dam for the collecting of any leachate that maybe generated in the landfill. One or more pipes, installed through the bottom of the berm will allow collected leachate to flow into the collection pond. The berm will be a stone masonry wall with a length of 85m and height of 4m and founded on a bedrock. It will be constructed perpendicular to the valley at elevation of 30meters above sea level.

12. Access Road

Access road is provided from the nearest public road system to the site. The access road in the site is approximately 1km old logging from the barangay road. The roadway should be rehabilitated and must consist of two lanes of about 10 meters width for two-way traffic. The road could be concreted but will be costly. The road during rehabilitation may be compacted and topped with a layer of tractive material such as gravel and crushed stone.

13. Cell Construction

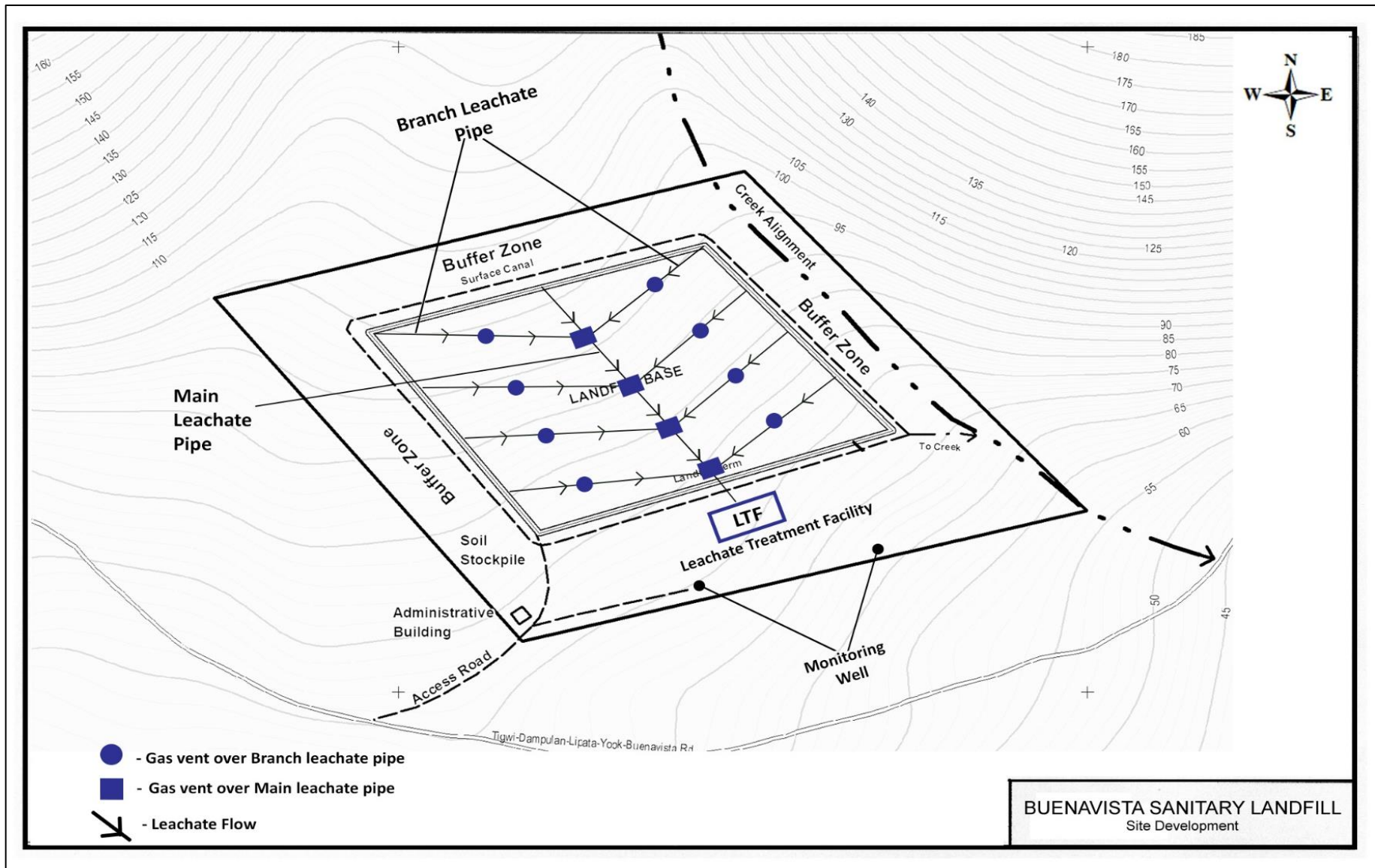
For the construction of operating cell, the area filling method will be used. The daily cell is the base unit of the sanitary landfill. All the solid waste received is spread and compacted in layers within a confined area and covered by soil materials which is then also compacted. The compacted waste and soil cover constitute a cell. A series of adjoining cells of the same height makes up a lift. The dimensions of the cell are determined by the volume of compacted waste which in turn depends on the density of the in-place solid waste. A minimum of 1,000 sq. meter area of cell will be developed as start-up operation. Bunds must be constructed on the sides of the cell to keep the waste in place. The bunds are usually constructed of builder's waste or rubble or soil cover material with slopes of 1:2 or 1:3 and constructed well ahead of the tipping face. Each lift should be not more than 3 meters high. The width of each face for each cell should not be more than 25 meters. The daily cover thickness should be 150mm and should be spread and compacted with about 3-4 passes. The top of each cell should drain uniformly to one side at a minimum slope of 5%. Runoff from the top of the cell is to be drained to the storm water control system.

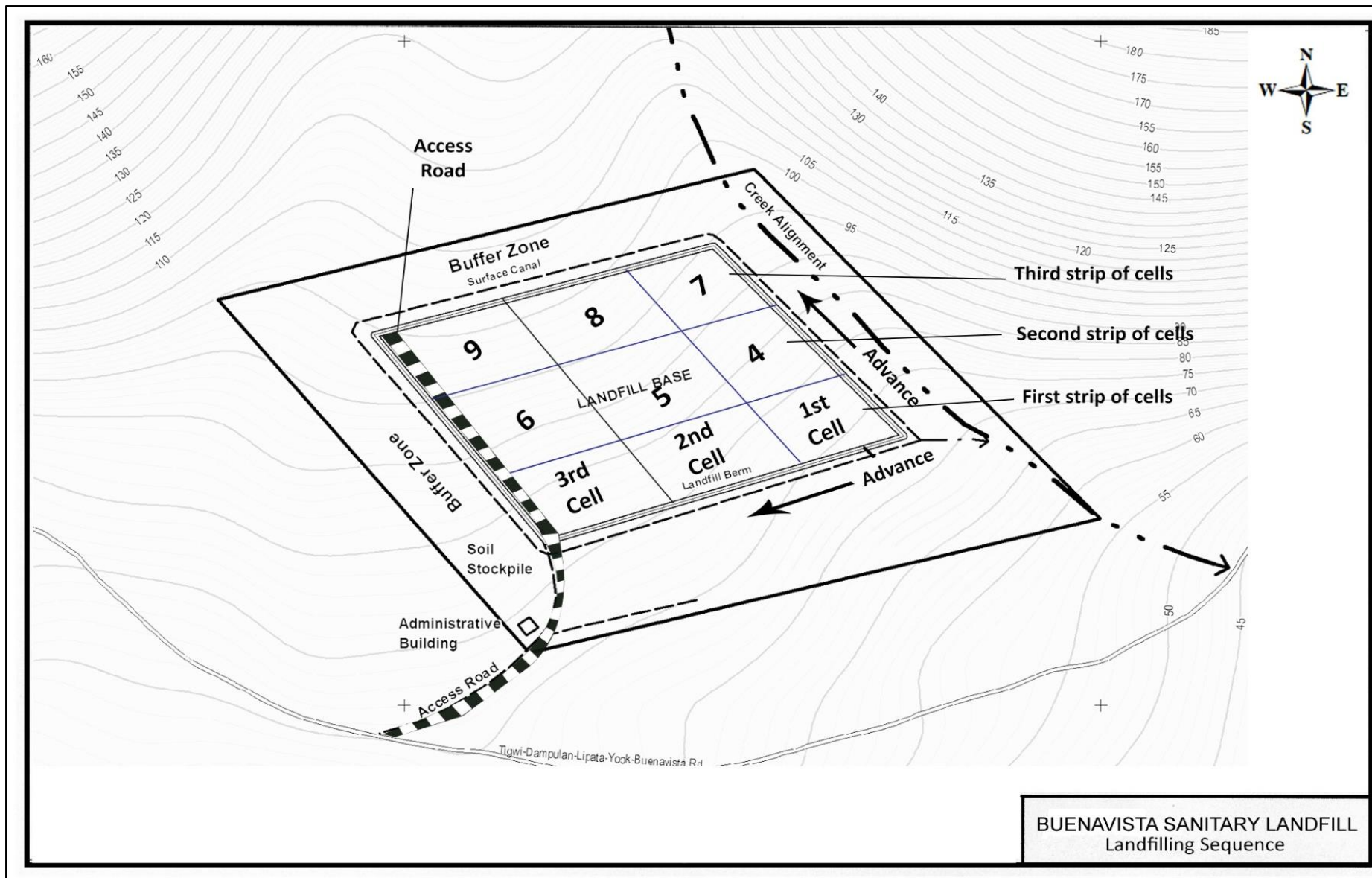
14. Stability of Landfill Slope

The landfill slopes will be using earth mounds above the landfilled layers where the embankments are mounted onto the landfill layer. This type of landfill slope can be sufficiently compacted and the wastes can be easily spread and compacted. The stability of the slope will greatly depend on the stability of the landfilled waste. In determining the gradient of the slope, the overall stability of the slope together with the landfilled waste layer shall be taken into consideration. In calculating the stability of the slope, potential structures and positions of the slope shall be assumed. The minimum value for the stable coefficient will give a stable slope. The forces that move the slope include the weight of the slope itself. In

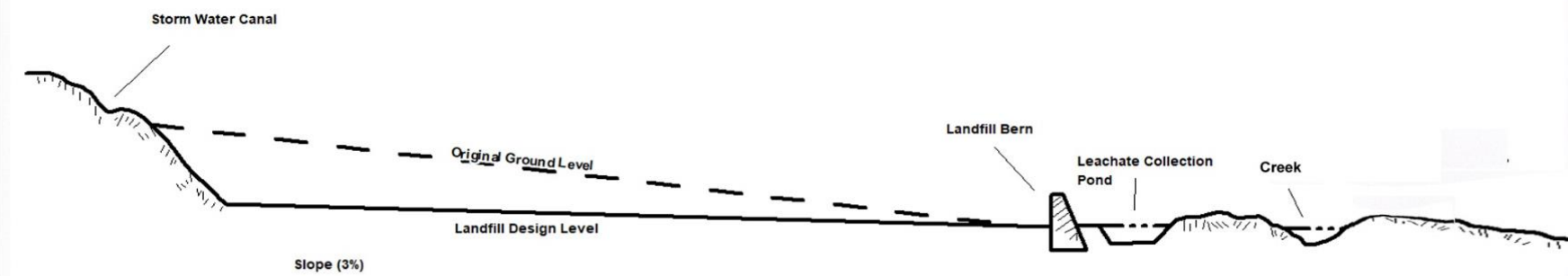
addition, water pressures in between shall also be considered in order to reduce the shear resistance.

Stability calculations are performed using the circular slip plane method wherein the safety coefficient is represented by the ratio between shear resistance and shear force. Although the safety of a slope is also depending on the surrounding environment, the safety coefficient shall always be above 1.2.

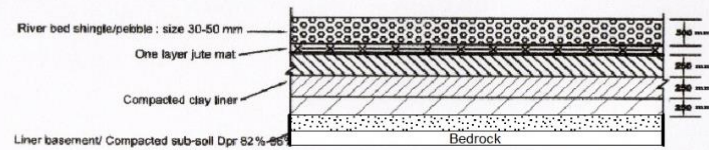




Elev. 100 m

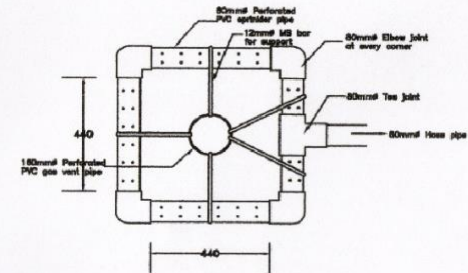


BUENAVISTA SANITARY LANDFILL
Longitudinal Profile



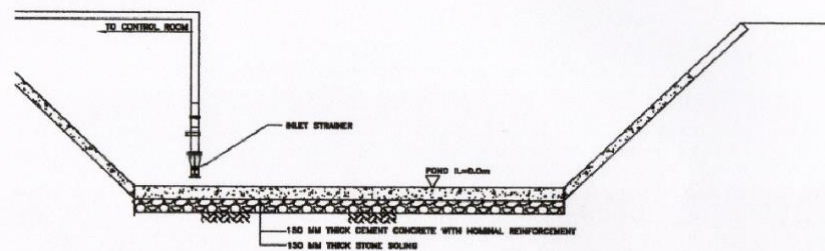
1 LINER SYSTEM SECTION

0 500 1000
SCALE (mm)



2 PLAN OF LEACHATE SPRINKLER SYSTEM

0 100 200
SCALE (mm)

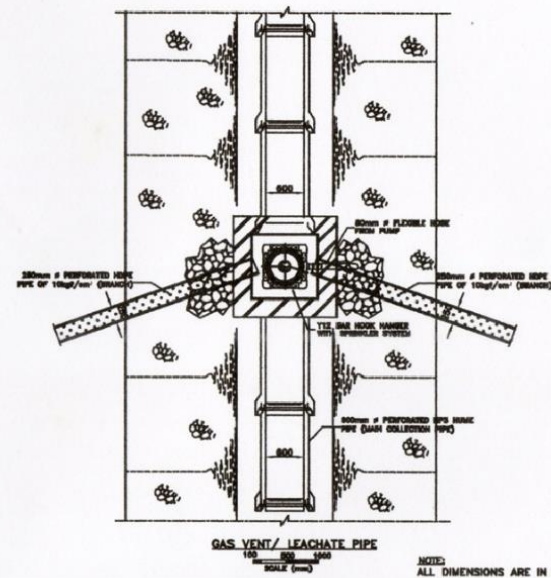
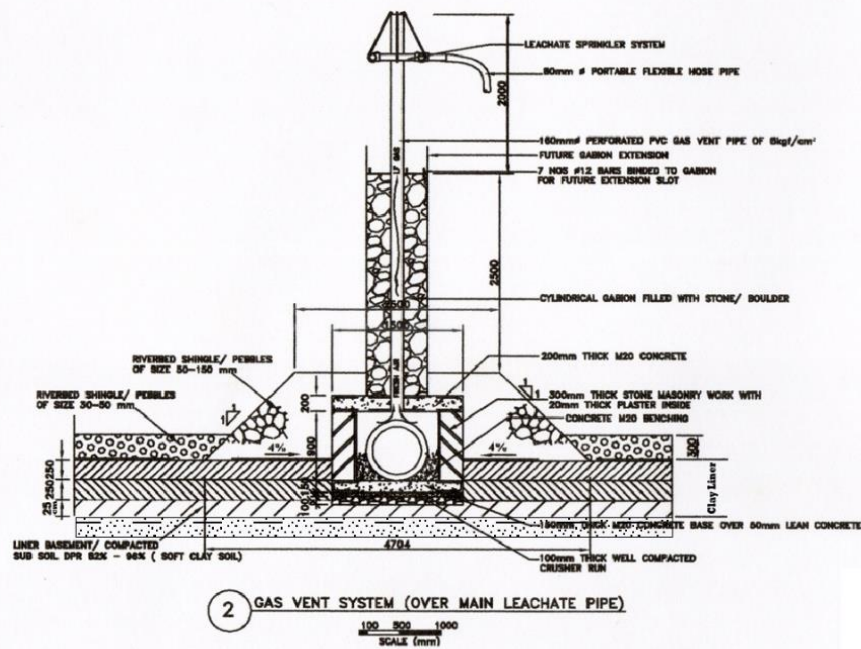
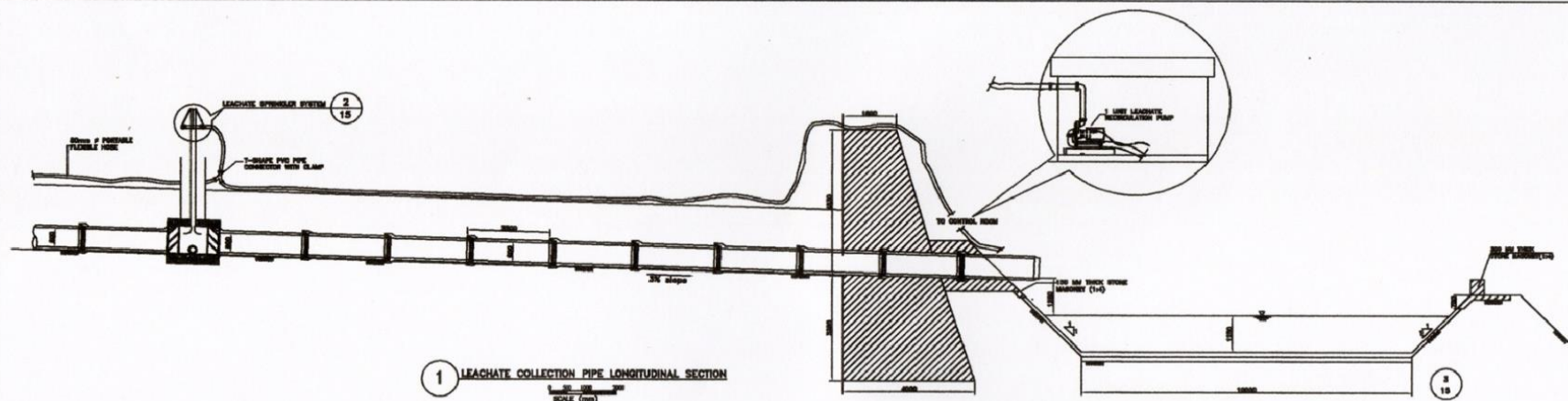


3 FLOOR DETAIL OF LEACHATE POND

0 500 1000
SCALE (mm)

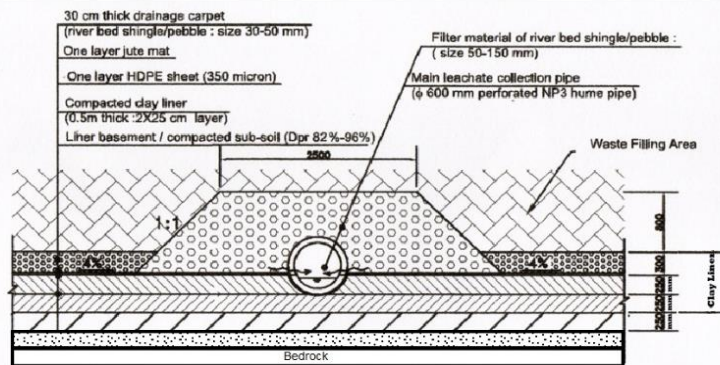
NOTE:
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.

BUENAVISTA SANITARY LANDFILL
General Detail

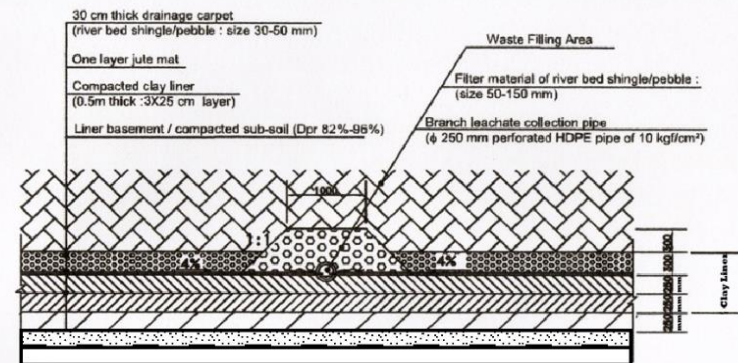


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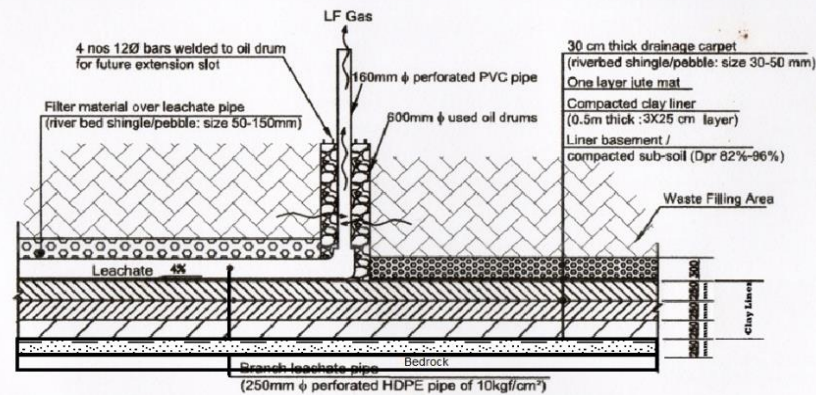
BUENAVISTA SANITARY LANDFILL
Leachate Collection Pipe and Gas Vent System



1 TYPICAL CROSS-SECTION: MAIN LEACHATE COLLECTION PIPE



2 TYPICAL CROSS SECTION: BRANCH LEACHATE COLLECTION PIPE



3 TYPICAL CROSS SECTION OF GAS VENT SYSTEM (OVER BRANCH LEACHATE PIPE)

NOTE:
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE MENTIONED

BUENAVISTA SANITARY LANDFILL
Detail of Leachate Collection Pipe/Gas Vent Pipe

IV. POST CLOSURE MANAGEMENT OF LANDFILL SITE

A. Necessity of Management of Post Closure Landfill Site

Even long after the landfill of wastes has been completed, the degradation process of wastes will continue. Generation of leachate and landfill gases will last considerably for a long period. The management of the landfill facilities shall be carried out properly even after the closure of landfill throughout the post closure land use phase.

B. Leachate Control

The quality and amount of leachate shall be monitored periodically even after the closure of the sanitary landfill. The periodical monitoring should be carried out until the time as it is ensured that the leachate level is low enough to cause of major impact in the surrounding environment. Appropriate measures shall be taken to the leachate treatment facilities as the leachate effluent level exceeds the applicable effluent standard.

Similarly, the monitoring of the landfill gases shall be carried out until the time as it is ensured that the level of landfill gases is low enough against the impact level to the surrounding environment. Appropriate measures such as periodical burning of methane gas shall be taken to promote releasing gasses and earlier decomposition.

C. Control of Land Subsidence

The landfill area will subside naturally due to the continuation of decomposition of organic matters in the filled wastes even after the closure of landfill. The ground conditions and state of subsidence shall be monitored and measured periodically in order to determine the timing for taking the remedial measures.

V. ASSESSMENT OF THE STATE OF STABLIZATION OF LANDFILL

1. State of Filled Waste or Landfill

Periodical visual monitoring and recording of the state of settlement of landfill shall be carried out for the major indicator supported by the leveling survey of the monitoring posts installed at the representative places of the filled area. The elapsed time leveling data will give the state of progress of settlement or the rate of settlement of the waste layer.

2. State of Water Quality of Leachate

Periodical monitoring, recording and analysis shall be carried out for water quality of leachate. The water quality parameters such as BOD5, COD and/or Electric Conductivity will be the appropriate indicator(s) for the assessment of stabilization of landfill through the decreasing trend of concentration of the indicator(s).

3. State of Landfill Gasses

Periodical monitoring, recording and analysis shall be carried out for landfill gasses represented by methane gas. The elapsed time data of methane gas concentration will give the state of decomposition of organic matter in wastes. Measuring and recording the burning time of methane gas at the gas vent provided with appropriate burning device will give also the decomposition state of filled waste. Burning treatment of methane gas shall be carried out with the utmost care and control lest it should cause of explosion accident.

VI. UTILIZATION AND MANAGEMENT OF POST-CLOSURE LANDFILL SITE

The post closure land use plan shall be formulated in consideration of the characteristics of the ground made on solid waste and the state of stabilization of the landfill site. The post closure management in the course of land use after the closure shall be carried out properly to minimize the probable impacts on the facilities and the users of the land.

VII. INSTITUTIONAL ANALYSIS

In the Philippines, managing solid wastes is one of the devolved functions to the Local Government Units based on the Republic Act 7160 or known as the Local Government Code of 1991. In addition, the passage of the Republic Act 9003 or the Ecological Solid Waste Management Act in 2000 placed the LGUs at the forefront of the battle for the effective implementation of the law. However, this mandate posed huge challenges for the LGUs considering their financial limitations and technical constraints.

Aside from ensuring that the solid wastes generated by the households and from the other sources are being collected effectively by the LGUs, residual wastes must be disposed of at the appropriate disposal facility. This is to guarantee that these wastes would not end up in

the rivers, streams, and oceans, and do not contribute to the rising problem of marine microplastic pollution which ultimately has negative impacts on public health. The disposal facility should follow the prescribed standards to prevent negative impacts to environmental health like water (surface and groundwater) contamination, air, and land pollutions.

However, the phasing out of all open dumping sites as mandated by the Republic Act 9003 forced the LGUs to cooperate and negotiate with the private sectors for their disposal waste management. These private companies, who have the financial capability, established the sanitary landfills following the specifications prescribed in the guidelines set by the DENR through the Department Administrative Order No. 50 series of 1998, DAO No. 10 series of 2006, and NSWMC Resolution No. 64 series of 2013. This institutional arrangement, entering into a contract agreement of the LGUs with the private company as a contractor for the provision of a sanitary landfill, has been the practice in the past.

Initially, this kind of institutional mechanism seemed effective. This addressed the financial limitation as well as the technical capability of the LGUs to put up their sanitary landfills following the specifications prescribed by the national government due to the high investment cost. Considering the yearly release of the budget, insufficient budget allocation, limited availability of the financing institutions, and the absence of financing and cooperation schemes, the establishment of sanitary landfills was not an option for most LGUs before, particularly to those belonging to the lower class or low-income earning municipalities and cities.

On the other hand, those municipalities and cities belonging to the rich and high class and even they are capable, find it difficult to identify a suitable area within their locality for the sanitary landfill. Because the location and area of the sanitary landfill should be compliant with the set of criteria prescribed in the abovementioned law and guidelines including that its operations will not detrimentally affect the environmentally sensitive resources such as an aquifer or groundwater reservoir and the watershed area.

Over almost decades on this institutional set-up, there is an urgent need for an alternative strategy. Because of the continuing urbanization and development, rising population, degradation of the terrestrial and marine environments, and the changing landscapes and land use, the demand for the establishment of more sanitary landfills is increasing and

immediate. In addition, the shorter life span of operating a sanitary landfill and the availability of a suitable site contribute to the need for long-term and sound institutional management solutions to the dynamics of managing solid wastes disposal.

In the long term, the potential of the LGUs to establish and operate a disposal facility must be the best option for effective solid waste management and prevent negative impacts of unmanaged wastes to the environment and public health. However, to address the issue of high investment and operating capitals, it is highly recommended for the LGUs to cluster among themselves as provided under the Republic Act 9003. Within the clustered LGUs, one must be agreed to become the host who will identify and allocate an area for the sanitary landfill, take charge of the establishment, operations, and management of the facility, and cater to the wastes generated by partner LGUs.

VIII. FINANCING SCHEME

The initially identified location of the sanitary landfill is in Brgy. Tungib, Lipata, Buenavista, Marinduque. For this project, the Municipality of Buenavista, as host LGU, will opt to apply for the loan from the funding institution(s) among the other financing schemes provided by the national government. The loan, once granted through a Loan Contract Agreement, will be used as the capital investment for the municipality to construct a disposal facility under the close supervision of the DENR – EMB MIMAROPA Region for technical guidance and support. The municipality will choose a company through public bidding to serve as a contractor who has the experience and financial integrity in the establishment of a sanitary landfill.

The Municipality of Buenavista will pay for the loan depending on the terms and conditions to be agreed upon by the municipality and the financing institution. There are two (2) sources of funds to pay the loan. The first is from the portion of the Internal Revenue Allotment (IRA) allotted every year for the solid waste management activities of the municipality. The second source will come from the payment from the partner LGUs who will dispose of their wastes in the sanitary landfill through the Memorandum of Agreement.

For the operation and maintenance costs, the Municipality of Buenavista will also source it from the portion of the payment from partner LGUs in the cluster. Among the identified LGUs who have already signified interest to be partners in the project are municipalities of Boac,

Gasán, Mogpog, and Torrijos. In addition, other potential sources of funds will be explored by the host LGU to augment the operation and maintenance of the facility like the adoption of user's fees or polluter's fees scheme, imposition of trash collection fees, and others. However, these other potential sources of funds should have corresponding policy instruments like ordinances before its implementation.

IX. INSTITUTIONAL ARRANGEMENT

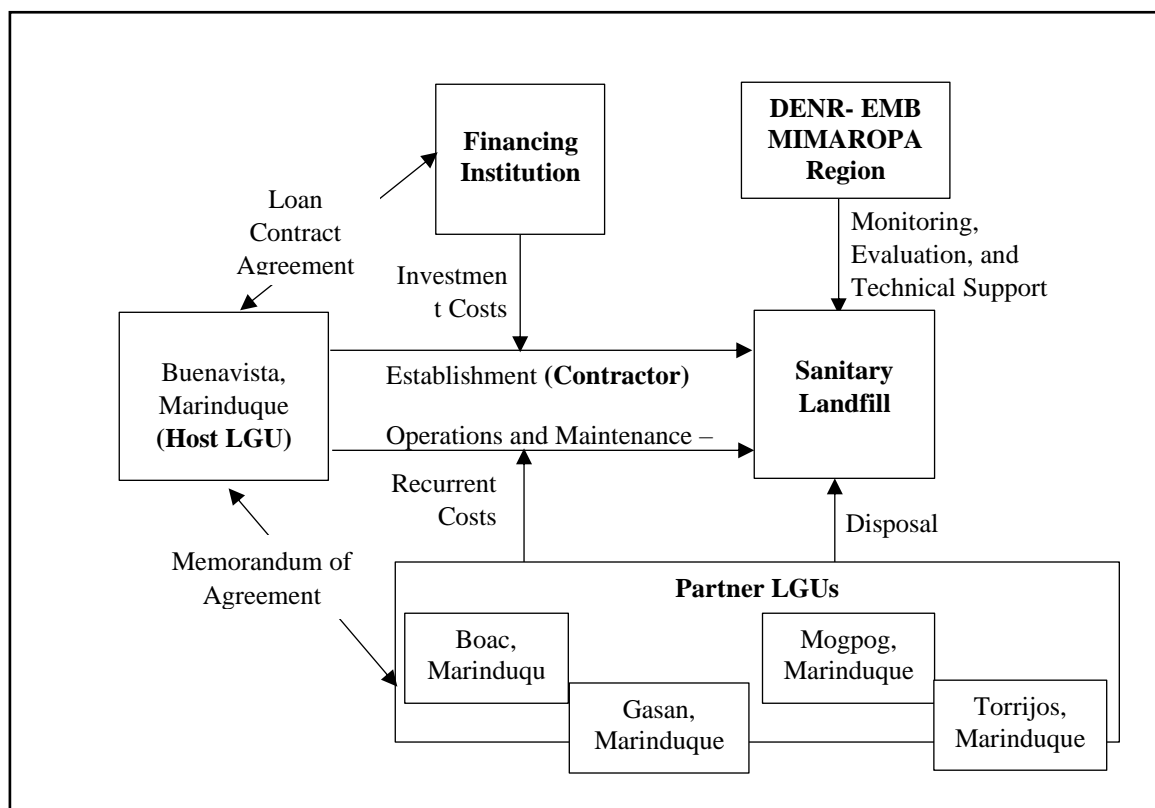


Figure 18. Institutional Arrangement Framework for establishing and operating the Clustered LGUs Sanitary Landfill in Marinduque, MIMAROPA Region

Shown in Figure 18 is the institutional arrangement to be adopted by this project to ensure the sustainability of the operations of the sanitary landfill. The instruments and roles of the stakeholders are specified in the framework. Among the major stakeholders in the project are the Municipality of Buenavista as the host LGU, the Municipalities of Boac, Gasán, Mogpog, and Torrijos as the partner LGUs within the cluster, the DENR-EMB MIMAROPA Region, the funding institution, the contractor for the construction of the facility, and the Project Management Office to be set-up.

Below are the major roles and responsibilities of the abovementioned stakeholders including the mechanism and instrument of cooperation.

Municipality of Buenavista, Marinduque, as Host LGU

1. Identify and allocate the site within their administrative jurisdiction suitable for the establishment of the Sanitary Landfill. The area or size should be large enough to accommodate the projected solid wastes generation of the municipalities within the cluster.
2. Source out the capital to cover the cost of the establishment of the Sanitary Landfill. Comply with all the necessary documentary requirements of the funding institution and enter into a loan agreement. Comply with all the terms and conditions to be agreed upon in the loan agreement.
3. Conduct public bidding in the construction of the Sanitary Landfill and enter into a contract agreement with the winning contractor.
4. Allocate budget from the IRA yearly for the payment of the loan and/or for operation and maintenance of the facility.
5. In charge of the operations and maintenance of the Sanitary Landfill. For this purpose, the Municipality of Buenavista may set up a Project Management Office that will directly supervise and manage the operations of the facility including the fiscal aspect.
6. Facilitate the provision of capacity building or training to the staff of the Project Management Office.
7. Enter into a Memorandum of Agreement with the partner LGUs within the cluster for the accommodation of their disposal of wastes and receive payment.
8. Closely coordinate with the DENR-EMB MIMAROPA Region for the technical assistance for the smooth construction and maintenance of the Sanitary Landfill and ensure its compliance with the prescribed guidelines.
9. Pass ordinance(s) for the operationalization of the user's or polluter's fees and collection fees once agreed upon as other sources of income before its implementation.
10. Ensure compliance with necessary legal and statutory documents relevant to the project like Environmental Compliance Certificate (ECC), Discharge Permit, and others.
11. Submit periodic reports to DENR – EMB MIMAROPA Region.

Municipalities of Boac, Gasan, Mogpog, and Torrijos, Marinduque, as partner LGUs

1. Enter into a Memorandum of Agreement with the host LGU for the disposal of their solid wastes and pay the corresponding amount to be agreed upon by the parties. The agency-to-agency mode of procurement may be used for the transfer of funds to the host LGUs.
2. Allocate budget from their IRA yearly for the payment for using the disposal facility of the host LGU and include in their long-term financial planning.
3. In charge of the collection and hauling of solid wastes from the households to the disposal facility.
4. Closely coordinate with the host LGU through the PMO regarding the operations of the Sanitary Landfill.
5. Comply with all the necessary legal and financial documents.

DENR-EMB MIMAROPA Region

1. Conduct monitoring and evaluation of the project to ensure compliance with the existing laws and regulations of the DENR.
2. Provide necessary technical support to the host LGU about the establishment of the Sanitary Landfill including its technical specifications and maintenance operations.
3. Provide capacity building to the host LGU and Project Management Office for a sound and effective management of the facility.

Contractor

1. Equip with technical capability and experiences for the construction of the disposal facility following the prescribed specifications set by the guidelines.
2. Participate in the public bidding process and comply with all the necessary legal, financial, and technical documents.
3. Provide post-project technical support.

X. RECOMMENDATIONS

1. Coordinate with Ms. Alida Ramos, Research Specialist of the Toxic and Hazardous Waste Research Center and Extension Center (THWRDEC) of the Ecosystems Research and

Development Bureau situated in Quezon City regarding the result of the recently concluded study titled, “Development of Waste Management System for Household Hazardous Waste”. The developed Management System for Household Hazardous Waste as an output of the research conducted by Ms. Ramos can be adopted by the Local Government Units in MIMAROPA region.

2. The EMB MIMAROPA can coordinate with the Philippine Rice Research Institute (PhilRice) in Maligaya, Munoz, Nueva Ecija regarding the production of biodiesel from waste cooking oil using the cruzesterification process for possible project partnership of LGU MIMAROPA and PhilRice.
3. Coordination can likewise be done with the University of Science and Technology of Southern Philippines, Cagayan de Oro City regarding the conduct of webinar for LGUs in MIMAROPA region spearheaded by EMB MIMAROPA on the utilization of used cooking oil as an alternative cooking fuel resource.

ANNEXES

ANNEX 1

Republic Act no 9003 – Ecological Solid Waste Management Act of 2000

H. No. 10651
S. No. 1595

**Republic of the Philippines
Congress of the Philippines
Metro Manila
Eleventh Congress
Third Regular Session**



Begun and held in Metro Manila, on Monday, the twenty-fourth day of July, two thousand.

[REPUBLIC ACT NO. 9003]

AN ACT PROVIDING FOR AN ECOLOGICAL SOLID WASTE MANAGEMENT PROGRAM, CREATING THE NECESSARY INSTITUTIONAL MECHANISMS AND INCENTIVES, DECLARING CERTAIN ACTS PROHIBITED AND PROVIDING PENALTIES, APPROPRIATING FUNDS THEREFOR, AND FOR OTHER PURPOSES

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

**CHAPTER I
BASIC POLICIES**

Article 1 General Provisions

Section 1. Short Title. -- This Act shall be known as the “Ecological Solid Waste Management Act of 2000”.

Section 2. Declaration of Policies. -- It is hereby declared the policy of the State to adopt a systematic, comprehensive and ecological solid waste management program which shall:

- (a) Ensure the protection of public health and environment;
- (b) Utilize environmentally-sound methods that maximize the utilization of valuable resources and encourage resources conservation and recovery;
- (c) Set guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, including composing, recycling, re-use, recovery, green charcoal process, and others, before collection, treatment and disposal in appropriate and environmentally- sound solid waste management facilities in accordance with ecologically sustainable development principles;
- (d) Ensure the proper segregation, collection, transport, storage, treatment and

disposal of solid waste through the formulation and adoption of the best environmental practices in ecological waste management excluding incineration;

- (e) Promote national research and development programs for improved solid waste management and resource conservation techniques, more effective institutional arrangement and indigenous and improved methods of waste reduction, collection, separation and recovery.
- (f) Encourage greater private sector participation in solid waste management;
- (g) Retain primary enforcement and responsibility of solid waste management with local government units while establishing a cooperative effort among the national government, other local government units, non-government organizations, and the private sector;
- (h) Encourage cooperation and self-regulation among waste generators through the application of market-based instruments;
- (i) Institutionalize public participation in the development and implementation of national and local integrated, comprehensive and ecological waste management programs; and
- (j) Strengthen the integration of ecological solid waste management and resource conservation and recovery topics into the academic curricula of formal and non-formal education in order to promote environmental awareness and action among the citizenry.

Article 2 Definitions of Terms

Section 3. Definition of Terms. – For the purpose of this Act:

- (a) Agricultural waste shall refer to waste generated from planting or harvesting of crops, trimming or pruning of plants and wastes or run-off materials from farms or fields;
- (b) Bulky wastes shall refer to waste materials which cannot be appropriately placed in separate containers because of either its bulky size, shape or other physical attributes. These include large worn-out or broken household, commercial, and industrial items such as furniture, lamps, bookcases, filing cabinets, and other similar items;
- (c) Bureau shall refer to the Environmental Management Bureau;
- (d) Buy-back center shall refer to a recycling center that purchases or otherwise accepts recyclable materials from the public for the purpose of recycling such materials;
- (e) Collection shall refer to the act of removing solid waste from the source or from a communal storage point;
- (f) Composting shall refer to the controlled decomposition of organic matter by micro-organisms, mainly bacteria and fungi, into a humus-like product;
- (g) Consumer electronics shall refer to special wastes that include worn-out, broken, and other discarded items such as radios, stereos, and TV sets;
- (h) Controlled dump shall refer to a disposal site at which solid waste is deposited in accordance with the minimum prescribed standards of site operation;

- (i) Department shall refer to the Department of Environment and Natural Resources;
- (j) Disposal shall refer to the discharge, deposit, dumping, spilling, leaking or placing of any solid waste into or in any land;
- (k) Disposal site shall refer to a site where solid waste is finally discharged and deposited;
- (l) Ecological solid waste management shall refer to the systematic administration of activities which provide for segregation at source, segregated transportation, storage, transfer, processing, treatment, and disposal of solid waste and all other waste management activities which do not harm the environment;
- (m) Environmentally acceptable shall refer to the quality of being re-usable, biodegradable or compostable, recyclable and not toxic or hazardous to the environment;
- (n) Generation shall refer to the act or process of producing solid waste;
- (o) Generator shall refer to a person, natural or juridical, who last uses a material and makes it available for disposal or recycling;
- (p) Hazardous waste shall refer to solid waste or combination of solid waste which because of its quantity, concentration, or physical, chemical or infectious characteristics may:
 - (1) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
 - (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed;
- (q) Leachate shall refer to the liquid produced when waste undergo decomposition, and when water percolate through solid waste undergoing decomposition. It is a contaminated liquid that contains dissolved and suspended materials;
- (r) Materials recovery facility – includes a solid waste transfer station or sorting station, drop-off center, a composting facility, and a recycling facility;
- (s) Municipal waste shall refer to wastes produced from activities within local government units which include a combination of domestic, commercial, institutional and industrial wastes and street litters;
- (t) Open dump shall refer to a disposal area wherein the solid wastes are indiscriminately thrown or disposed of without due planning and consideration for environmental and health standards;
- (u) Opportunity to recycle shall refer to the act of providing a place for collecting source-separated recyclable material, located either at a disposal site or at another location more convenient to the population being served, and collection at least once a month of source-separated recyclable material from collection service customers and to providing a public education and promotion program that gives notice to each person of the opportunity to recycle and encourage source separation of recyclable material;
- (v) Person(s) shall refer to any being, natural or juridical, susceptible of rights and obligations, or of being the subject of legal relations;
- (w) Post-consumer material shall refer only to those materials or products generated by a business or consumer which have served their intended end

use, and which have been separated or diverted from solid waste for the purpose of being collected, processed and used as a raw material in the manufacturing of recycled product, excluding materials and by-products generated from, and commonly used within an original manufacturing process, such as mill scrap;

- (x) Receptacles shall refer to individual containers used for the source separation and the collection of recyclable materials;
- (y) Recovered material shall refer to material and by-products that have been recovered or diverted from solid waste for the purpose of being collected, processed and used as a raw material in the manufacture of a recycled product;
- (z) Recyclable material shall refer to any waste material retrieved from the wastestream and free from contamination that can still be converted into suitable beneficial use or for other purposes, including, but not limited to, newspaper, ferrous scrap metal, non-ferrous scrap metal, used oil, corrugated cardboard, aluminum, glass, office paper, tin cans and other materials as may be determined by the Commission;
- (aa) Recycled material shall refer to post-consumer material that has been recycled and returned to the economy;
- (bb) Recycling shall refer to the treating of used or waste materials through a process of making them suitable for beneficial use and for other purposes, and includes any process by which solid waste materials are transformed into new products in such a manner that the original products may lose their identity, and which may be used as raw materials for the production of other goods or services: *Provided*, That the collection, segregation and re-use of previously used packaging material shall be deemed recycling under this Act;
- (cc) Resource conservation shall refer to the reduction of the amount of solid waste that are generated or the reduction of overall resource consumption, and utilization of recovered resources;
- (dd) Resource recovery shall refer to the collection, extraction or recovery of recyclable materials from the waste stream for the purpose of recycling, generating energy or producing a product suitable for beneficial use: *Provided*, That, such resource recovery facilities exclude incineration;
- (ee) Re-use shall refer to the process of recovering materials intended for the same or different purpose without the alteration of physical and chemical characteristics;
- (ff) Sanitary landfill shall refer to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation of the facility;
- (gg) Schedule of Compliance shall refer to an enforceable sequence of actions or operations to be accomplished within a stipulated time frame leading to compliance with a limitation, prohibition, or standard set forth in this Act or any rule or regulation issued pursuant thereto;
- (hh) Secretary shall refer to the Secretary of the Department of Environment and Natural Resources;

- (ii) Segregation shall refer to a solid waste management practice of separating different materials found in solid waste in order to promote recycling and re-use of resources and to reduce the volume of waste for collection and disposal;
- (jj) Segregation at source shall refer to a solid waste management practice of separating, at the point of origin, different materials found in solid waste in order to promote recycling and re-use of resources and to reduce the volume of waste for collection and disposal;
- (kk) Solid waste shall refer to all discarded household, commercial waste, non-hazardous institutional and industrial waste, street sweepings, construction debris, agriculture waste, and other non-hazardous/non-toxic solid waste. Unless specifically noted otherwise, the term “solid waste” as used in this Act shall not include:
 - (1) waste identified or listed as hazardous waste of a solid, liquid, contained gaseous or semisolid form which may cause or contribute to an increase in mortality or in serious or incapacitating reversible illness, or acute/chronic effect on the health of persons and other organisms;
 - (2) infectious waste from hospitals such as equipment, instruments, utensils, and fomites of a disposable nature from patients who are suspected to have or have been diagnosed as having communicable diseases and must therefore be isolated as required by public health agencies, laboratory wastes such as pathological specimens (i.e., all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals), and disposable fomites that may harbor or transmit pathogenic organisms, and surgical operating room pathological specimens and disposable fomites attendant thereto, and similar disposable materials from outpatient areas and emergency rooms; and
 - (3) waste resulting from mining activities, including contaminated soil and debris.
- (ll) Solid waste management shall refer to the discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations, and that is also responsive to public attitudes;
- (mm) Solid waste management facility shall refer to any resource recovery system or component thereof; any system, program, or facility for resource conservation; any facility for the collection, source separation, storage, transportation, transfer, processing, treatment, or disposal of solid waste;
- (nn) Source reduction shall refer to the reduction of solid waste before it enters the solid waste stream by methods such as product design, materials substitution, materials re-use and packaging restrictions;
- (oo) Source separation shall refer to the sorting of solid waste into some or all of its component parts at the point of generation;

- (pp) Special wastes shall refer to household hazardous wastes such as paints, thinners, household batteries, lead-acid batteries, spray canisters and the like. These include wastes from residential and commercial sources that comprise of bulky wastes, consumer electronics, white goods, yard wastes that are collected separately, batteries, oil, and tires. These wastes are usually handled separately from other residential and commercial wastes;
- (qq) Storage shall refer to the interim containment of solid waste after generation and prior to collection for ultimate recovery or disposal;
- (rr) Transfer stations shall refer to those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport. This term does not include any of the following:
 - (1) a facility whose principal function is to receive, store, separate, convert, or otherwise process in accordance with national minimum standards, manure;
 - (2) a facility, whose principal function is to receive, store, convert, or otherwise process wastes which have already been separated for re-use and are not intended for disposal; and
 - (3) the operations premises of a duly licensed solid waste handling operator who receives, stores, transfers, or otherwise processes waste as an activity incidental to the conduct of a refuse collection and disposal business.
- (ss) Waste diversion shall refer to activities which reduce or eliminate the amount of solid wastes from waste disposal facilities;
- (tt) White goods shall refer to large worn-out or broken household, commercial, and industrial appliances such as stoves, refrigerators, dishwaters, and clothes washers and dryers collected separately. White goods are usually dismantled for the recovery of specific materials (e.g., copper, aluminum, etc.); and
- (uu) Yard waste shall refer to wood, small or chipped branches, leaves, grass clippings, garden debris, vegetables residue that is recognizable as part of a plant or vegetable and other materials identified by the Commission.

CHAPTER II

INSTITUTIONAL MECHANISM

Section 4. National Solid Waste Management Commission. There is hereby established a National Solid Waste Management Commission, hereinafter referred to as the Commission, under the Office of the President. The Commission shall be composed of fourteen (14) members from the government sector and three (3) members from the private sector. The government sector shall be represented by the heads of the following agencies in their *ex officio* capacity:

- (1) Department of Environment and Natural Resources (DENR);
- (2) Department of Interior and Local Government (DILG);
- (3) Department of Science and Technology (DOST);
- (4) Department of Public Works and Highways (DPWH);
- (5) Department of Health (DOH);
- (6) Department of Trade and Industry (DTI);
- (7) Department of Agriculture (DA);
- (8) Metro Manila Development Authority (MMDA);
- (9) League of provincial governors;
- (10) League of city mayors;
- (11) League of municipal mayors;
- (12) Association of barangay councils;
- (13) Technical Education and Skills Development Authority (TESDA); and
- (14) Philippine Information Agency.

The private sector shall be represented by the following:

- (a) A representative from nongovernment organizations (NGOs) whose principal purpose is to promote recycling and the protection of air and water quality;
- (b) A representative from the recycling industry; and
- (c) A representative from the manufacturing or packaging industry;

The Commission may, from time to time, call on any other concerned agencies or sectors as it may deem necessary.

Provided, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be nominated through a process designed by themselves and shall be appointed by the President for a term of three (3) years.

Provided, further, That the Secretaries of the member agencies of the Commission shall formulate action plans for their respective agencies to complement the National Solid Waste Management Framework.

The Department Secretary and a private sector representative of the Commission shall serve as chairman and vice chairman, respectively. The private sector representatives of the Commission shall be appointed on the basis of their integrity, high degree of professionalism and having distinguished themselves in environmental and resource management. The members of the Commission shall serve and continue to hold office until their successors shall have been appointed and qualified. Should a member of the Commission fail to complete his/her term, the successor shall be appointed by the President of the Philippines but only for the unexpired portion of the term. Finally, the members shall be entitled to reasonable traveling expenses and honoraria.

The Department, through the Environmental Management Bureau, shall provide secretariat support to the Commission. The Secretariat shall be headed by an executive director who shall be nominated by the members of the Commission and appointed by the chairman.

Section 5. Powers and Functions of the Commission. -- The Commission shall oversee the implementation of solid waste management plans and prescribe policies to achieve the objectives of this Act. The Commission shall undertake the following activities:

- (a) Prepare the National Solid Waste Management Framework;
- (b) Approve local solid waste management plans in accordance with its rules and regulations;
- (c) Review and monitor the implementation of local solid waste management plans;
- (d) Coordinate the operation of local solid waste management boards in the provincial and city/municipal levels;
- (e) To the maximum extent feasible, utilizing existing resources, assist provincial, city and municipal solid waste management boards in the preparation, modification, and implementation of waste management plans;
- (f) Develop a model provincial, city and municipal solid waste management plan that will establish prototypes of the content and format which provinces, cities and municipalities may use in meeting the requirements of the National Solid Waste Management Framework;
- (g) Adopt a program to provide technical and other capability building assistance and support to local government units in the development and implementation of source reduction programs;
- (h) Develop and implement a program to assist local government units in the identification of markets for materials that are diverted from disposal facilities through re-use, recycling, and composting, and other environment-friendly methods;
- (i) Develop a mechanism for the imposition of sanctions for the violation of environmental rules and regulations;
- (j) Manage the Solid Waste Management Fund;
- (k) Develop and prescribe procedures for the issuance of appropriate permits and clearances;
- (l) Review the incentives scheme for effective solid waste management, for purposes of ensuring relevance and efficiency in achieving the objectives of this Act;
- (m) Formulate the necessary education promotion and information campaign strategies;
- (n) Establish, after notice and hearing of the parties concerned, standards, criteria, guidelines and formula that are fair, equitable and reasonable in establishing tipping charges and rates that the proponent will charge in the operation and management of solid waste management facilities and technologies;
- (o) Develop safety nets and alternative livelihood programs for small recyclers and other sectors that will be affected as a result of the construction and/or operation of a solid waste management recycling plant or facility;
- (p) Formulate and update a list of non-environmentally acceptable materials in accordance with the provisions of this Act. For this purpose, it shall be necessary that proper consultation be conducted by the Commission with all concerned industries to ensure a list that is based on technological and

- economic viability;
- (q) Encourage private sector initiatives, community participation and investments resource recovery-based livelihood programs for local communities;
- (r) Encourage all local government agencies and all local government units to patronize products manufactured using recycled and recyclable materials;
- (s) Propose and adopt regulations requiring the source separation and post separation collection, segregated collection, processing, marketing and sale of organic and designated recyclable material generated in each local government unit; and
- (t) Study and review the following:
 - (i) Standards, criteria and guidelines for the promulgation and implementation of an integrated national solid waste management framework; and
 - (ii) Criteria and guidelines for siting, design, operation and maintenance of solid waste management facilities.

Section 6. Meetings. -- The Commission shall meet at least once a month. The presence of at least a majority of the members shall constitute a quorum. The chairman, or in his absence the vice-chairman, shall be presiding officer. In the absence of the heads of the agencies mentioned in Section 4 of this Act, they may designate permanent representatives to attend the meetings.

Section 7. The National Ecology Center. -- There shall be established a National Ecology Center under the Commission which shall provide consulting, information, training, and networking services for the implementation of the provisions of this Act.

In this regard, it shall perform the following functions:

- (a) Facilitate training and education in integrated ecological solid waste management;
- (b) Establish and manage a solid waste management information data base, in coordination with the DTI and other concerned agencies:
 - (1) on solid waste generation and management techniques as well as the management, technical and operational approaches to resource recovery; and
 - (2) of processors/recyclers, the list of materials being recycled or bought by them and their respective prices;
- (c) Promote the development of a recycling market through the establishment of a national recycling network that will enhance the opportunity to recycle;
- (d) Provide or facilitate expert assistance in pilot modeling of solid waste management facilities; and
- (e) Develop, test, and disseminate model waste minimization and reduction auditing procedures for evaluating options.

The National Ecology Center shall be headed by the director of the Bureau in his *ex officio* capacity. It shall maintain a multi-sectoral, multi-disciplinary pool of experts including those from the academe, inventors, practicing professionals, business and industry, youth, women and other concerned sectors, who shall be screened according to qualifications set by the Commission.

Section 8. Role of the Department. -- For the furtherance of the objectives of this Act, the Department shall have the following functions:

- (a) Chair the Commission created pursuant to this Act;
- (b) Prepare an annual National Solid Waste Management Status Report;
- (c) Prepare and distribute information, education and communication materials on solid waste management;
- (d) Establish methods and other parameters for the measurement of waste reduction, collection and disposal;
- (e) Provide technical and other capability building assistance and support to the LGUs in the development and implementation of local solid waste management plans and programs;
- (f) Recommend policies to eliminate barriers to waste reduction programs;
- (g) Exercise visitorial and enforcement powers to ensure strict compliance with this Act;
- (h) Perform such other powers and functions necessary to achieve the objectives to this Act; and
- (i) Issue rules and regulations to effectively implement the provisions of this Act.

Section 9. Visitorial Powers of the Department. -- The Department or its duly authorized representative shall have access to, and the right to copy therefrom, the records required to be maintained pursuant to the provisions of this Act. The Secretary or the duly authorized representative shall likewise have the right to enter the premises of any generator, recycler or manufacturer, or other facilities any time to question any employee or investigate any fact, condition or matter which may be necessary to determine any violation, or which may aid in the effective enforcement of this Act and its implementing rules and regulations. This Section shall not apply to private dwelling places unless the visitorial power is otherwise judicially authorized.

Section 10. Role of LGUs in Solid Waste Management. -- Pursuant to the relevant provisions of R.A. No. 7160, otherwise known as the Local Government Code, the LGUs shall be primarily responsible for the implementation and enforcement of the provisions of this Act within their respective jurisdictions.

Segregation and collection of solid waste shall be conducted at the barangay level specifically for biodegradable, compostable and reusable wastes: *Provided*, That the collection of non-recyclable materials and special wastes shall be the responsibility of the municipality or city.

Section 11. Provincial Solid Waste Management Board. -- A Provincial Solid Waste Management Board shall be established in every province, to be chaired by the governor. Its members shall include:

- (a) All the mayors of its component cities and municipalities;
- (b) One (1) representative from the Sangguniang Panlalawigan to be represented by the chairperson of either the Committees on Environment or Health or their equivalent committees, to be nominated by the presiding officer;
- (c) The provincial health and/or general services officers, whichever may be

- recommended by the governor;
- (d) The provincial environment and natural resources officer;
- (e) The provincial engineer;
- (f) Congressional representative/s from each congressional district within the province;
- (g) A representative from the NGO sector whose principal purpose is to promote recycling and the protection of air and water quality;
- (h) A representative from the recycling industry;
- (i) A representative from the manufacturing or packaging industry; and
- (j) A representative of each concerned government agency possessing relevant technical and marketing expertise as may be determined by the Board.

The Provincial Solid Waste Management Board may, from time to time, call on any other concerned agencies or sectors as it may deem necessary.

Provided, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be selected through a process designed by themselves and shall be endorsed by the government agency representatives of the Board: *Provided, further*, That in the Province of Palawan, the Board shall be chaired by the chairman of the Palawan Council for Sustainable Development, pursuant to Republic Act No. 7611.

In the case of Metro Manila, the Board shall be chaired by the chairperson of the MMDA and its members shall include:

- (i) all mayors of its component cities and municipalities;
- (ii) A representative from the NGO sector whose principal purpose is to promote recycling and the protection of air and water quality;
- (iii) A representative from the recycling industry; and
- (iv) A representative from the manufacturing or packaging industry.

The Board may, from time to time, call on any other concerned agencies or sectors as it may deem necessary.

Provided, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be selected through a process designed by themselves and shall be endorsed by the government agency representatives of the Board.

The Provincial Solid Waste Management Board shall have the following functions and responsibilities:

- (1) Develop a provincial solid waste management plan from the submitted solid waste management plans of the respective city and municipal solid waste management boards herein created. It shall review and integrate the submitted plans of all its component cities and municipalities and ensure that the various plans complement each other, and have the requisite components. The Provincial Solid Waste Management Plan shall be submitted to the Commission for approval.

The Provincial Plan shall reflect the general program of action and initiatives of the provincial government in implementing a solid waste management program that would support the various initiatives of its component cities and municipalities.

- (2) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Section 17 of the Local Government Code;
- (3) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem;
- (4) Recommend measures to generate resources, funding and implementation of projects and activities as specified in the duly approved solid waste management plans;
- (5) Identify areas within its jurisdiction which have common solid waste management problems and are appropriate units for planning local solid waste management services in accordance with Section 41 hereof;
- (6) Coordinate the efforts of the component cities and municipalities in the implementation of the Provincial Solid Waste Management Plan;
- (7) Develop an appropriate incentive scheme as an integral component of the Provincial Solid Waste Management Plan;
- (8) Convene joint meetings of the provincial, city and municipal solid waste management boards at least every quarter for purposes of integrating, synchronizing, monitoring and evaluating the development and implementation of its provincial solid waste management plan;
- (9) Represent any of its component city or municipality in coordinating its resource and operational requirements with agencies of the national government;
- (10) Oversee the implementation of the Provincial Solid Waste Management Plan;
- (11) Review every two (2) years or as the need arises the Provincial Solid Waste Management Plan for purposes of ensuring its sustainability, viability, effectiveness and relevance in relation to local and international developments in the field of solid waste management; and
- (12) Allow for the clustering of LGUs for the solution of common solid waste management problems.

Section 12. City and Municipal Solid Waste Management Board. -- Each city or municipality shall form a City or Municipal Waste Management Board that shall prepare, submit and implement a plan for the safe and sanitary management of solid waste generated in areas under its geographic and political coverage.

The City or Municipal Solid Waste Management Board shall be composed of the city or municipal mayor as head with the following as members:

- (a) One (1) representative of the Sangguniang Panlungsod or the Sangguniang Bayan, preferably chairpersons of either the Committees on Environment or Health, who will be designated by the presiding officer;
- (b) President of the Association of Barangay Councils in the municipality or city;
- (c) Chairperson of the Sangguniang Kabataan Federation;
- (d) A representative from NGOs whose principal purpose is to promote recycling and the protection of air and water quality;

- (e) A representative from the recycling industry;
- (f) A representative from the manufacturing or packaging industry; and
- (g) A representative of each concerned government agency possessing relevant technical and marketing expertise as may be determined by the Board.

The City or Municipal Solid Waste Management Board may, from time to time, call on any concerned agencies or sectors as it may deem necessary.

Provided, That representatives from the NGOs, recycling and manufacturing or packaging industries shall be selected through a process designed by themselves and shall be endorsed by the government agency representatives of the Board.

The City and Municipal Solid Waste Boards shall have the following duties and responsibilities:

- (1) Develop the City or Municipal Solid Waste Management Plan that shall ensure the long-term management of solid waste, as well as integrate the various solid waste management plans and strategies of the barangays in its area of jurisdiction. In the development of the Solid Waste Management Plan, it shall conduct consultations with the various sectors of the community;
- (2) Adopt measures to promote and ensure the viability and effective implementation of solid waste management programs in its component barangays;
- (3) Monitor the implementation of the City or Municipal Solid Waste Management Plan through its various political subdivisions and in cooperation with the private sector and the NGOs;
- (4) Adopt specific revenue-generating measures to promote the viability of its Solid Waste Management Plan;
- (5) Convene regular meetings for purposes of planning and coordinating the implementation of the solid waste management plans of the respective component barangays;
- (6) Oversee the implementation of the City or Municipal Solid Waste Management Plan;
- (7) Review every two (2) years or as the need arises the City or Municipal Solid Waste Management Plan for purposes of ensuring its sustainability, viability, effectiveness and relevance in relation to local and international developments in the field of solid waste management;
- (8) Develop the specific mechanics and guidelines for the implementation of the City or Municipal Solid Waste Management Plan;
- (9) Recommend to appropriate local government authorities specific measures or proposals for franchise or build-operate-transfer agreements with duly recognized institutions, pursuant to R.A. 6957, to provide either exclusive or non-exclusive authority for the collection, transfer, storage, processing, recycling or disposal of municipal solid waste. The proposals shall take into consideration appropriate government rules and regulations on contracts, franchises and build-operate-transfer agreements;
- (10) Provide the necessary logistical and operational support to its component cities and municipalities in consonance with subsection (f) of Section 17 of the Local

- Government Code;
- (11) Recommend measures and safeguards against pollution and for the preservation of the natural ecosystem; and
 - (12) Coordinate the efforts of its component barangays in the implementation of the city or municipal Solid Waste Management Plan.

Section 13. Establishment of Multi-Purpose Environment Cooperatives or Associations in Every LGU. -- Multi-purpose cooperatives and associations that shall undertake activities to promote the implementation and/or directly undertake projects in compliance with the provisions of this Act shall be encouraged and promoted in every LGU.

CHAPTER III

COMPREHENSIVE SOLID WASTE MANAGEMENT

Article 1 General Provisions

Section 14. National Solid Waste Management Status Report. -- The Department, in coordination with the DOH and other concerned agencies, shall within six (6) months after the effectivity of this Act, prepare a National Solid Waste Management Status Report which shall be used as a basis in formulating the National Solid Waste Management Framework provided in Section 15 of this Act. The concerned agencies shall submit to the Department relevant data necessary for the completion of the said report within three (3) months following the effectivity of this Act. The said report shall include, but shall not be limited to, the following:

- (a) Inventory of existing solid waste facilities;
- (b) General waste characterization, taking into account the type, quantity of waste generated and estimation of volume and type of waste for reduction and recycling;
- (c) Projection of waste generation;
- (d) The varying regional geologic, hydrologic, climatic, and other factors vital in the implementation of solid waste practices to ensure the reasonable protection of:
 - (1) the quality of surface and groundwater from leachate contamination;
 - (2) the quality of surface waters from surface run-off contamination; and
 - (3) ambient air quality.
- (e) Population density, distribution and projected growth;
- (f) The political, economic, organizational, financial and management problems affecting comprehensive solid waste management;
- (g) Systems and techniques of waste reduction, re-use and recycling;
- (h) Available markets for recyclable materials;
- (i) Estimated cost of collecting, storing, transporting, marketing and disposal of wastes and recyclable materials; and
- (j) Pertinent qualitative and quantitative information concerning the extent of solid waste management problems and solid waste management activities undertaken by local government units and waste operators.

Provided, That the Department, in consultation with concerned agencies, shall review, update and publish a National Solid Waste Management Status Report every two (2) years or as the need arises.

Section 15. National Solid Waste Management Framework. -- Within six (6) months from the completion of the National Solid Waste Management Status Report under Section 14 of this Act, the Commission created under Section 4 of this Act shall, with public participation, formulate and implement a National Solid Waste Management Framework. Such framework shall consider and include:

- (a) Analysis and evaluation of the current state, trends projections of solid waste management on the national, provincial and municipal levels;
- (b) Identification of critical solid waste facilities and local government units which will need closer monitoring and/or regulation;
- (c) Characteristics and conditions of collection, storage, processing, disposal, operating methods, techniques and practices, location of facilities where such operating methods, techniques and practices are conducted, taking into account the nature of the waste;
- (d) Waste diversion goal pursuant to Section 20 of this Act;
- (e) Schedule for the closure and/or upgrading of open and controlled dumps pursuant to Section 37 of this Act;
- (f) Methods of closing or upgrading open dumps for purposes of eliminating potential health hazards;
- (g) The profile of sources, including industrial, commercial, domestic and other sources;
- (h) Practical applications of environmentally sound techniques of waste minimization such as, but not limited to, resource conservation, segregation at source, recycling, resource recovery, including waste-to-energy generation, re-use and composting;
- (i) A technical and economic description of the level of performance that can be attained by various available solid waste management practices which provide for the protection of public health and the environment;
- (j) Appropriate solid waste facilities and conservation systems;
- (k) Recycling programs for the recyclable materials, such as but not limited to glass, paper, plastic and metal;
- (l) Venues for public participation from all sectors at all phases/stages of the waste management program/project;
- (m) Information and education campaign strategies;
- (n) A description of levels of performance and appropriate methods and degrees of control that provide, at the minimum, for protection of public health and welfare through:
 - (1) Protection of the quality of groundwater and surface waters from leachate and run-off contamination;
 - (2) Disease and epidemic prevention and control;
 - (3) Prevention and control of offensive odor; and
 - (4) Safety and aesthetics.
- (o) Minimum criteria to be used by the local government units to define ecological solid waste management practices. As much as practicable, such

guidelines shall also include minimum information for use in deciding the adequate location, design, and construction of facilities associated with solid waste management practices, including the consideration of regional, geographic, demographic, and climatic factors; and

- (p) The method and procedure for the phaseout and the eventual closure within eighteen (18) months from effectivity of this Act in case of existing open dumps and/or sanitary landfills located within an aquifer, groundwater reservoir or watershed area.

Section 16. Local Government Solid Waste Management Plans. -- The province, city or municipality, through its local solid waste management boards, shall prepare its respective 10-year solid waste management plans consistent with the National Solid Waste Management Framework: *Provided*, That the waste management plan shall be for the re-use, recycling and composting of wastes generated in their respective jurisdictions: *Provided, further*, That the solid waste management plan of the LGU shall ensure the efficient management of solid waste generated within its jurisdiction. The plan shall place primary emphasis on implementation of all feasible re- use, recycling, and composting programs while identifying the amount of landfill and transformation capacity that will be needed for solid waste which cannot be re-used, recycled, or composted. The plan shall contain all the components provided in Section 17 of this Act and a timetable for the implementation of the solid waste management program in accordance with the National Framework and pursuant to the provisions of this Act: *Provided, finally*, That it shall be reviewed and updated every year by the provincial, city or municipal solid waste management board.

For LGUs which have considered solid waste management alternatives to comply with Section 37 of this Act, but are unable to utilize such alternatives, a timetable or schedule of compliance specifying the remedial measures and eventual compliance shall be included in the plan.

All local government solid waste management plans shall be subjected to the approval of the Commission. The plan shall be consistent with the national framework and in accordance with the provisions of this Act and of the policies set by the Commission:

Provided, That in the Province of Palawan, the local government solid waste management plan shall be approved by the Palawan Council for Sustainable Development, pursuant to R.A. No. 7611.

Section 17. The Components of the Local Government Solid Waste Management Plan. The solid waste management plan shall include, but not limited to, the following components:

- (a) City or Municipal Profile – The plan shall indicate the following background information on the city or municipality and following background information on the city or municipality and its component barangays, covering important highlights of the distinct geographic and other conditions:

- (1) Estimated population of each barangay within the city or municipality and population projection for a 10-year period;
 - (2) Illustration or map of the city/municipality, indicating locations of residential, commercial, and industrial centers, and agricultural area, as well as dump sites, landfills and other solid waste facilities. The illustration shall indicate as well, the proposed sites for disposal and other solid waste facilities;
 - (3) Estimated solid waste generation and projection by source, such as residential, market, commercial, industrial, construction/demolition, street waste, agricultural, agro-industrial, institutional, other wastes; and
 - (4) Inventory of existing waste disposal and other solid waste facilities and capacities.
- (b) Waste characterization – For the initial source reduction and recycling element of a local waste management plan, the LGU waste characterization component shall identify the constituent materials which comprise the solid waste generated within the jurisdiction of the LGU. The information shall be representative of the solid waste generated and disposed of within that area. The constituent materials shall be identified by volume, percentage in weight or its volumetric equivalent, material type, and source of generation which includes residential, commercial, industrial governmental, or other sources. Future revisions of waste characterization studies shall identify the constituent materials which comprise the solid waste disposed of at permitted disposal facilities.
- (c) Collection and Transfer – The plan shall take into account the geographic subdivisions to define the coverage of the solid waste collection area in every barangay. The barangay shall be responsible for ensuring that a 100% collection efficiency from residential, commercial, industrial and agricultural sources, where necessary within its area of coverage, is achieved. Toward this end, the plan shall define and identify the specific strategies and activities to be undertaken by its component barangays, taking into account the following concerns:
- (1) Availability and provision of properly designed containers or receptacles in selected collection points for the temporary storage of solid waste while awaiting collection and transfer to processing sites or to final disposal sites;
 - (2) Segregation of different types of solid waste for re-use, recycling and composting;
 - (3) Hauling and transfer of solid waste from source or collection points to processing sites or final disposal sites;
 - (4) Issuance and enforcement of ordinances to effectively implement a collection system in the barangay; and
 - (5) Provision of properly trained officers and workers to handle solid waste disposal.

The plan shall define and specify the methods and systems for the transfer of solid waste from specific collection points to solid waste management facilities.

- (d) Processing – The plan shall define the methods and the facilities required to process the solid waste, including the use of intermediate treatment facilities for composting, recycling, conversion and other waste processing systems. Other appropriate waste processing technologies may also be considered provided that such technologies conform with internationally acceptable and other standards set in other laws and regulations.
- (e) Source reduction – The source reduction component shall include a program and implementation schedule which shows the methods by which the LGU will, in combination with the recycling and composting components, reduce a sufficient amount of solid waste disposed of in accordance with the diversion requirements of Section 20.

The source reduction component shall describe the following:

- (1) strategies in reducing the volume of solid waste generated at source;
- (2) measures for implementing such strategies and the resources necessary to carry out such activities;
- (3) other appropriate waste reduction technologies that may also be considered, provided that such technologies conform with the standards set pursuant to this Act;
- (4) the types of wastes to be reduced pursuant to Section 15 of this Act;
- (5) the methods that the LGU will use to determine the categories of solid wastes to be diverted from disposal at a disposal facility through re-use, recycling and composting; and
- (6) new facilities and of expansion of existing facilities which will be needed to implement re-use, recycling and composting.

The LGU source reduction component shall include the evaluation and identification of rate structures and fees for the purpose of reducing the amount of waste generated, and other source reduction strategies, including but not limited to, programs and economic incentives provided under Section 45 of this Act to reduce and use of non-recyclable materials, replace disposable materials and products with reusable materials and products, reduce packaging, and increase the efficiency of the use of paper, cardboard, glass, metal, and other materials. The waste reduction activities of the community shall also take into account, among others, local capability, economic viability, technical requirements, social concerns, disposition of residual waste and environmental impact: *Provided, That*, projection of future facilities needed and estimated cost shall be incorporated in the plan.

- (f) Recycling – The recycling component shall include a program and implementation schedule which shows the methods by which the LGU shall, in combination with the source reduction and composting components, reduce a sufficient amount of solid waste disposed of in accordance with the

diversion requirements set in Section 20.

The LGU recycling component shall describe the following:

- (1) The types of materials to be recycled under the programs;
- (2) The methods for determining the categories of solid wastes to be diverted from disposal at a disposal facility through recycling; and
- (3) New facilities and expansion of existing facilities needed to implement the recycling component.

The LGU recycling component shall describe methods for developing the markets for recycled materials, including, but not limited to, an evaluation of the feasibility of procurement preferences for the purchase of recycled products. Each LGU may determine and grant a price preference to encourage the purchase of recycled products.

The five-year strategy for collecting, processing, marketing and selling the designated recyclable materials shall take into account persons engaged in the business of recycling or persons otherwise providing recycling services before the effectivity of this Act. Such strategy may be based upon the results of the waste composition analysis performed pursuant to this Section or information obtained in the course of past collection of solid waste by the local government unit, and may include recommendations with respect to increasing the number of materials designated for recycling pursuant to this Act.

The LGU recycling component shall evaluate industrial, commercial, residential, agricultural, governmental, and other curbside, mobile, drop-off, and buy-back recycling programs, manual and automated materials recovery facilities, zoning, building code changes and rate structures which encourage recycling of materials. The Solid Waste Management Plan shall indicate the specific measures to be undertaken to meet the waste diversion specified under Section 20 of this Act.

Recommended revisions to the building ordinances, requiring newly-constructed buildings and buildings undergoing specified alterations to contain storage space, devices or mechanisms that facilitate source separation and storage of designated recyclable materials to enable the local government unit to efficiently collect, process, market and sell the designated materials. Such recommendations shall include, but shall not be limited to separate chutes to facilitate source separation in multi-family dwellings, storage areas that conform to fire and safety code regulations, and specialized storage containers.

The Solid Waste Management Plan shall indicate the specific measures to be undertaken to meet the recycling goals pursuant to the objectives of this Act.

- (g) Composting -- The composting component shall include a program and implementation schedule which shows the methods by which the LGU shall, in combination with the source reduction and recycling components, reduce a sufficient amount of solid waste disposed of within its jurisdiction to comply with the diversion requirements of Section 20 hereof.

The LGU composting components shall describe the following:

- (1) The types of materials which will be composted under the programs;
- (2) The methods for determining the categories of solid wastes to be diverted from disposal at a disposal facility through composting; and
- (3) New facilities, and expansion of existing facilities needed to implement the composting component.

The LGU composting component shall describe methods for developing the markets for composted materials, including, but not limited to, an evaluation of the feasibility of procurement preferences for purchase of composted products. Each LGU may determine and grant a price preference to encourage the purchase of composted products.

- (h) Solid waste facility capacity and final disposal -- The solid waste facility component shall include, but shall not be limited to, a projection of the amount of disposal capacity needed to accommodate the solid waste generated, reduced by the following:

- (1) Implementation of source reduction, recycling, and composting programs required in this Section or through implementation of other waste diversion activities pursuant to Section 20 of this Act;
- (2) Any permitted disposal facility which will be available during the 10-year planning period; and
- (3) All disposal capacity which has been secured through an agreement with another LGU, or through an agreement with a solid waste enterprise.

The plan shall identify existing and proposed disposal sites and waste management facilities in the city or municipality or in other areas. The plan shall specify the strategies for the efficient disposal of waste through existing disposal facilities and the identification of prospective sites for future use. The selection and development of disposal sites shall be made on the basis of internationally accepted standards and on the guidelines set in Sections 41 and 42 of this Act.

Strategies shall be included to improve said existing sites to reduce adverse impact on health and the environment, and to extend life span and capacity.

The plan shall clearly define projections for future disposal site requirements and the estimated cost for these efforts.

Open dump sites shall not be allowed as final disposal sites. If an open dump site is existing within the city or municipality, the plan shall make provisions for its closure or eventual phase out within the period specified under the framework and pursuant to the provisions under Section 37 of this Act. As an alternative, sanitary landfill sites shall be developed and operated as a final disposal site for solid and, eventually, residual wastes of a municipality or city or a cluster of municipalities and/or cities. Sanitary landfills shall be designed and operated in accordance with the guidelines set under Sections 40 and 41 of this Act.

Education and public information -- The education and public information component shall describe how the LGU will educate and inform its citizens about the source reduction, recycling, and composting programs.

The plan shall make provisions to ensure that information on waste collection services, solid waste management and related health and environmental concerns are widely disseminated among the public. This shall be undertaken through the print and broadcast media and other government agencies in the municipality. The DECS and the Commission on Higher Education shall ensure that waste management shall be incorporated in the curriculum of primary, secondary and college students.

Special waste -- The special waste component shall include existing waste handling and disposal practices for special waste or household hazardous wastes, and the identification of current and proposed programs to ensure the proper handling, re-use, and long-term disposal of special wastes.

Resource requirement and funding -- The funding component includes identification and description of project costs, revenues, and revenue sources the LGU will use to implement all components of the LGU solid waste management plan.

The plan shall likewise indicate specific projects, activities, equipment and technological requirements for which outside sourcing of funds or materials may be necessary to carry out the specific components of the plan. It shall define the specific uses for its resource requirements and indicate its costs. The plan shall likewise indicate how the province, city or municipality intends to generate the funds for the acquisition of its resource requirements. It shall also indicate if certain resource requirements are being or will be sourced from fees, grants, donations, local funding and other means. This will serve as basis for the determination and assessment of incentives which may be extended to the province, city or municipality as provided for in Section 45 of this Act.

- (i) Privatization of solid waste management projects -- The plan shall likewise

indicate specific measures to promote the participation of the private sector in the management of solid wastes, particularly in the generation and development of the essential technologies for solid waste management. Specific projects or component activities of the plan which may be offered as private sector investment activity shall be identified and promoted as such. Appropriate incentives for private sector involvement in solid waste management shall likewise be established and provided for in the plan, in consonance with Section 45 hereof and other existing laws, policies and regulations; and

- (j) Incentive programs -- A program providing for incentives, cash or other wise, which shall encourage the participation of concerned sectors shall likewise be included in the plan.

Section 18. Owner and Operator. -- Responsibility for compliance with the standards in this Act shall rest with the owner and/or operator. If specifically designated,

the operator is considered to have primary responsibility for compliance; however, this does not relieve the owner of the duty to take all reasonable steps to assure compliance with these standards and any assigned conditions. When the title to a disposal is transferred to another person, the new owner shall be notified by the previous owner of the existence of these standards and of the conditions assigned to assure compliance.

Section 19. Waste Characterization. -- The Department, in coordination with the LGUs, shall be responsible for the establishment of the guidelines for the accurate characterization of wastes including determination of whether or not wastes will be compatible with containment features and other wastes, and whether or not wastes are required to be managed as hazardous wastes under R.A. 6969, otherwise known as the Toxic Substances and Hazardous and Nuclear Waste Control Act.

Section 20. Establishing Mandatory Solid Waste Diversion. -- Each LGU plan shall include an implementation schedule which shows that within five (5) years after the effectivity of this Act; the LGU shall divert at least 25% of all solid waste from waste disposal facilities through re-use, recycling, and composting activities and other resource recovery activities: *Provided*, That the waste diversion goals shall be increased every three (3) years thereafter: *Provided, further*, That nothing in this Section prohibits a local government unit from implementing re-use, recycling, and composting activities designed to exceed the goal.

Article 2 Segregation of Wastes

Section 21. Mandatory Segregation of Solid Wastes. -- The LGUs shall evaluate alternative roles for the public and private sectors in providing collection services, type of collection system, or combination of systems, that best meet their needs: *Provided*, That segregation of wastes shall primarily be conducted at the source, to include household, institutional, industrial, commercial and agricultural sources: *Provided, further*, That wastes shall be segregated into the categories provided in Section 22 of this Act.

For premises containing six (6) or more residential units, the local government unit shall promulgate regulations requiring the owner or person in charge of such premises to:

- (a) provide for the residents a designated area and containers in which to accumulate source separated recyclable materials to be collected by the municipality or private center; and
- (b) notify the occupants of such buildings of the requirements of this Act and the regulations promulgated pursuant thereto.

Section 22. Requirements for the Segregation and Storage of Solid Waste. - The following shall be the minimum standards and requirements for segregation and storage of solid waste pending collection:

- (a) There shall be a separate container for each type of waste from all sources: *Provided*, That in the case of bulky waste, it will suffice that the same be collected and placed in a separate and designated area; and
- (b) The solid waste container depending on its use shall be properly marked or identified for on-site collection as "compostable", "non-recyclable", "recyclable" or "special waste", or any other classification as may be determined by the Commission.

Article 3 Collection and Transport of Solid Waste

Section 23. Requirements for Collection of Solid Waste. -- The following shall be the minimum standards and requirements for the collection of solid waste:

- (a) All collectors and other personnel directly dealing with collection of solid waste shall be equipped with personal protective equipment to protect them from the hazards of handling solid wastes;
- (b) Necessary training shall be given to the collectors and personnel to ensure that the solid wastes are handled properly and in accordance with the guidelines pursuant to this Act; and
- (c) Collection of solid waste shall be done in a manner which prevents damage to the container, and spillage or scattering of solid waste within the collection vicinity.

Section 24. Requirements for the Transport of Solid Waste. -- The use of separate collection schedules and/or separate trucks or haulers shall be required for specific types of wastes. Otherwise, vehicles used for the collection and transport of solid wastes shall have the appropriate compartments to facilitate efficient storing of sorted wastes while in transit.

Vehicles shall be designed to consider road size, condition and capacity to ensure the safe and efficient collection and transport of solid wastes.

The waste compartment shall have a cover to ensure the containment of solid wastes while in transit.

For the purpose of identification, vehicles shall bear the body number, the name, and telephone number of the contractor/agency collecting solid waste.

Section 25. Guidelines for Transfer Stations. - Transfer stations shall be designed and operated for efficient waste handling capacity and in compliance with environmental standards and guidelines set pursuant to this Act and other regulations: Provided, that no waste shall be stored in such station beyond twenty-four (24) hours.

The siting of the transfer station shall consider the land use plan, proximity to collection area, and accessibility of haul routes to disposal facility. The design shall give primary consideration to size and space sufficiency in order to accommodate the waste for storage and vehicles for loading and unloading of wastes.

Article 4 Recycling Program

Section 26. Inventory of Existing Markets for Recyclable Materials. - The DTI shall, within six (6) months from the effectivity of this Act and in cooperation with the Department, the DILG and other concerned agencies and sectors, publish a study of existing markets for processing and purchasing recyclable materials and the potential steps necessary to expand these markets. Such study shall include, but not be limited to, an inventory of existing markets for recyclable materials, product standards for recyclable and recycled materials, and a proposal, developed in conjunction with the appropriate agencies, to stimulate the demand for the production of products containing post-consumer and recovered materials.

Section 27. Requirement for Eco-Labeling. - The DTI shall formulate and implement a coding system for packaging materials and products to facilitate waste recycling and re-use.

Section 28. Reclamation Programs and Buy-back Centers for Recyclables and Toxics. - The National Ecology Center shall assist LGUs in establishing and implementing deposit or reclamation programs in coordination with manufacturers, recyclers and generators to provide separate collection systems or convenient drop-off locations for recyclable materials and particularly for separated toxic components of the waste stream like dry cell batteries and tires to ensure that they are not incinerated or disposed of in landfill. Upon effectivity of this Act, toxic materials present in the waste stream should be separated at source, collected separately, and further screened and sent to appropriate hazardous waste treatment and disposal plants, consistent with the provisions of R.A. No. 6969.

Section 29. Non-Environmentally Acceptable Products. -- Within one (1) year from the effectivity of this Act, the Commission shall, after public notice and hearing, prepare a list of non-environmentally acceptable products as defined in this Act that shall be prohibited according to a schedule that shall be prepared by the Commission: Provided, however, That non-environmentally acceptable products shall not be prohibited unless the Commission first finds that there are alternatives available which are available to consumers at no more than ten percent (10%) greater cost than the disposable product.

Notwithstanding any other provision to the contrary, this section shall not apply to:

- (a) Packaging used at hospitals, nursing homes or other medical facilities; and
- (b) Any packaging which is not environmentally acceptable, but for which there is no commercially available alternative as determined by the Commission.

The Commission shall annually review and update the list of prohibited non-environmentally acceptable products.

Section 30. Prohibition on the Use of Non-Environmentally Acceptable Packaging. -

No person owning, operating or conducting a commercial establishment in the country shall sell or convey at retail or possess with the intent to sell or convey at retail any products that are placed, wrapped or packaged in on packaging which is not environmentally acceptable packaging: *Provided*, That the Commission shall determine a phaseout period after proper consultation and hearing with the stakeholders or with the sectors concerned. The presence in the commercial establishment of non-environmentally acceptable packing shall constitute a rebuttable presumption of intent to sell or convey the same at retail to customers.

Any person who is a manufacturer, broker or warehouse operator engaging in the distribution or transportation of commercial products within the country shall file a report with the concerned local government unit within one (1) year from the effectivity of this Act, and annually thereafter, a listing of any products in packaging which is not environmentally acceptable. The Commission shall prescribe the form of such report in its regulations.

A violation of this Section shall be sufficient grounds for the revocation, suspension, denial or non-renewal of any license for the establishment in which the violation occurs.

Section 31. Recycling Market Development. - The Commission together with the National Ecology Center, the DTI and the Department of Finance shall establish procedures, standards and strategies to market recyclable materials and develop the local market for recycled goods, including but not limited to:

- (a) measures providing economic incentives and assistance including loans and grants for the establishment of privately-owned facilities to manufacture finished products from post-consumer materials;
- (b) guarantees by the national and local governments to purchase a percentage of the output of the facility; and
- (c) maintaining a list of prospective buyers, establishing contact with prospective buyers and reviewing and making any necessary changes in collecting or processing the materials to improve their marketability.

In order to encourage establishment of new facilities to produce goods from post-consumer and recovered materials generated within local government units, and to conserve energy by reducing materials transportation, whenever appropriate, each local government unit may arrange for long-term contracts to purchase a substantial share of the product output of a proposed facility which will be based in the jurisdiction of the local government unit if such facility will manufacture such finished products from post-consumer and recovered materials.

Section 32. Establishment of LGU Materials Recovery Facility. - There shall be established a Materials Recovery Facility (MRF) in every barangay or cluster of barangays. The facility shall be established in a barangay-owned or leased land or any suitable open space to be determined by the barangay through its Sanggunian. For this purpose, the barangay or cluster of barangays shall allocate a certain parcel of land for the MRF. The determination of site and actual establishment of the facility shall likewise be subject to the guidelines and criteria set pursuant to this Act. The MRF shall receive mixed waste for final sorting, segregation, composting, and recycling. The resulting residual wastes shall be transferred to a long-term storage or disposal facility or sanitary landfill.

Section 33. Guidelines for Establishment of Materials Recovery Facility. - Materials recovery facilities shall be designed to receive, sort, process, and store compostable and recyclable material efficiently and in an environmentally sound manner. The facility shall address the following considerations:

- (a) The building and/or land layout and equipment must be designed to accommodate efficient and safe materials processing, movement, and storage; and
- (b) The building must be designed to allow efficient and safe external access and to accommodate internal flow.

Article 5 Composting

Section 34. Inventory of Markets for Composts. - Within six (6) months after the effectivity of this Act, the DA shall publish an inventory of existing markets and demands for composts. Said inventory shall thereafter be updated and published annually: *Provided*, that the composting of agricultural wastes, and other compostable materials, including but not limited to garden wastes, shall be encouraged.

Section 35. Guidelines for Compost Quality. - Compost products intended to be distributed commercially shall conform with the standards for organic fertilizers set by the DA. The DA shall assist the compost producers to ensure that the compost products conform to such standards.

Article 6 Waste Management Facilities

Section 36. Inventory of Waste Disposal Facilities. -- Within six (6) months from the effectivity of this Act, the Department, in cooperation with the DOH, DILG and other concerned agencies, shall publish an inventory of all solid waste disposal facilities or sites in the country.

Section 37. Prohibition Against the Use of Open Dumps for Solid Waste. -- No open dumps shall be established and operated, nor any practice or disposal of solid waste by any person, including LGUs, which constitutes the use of open dumps for solid waste, be allowed after the effectivity of this Act: *Provided*, That within three (3) years after the effectivity of this Act, every LGU shall convert its open dumps into controlled dumps, in accordance with the guidelines set in Section 41 of this Act: *Provided, further*, That no controlled dumps shall be allowed five (5) years following effectivity of this Act.

Section 38. Permit for Solid Waste Management Facility Construction and Expansion. --

No person shall commence operation, including site preparation and construction of a new solid waste management facility or the expansion of an existing facility until said person obtains an Environmental Compliance Certificate (ECC) from the Department pursuant to P.D. 1586 and other permits and clearances from concerned agencies.

Section 39. Guidelines for Controlled Dumps. -- The following shall be the minimum considerations for the establishment of controlled dumps:

- (a) Regular inert cover;
- (b) Surface water and peripheral site drainage control;
- (c) Provision for aerobic and anaerobic decomposition;
- (d) Restriction of waste deposition to small working areas;
- (e) Fence, including provision for litter control;
- (f) Basic record-keeping;
- (g) Provision of maintained access road;
- (h) Controlled waste picking and trading;
- (i) Post-closure site cover and vegetation; and
- (j) Hydrogeological siting.

Section 40. Criteria for Siting a Sanitary Landfill. -- The following shall be the minimum criteria for the siting of sanitary landfills:

- (a) The site selected must be consistent with the overall land use plan of the LGU;
- (b) The site must be accessible from major roadways or thoroughfares;
- (c) The site should have an adequate quantity of earth cover material that is easily handled and compacted;
- (d) The site must be chosen with regard for the sensitivities of the community's residents;
- (e) The site must be located in an area where the landfill's operation will not detrimentally affect environmentally sensitive resources such as aquifer, groundwater reservoir or watershed area;
- (f) The site should be large enough to accommodate the community's wastes for a period of five (5) years during which people must internalize the value of environmentally sound and sustainable solid waste disposal;
- (g) The site chosen should facilitate developing a landfill that will satisfy budgetary constraints, including site development, operation for many years, closure, post-closure care and possible remediation costs;
- (h) Operating plans must include provisions for coordinating with recycling and resource recovery projects; and
- (i) Designation of a separate containment area for household hazardous wastes.

Section 41. Criteria for Establishment of Sanitary Landfill. -- The following shall be the minimum criteria for the establishment of sanitary landfills:

- (a) Liners -- a system of clay layers and/or geosynthetic membranes used to contain leachate and reduce or prevent contaminant flow to groundwater;
- (b) Leachate collection and treatment system -- Installation of pipes at the low

- areas of the liner to collect leachate for storage and eventual treatment and discharge;
- (c) Gas control recovery system – a series of vertical wells or horizontal trenches containing permeable materials and perforated piping placed in the landfill to collect gas for treatment or productive use as an energy source;
- (d) Ground water monitoring well system – wells placed at an appropriate location and depth for taking water samples that are representative of groundwater quality;
- (e) Cover – two (2) forms of cover consisting of soil and geosynthetic materials to protect the waste from long-term contact with the environment:
 - (i) a daily cover place over the waste at the close of each day's operations, and;
 - (ii) a final cover, or cap, which is the material placed over the completed landfill to control infiltration of water, gas emission to the atmosphere, and erosion.
- (f) Closure procedure – with the objectives of establishing low maintenance cover systems and final cover that minimizes the infiltration of precipitation into the waste. Installation of the final cover must be completed within six (6) months of the last receipt of wastes; and
- (g) Post-closure care procedure – During this period, the landfill owner shall be responsible for providing for the general upkeep of the landfill, maintaining all of the landfill's environmental protection features, operating monitoring equipment, remediating groundwater should it become contaminated and controlling landfill gas migration or emission.

Section 42. Operating Criteria for Sanitary Landfills. – In the operation of a sanitary landfill, each site operator shall maintain the following minimum operating requirements:

- (a) Disposal site records of, but not limited to:
 - (1) Records of weights or volumes accepted in a form and manner approved by the Department. Such records shall be submitted to the Department upon request, accurate to within ten percent (10 %) and adequate for overall planning purposes and forecasting the rate of site filling;
 - (2) Records of excavations which may affect the safe and proper operation of the site or cause damage to adjoining properties;
 - (3) Daily log book or file of the following information: fires, landslides, earthquake damage, unusual and sudden settlement, injury and property damage, accidents, explosions, receipt or rejection of unpermitted wastes, flooding, and other unusual occurrences;
 - (4) Record of personnel training; and
 - (5) copy of written notification to the Department, local health agency, and fire authority of names, addresses and telephone numbers of the operator or responsible party of the site:
- (b) Water quality monitoring of surface and ground waters and effluent, and gas emissions;
- (c) Documentation of approvals, determinations and other requirements by the Department;
- (d) Signs –

- (1) Each point of access from a public road shall be posted with an easily visible sign indicating the facility name and other pertinent information as required by the Department;
 - (2) If the site is open to the public, there shall be an easily visible sign at the primary entrance of the site indicating the name of the site operator, the operator's telephone number, and hours of operation; an easily visible sign at an appropriate point shall indicate the schedule of charges and the general types of materials which will be accepted or not;
 - (3) If the site is open to the public, there shall be an easily visible road sign and/or traffic control measures which direct traffic to the active face and other areas where wastes or recyclable materials will be deposited; and
 - (4) Additional signs and/or measures may be required at a disposal site by the Department to protect personnel and public health and safety;
- (e) Monitoring of quality of surface, ground and effluent waters, and gas emissions;
 - (f) The site shall be designed to discourage unauthorized access by persons and vehicles by using a perimeter barrier or topographic constraints. Areas within the site where open storage or ponding of hazardous materials occurs shall be separately fenced or otherwise secured as determined by the Department. The Department may also require that other areas of the site be fenced to create an appropriate level of security;
 - (g) Roads within the permitted facility boundary shall be designed to minimize the generation of dust and the tracking of materials onto adjacent public roads. Such roads shall be kept in safe condition and maintained such that vehicle access and unloading can be conducted during inclement weather;
 - (h) Sanitary facilities consisting of adequate number of toilets and handwashing facilities, shall be available to personnel at or in the immediate vicinity of the site;
 - (i) Safe and adequate drinking water supply for the site personnel shall be available;
 - (j) The site shall have communication facilities available to site personnel to allow quick response to emergencies;
 - (k) Where operations are conducted during hours of darkness, the site and/or equipment shall be equipped with adequate lighting as approved by the Department to ensure safety and to monitor the effectiveness of operations;
 - (l) Operating and maintenance personnel shall wear and use appropriate safety equipment as required by the Department;
 - (m) Personnel assigned to operate the site shall be adequately trained in subject pertinent to the site operation and maintenance, hazardous materials recognition and screening and heavy equipment operations, with emphasis on safety, health, environmental controls and emergency procedures. A record of such training shall be placed in the operating record;
 - (n) The site operator shall provide adequate supervision of a sufficient number

of qualified personnel to ensure proper operation of the site in compliance with all applicable laws, regulations, permit conditions and other requirements. The operator shall notify the Department and local health agency in writing of the names, addresses, and telephone number of the operator or responsible party. A copy of the written notification shall be placed in the operating record;

- (o) Any disposal site open to the public shall have an attendant present during public operating hours or the site shall be inspected by the operator on a regularly scheduled basis, as determined by the Department;
- (p) Unloading of solid wastes shall be confined to a small area as possible to accommodate the number of vehicles using the area without resulting in traffic, personnel, or public safety hazards. Waste materials shall normally be deposited at the toe of the fill, or as otherwise approved by the Department;
- (q) Solid waste shall be spread and compacted in layers with repeated passages of the landfill equipment to minimize voids within the cell and maximize compaction. The loose layer shall not exceed a depth approximately two feet before compaction. Spreading and compacting shall be accomplished as rapidly as practicable, unless otherwise approved by the Department;
- (r) Covered surfaces of the disposal area shall be graded to promote lateral runoff of precipitation and to prevent ponding. Grades shall be established of sufficient slopes to account for future settlement of the fill surface. Other effective maintenance methods may be allowed by the Department; and
- (s) Cover material or native material unsuitable for cover, stockpiled on the site for use or removal, shall be placed so as not to cause problems or interfere with unloading, spreading, compacting, access, safety, drainage, or other operations.

Article 7 Local Government Solid Waste Management

Section 43. Guidelines for Identification of Common Solid Waste Management Problems. – For purposes of encouraging and facilitating the development of local government plans for solid waste management, the Commission shall, as soon as practicable but no later than six (6) months from the effectivity of this Act, publish guidelines for the identification of those areas which have common solid waste management problems and are appropriate units for clustered solid waste management services. The guidelines shall be based on the following:

- (a) the size and location of areas which should be included;
- (b) the volume of solid waste which would be generated;
- (c) the available means of coordinating local government planning between and among the LGUs and for the integration of such with the national plan; and
- (d) possible lifespan of the disposal facilities.

Section 44. Establishment of Common Waste Treatment and Disposal Facilities. – Pursuant to Sec. 33 of R.A. 7160, otherwise known as the Local Government Code, all provinces cities, municipalities and barangays, through appropriate ordinances, are hereby mandated to consolidate, or coordinate their efforts, services, and resources for purposes of jointly addressing common solid waste management problems and/or establishing common waste disposal facilities.

The Department, the Commission and local solid waste management boards shall provide technical and marketing assistance to the LGUs.

CHAPTER IV

Incentives

Section 45. Incentives. – (a) Rewards, monetary or otherwise, shall be provided to individuals, private organizations and entities, including non-government organizations, that have undertaken outstanding and innovative projects, technologies, processes and techniques or activities in re-use, recycling and reduction. Said reward shall be sourced from the Fund herein created.

(b) An incentive scheme is hereby provided for the purpose of encouraging LGUs, enterprises, or private entities, including NGOs, to develop or undertake an effective solid waste management, or actively participate in any program geared towards the promotion thereof as provided for in this Act.

(1) Fiscal Incentives – Consistent with the provisions of E.O. 226 otherwise known as the Omnibus Investments Code, the following tax incentives shall be granted:

(a) Tax and Duty Exemption on Imported Capital Equipment and Vehicles
– Within ten (10) years upon effectivity of this Act, LGUs, enterprises or private entities shall enjoy tax and duty-free importation of machinery, equipment, vehicles and spare parts used for collection of solid wastes; *Provided*, that the importation of such machinery, equipment, vehicle and spare parts shall comply with the following conditions:

- (i) They are not manufactured domestically in sufficient quantity, of comparable quality and at reasonable prices;
- (ii) They are reasonably needed and will be used actually, directly and exclusively for the above mentioned activities;
- (iii) The approval of the Board of Investment (BOI) of the DTI for the importation of such machinery, equipment, vehicle and spare parts:

Provided, further, That the sale, transfer or disposition of such machinery, equipment, vehicle and spare parts, without prior approval of the BOI, within five (5) years from the date of acquisition shall be prohibited, otherwise, the LGU concerned, enterprises or private entities and the vendee, transferee or assignee shall be solidarily liable to pay twice the amount of tax and duty exemption given it.

- (b) Tax Credit on Domestic Capital Equipment – Within ten (10) years from the effectivity of this Act, a tax credit equivalent to 50% of the value of the national internal revenue taxes and customs duties that would have been waived on the machinery, equipment, vehicle and spare parts, had these items been imported shall be given to enterprises, private entities, including NGOs, subject to the same conditions and prohibition cited in the preceding paragraph.
- (c) Tax and Duty Exemption of Donations, Legacies and Gift – All legacies, gifts and donations to LGUs, enterprises or private entities, including NGOs, for the support and maintenance of the program for effective solid wastes management shall be exempt from all internal revenue taxes and customs duties, and shall be deductible in full from the gross income of the donor for income tax purposes.
- (2) Non-Fiscal Incentives – LGUs, enterprises or private entities availing of tax incentives under this Act shall also be entitled to applicable non-fiscal incentives provided for under E.O. 226, otherwise known as the Omnibus Investments Code.
The Commission shall provide incentives to businesses and industries that are engaged in the recycling of wastes and which are registered with the Commission and have been issued ECCs in accordance with the guidelines established by the Commission. Such incentives shall include simplified procedures for the importation of equipment, spare parts, new materials, and supplies, and for the export of processed products.
- (3) Financial Assistance Program – Government financial institutions such as the Development Bank of the Philippines (DBP), Landbank of the Philippines (LBP), Government Service Insurance System (GSIS), and such other government institutions providing financial services shall, in accordance with and to the extent allowed by the enabling provisions of their respective charters or applicable laws, accord high priority to extend financial services to individuals, enterprises, or private entities engaged in solid waste management.
- (4) Extension of Grants to LGUs. – Provinces, cities and municipalities whose solid waste management plans have been duly approved by the Commission or who have been commended by the Commission for adopting innovative solid waste management programs may be entitled to receive grants for the purpose of developing their technical capacities toward actively participating in the program for effective and sustainable solid waste management.
- (5) Incentives to Host LGUs. – Local government units who host common waste management facilities shall be entitled to incentives.

CHAPTER V

Financing Solid Waste Management

Section 46. Solid Waste Management Fund. – There is hereby created, as a special account in the National Treasury, a Solid Waste Management Fund to be administered by the Commission. Such fund shall be sourced from the following:

- (a) Fines and penalties imposed, proceeds of permits and licenses issued by the Department under this Act, donations, endowments, grants and contributions from domestic and foreign sources; and
- (b) Amounts specifically appropriated for the Fund under the annual General Appropriations Act.

The Fund shall be used to finance the following:

- (1) products, facilities, technologies and processes to enhance proper solid waste management;
- (2) awards and incentives;
- (3) research programs;
- (4) information, education, communication and monitoring activities;
- (5) technical assistance; and
- (6) capability building activities.

LGUs are entitled to avail of the Fund on the basis of their approved solid waste management plan. Specific criteria for the availment of the Fund shall be prepared by the Commission.

The fines collected under Sec. 49 shall be allocated to the LGU where the fined prohibited acts are committed in order to finance the solid waste management of said LGU. Such allocation shall be based on a sharing scheme between the Fund and the LGU concerned.

In no case, however, shall the Fund be used for the creation of positions or payment of salaries and wages.

Section 47. Authority to Collect Solid Waste Management Fees. – The local government unit shall impose fees in amounts sufficient to pay the costs of preparing, adopting, and implementing a solid waste management plan prepared pursuant to this Act. The fees shall be based on the following minimum factors:

- (a) types of solid waste;
- (b) amount/volume of waste; and
- (c) distance of the transfer station to the waste management facility.

The fees shall be used to pay the actual costs incurred by the LGU in collecting the local fees. In determining the amounts of the fees, an LGU shall include only those costs directly related to the adoption and implementation of the plan and the setting and collection of the local fees.

CHAPTER VI

Penal Provisions

Section 48. Prohibited Acts. – The following acts are prohibited:

- (1) Littering, throwing, dumping of waste matters in public places, such as roads, sidewalks, canals, esteros or parks, and establishment, or causing or permitting the same;
- (2) Undertaking activities or operating, collecting or transporting equipment in violation of sanitation operation and other requirements or permits set forth in or established pursuant to this Act;
- (3) The open burning of solid waste;
- (4) Causing or permitting the collection of non-segregated or unsorted waste;
- (5) Squatting in open dumps and landfills;
- (6) Open dumping, burying of biodegradable or non-biodegradable materials in flood-prone areas;
- (7) Unauthorized removal of recyclable material intended for collection by authorized persons;
- (8) The mixing of source-separated recyclable material with other solid waste in any vehicle, box, container or receptacle used in solid waste collection or disposal;
- (9) Establishment or operation of open dumps as enjoined in this Act, or closure of said dumps in violation of Sec. 37;
- (10) The manufacture, distribution or use of non-environmentally acceptable packaging materials;
- (11) Importation of consumer products packaged in non-environmentally acceptable materials;
- (12) Importation of toxic wastes misrepresented as “recyclable” or “with recyclable content”;
- (13) Transport and dumping in bulk of collected domestic, industrial, commercial and institutional wastes in areas other than centers of facilities prescribed under this Act;
- (14) Site preparation, construction, expansion or operation of waste management facilities without an Environmental Compliance Certificate required pursuant to Presidential Decree No. 1586 and this Act and not conforming with the land use plan of the LGU;
- (15) The construction of any establishment within two hundred (200) meters from open dumps or controlled dumps or sanitary landfills; and
- (16) The construction or operation of landfills or any waste disposal facility on any aquifer, groundwater reservoir or watershed area and or any portions thereof;

Section 49. Fines and Penalties – (a) Any person who violates Sec. 48, paragraph (1) shall, upon conviction, be punished with a fine of not less than Three hundred pesos (P300.00) but not more than One thousand pesos (P1,000.00) or render community service for not less than one (1) day to not more than fifteen (15) days to an LGU where such prohibited acts are committed, or both;

Any person who violates Sec. 48, pars. (2) and (3), shall, upon conviction, be punished with a fine of not less than Three hundred pesos (P300.00) but not more than One thousand pesos (P1,000.00) or imprisonment of not less than one (1) day to not more than fifteen (15) days, or both;

Any person who violates Sec. 48 pars. (4), (5), (6), and (7) shall, upon conviction, be punished with a fine of not less than One thousand pesos (P1,000.00) but not more than Three thousand pesos (P3,000.00) or imprisonment of not less than fifteen (15) days but not more than six (6) months, or both;

- (b) Any person who violates Sec. 48 pars. (8), (9), (10) and (11) for the first time shall, upon conviction, pay a fine of Five hundred thousand pesos (P500,000.00) plus an amount not less than five percent (5%) but not more than ten percent (10%) of his net annual income during the previous year.
- (c) The additional penalty of imprisonment of a minimum period of one (1) year, but not to exceed three (3) years at the discretion of the court, shall be imposed for second or subsequent violations of Sec. 48, paragraphs (9) and (10).
- (d) Any person who violates Sec. 48, pars. (12) and (13), shall, upon conviction, be punished with a fine of not less than Ten thousand pesos (P10,000.00) but not more than Two hundred thousand pesos (P200,000.00) or imprisonment of not less than thirty (30) days but not more than three (3) years, or both;
- (e) Any person who violates Sec. 48, pars. (14), (15) and (16) shall, upon conviction, be punished with a fine not less than One hundred thousand pesos (P100,000.00) but not more than One million pesos (P1,000,000.00), or imprisonment not less than one (1) year but not more than six (6) years, or both.

If the offense is committed by a corporation, partnership, or other juridical entity duly organized in accordance with law, the chief executive officer, president, general manager, managing partner or such other officer-in-charge shall be liable for the commission of the offense penalized under this Act.

If the offender is an alien, he shall, after service of the sentence prescribed above, be deported without further administrative proceedings.

The fines herein prescribed shall be increased by at least ten percent (10%) every three (3) years to compensate for inflation and to maintain the deterrent function of such fines.

Section 50. Administrative Sanctions. – Local government officials and officials of government agencies concerned who fail to comply with and enforce rules and regulations promulgated relative to this Act shall be charged administratively in accordance with R.A. 7160 and other existing laws, rules and regulations.

CHAPTER VII

Miscellaneous Provisions

Section 51. Mandatory Public Hearings. – Mandatory public hearings for the national framework and local government solid waste management plans shall be undertaken by

the Commission and the respective Boards in accordance with the process to be formulated in the implementing rules and regulations.

Section 52. Citizen Suits. – For purposes of enforcing the provisions of this Act or its implementing rules and regulations, any citizen may file an appropriate civil, criminal or administrative action in the proper courts/bodies against:

- (a) Any person who violates or fails to comply with the provisions of this Act or its implementing rules and regulations; or
- (b) The Department or other implementing agencies with respect to orders, rules and regulations issued inconsistent with this Act; and/or
- (c) Any public officer who willfully or grossly neglects the performance of an act specifically enjoined as a duty by this Act or its implementing rules and regulations; or abuse his authority in the performance of his duty; or, in any manner, improperly performs his duties under this Act or its implementing rules and regulations: *Provided, however,* That no suit can be filed until after thirty-day (30) notice has been given to the public officer and the alleged violator concerned and no appropriate action has been taken thereon.

The Court shall exempt such action from the payment of filing fees and shall, likewise, upon *prima facie* showing of the non-enforcement or violation complained of, exempt the plaintiff from the filing of an injunction bond for the issuance of a preliminary injunction.

In the event that the citizen should prevail, the Court shall award reasonable attorney's fees, moral damages and litigation costs as appropriate.

Section 53. Suits and Strategic Legal Action Against Public Participation (SLAPP) and the Enforcement of this Act. – Where a suit is brought against a person who filed an action as provided in Sec. 52 of this Act, or against any person, institution or government agency that implements this Act, it shall be the duty of the investigating prosecutor or the Court, as the case may be, to immediately make a determination not exceeding thirty (30) days whether said legal action has been filed to harass, vex, exert undue pressure or stifle such legal recourses of the person complaining of or enforcing the provisions of this Act. Upon determination thereof, evidence warranting the same, the Court shall dismiss the case and award attorney's fees and double damages.

This provision shall also apply and benefit public officers who are sued for acts committed in their official capacity, there being no grave abuse of authority, and done in the course of enforcing this Act.

Section 54. Research on Solid Waste Management. – The Department, after consultations with the cooperating agencies, shall encourage, cooperate with and render financial and other assistance to appropriate government agencies and private agencies, institutions and individuals in the conduct and promotion of researches, experiments, and other studies on solid waste management; particularly those relating to:

- (a) adverse health effects of the release into the environment of materials present in

- solid wastes, and methods to eliminate said effects;
- (b) the operation and financing of solid waste disposal programs;
- (c) the planning, implementation and operation of resource recovery and resource conservation systems;
- (d) the production of usable forms of recovered resources, including fuel from solid waste;
- (e) the development and application of new and improved methods of collecting and disposing of solid waste and processing and recovering materials and energy from solid waste;
- (f) improvements in land disposal practices for solid waste (including sludge); and
- (g) development of new uses of recovered resources and identification of existing or potential markets of recovered resources.

In carrying out solid waste researches and studies, the Secretary of the Department or the authorized representative may make grants or enter into contracts with government agencies, non-government organizations and private persons.

Section 55. Public Education and Information - The Commission shall, in coordination with DECS, TESDA, CHED, DILG and PIA, conduct a continuing education and information campaign on solid waste management. Such education and information program shall:

- (a) Aim to develop public awareness of the ill-effects of and the community-based solutions to the solid waste problem;
- (b) Concentrate on activities which are feasible and which will have the greatest impact on the solid waste problem of the country, like resource conservation and recovery, recycling, segregation at source, re-use, reduction and composting of solid waste; and
- (c) Encourage the general public, accredited NGOs and people's organizations to publicly endorse and patronize environmentally acceptable products and packaging materials.

Section 56. Environmental Education in the Formal and Non-formal Sectors. - The national government, through the DECS and in coordination with concerned government agencies, NGOs and private institutions, shall strengthen the integration of environmental concerns in school curricula at all levels, with particular emphasis on the theory and practice of waste management principles like waste minimization, specifically resource conservation and recovery, segregation at source, reduction, recycling, re-use and composting, in order to promote environmental awareness and action among the citizenry.

Section 57. Business and Industry Role. - The Commission shall encourage commercial and industrial establishments, through appropriate incentives other than tax incentives, to initiate, participate and invest in integrated ecological solid waste management projects, to manufacture environment-friendly products, to introduce, develop and adopt innovative processes that shall recycle and re-use materials, conserve raw materials and energy, reduce waste, and prevent pollution, and to undertake community activities to promote and propagate effective solid waste management practices.

Section 58. Appropriations. - For the initial operating expenses of the Commission and the National Ecology Center as well as the expenses of the local government units to carry out the mandate of this Act, the amount of Twenty million pesos (P20,000,000.00) is hereby appropriated from the Organizational Adjustment Fund on the year this Act is approved. Thereafter, it shall submit to the Department of Budget and Management its proposed budget for inclusion in the General Appropriations Act.

Section 59. Implementing Rules and Regulations (IRR). - The Department, in coordination with the Committees on Environment and Ecology of the Senate and House of Representatives, respectively, the representatives of the Leagues of Provinces, Cities, Municipalities and Barangay Councils, the MMDA and other concerned agencies, shall promulgate the implementing rules and regulations of this Act, within one (1) year after its enactment: *Provided*, That rules and regulations issued by other government agencies and instrumentalities for the prevention and/or abatement of the solid waste management problem not inconsistent with this Act shall supplement the rules and regulations issued by the Department, pursuant to the provisions of this Act.

The draft of the IRR shall be published and be the subject of public consultations with affected sectors. It shall be submitted to the Committees on Environment and Ecology of the Senate and House of Representatives, respectively, for review before approval by the Secretary.

Section 60. Joint Congressional Oversight Committee. - There is hereby created a Joint Congressional Oversight Committee to monitor the implementation of the Act and to oversee the function of the Commission. The Committee shall be composed of five (5) Senators and five (5) Representatives to be appointed by the Senate President and the Speaker of the House of Representatives, respectively. The Oversight Committee shall be co-chaired by a Senator and a Representative designated by the Senate President and the Speaker of the House of Representatives, respectively.

Section 61. Abolition of the Presidential Task Force on Waste Management and the Project Management Office on Solid Waste Management. - The Presidential Task Force on Waste Management which was created by virtue of Memorandum Circular No. 39 dated November 2, 1987, as amended by Memorandum Circular No. 39A and 88 is hereby abolished. Further, pursuant to Administrative Order No. 90 dated October 19, 1992, the Project Management Office on Solid Waste Management is likewise hereby abolished. Consequently, their powers and functions shall be absorbed by the Commission pursuant to the provisions of this Act.

Section 62. Transitory Provision. - Pending the establishment of the framework under Sec. 15 hereof, plans under Sec. 16 and promulgation of the IRR under Sec. 59 of this Act, existing laws, regulations, programs and projects on solid waste management shall be enforced: *Provided*, That for specific undertaking, the same may be revised in the interim in accordance with the intentions of this Act.

Section 63. Report to Congress. - The Commission shall report to Congress, not later than March 30 of every year following the approval of this Act, giving a detailed account of its accomplishment and progress on solid waste management during the year and make the necessary recommendations in areas where there is need for legislative action.

Section 64. Separability Clause. - If any provision of this Act or the application of such provision to any person or circumstances is declared unconstitutional, the remainder of the Act or the application of such provision to other persons or circumstances shall not be affected by such declaration.

Section 65. Repealing Clause. - All laws, decrees, issuances, rules and regulations, or parts thereof inconsistent with the provisions of this Act are hereby repealed or modified accordingly.

Section 66. Effectivity. - This Act shall take effect fifteen (15) days after its publication in at least two (2) newspapers of general circulation.

Approved,

(Sgd.) AQUILINO Q. PIMENTEL, JR.
President of the Senate

(Sgd.) ARNULFO P. FUENTEBELLA
Speaker of the House of Representatives

This Act which is a consolidation of House Bill No. 10651 and Senate Bill No. 1595 was finally passed by the House of Representatives and the Senate on December 20, 2000 and December 12, 2000, respectively.

(Sgd.) LUTGARDO B. BARBO
Secretary of the Senate

(Sgd.) ROBERTO P. NAZARENO
Secretary General House of Representatives

Approved: January 26, 2001

(Sgd) GLORIA MACAPAGAL-ARROYO
President of the Philippines

ANNEX 2

DENR-EMB – National Solid Waste Management Status Report 2018



Environmental Management Bureau Department of Environment and Natural Resources

NATIONAL SOLID WASTE MANAGEMENT STATUS REPORT



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Preface

Solid waste management remains a challenge for the Philippines. In this National Solid Waste Management Status Report 2008 – 2018 prepared by the Environmental Management Bureau of the Department of Environment and Natural Resources, the 10-year report focuses on the status of implementation, assessment and management of solid wastes in the country.

Also highlighted in the report are various issues and concerns that need to be addressed as EMB continues to work together with local government units all over the country for the successful implementation of Republic Act 9003 or the Ecological Solid Waste Management Act.

The primary goal of solid waste management is to reduce and eliminate the adverse impacts of waste materials on the environment and human health. With this report, EMB aims to share with its stakeholders the right information to make better choices in addressing the country's solid waste management problem.

Acronyms and Abbreviations Used

AO	Administrative Order
ATC	Authority to Close
BEO	Barangay Environmental Officer
BLGS-DILG	Bureau of Local Government Supervision- Department of Interior and Local Government
BOI	Board of Investments
BSWMC	Barangay Solid Waste Management Committee
CAR	Cordillera Administrative Region
CCQMD	Composting, Compost Quality and Market Development
CENRO	City Environment and Natural Resources Office
DA	Department of Agriculture
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DOE	Department of Energy
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
EMB	Environmental Management Bureau
ENRMP	Environment and Natural Resources Management Project
EO	Executive Order
EOHO	Environmental and Occupational Health Office
ESWM	Ecological Solid Waste Management
GHG	greenhouse gas

GMI	Global Methane Initiatives
GPP	Green Procurement Program
HDPE	high-density polyethylene
HOA	Homeowners' Association
HUC	Highly Urbanized Cities
IRR	Implementing Rules and Regulations
ITDI-DOST	Industrial Technology and Development Institute—Department of Science and Technology
IWS	informal waste sector
JICA	Japan International Cooperation Agency
LCA	life cycle assessment
LCP	League of Cities in the Philippines
LGC	Local Government Code
LGU	local government unit
LMP	League of Municipalities in the Philippines
LnB	Liga ng mga Barangay
LPP	League of Provinces in the Philippines
MENRO	Municipal Environment and Natural Resources Office
MMDA	Metro Manila Development Authority
MRF	Materials Recovery Facility
MSC	Multi-Sectoral Committee
MSW	Municipal Solid Waste
NCR	National Capital Region
NEA	Non-Environmentally Acceptable
NEAP	Non-Environmentally Acceptable Products

NEAPP	Non-environmentally Acceptable Products and Packaging Materials
NEC	National Ecology Center
NEDA	National Economic and Development Authority
NFSCC	National Framework Strategy on Climate Change
NGO	non government organization
NSWMC	National Solid Waste Management Commission
NSWMF	National Solid Waste Management Framework
NSWMS	National Solid Waste Management Strategy
PD	Presidential Decree
PDP	Philippine Development Plan
PENRO	Provincial Environment and Natural Resources Office
PET	polyethylene terephthalate
PIA	Philippine Information Agency
PMP	Philippine Methane Partnership
PP	polypropylene
PSWMB	Provincial Solid Waste Management Board
RA	Republic Act
RCA	Residuals Containment Area
REC	Regional Ecology Centers
SLF	Sanitary Landfill
SWM	Solid Waste Management
SWMB	Solid Waste Management Board
SWMC	Solid Waste Management Committee
TESDA	Technical Education and Skills Development Authority

TWC	Technical Working Committee
TWG	Technical Working Group
UNEP	United Nations Environment Programme
WACS	Waste Analysis and Characterization Study
WEEE	Waste Electrical and Electronic Equipment
WTE	waste to energy
ZBO	Zero Basura Olympics

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1. Solid waste conditions

Describing the solid waste conditions in the country involves understanding the composition and sources of solid wastes, waste generation rates and waste projection.

1.1 Sources and composition of municipal solid wastes (MSW)

The amount, composition and sources of solid wastes generated can be statistically determined through the conduct of waste analysis and characterization studies (WACS).

Sources of MSW

Information on the sources of MSW was provided by a number of Environmental Management Bureau (EMB) Regional Offices in addition to data from submitted Solid Waste Management Plans. The available information from 2008 to 2013 was synthesized and summarized in **Figure 1a**.

MSW comes from residential, commercial, institutional and industrial sources. Residential waste constitutes the bulk (56.7%) of MSW and includes kitchen scraps, yard waste, paper and cardboards, glass bottles, plastic containers and sando bags, foils, soiled tissues and diapers, and special wastes such as containers of household cleaning agents, batteries and waste electrical and electronic equipment (WEEE).

Commercial sources which include commercial establishments and public or private markets contribute 27.1% of which, in some regions, about two-thirds of commercial wastes come from the latter. Institutional sources such as government offices, educational and medical institutions account for about 12.1% while the remaining 4.1% are wastes coming from the industrial or manufacturing sector.

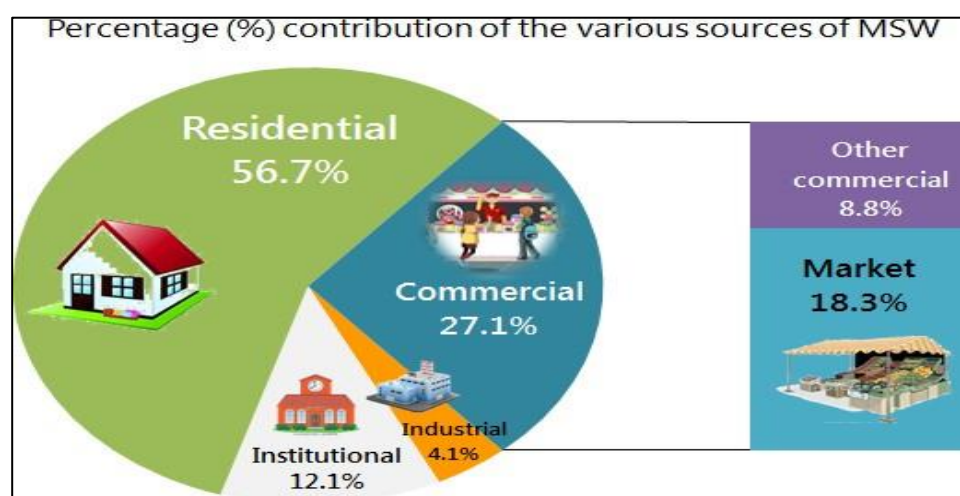


Figure 1a. Sources of municipal solid wastes in the Philippines, 2008-2013

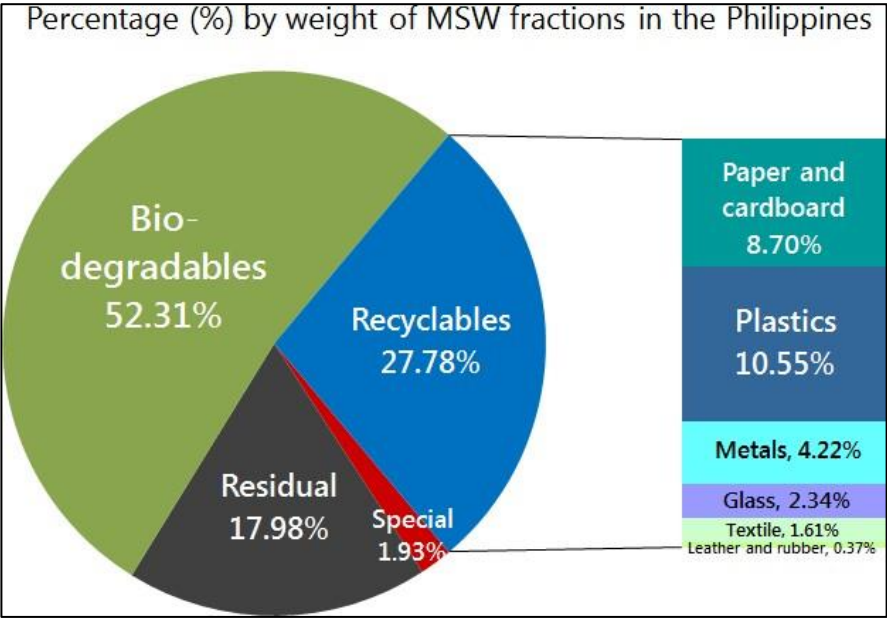


Figure 1-2. Composition of municipal solid wastes in the Philippines, 2008-2013

Biodegradable wastes comprise about half (52.31%) of MSW although primary data suggest that figures can range from 30% to as much as 78%. Typical bio-waste consists of kitchen or food waste and yard or garden waste. From the available information, it could be estimated that 86.2% of compostable waste comes from food scraps while 13.8% are leaves and twigs.

Recyclable wastes account for almost a third (27.78%) of MSW with an estimated range of 4.1% to 53.3%. Plastic packaging materials comprise around 38% of this waste fraction and followed by paper and cardboard waste, which contributes about 31%. The remaining 31% is made up of metals, glass, textile, leather and rubber.

Special wastes which consist of household healthcare waste, WEEE, bulky waste and other hazardous materials contribute a measly 1.93% with values ranging from negligible up to 9.2%.

Finally, residuals have been found to make up 17.98% of generated MSW. Most LGUs present these data as a combination of disposable wastes as well as inert materials, which comprise about 12% of the residual waste.

1.2 Waste generation rates

Waste generation rates have been estimated based on⁷⁷ Consolidated data generated from WACS presented in EMB regional reports and selected local 10-year SWM plans. Using 2010 as base year, **Table 1a** summarizes waste generation rates in the Philippines, Metro Manila, highly urbanized cities (HUCs), municipalities and other cities.

Table 1a. Synthesized waste generation rates in the Philippines for the base year 2010

Scope / Coverage	Sample size (as % of de- mographics)	Range	Weighted Average
		kg/capita/day	
Metro Manila (NCR)	100%	0.27 – 1.00	0.61
Metro Manila and some highly urbanized cities (HUCs)	N/A	0.27 – 1.00	0.69
Other cities and provincial capi-tals (excluding NCR/HUCs)	N/A	0.29 – 0.64	0.50
PHILIPPINES (Nationwide)	79%	0.10 – 0.79	0.40
All LGUs in the country, ex-cluding Metro Manila	76%	0.10 – 0.71	0.34
Municipalities (cities and some capital towns excluded)	N/A	0.10 – 0.64	0.31

In 2010, waste generation rates vary from as low as 0.10 kg/capita/day in the municipalities outside of Metro Manila to 1.00 kg/capita/day in Metro Manila and HUCs. The rates are dependent on household income, lo- cal economic activity and waste avoidance policies and incentives. The average per capita generation rate for the Philippines is 0.40 kg.

1.3 Waste projection

Based on the per capita rate of 0.40 and annual projected population, the amount of waste generated yearly in the entire Philippines and Metro Manila in terms of tonnage can be seen in **Figure 1c**.

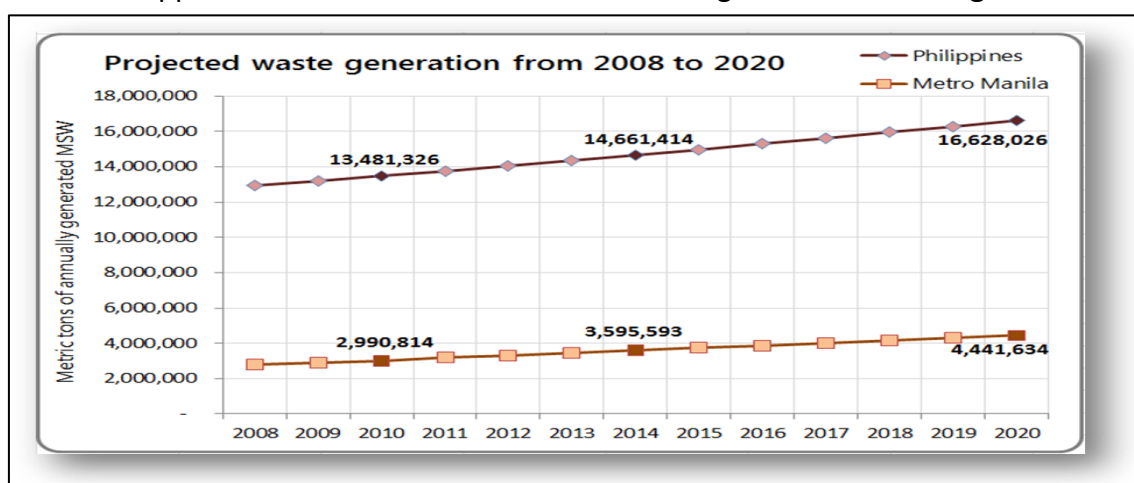


Figure 1c. Projected waste generation 2008-2020 (metric tons per year)

The figure shows that the yearly amount of waste in the country is expected to increase from 13.48 million tons in 2010 to 14.66 million tons in 2014 to 18.05 million tons in 2020. On the other hand, Metro Manila’s waste generation continues to increase as it contributes 22.2%, 24.5% and 26.7% to the country’s solidwaste in the years 2010, 2014 and 2020, respectively.

2. Solid waste impacts on health and the environment

Improper solid waste management practices can have a number of environmental and health impacts. The adverse impacts and their causes are shown in **Figure 2a**. As discussed earlier, municipal solid wastes come from residential, institutional, commercial, and industrial sources. Other sources include illegal dumps, street sweepings and litter and rubbish from roads, open spaces and water bodies. People who live near or within dumpsites are vulnerable to various diseases. Leachate from solid waste can contaminate groundwa- ter tables and surface waters. Insects and pests in open dumpsites are disease vectors. Methane gases from dumpsites can affect the health of exposed populations and contribute to global warming. Coastal and marine litter affects aesthetics, causes pollution, and harms marine organisms. Improperly managed solid wastes also can result in increased flooding and destruction of infrastructures due to clogged waterways.

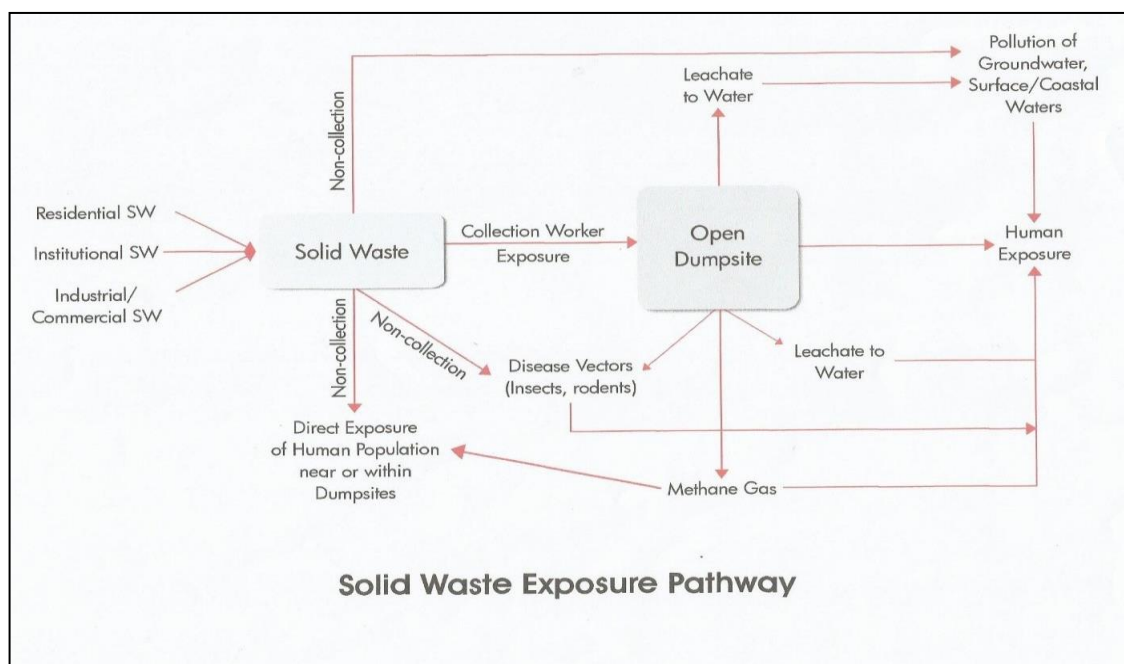


Figure 2a. Solid waste exposure pathway

The disease pathway associated with the poor handling of solid waste becomes manifest usually through di- rect exposure of humans and the pollution of surface water and groundwater due to leachate from open dumps. The World Health Organization and the World Bank estimate that approximately 88% of diarrhea cases worldwide can be attributed to poor water quality, sanitation, and hygiene. (See Table 2a).

In the samemanner, poor water quality, sanitation, and hygiene cause 100% of cholera cases, 100% of helminthiasis cases, 50% of hepatitis cases, and 50% of typhoid and paratyphoid fever cases.

Table 2a. Fraction of disease cases attributable to water, sanitation and hygiene

Disease	AttributableFraction	Source
Diarrhea	88%	WHO
Helminthiasis	100%	WHO
Typhoid & Paratyphoid	50%	WB
Cholera	100%	Widely accepted
Hepatitis A	50%	WB

Sources: WHO, Preventing Disease Through Healthy Environments, 2006; World Bank, Philippine Environment Monitor 2006: Environmental Health

However, there is no established information on the proportion of disease incidence in Table 2a that can be attributed solely to solid waste pollution. A study made on the cost sharing framework for solid waste management in 2010 has assumed that the proportion of the municipal population within the vicinity of open dumpsites is the population with the highest risk of contracting diseases. If the leachate from dumpsites affect the groundwater and domestic water supply, then the population at risk might be even greater.

Thus, the potential population at risk was estimated based on the population of potentially affected barangays surrounding open dumpsites. Using a sample of open dumpsites, it is estimated that an average of 27% of the municipal population might be at risk from water-borne diseases due to open dumpsites. Hence, it can be assumed to be the same proportion of diarrhea cases solely attributable to solid waste pollution.

Morbidity or illness due to acute diarrhea has economic cost that includes costs of hospitalization, medical costs and foregone income due to reduced workdays.

There are other environmental costs associated with improperly disposed municipal solid wastes. These include pollution of surface and marine waters that could deplete fish and other marine resources, damages to infrastructures from worsened flooding incidence due to clogged waterways, increased cost of dredging and coastal cleanups and loss of aesthetic value.

3. Ecological Solid Waste Management: status of implementation of Republic Act No. 9003

3.1 Avoidance, reduction and reuse

SWM implementation follows a hierarchy of options as illustrated by an inverted triangle in **Figure 3a**. The most preferred option is waste avoidance and reduction where the ultimate goal is to reduce the amount of materials entering the waste stream. Apart from avoidance, achieving this goal involves product reuse, increased product durability, reduced material use in production and decreased consumption. Behavioral change is deemed necessary in the exercise of this option as lifestyle demands often favor convenience over conservation with minimal regard for long-term environmental consequences.

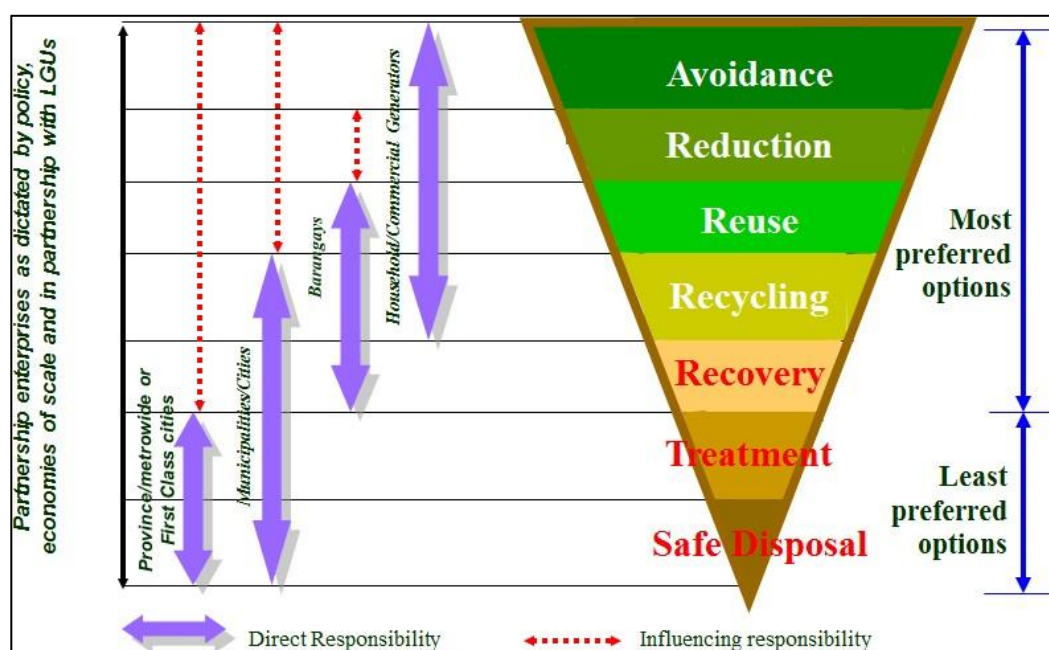


Figure 3a Overall policy of RA 9003 based on waste management hierarchy

There are now various initiatives towards waste reduction such as green procurement, eco-labeling, identification of non-environmentally acceptable products and implementation of 3Rs.

Executive Order (EO) No. 301 was issued in 2004 establishing a Green Procurement Program (GPP) for the executive branch of government. The EO also provides for a systematic and comprehensive *National Eco-Labeling Program* necessary to support a “green procurement” policy in both government and the general public. The GPP is an approach to procurement in which environmental impacts are taken into account in purchasing decisions. Environmentally responsible initiatives include switch to electronic submission of purchase requests, reduction of materials and energy usage, greening the supply chain and patronage of eco-labeled products.

The National Solid Waste Management Commission (NSWMC) is mandated under RA 9003 to prepare and update a list of non-environmentally acceptable products (NEAP) to be prohibited according to a

scheduled and as long as NEAP alternatives cost no more than 10% of the cost of disposable products. However, no product has yet been determined as non-environmentally acceptable (NEA).

Through NSWMC Resolution 9, a Technical Working Committee (TWC) was created to work on the phasing out of NEA products and packaging materials. The TWC has established four product categories that will be subjected for evaluation, namely: plastics, construction materials, baby products and electronics. The NSWMC TWC through the Industrial Technology and Development Institute of the Department of Science and Technology (ITDI-DOST) conducted a study to determine the non-environmental acceptability of products or packaging material and life cycle assessment (LCA) of the products to be listed as NEAP. A third party was engaged to conduct the study to look into applying appropriate assessment tools to come up with a scientific basis on classifying certain material as non-environmentally acceptable which shall cover plastic carrier bags and foam polystyrene.

The study established a comprehensive LCA of the environmental impact of plastic, paper, and non-woven polypropylene (PP) carrying bags in the Philippines. The functional unit used in the study is based on the usual products purchased by a Filipino family. A cradle-to-grave analysis was employed to assess the impacts of the various life-cycle stages of the three alternatives. The life-cycle inventory was categorized into the on-site, pre-combustion, and transportation inventories. In addition, the impact categories were assessed based on the internal and external impacts. The study concluded that:

- a) Non-Woven PP provides the least impact among the options evaluated
- b) Based on the cost of remediation, the flooding contribution of paper bags compared to plastic is higher. It must be however that the approach adopted is limited in scope due to the availability of cost and waste data
- c) Plastic bags are more environmentally desirable compared to paper in all impact areas. This is primarily traced to their lower material quantity used.

About 316 LGUs have passed ordinances banning or regulating the sale and use of plastic bags and polystyrene foams due to their perceived role in the clogging of waterways, increased flooding and water pollution. Among these LGUs are the cities of Muntinlupa, Quezon and Pasig in Metro Manila and the municipalities of Los Banos, Laguna, Burgos, Ilocos Sur and San Marcos, Isabela. In response, the plastics industry has undertaken voluntary measures such as in-store recovery programs with selected supermarkets and the introduction of oxo-biodegradable plastic bags.

Shopping mall giants like SM Group, Ayala Malls and Robinson's Supermarket continually promote the reuse, reduction and recycling (3R) of waste through their eco-shopping bag program and their monthly waste markets and recyclers' fairs nationwide. Other malls, supermarkets, fast food chains and commercial shops also have their own SWM programs. Unilever Philippines' "Project Eliminate" enabled

their plant and offices to reduce trash by 50% while Nestlé Philippines' "Waste to Resource" project enabled the composting of coffee grounds. Coca-Cola Bottlers Philippines' "Give a Can, Give a Hope" program works with Tahanang Walang Hagdanan as a partner and beneficiary in recycling.

The Industrial Waste Exchange Program is managed by the Philippine Business for the Environment, which acts as a clearinghouse and matching agent for waste generators and buyers. The Eco Index in Region IV-A organizes regular Resource Recovery Events that allow waste generators to bring in their recyclables/waste products to invited recyclers and waste users. At the regional level, EMB's main partner in environmental education and recycling promotion are the Pollution Control Association of the Philippines and other local stakeholders.

3.2 Segregation at source

In cases where segregation at source and segregated storage are not practiced by households, communities and businesses, most solid wastes end up as "mixed garbage". This may be due to limited awareness, appreciation and discipline on the part of the citizenry, lack of incentives and enforcement of ordinances on the part of the government, or inadequate support facilities in place to receive pre-segregated materials.

To address this problem, some LGUs provide segregated waste containers and implement color codes to aid in the easy identification of segregated bins. In 2013, the NSWMC had already approved Resolution No. 60 to provide recommendatory measures for mandatory solid waste segregation at source, segregated collection and recovery to guide waste generator on onsite separation and support the LGUs in implementing 'no-segregation, no-collection' campaigns.

Some LGUs have strictly enforced segregation at source coupled with segregated collection, through a "no segregation, no collection" ordinance and the operation of Materials Recovery Facility (MRFs). The DENR Environment and Natural Resources Management Project (ENRMP) aimed at identifying and selecting LGUs with promising initiatives and regularly monitoring its compliance and performance. Compliance of this select group of 128 LGUs on the mandatory segregation at source ranges from 53% to 100% based on validations conducted by NSWMC Secretariat.

Collection is the act of removing solid waste from the source or from a communal storage point. It is regarded as potentially the most expensive of the functional elements of SWM.

RA 9003 requires segregated collection by the LGUs. Waste segregation and collection are to be conducted at the barangay level specifically for biodegradable and recyclable wastes while disposal and collection of non-recyclable/residual and special wastes are the responsibility of the city or municipality.

Waste collection techniques include 1) door-to door – where waste materials are collected in every house within a target area to recover recyclables to be sold to junkshops and biodegradables either for use as animal feeds or for composting and 2) block or communal – which utilizes MRFs in barangays that are within or near the targeted collection area.

Solid waste collection in the country has environmental, social, economic and political implications. For example, people have the tendency to link uncollected garbage and dirty surroundings to the performance of local officials. Collection is usually done by an LGU department such as the General Services Office, Engineering Office, Environment and Sanitation Office or the Department of Public Services. Many LGUs also outsource waste collection to private contractors.

There is a growing number of cities and municipalities that are implementing ‘no segregation, no collection’ policies leading to more responsible attitudes and behavior towards the environment and greater efficiency in the delivery of SWM services. However, many LGUs still practice mixed waste collection – a backward step that produces the opposite effect.

As reported by 128 ENRMP pilot sites, compliance to segregated collection ranges from 43% to 100%. Outside of ENRMP, however, very few regions and LGUs gather information on segregated waste collection rates.

It is estimated that waste collection coverage in the LGUs may vary from 30% to more than 99%. Urban centers register higher coverages and frequencies compared to rural areas. Nevertheless, some LGUs devise ways to still extend service to the rural and upland communities by making special arrangements such as the adoption of satellite accumulation areas or residuals containment areas.

Reasons identified for waste collection inefficiencies are:

- poor labor management and supervision
- more workers on the roles than needed
- inadequate cooperation from the citizenry with collection schedules and methods
- inappropriate type and size of collection vehicles
- non-rational routes for collection service
- failure to optimize vehicle productivity by selecting the appropriate crew size and shift duration
- inadequate communal container capacity at the communal collection points

3.3 Recovery and processing

Materials Recovery Facility (MRF)

RA 9003 mandates the establishment of a MRF in every barangay or cluster of barangays in barangay-owned, leased land or any suitable open space designated by the barangay. The MRF shall be designed to receive, sort, process and store compostable and recyclable material efficiently and in an environmentally sound manner. Any resulting residual waste shall be transferred to a proper disposal facility.

MRFs are also being established in schools, malls, and other commercial establishments. There are also mobile and gravity-driven, centralized MRFs. A number of LGUs also engage local junkshops to serve as their MRFs. Through Memorandum of Agreements and following the guidelines on MRF establishment, junk dealers become part of the formal SWM system of the LGU. **Figures 3b to 3d** show the different types and designs of MRFs.



Figure 3b. Low-cost MRFs in the Philippines



Figure 3d. Centralized gravity-driven MRFs in Negros Island LGUs



The NSWMC has reported the number of MRFs for the years 2008 to 2018. Figure 3e shows the number of MRFs and the number of barangays served by MRFs during those years. Based on the table, there was a six-fold increase in the number of barangays served from 2,701 in 2008 to 13,612 in 2018.

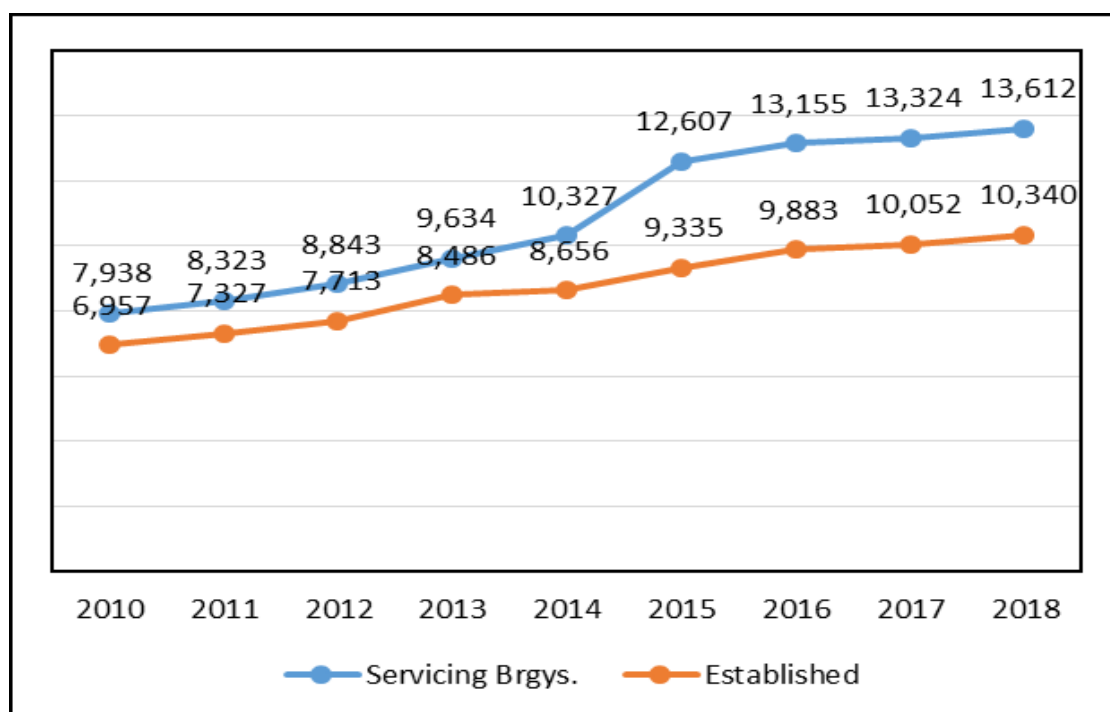


Figure 3-e. Number of MRFs and barangays served by MRFs from 2008 to 2018

Composting

Under RA 9003, composting is regarded as a means to meet the mandatory waste diversion requirements. It is the biological decomposition of biodegradable solid waste under controlled predominantly aerobic conditions to a state that is sufficiently stable for nuisance-free storage and handling and is satisfactorily matured for safe use in agriculture. It can either be a component of an MRF or established as a standalone processing facility. The law also provides for an inventory of markets for compost and guidelines for compost quality.

Typical small-scale composting in the Philippines is done in compost pits, tire towers, coconut shell stack, bottomless bins, clay pots and plastic sacks. Meanwhile, large-scale composting is done in windrows (by

turn-ing, passive aeration, active aeration and static piles), in-vessel (e.g., agitated beds, composting silos and rotating drum bioreactors), and through vermi or worm composting.

The different types of composting techniques used by LGUs, national government agencies, private farms and cooperatives in the Philippines are shown in **Figures 3f to 3i**. It is estimated that composting could reduce the weight of organic waste by 50% or more and vermicomposting by 70-80%, the latter capable of turning biodegradables into a high-quality vermicompost product.



Figure 3h. Vermicomposting facilities at EMB-Region 8 in Palo, Leyte (left), Buro-buro Springs Farm in Talisay City, Negros Occidental (center) and at the Ormoc City Eco-Center, Leyte (right)



Figure 3i. Other techniques such as the coconut shell stack and can composting in Barangay Olaycon, Monkayo, Compostela Valley (left), Bokashi composting at Buro-buro Springs Farm (center) and Takakura composting in Bago City, Negros Occidental (right)

Recycling

The important role of recycling in achieving the mandatory waste diversion requirements is recognized under RA 9003. This law offers guidelines on the establishment and operation of buy-back centers and MRFs and provides for an inventory of markets and eco-labelling of recyclables. Recycling may either be a component of an MRF or established as a stand-alone processing facility.

Recyclables, particularly those with high commercial value such as paper, scrap metals and plastics are typically sold to junk dealers, consolidators and recyclers. The accumulated recyclables from MRFs are delivered to junkshops. In many cases, either the semi-formal or informal waste collectors or even the generators themselves bring the sellable materials to junkshops or at designated areas during recyclables collection events.

The recovered materials that are sold to local junkshops pass through a business chain of middlemen and wholesaler for use by the industry sector, mainly outside the Philippines. However, there are local commercial-based. Based on a 2008 study by NSWMC and Japan International Cooperation Agency, primary waste collectors could divert significant amount of recyclables from the waste stream as shown in **Table 3a**.

Table 3a. Collection of recyclable materials by primary collectors (unit: kg/capita/day)

Recyclable Material	Primary Collector	Metro Manila	Metro Cebu	Southern Mindanao
Paper	Street Collectors	3.18	3.59	2.45
	Collection Workers	21.83	1.81	0.62
	Disposal Site Scavengers	22.01	8.21	12.86
Aluminum	Street Collectors	0.76	0.35	0.40
	Collection Workers	0.78	0.13	0.02
	Disposal Site Scavengers	2.50	0.05	1.79
Other Metals	Street Collectors	1.39	5.04	14.76
	Collection Workers	12.35	0.94	0.64
	Disposal Site Scavengers	16.75	6.34	13.75
Plastic	Street Collectors	1.63	3.94	3.50
	Collection Workers	9.79	0.50	0.63
	Disposal Site Scavengers	20.32	4.48	25.00
	Street Collectors	0.85	0.58	6.65

Glass	Collection Workers	6.58	0.26	0.94
	Disposal Site Scavengers	9.96	0.32	49.64

Source: JICA Study, 2008

Some LGUs have started recognizing the important contribution of informal and semi-formal sectors in diverting wastes away from disposal sites and have explored ways of partnering with them.

In most regions, LGUs find that there are available markets for recyclable materials except for those with low economic value. For the latter, they had to seek alternatives to recycling these materials into marketable and innovative products such as bags, slippers, fashion accessories, decorative items, furniture and fixtures,



Figure 3j. Waste Market Fair organized in Davao City and the Waste2Cash Market Programs held in Naga City, Camarines Sur (left) and Legazpi City, Albay (right)



Figure 3k. Trust International Paper Company in Bulacan and Dasmarinas Paper Mills in Cavite recycle paper and cardboard (left) while Coca-Cola Bottlers, Philippines partners with Tahanang Walang Hagdanan to convert post-consumer aluminum waste into wheelchairs



Figure 3I. Fashion accessories produced from the recycling of waste materials in Agusandel Sur, Aurora, Leyte, Southern Leyte and Samar

3.4 Disposal

Waste disposal refers to the discharge, deposit, dumping, spilling, leaking or placing of any solid waste into or in any land while disposal sites refer to areas where solid waste is finally discharged and deposited. It is regarded as the least preferred method of managing solid waste although it plays an important role in dealing with residual waste.

Almost all solid wastes ended up at dumpsites before the passage of RA 9003. Dumpsites are raw, open spaces designated as local disposal areas that lack engineering measures and pollution control systems. These are often located close to ravines, gullies, seashore, bodies of water and other open spaces and usually become inaccessible during heavy rains.

The law mandates the closure and rehabilitation of all dumpsites and their replacement with sanitary landfills (SLFs). SLFs are disposal facilities with impermeable liners to prevent liquid discharges from polluting ground and surface waters. It should also have a gas management system to reduce risks of burning or explosion, a regular soil cover to minimize odor, and other environmental protection features

Open and controlled dumpsites

RA 9003 prohibits the establishment and operation of open dumps or any practice or disposal involving the use of open dumps. Open dumps, however, were allowed to be converted into controlled dumps only until 2006 as a temporary and remedial measure. Nevertheless, controlled dumps which were required to

meet basic waste management guidelines should have been phased out in 2006 in favor of sanitary landfills. The legally mandated transition was not fully realized as many open and controlled dumps are still currently in operation.

The number of illegal dumpsites in the country has decreased by more than half over the past 8 years from 806 in 2008 to 353 in 2018. These dumps might have either been completely closed and rehabilitated or are undergoing rehabilitation for closure.

Figure 3n shows the number of illegal dumpsites in every region of the country in 2018. The data show that Regions 5, 7 and 4A had the most number of illegal dumpsites. NCR, CAR and Region 12 had no reported illegal dumpsite while Region 9 and Region 8 had fewer remaining illegal dumpsites.



Source: NSWMC

Figure 3n. Number of illegal dumpsites in 2018, per region

Sanitary landfills

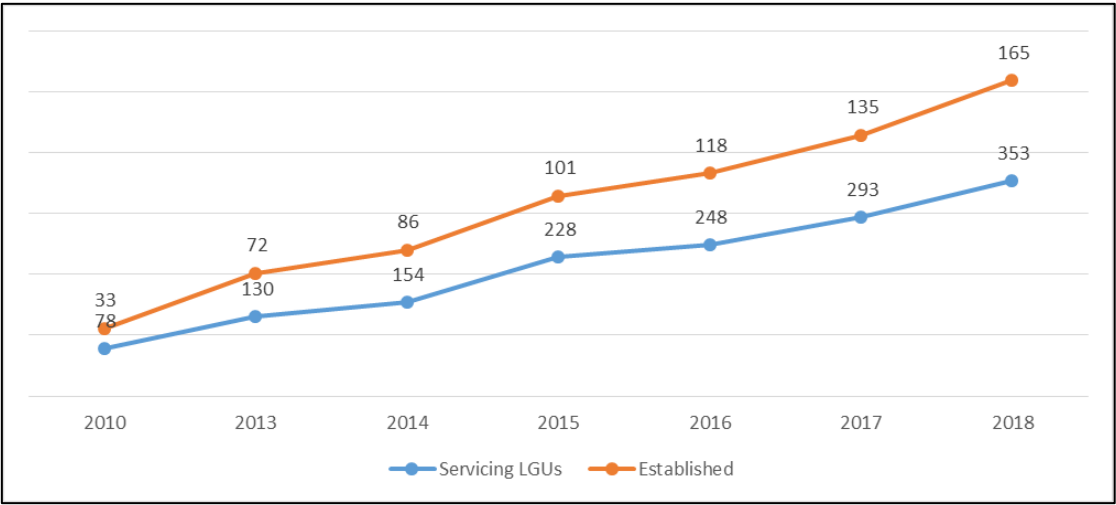
A sanitary landfill (SLF) refers to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation of the facility. Prior to 2004, the country had only four sanitary landfills - located in Capas, Tarlac, Inayawan, Cebu City, San Mateo, Rizal and Carmona, Cavite.

Sections 40 to 42 of RA 9003 provide for the criteria in site selection, establishment and operation of SLFs. Specifically, Section 41 stipulates the minimum requirements for the establishment of SLFs: a landfill liner system, leachate collection and treatment, gas control recovery system, groundwater monitoring wells, a daily cover during operations and final cap over the completely filled landfill, and a closure and post-closure maintenance procedure.

The traditional material used to render landfill cells impervious to water seepage is high-density polyethylene (HDPE) plastic material. However, with the pioneering efforts in Bais City, it was found that compacted ben- tonite clay or clay-spiked host soil may be used as alternative liner material as long as it passes the permea- bility requirements for a landfill liner.

In 2005, the NSWMC issued a Resolution No. 06 on the guidelines for establishing categorized SLFs, which was later adopted at Department Administrative Order (DAO) 2006-10 and supplemented by the ‘Technical guidebook on solid wastes disposal design, operation and management. The guidelines still mandate the use of the relatively expensive HDPE for bigger SLFs but the minimum requirements of clay liners for smaller

In Figure 3o, waste disposal remains a challenge since a total of 353 illegal dumpsites have to be closed and rehabilitated in accordance with Section 37 of RA 9003. This is offset by the fact that there has been a steady increase in the number of SLFs being established and LGUs having access to them; from 33 SLFs that cater to the residual waste of 78 LGUs in 2010, to about 353 LGUs already have access to 165 SLFs in December 2018.



Source: NSWMC
Figure 3o. Number of operational sanitary landfills from 2010 to 2018, per region

Table 3b also shows an updated list of 166 SLFs established in the country as of December 2018. Five (5) of these landfills are currently not operating.

Table 3b. Operational Sanitary Landfills and their Locations, 2014

	Region	Province	LGU	Barangay
1	1	Ilocos Norte	Bacarra	Pungto
2	1	Ilocos Norte	Banna	Bangsar
3	1	Ilocos Norte	Nueva Era	Poblacion
4	1	Ilocos Norte	Paoay	Mumulaan
5	1	Ilocos Norte	Piddig	Abucay
6	1	Ilocos Norte	San Nicolas	San Guillermo*
7	1	Ilocos Norte	Vintar	Ester
8	1	Ilocos Sur	Candon City	Balingaoan
9	1	Ilocos Sur	Narvacan	Dasay
10	1	Ilocos Sur	Santiago	
11	1	Ilocos Sur	Santa Cruz	Gabor Norte
12	1	La Union	Agoo	San Agustin
13	1	La Union	Balaoan	Calumbuyan (Nagsabaran Norte)
14	1	La Union	Bangar	Cadapil
15	1	La Union	Luna	Sucoc Norte
16	1	La Union	Naguilian	Cabaritan Norte
17	1	La Union	Rosario	Inabaan Norte
18	1	La Union	San Fernando City	Dallangayan Oeste
19	1	La Union	San Gabriel	Lipay Sur
20	1	La Union	Santol	Corrooy
21	1	La Union	Sudipen	Sengnat
22	1	Pangasinan	Binalonan	Camangaa*
23	1	Pangasinan	Bolinao	Balingasay
24	1	Pangasinan	Urdaneta City	Sitio Calegu, Catabian
25	2	Cagayan	Ballesteros	Centro West (Pob.)

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26	2	Cagayan	Gattaran	Casicallan Norte*
27	2	Cagayan	Gonzaga	Pateng
28	2	Cagayan	Lal- lo	Cagoran
29	2	Cagayan	Peñablanca	Baliuag
30	2	Cagayan	Sanchez Mira	Santor
31	2	Isabela	Quezon	Sitio Namnama, Santos (Pob.)
32	2	Nueva Vizcaya	Aritao	Kirang
33	2	Nueva Vizcaya	Bagabag	Sitio Tapaya, Baretbet
34	2	Nueva Vizcaya	Bayombong	Luyang
35	2	Nueva Vizcaya	Solano	Concepcion
36	2	Quirino	Diffun	Ricarte Norte
37	2	Quirino	Maddela	Balligui
38	2	Quirino	Saguday	Cardenas
39	3	Aurora	Dipaculao	Toytuyan
40	3	Aurora	Maria Aurora	San Joanquin
41	3	Aurora	San Luis	L. Pimentel
42	3	Bataan	Abucay	Sitio Macao, Capitangan
43	3	Bataan	Balanga City	Munting Batangas
44	3	Bataan	Hermosa	Mambog (Eco-Nest)
45	3	Bulacan	Norzagaray	Sitio Tiakad, San Mateo (WACUMAN)
46	3	Bulacan	Norzagaray	Sitio Coral, Matictic
47	3	Nueva Ecija	General Tinio	San Pedro
48	3	Nueva Ecija	Guimba	Lennecc

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49	3	Nueva Ecija	Santa Rosa	Mapalad
50	3	Tarlac	Capas	Sitio Kalangitan, Cutcut (Metro Clark Waste Management, Corp.)
51	3	Zambales	Candelaria	Pinagrealan
52	3	Zambales	Olongapo City	New Cabalan
53	3	Zambales	Palauig	Salaza
54	3	Zambales	Subic	Naugsol
55	4A	Batangas	Alitagtag	San Juan
56	4A	Batangas	Batangas City	San Jose Sico
57	4A	Batangas	Bauan	Malindig
58	4A	Batangas	Cuenca	Poblacion 8
59	4A	Batangas	Lemery	Poblacion 1
60	4A	Batangas	Taysan	Piña
61	4A	Cavite	Dasmariñas City	Salawag (Lexter)
62	4A	Cavite	Imus City	Pasong Buaya 1 (Coldwell Environmental Care Corp.)
63	4A	Laguna	Bay	Santa Cruz
64	4A	Laguna	Calamba City	Bubuyan (SURI Waste Mgt.)
65	4A	Laguna	Kalayaan	Sitio Malaking Pulo, San Juan
66	4A	Laguna	Paete	Sitio Santa Ana, #3 Ermita
67	4A	Laguna	San Pablo City	Santo Niño

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68	4A	Laguna	San Pedro City	Narra Road, San Antonio (Pilotage)
69	4A	Laguna	Santa Cruz	Alipit (Gemtech)
70	4A	Quezon	Dolores	Dagatan
71	4A	Quezon	General Nakar	Anoling
72	4A	Quezon	Gumaca	San Vicente
73	4A	Quezon	Infanta	Magsaysay
74	4A	Quezon	Lucena City	Kanlurang Mayao
75	4A	Quezon	Mauban	Sitio Tejero, Lual Barrio
76	4A	Quezon	Pagbilao	Ibabang Bagumbungan
77	4A	Quezon	Plaridel	Tanauan
78	4A	Quezon	Real	Tanauan
79	4A	Quezon	Sampaloc	Sitio core Housing, Bilucan
80	4A	Quezon	Sariaya	Sampaloc 1
81	4A	Quezon	Tayabas City	Pandakaki
82	4A	Rizal	Rodriguez (Montalban)	Sitio Lukutan, San Isidro (Rizal Provincial) (Green Leap)

83	4A	Rizal	Morong	San Guillermo (Morong Engi- neered SLF)
84	4A	Rizal	San Mateo	Sitio Mabilog, Pintong Bukawe(New San Mateo SLF)

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85	4B	Marinduque	Boac	Sitio Bago-Agong, Brgy. Maybo
86	4B	Occidental Mindoro	Lubang	Sitio Pulili, Brgy. Tangal
87	4B	Oriental Mindoro	Calapan City	Batino
88	4B	Oriental Mindoro	Pinamalayan	Maningcol
89	4B	Palawan	Bataraza	Rio Tuba (Coral Bay Nickel Corp.)
90	4B	Palawan	El Nido (Bacuit)	Villa Libertad
91	4B	Palawan	Puerto Princesa City	Lourdes Village
92	4B	Palawan	Quezon	Sitio Metropal, Brgy. Malatgao
93	4B	Romblon	Odiongan	Bangon (c/o Tita Nelia); Anahao
94	4B	Romblon	San Jose	Combot
95	5	Albay	Legazpi City	Sitio Caridad, Banquerohan
96	5	Masbate	Masbate City	Usab*
97	6	Aklan	Malay	Cabulihan
98	6	Iloilo	Iloilo City	Calajunan
99	6	Negros Occidental	Bacolod City	Felisa
100	6	Negros Occidental	Bago City	Ma-ao
101	6	Negros Occidental	Cadiz City	Cabahug
102	6	Negros Occidental	Kabankalan City	
103	6	Negros Occidental	Sagay City	Paraiso
104	6	Negros Occidental	San Carlos City	Hilamunan

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105	6	Negros Occidental	Sipalay City	Sitio Can-Araw, Brgy. Cabadyangan
106	7	Negros Oriental	Bais City	Cambanjao
107	7	Negros Oriental	Bayawan City (Tulong)	Maninihon
108	7	Bohol	Alburquerque	Dangay
109	7	Cebu	Aloguinsan	Tampa-an
110	7	Cebu	Asturias	Sitio Libaong, San Isidro
111	7	Cebu	Badian	Dobdob
112	7	Cebu	Balamban	Lamesa
113	7	Cebu	Cebu City	Inayawan
114	7	Cebu	Consolacion	Polog
115	7	Cebu	Cordova	Poblacion
116	7	Cebu	Dalaguete	Tapon
117	7	Cebu	Talisay City	Sitio Tapul, Maghaway
118	7	Cebu	Toledo City	Sitio Masaba, Das; Putingbato
119	7	Siquijor	Siquijor	Caipilan
120	8	Leyte	Burauen	Gamay
121	8	Leyte	Tacloban City	San Roque
122	8	Leyte	Ormoc City	
123	8	Samar	Basey	Roxas
124	8	Samar	Calbayog City	Dinag-an
125	8	Southern Leyte	Tomas Oppus	Anahawan
126	8	Southern Leyte	Maasin City	Bactul II
127	9	Zamboanga del Sur	Zamboanga City	Salaan*

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128	10	Bukidnon	Damulog	Sitio Narugaran, Pocopoco
129	10	Bukidnon	Lantapan	Bantuanon
130	10	Bukidnon	Maramag	South Poblacion
131	10	Bukidnon	San Fernando	Nacabuklad
132	10	Bukidnon	Valencia City	Barobo
133	10	Camiguin	Mambajao	Benhaan
134	10	Lanao del Norte	Iligan City	Bonbonon
135	10	Misamis Oriental	Cagayan de Oro City	Pagalungan
136	11	Davao del Norte	Island Garden City Of Samal	Sitio Sampao, Mambago-A
137	11	Davao del Sur	Davao City	New Carmen, Tugbok Dist.
138	11	Davao Oriental	Lupon	Lupon
139	12	Cotabato	Arakan	Greenfield
140	12	Cotabato	Kidapawan City	Onica
141	12	Cotabato	Magpet	Doles
142	12	Cotabato	Matalam	Manubuan
143	12	Cotabato	M'Lang	Tibao
144	12	Cotabato	President Roxas	Cabangbangan
145	12	Sarangani	Alabel	Sitio Mahayahay, Bagakay
146	12	Sarangani	Maasim	Kamanga
147	12	Sarangani	Malungon	Poblacion
148	12	South Cotabato	General Santos City	Sinawal
149	12	South Cotabato	Surallah	Colungolo

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150	12	South Cotabato	Polomolok	Purok 6, Kinilis
151	12	Sultan Kudarat	Kalamansig	Sitio Bantogon, Santa Clara
152	12	Sultan Kudarat	Lebak	Sitio Kitay, Salaman
153	12	Sultan Kudarat	Isulan	Sitio Kamanga, Laguilayan
154	12	Sultan Kudarat	Tacurong City	Upper Katungal
155	Caraga	Agusan del Norte	Butuan City	Dumalagan
156	Caraga	Dinagat Islands	San Jose	Luna
157	Caraga	Surigao del Norte	Alegria	Gamuton
158	Caraga	Surigao del Norte	Surigao City	Cagniog
159	CAR	Apayao	Calanasan	Poblacion
160	CAR	Apayao	Luna	Bayugao, Turod
161	CAR	Apayao	Pudtol	Swan
162	CAR	Benguet	La Trinidad	Induyan, Alno
163	CAR	Ifugao	Alfonso Lista	Poblacion
164	CAR	Kalinga	Tabuk City	Dilag
165	NCR	Metro Manila	Navotas City	Tanza (PhilEcology System Corp.)
166	ARMM	Lanao del Sur	Wao	Katutungan

Source: NSWMC

Based on information provided by NSWMC, the number and percentage of LGUs with access to sanitarylandfills have increased from 63 LGUs (3.9%) in 2008 to 228 LGUs (14%) in 2015. (See **Table 3c**).

Table 3c. Number and percentage of LGUs with access to SLFs, 2008-2018

Parameter	Year							
	1	2	3	4	5	6	7	8
Population of	88,543,800	92,337,852	98,449,090	100,420,642	101,883,764	103,320,222	104,918,090	106,512,074

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thePhilippines								
Number ofoperating SLFs	21	29	72	86	101	118	135	166
Number ofLGUs with access to SLFs	63	78	130	154	228	248	293	353
Percent of LGUs with access to SLFs	3.9%	4.8%	8.0%	9.4%	14.0%	15.17%	17.93%	21.78%

Source: NSWMC

Clustered landfills

Clustering is an option in which small LGUs can pool their resources into setting up a common solid waste disposal facility. It also enables them to attain large economies of scale and reduce the cost per unit of solid waste disposal. The main constraints, however, are finding a host LGU and the social acceptability of the proposed facility.

Forms of clustering in the Philippines include private sector-led ventures that offer their landfills where LGUs dispose their residual waste upon payment of tipping fees. There also LGUs that host a facility that serve neighboring municipalities for a fee.

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Inter-municipal clustering has been successful in the province of South Cotabato. The establishment of a common Category 2 SLF at Barangay Colongulo, Surallah, South Cotabato (**Figure 3p**) in 2011 was financially supported by the provincial government with technical assistance from DENR and United States Agency for International Development (USAID). The facility is now being shared among the municipalities of Surallah, Norala, T'boli, Banga, Sto. Nino and Lake Sebu. Earlier, in 2008, a Category 1 SLF was established in Barangay Kinilis, Polomolok as a result of the partnership between the LGU and Dole Philippines, Inc. The facility also serves neighboring municipalities.



Figure 3p. Clustered sanitary landfill in Surallah, South Cotabato

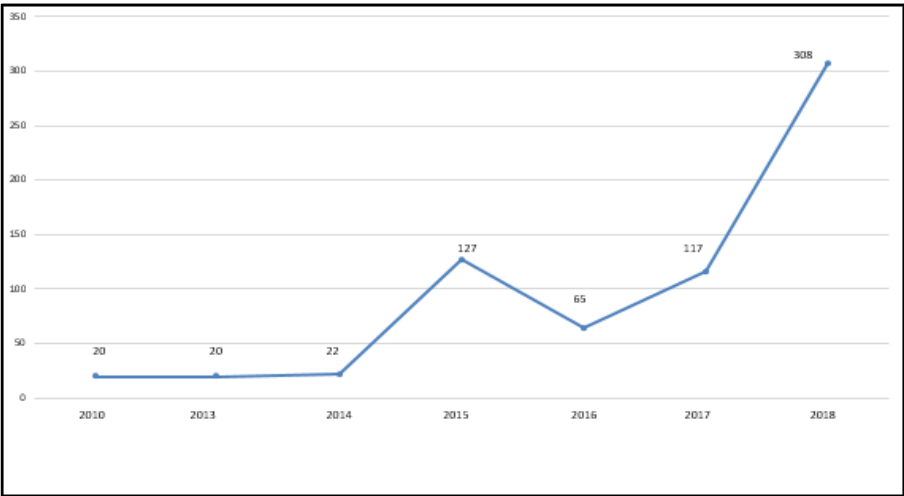
3.5 Local Solid Waste Management Plans

RA 9003 requires the preparation of 10-year SWM plans by provinces, cities and municipalities consistent with the national SWM Framework. These plans shall include all the components identified in the law.

The plans are subject to annual review and updating by the provincial, city or municipal SWM boards. All plans must be approved by the NSWMC. An annotated outline has been prepared by the NSWMC to guide the LGUs on the specific components of the plans as well as to facilitate the review and approval of the plans submitted to NSWMC.

Submission and approval of SWM Plans

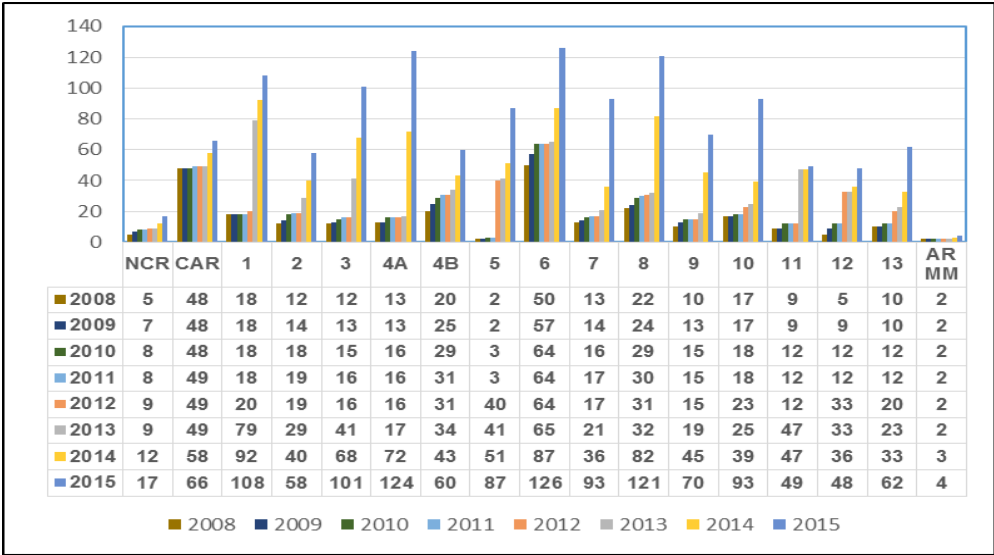
Figure 3q shows the number of local SWM Plans approved by the NSWMC. These submitted plans were reviewed and evaluated by the EMB and endorsed to the NSWMC TWG for deliberation. It will be noted that approved plans were more than doubled during the previous year (2018), from 127 in 2017 to 308.



Source: NSWMC

Figure 3q. Number of 10-year SWM Plans approved by the NSWMC from 2010 to 2018

Disaggregated data on the number of submitted plans per region from 2008 to 2015 are shown in Figure 3r. It must be noted that regions that were previously lagging in plan submission have accelerated their plan completion efforts towards the end of 2015.



Source: NSWMC

Figure 3r. Number of SWM Plans submitted in 2008-2015, by region

Figure 3s shows the percentage of LGUs with submitted plans compared to the approved SWM plans of 2018. In 2018, 100% of LGUs in the NCR, Regions 1, 9, 10, 11, 12, CARAGA and CAR have submitted their

10-year SWM Plans. Except for ARMM, the rest of the regions have 95% compliance rates in terms of submission of plans.

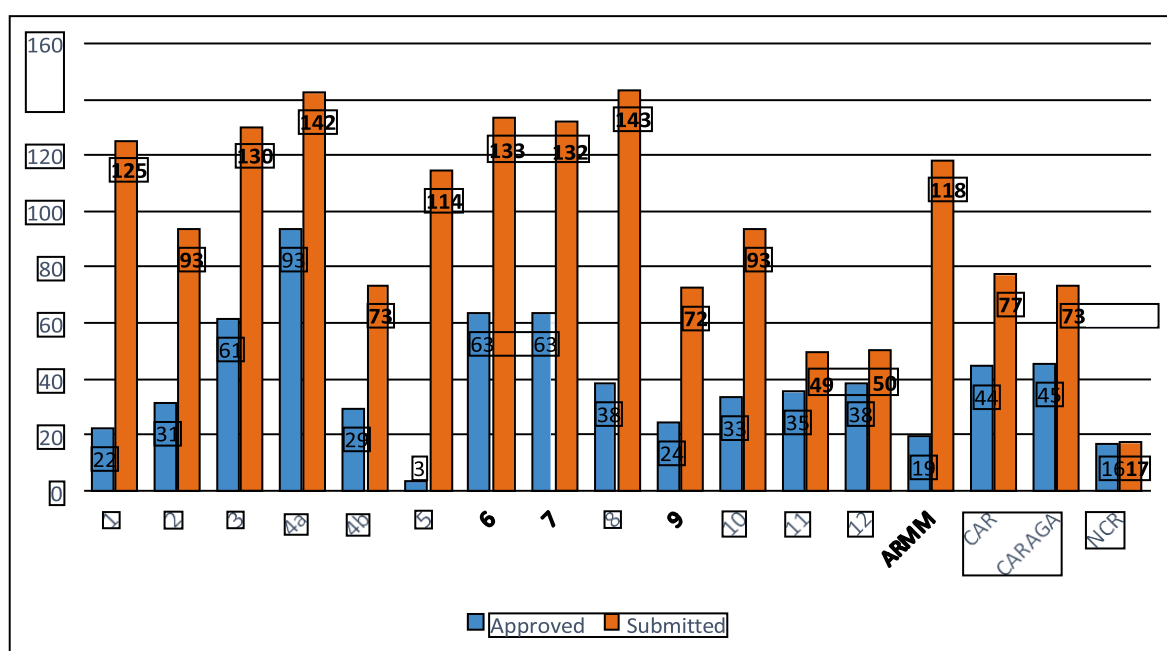


Figure 3s. Percentage of LGUs with submitted viz a viz approved SWM Plans in 2018

4. Legal and institutional framework

4.1 Legislations and policies

Over the last 17 years (1999 to 2015), the Philippines has endeavored to improve its management and operation of solid waste through several national laws, rules, regulations, orders, and memoranda on environment, including resolutions and ordinances issued by local government units.

The Ecological Solid Waste Management Act (RA 9003)

In 2001, RA 9003, otherwise known as the Ecological Solid Waste Management Act of 2000, was enacted into law declaring the policy of the government to “adopt a systematic, comprehensive, and ecological solid waste management program” in the country.

The ecological solid waste management (ESWM) policy is based on the management of waste in the following hierarchy:

Efficient management of residuals and of final disposal sites and/or any other related technologies for the destruction/reuse of residuals

Provided in RA 9003 and its IRR are mandates and schedules of implementation to be undertaken by provincial, city/municipal, and barangay governments within their jurisdiction. The most important of these include:

- Creation of a Solid Waste Management (SWM) Board (city/municipal and provincial levels)
- Creation of a SWM Committee (barangay level)
- Submission of a 10-year SWM Plan (city/municipal levels)
- Establishment of Materials Recovery Facilities (MRF) per barangay or cluster of barangays and city/municipal centralized MRF
- Closure of open dumpsites and conversion into controlled dumpsites by 2004 (city/municipal levels)
- Banning of controlled dumpsites by 2006 (city/municipal levels)

Other SWM-related laws and policies

There are also relevant laws enacted at the national level that affect the implementation of RA 9003. These are summarized as follows:

Toxic Substances and Hazardous and Nuclear Waste Act of 1990 (RA 6969). The act calls for the regulation of and restriction on the importation, manufacture, processing, sale, distribution, use and disposal of chemical substances and mixtures that pose risk and/or injury to health and to the natural environment.

Local Government Code (RA 7160). The act devolved certain powers to the local governments units, including enforcement of laws and cleanliness and sanitation, solid waste management, and other environmental matters.

Clean Air Act of 1999 (RA 8749). The act directs all government agencies to adopt the integrated air quality framework as a blueprint for compliance. Among its salient provisions are the “polluters must pay” principle, and the prohibition of the use of the incineration method, which is defined as the burning of municipal, biomedical and hazardous waste or the process, which emits poisonous and toxic fumes. The act further mandates LGUs to promote, encourage, and implement segregation, recycling and composting within their jurisdiction. It also required the phasing out of incinerators by July 2003.

Philippine Clean Water Act of 2004 (RA 9275). The act provides for the protection, preservation, revival of quality of fresh, brackish and marine waters of the country to pursue economic growth.

Environmental Awareness and Education Act of 2008 (RA 9512). The act promotes environmental awareness through environmental education. It integrates environmental education in the school curricula at all levels, public or private, barangay day care and pre-school, and non-formal, vocational, and indigenous learning.

Renewable Energy Act of 2008 (RA 9513). The act promotes the development, utilization and commercialization of renewable energy and for other purposes.

Section 30 of RA 9513 provides for the use of “waste to energy” technology subject to requirements of RAs 9003 and 8749 (Clean Air Act). Specifically, waste to energy technology refers to “systems which convert biodegradable material such as but not limited to animal manure or agricultural waste, into useful energy processes such as: anaerobic digestion, fermentation, and gasification, among others, subject to the provisions of the Clean Air Act of 1999 and the Ecological Solid Waste Management Act of 2000”.

Climate Change Act of 2009 (RA 9729). The act declares as a Philippine policy the adoption of the ultimate objective of the United Nations Framework Convention on Climate Change, which is the stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Code of Sanitation of the Philippines (Presidential Decree ~~PD~~ 856). The decree prescribes sanitation requirements for hospitals, markets, ports, airports, vessels, aircraft, food establishments, buildings, and other establishments. Refuse collection and disposal system in cities and municipalities are described in Chapter XVIII of the law.

Environmental Impact Assessment Law (PD 1586). Approved on June 11, 1978, the law establishes and institutionalizes an environmental impact system where projects to be undertaken would be reconciled with the requirements of environmental quality. This requires proponents of critical projects and projects located in critical areas to secure an environmental compliance certificate from the President or his duly authorized representative. The inclusion of the construction of SLF as a critical project was done later.

PD 1160. The law vests authority in Barangay Captains to enforce pollution and environmental control laws. It also deputizes the Barangay Council member and Barangay Zone Chairperson as peace officers.

Executive Order (EO) 774. Issued on December 26, 2008 the order calls for the reorganization of the Presidential Task Force on Climate Change, headed by the President, with all cabinet members as members of the Task Force. EO 774 created 13 Task Groups that included solid waste management.

The Philippine Disaster Risk Reduction and Management Act of 2010. In relation to Climate Change program, the law supports the 3 R's of SWM in promoting to consumers avoidance of using the disposable

and unnecessary products in order to avoid or reduce the solid wastes generated by households, commercials, institutional, industries and all levels of stakeholders.

Of significance also are several national policy frameworks that support solid waste management in the country, namely:

National Solid Waste Management Framework (NSWMF) 2004. As provided for under RA 9003, the NSWMF outlines the preferred approach to support the adoption of systematic, comprehensive and ecological solid waste management program. It focuses on the waste management hierarchy that emphasizes waste avoidance and minimization through reuse, recycling, composting and resource recovery.

National Framework Strategy on Climate Change (NFSCC) - Chapter 8: Mitigation pillar on waste management (2010-2022). Pursuant to RA 9729 (Climate Change Act of 2009), the Climate Change Commission passed NFSCC, which finds the waste sector as the third largest greenhouse gas emitter. In response to this, NFSCC identifies SWM as among the six (6) priority sectors with strategic priorities:

- Enhanced implementation of RA 9003
- Promotion of best practices in waste management, involving all categories of waste
- Strengthen the advocacy of proper waste management as a tool towards better communicating and mobilizing the public to address climate change

Philippine Development Plan (PDP) 2011-2016 Chapter 9: Sustainable and climate-resilient environment and natural resources; Chapter 10: Accelerating infrastructure development. The Plan's infrastructure development program ensures equitable access to infrastructure services. The government aims to accelerate the provision of safe, efficient, reliable, cost-effective, and sustainable infrastructure. Under its 'infrastructure' component, the PDP aims to increase the percentage of the number of LGUs served by SLFs to 7.76% by 2016.

Meanwhile, the PDP's environmental protection program mitigates the demands arising from development, population expansion, poor environmental protection and climate change, through integrated approaches. Targets by 2016 include an increase in waste diversion rate by 50% through reuse, recycling and composting and other resource recovery activities; closure and rehabilitation of all existing dumpsites; and full operationalization of National/Regional Ecology Centers.

Philippine National Solid Waste Management Strategy (NSWMS) (2012-2016). In relation to the NSWMF, a National Solid Waste Management Strategy (NSWMS) was developed through a consultative process. The NSWMS has the following components:

- bridging policy gaps and harmonizing policies;
- capacity development, social marketing and advocacy;

- sustainable SWM financing mechanisms;
- creating economic opportunities;
- support for knowledge management on technology, innovation and research;
- organizational development and enhancing inter-agency collaboration;
- compliance monitoring, enforcement and recognition, and;
- cross cutting issues on good governance, caring for vulnerable groups and disaster and climate change risks through SWM

As the overarching law governing ecological SWM implementation in the Philippines, RA 9003 mandates all LGUs to cease using dumpsites as final repository for solid wastes. Along with the closure and rehabilitation of existing dumps, LGUs would have to put up sanitary landfills as the legitimate mode of disposal.

Various national environmental legislations also require wastewater or leachate control measures to prevent surface and groundwater contamination as well as proper gas management systems to reduce GHG emissions and occupational health and safety risks. At the same time, RA 9003 requires the diversion of at least 25% of waste away from disposal facilities, which can be done through the establishment of composting and MRF.

NSWMC resolutions and corresponding administrative orders

Since 2002, the NSWMC has passed supplementary guidelines in the form of NSWMC Resolutions to enhance the understanding of RA 9003 provisions. Some of these have been further detailed as DENR Administrative Orders (DAO). Hereunder are the resolutions issued by the NSWMC.

Table 4a. List of selected NSWMC Resolutions and corresponding Administrative Orders (AO)

RESOLUTION NUMBER	TITLE	DATE SIGNED/ SIGNATORY
1 Series of 2002	Delegation of Certain Functions of the NSWMC Chairman to the DENR Regional Executive Directors and Prescribing Appropriate Clearances for Solid Waste Management Facilities	Date of Approval: April 24, 2002 Signed by DENR Sec. Heherson T. Alvarez
2 Series of 2003	A Resolution Requesting the Provincial Government of Tarlac to Re-consider Its Stand on Accommodating Only Wastes Coming From the Province of Tarlac and the Clark Economic Zone for Disposal at the Clark Sanitary Landfill	Date of Approval was not specified Signed by NSWMC Chair, Sec. Elisea G. Gozun

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3 Series of 2004	Supporting the Recommendation by the Metro Manila Development Authority Thru its Council To Her Excellency the President to Disap-prove the Contract Entered into by the Executive Committee of the Presidential Task Force on Waste Management with JANCOM Envi-ronmental Corporation and for Other Purpose	Date of Approval: December 8, 2004 Signed by NSWMC Chairman Sec. Michael T. Defensor
4 Series of 2005	Acceptance and Approval of the Proposed Closure Plan for the Navo-tas Controlled Dump Facility	Date of Approval: June 6, 2005 Signed by NSWMC Chairman Sec. Michael T. Defensor
5 Series of 2005	Adoption of the Guidelines on the Closure and Rehabilitation of Dis-posal Facilities	Date of approval: December 15, 2005 Signed by NSWMC Chairman Sec. Michael T. Defen-sor
6 Series of 2005	Adoption of the Guidelines on Categorized Disposal Facilities	Date of Approval: December 15, 2005 Signed by NSWMC Chairman Sec. Michael T. Defen-sor
7 Series of 2005	Designation of the Executive Director and Deputy Executive Director of the National Solid Waste Management Commission-Secretariat	Date of Approval: December 15, 2005 Signed by NSWMC Chairman Sec. Michael T. Defensor
8 Series of 2006	Guidelines on the Review and Approval of the 10-year Solid Waste Management Plans of Local Government Units	Date of Approval: 2006 NSWMC Chairman: Sec. Angelo T. Reyes
9 Series of 2006	Creation of a Technical Working Committee (TWC) for Phasing Out NEA Products and Packaging Materials	Date of Approval: 2006 Signed by NSWMC Chairman Sec. Angelo T. Reyes
10 Series of 2008	Approval of the NSWMC Work Program with the Corresponding Operational Budget and Request for Subsequent Endorsement to the De-partment of Budget and Management	Date of Approval: January 30, 2008 Signed by NSWMC Chairman Sec. Angelo T. Reyes
11 Series of 2007	Adoption of "LALA" as the Filipino Term for Sanitary Landfill	Date of Approval: July 26, 2007 Signed by NSWMC Chairman Sec. Angelo T. Reyes
12 Series of 2007	Adopting and Approving the Output and Recommendations of the NSWMC-Inter-Agency Technical Working Group (NSWMC-IATWG) on the JANCOM Waste Management Contract	Date of Approval: July 26, 2007 Signed by NSWMC Chairman Sec. Angelo T. Reyes
13 Series of	Adoption and endorsement of the Cost-Sharing Framework for Solid Waste	Date of Approval: January 30, 2008

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2008	Management (SWM) Services to the NEDA-INFRA COM and other appropriate government agency as deemed necessary	Signed by NSWMC Chairman Sec. Angelo T. Reyes
14 Series of 2009	Designation of the Executive Director of the National Solid Waste Management Commission Secretariat	NSWMC Meeting: December 11, 2008 Signed by NSWMC Chairman Sec. Jose L. Atienza, Jr.
15 Series of 2009	Resolution Creating a National Solid Waste Management Technical Working Group (NSWMC-TWG)	Date of Approval: January 29, 2009 Signed by NSWMC Chairman Sec. Jose L. Atienza, Jr.
16 Series of 2009	Resolution to Include Department of Education (Dep-Ed) as Member of the Technical Working Group (TWG) of the National Solid Waste Management Commission	Date of Approval: January 23, 2009 Signed by NSWMC Chairman: Sec. Ange-lo T. Reyes
17 Series of 2009	Resolution Adopting the 3-Strike Policy	(Presented and agreed to be adopted by the NSWMC during the TWG meeting on January 23, 2009) Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
18 Series of 2009	Resolution Adopting the Japan International Cooperation Agency (JICA) Recycling Industry Development Study	(Presented and agreed to be adopted by the NSWMC during the TWG meeting on February 20, 2009) Signed by Sec. Jose L. Atienza, Jr.
19 Series of 2009	Resolution Adopting the Guidelines on the Phasing Out of Non-Environmentally Acceptable (NEA) Products and Packaging Materials	Date of Approval: June 29, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
20 Series of 2009	Resolution Replacing One (1) NGO Representative to the Non-Environmentally Acceptable Product (NEAP) and Packaging Materials Technical Working Committee (TWC)	Date of Approval: June 24, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
21 Series to 23 Series of 2009	Resolution allowing the LGUs a month grace period to comply with RA 9003 after attending the F1-Zero Basura Caravan	

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	Resolution approving the publication of the list on non-complying LGUs	
24 Series of 2009	Resolution for Department of Interior and Local Government (DILG) to Issue a Circular to Tap All Barangays to Submit Status of Compliance Regarding the Establishment of Materials Recovery Facilities (MRFs)	Date of Approval: June 25, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
25 Series of 2009	Draft Resolution on Adoption of Modified Guidelines on Landfill Sitting Criteria and Suitability Assessment Procedure	
26 Series of 2009	Resolution Adopting Eco-Park as an Option to Sanitary Landfill (“Eco-park be an option for waste disposal instead of Sanitary Landfill”)	Date of Approval: June 25, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
27 Series of 2009	Resolution Allowing the Conduct of Provincial Ecological Solid Waste Management Summit	Date of Approval: June 25, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
28-33 Series of 2009	Resolution allowing the Establishment of Metro Manila Recycling Plant at the Smokey Landfill with the Use of Refuse Derived Fuels (RDF) Technology	
	Resolution allowing the use of Patented Steam Reduction Technology as an Alternative Method for Ecological Solid Waste Management	
	Resolution for the Banning of Thin Film Single Use Plastic Bags	
	Resolution to adopt full implementation and Operationalization of the National Ecology Center (NEC)	
	Resolution Adopting the Extended Producers/Products Responsibility (EPR) Program	
34 Series of 2009	Resolution affirming the NSWMC Secretariat to Perform the Functions of the National Ecology Center	Date of Approval: September 30, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.

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35 Series of 2009	Resolution Adopting the Guidelines on Deputation of Solid Waste Management Officers	Date of Approval: October 9, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
36 Series of 2009	Resolution Adopting the Criteria for Accreditation of an Individual and Individual Member of an Organization as Solid Waste Management Experts	Date of Approval: October 9, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
37 Series of 2009	Resolution Authorizing the Philippine Information Agency (PIA) to Prepare the Communication Plans for NSWMC	
38 Series of 2009	Resolution to Commend Dr. Christopher Silverio for his Invaluable Contribution as DOST Representative to National Solid Waste Management Commission	Date of Approval: October 9, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
39 Series of 2009	Resolution Amending NSWMC Resolution 8 re: Guidelines on the Review and Approval of the 10-yr Solid Waste Management Plans of Local Government Units (LGUs)	Date of Approval: October 9, 2009 Signed by NSWMC Chairman: Sec. Jose L. Atienza, Jr.
40 Series of 2010	Resolution to Adopt the Guidelines for the Campaign of Basura-Free Elections 2010	Date of Approval: February 10, 2010 Signed by NSWMC Chairman: Sec. Eleazar P. Quinto
41 Series of 2010	Resolution Approving the 10 Year SWM Plans of Various LGUs Maria Aurora, Aurora Tineg, Abra Sampaloc, Quezon Solano, Nueva Viscaya Sta. Cruz, Ilocos Sur, Zamboanga City, Boracay, Malay, Aklan	Date of Approval : March 4, 2010 Signed by NSWMC Chairman: Sec. Horacio C. Ramos
42 Series of 2010	Designation of the Executive Director of the National Solid Waste Management Commission-Secretariat	Date of Approval: March 4, 2010 Signed by the Chairman: Sec. Horacio C. Ramos
43 Series of 2010	Resolution to Commend Assistant Secretary GERARDO V. CALDERON as Outgoing Executive Director of National Solid Waste Management Commission Secretariat	Date of Approval: March 4, 2010 Signed by NSWMC Chairman: Sec. Ho-racio C. Ramos
44 Series of 2010	Resolution to Commend Dr. METODIO PALAYPAY for his Invaluable Contribution as	Date of Approval: May 20, 2010 Signed by NSWMC Chairman: Sec. Ho-racio C. Ramos

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	NGO Representative to National Solid Waste Management Commission	
45 Series of 2010	Resolution to Commend ATTY. ZOILO L. ANDIN, JR. as Outgoing Executive Director of the National Solid Waste Management Commission Secretariat	Date of Approval: May 20, 2010 Signed by NSWMC Chairman: Sec. Ho-racio C. Ramos
46 Series of 2010	Resolution to Commend Ms. LUZ SABAS for Her Invaluable Contribution as Non Government Organization Founder to the Implementation of RA 9003 known as Ecological Solid Waste Management	Date of Approval: May 20, 2010 Signed by NSWMC Chairman: Sec. Ho-racio C. Ramos
47 Series of 2010	Resolution Adopting the National Framework Plan for the Informal Sector in Solid Waste Management	Date of Approval: May 20, 2010 Signed by NSWMC Chairman: Sec. Ho-racio C. Ramos
48 Series of 2010	Resolution Creating the Multi-Sectoral Committee for Capacity Development of the Informal Waste Sector	Date of Approval: May 20, 2010 Signed by NSWMC Chairman: Sec. Horacio C. Ramos
49 Series of 2010	Resolution for the National Solid Waste Management Commission Members to Approve the 10 year Solid Waste Management Plans of Local Government Units (LGUs)	Date of Approval: October 22, 2010 Signed by NSWMC Chairman: Sec. Ramon JP Paje
50 Series of 2010	Adoption of the Guidebooks on Formulation of Solid Waste Management Plan, Safe Closure of Disposal Sites, Solid Waste Disposal Design Operation and Management	Date of Approval: October 22, 2010 Signed by NSWMC Chairman: Sec. Ramon JP Paje
51 Series of 2010	Resolution Adopting the National Ecology Center (NEC) and Regional Ecology Centers (RECs) Operational Guidelines	Date of Approval: October 22, 2010 Signed by NSWMC Chairman: Sec. Ramon JP Paje
52 Series of 2010	Resolution Adopting Prototype City/Municipal Ordinance Regulating the Establishment and Operation of Junkshops and Provide Corresponding Penalties	Date of Approval: October 22, 2010 Signed by NSWMC Chairman: Sec. Ramon JP Paje
53 Series of 2010	Granting Authority to the EMB Director to issue Notice to Sue to Non-Complying LGUs to Section 37 of RA 9003	Date of Approval: October 22, 2010 Signed by NSWMC Chairman:

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		Sec. Ramon JP Paje
54 Series of 2010	Resolution Requesting the Department of Budget and Management to Create Plantilla Positions for Executive Director, Deputy Executive Director and Staff of the National Solid Waste Management Commission Secretariat at the Environmental Management Bureau, Central Office	Date of Approval: October 22, 2010 Signed by NSWMC Chairman: Sec. Ramon JP Paje
55 series of 2013	Resolution for the NSWMC members to approve the ten-year SWM Plans of the LGUs	Date of Approval: January 24, 2013 Signed by Commissioner, Vice Chair, NSWMC and Representative, Recycling Sector
56 series of 2013	Resolution Amending DENR Administrative Order No. 9 Series of 2006, Other-wise known as General Guidelines in the Closure and Rehabilitation of Open Dumpsites and Controlled Dump Facilities	Date of Approval: January 24, 2013 Signed by Commissioner, Vice Chair, NSWMC and Representative, Recycling Sector
57 series of 2013	Resolution Creating a Philippine Methane Partnership Technical Working Group (PMP-TWG)	Date of Approval: January 24, 2013 Signed by Commissioner, Vice Chair, NSWMC and Representative, Recycling Sector
58 series of 2013	Resolution on the Application for registration by Mundo Verde Corporation with the Board of Investments of the Department of Trade and Industry (BOI-DTI)	Date of Approval: January 24, 2013 Signed by Commissioner, Vice Chair, NSWMC and Representative, Recycling Sector
9 series of 2013	Adopting the National Solid Waste Management Strategy (2012-2016)	Date of Approval: January 24, 2013 Signed by Commissioner, Vice Chair, NSWMC and Representative, Recycling Sector
60 series of 2013	Guidelines for Mandatory Solid Waste Segregation at Source, Segregated Collection and Recovery, and Prescribing Fines and Penalties for Violation thereof	Date of Approval: January 24, 2013 Signed by Commissioner, Vice Chair, NSWMC and Representative, Recycling Sector
61 series of 2013	Resolution to Enjoin the Metro Manila Council (MMC) to Effect the Massive and Continuous Clean-Up of Metro Manila in Accordance with the Provisions of RA 9003	Date of Approval: July 5, 2013 Signed by the Chairman: Sec. Ramon JP Paje Date Signed: February 7, 2014

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62 series of 2013	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Alabang, Sarangani	Date of approval: July 5, 2013 Signed by the Chairman: Sec. Ramon JP Paje Date Signed: February 7, 2014
63 series of 2013	Resolution for the Institutionalization of the National Solid Waste Management Commission and the Offices Created Under it Particularly the Secretariat and the National Ecology Center	Date of approval: July 5, 2013 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
64 series of 2013	Adoption of Modified Guidelines on Site Identification Criteria and Suitability Assessment for Sanitary Landfills	Date of approval: July 5, 2013 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
65 series of 2013	Resolution Providing Conditional Approval of the Ten-Year Solid Waste Management Plans of Local Government Units	Date of Approval: October 3, 2013 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
66 series of 2013	Resolution Designating the Chief of the Solid Waste Management Division as OIC-Executive Director of the National Solid Waste Management Commission Secretariat	Date of Approval: December 13, 2013 Signed by the Chairman: Sec. Ramon JP Paje Date Signed: February 7, 2014
67 series of 2013	Resolution Approving the 10-year SWM Plans of the following LGUs: Municipality of Monkayo, Compostela, Valley and Municipality of Maragusan, Compostela Valley	Date of Approval: December 13, 2013 Signed by the Chairman: Sec. Ramon JP Paje Date Signed: February 7, 2014
68 series of 2013	Adoption of the Guidelines on the Clustering of Local Government Units (LGUs) on Common Ecological Solid Waste Management (ESWM) System	Date of Approval: December 13, 2013 Signed by the Chairman: Sec. Ramon JP Paje Date Signed: February 7, 2014
	Resolution on the Nationwide Implementation of the Establishment of an Appropriate	Date of Approval: December 13, 2013 Signed by the Chairman: Sec. Ramon JP Paje

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69 series of 2013	Ecological Solid Waste Management System for Home Owners Association (HOAs), Public Markets and Commercial Establishments and the Ecosavers Program for Public Schools	Date Signed: February 7, 2014
70 series of 2013	Adoption of Guidelines Prescribing Deadlines on the Submission of Ten-Year SWM Plans	Date of Approval : December 13, 2013 Signed by Commissioner Crispian N. Lao ,Vice Chair, NSWMC and Representative, Recycling Sector
71 series of 2013	Resolution Endorsing the Nomination of Deputy Executive Director Eligio T. Ildefonso as OIC-Executive Director of the NSWMCS upon the Retirement of the OIC-Executive Director, Emelita C. Aguinald	Date of Approval: December 13, 2013 Signed by the Chairman: Sec. Ramon JPPaje Date Signed: February 7, 2014
72 series of 2013	Resolution Endorsing the Declaration of every month of January as Zero Waste Management Month in the Philippines	Date of Approval: December 13, 2013 Signed by the Chairman: Sec. Ramon JPPaje Date Signed: February 7, 2014
73 series of 2013	Amending Resolution Number 65 providing conditional approval to the Ten-Year SWM Plans of Local Government Units	Date of Approval: February 11, 2014 Signed by Commissioner Crispian N. Lao ,Vice Chair, NSWMC and Representative, Recycling Sector
74 series of 2013	Resolution Mandating the Local Government Units (LGUs) to strictly implement RA 9003	Date of Approval: February 11, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
75 series of 2014	Resolution for the establishment /development of the 10-storey National Ecology Center Pursuant to RA 9003	Date of Approval: April 3, 2014 Signed by USec. Manuel D. Gerochi on June 9, 2014
76 series of 2014	Resolution Adopting the Enforcement Policy for the Barangays	Date of Approval: April 3, 2014 Signed by USec Manuel D. Gerochi on June 9, 2014

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77 series of 2014	Governing Rules and Regulations of the National Solid Waste Management Commission (NSWMC)	Date of Approval: April 29, 2014 Signed by USec Manuel D. Gerochi
78 series of 2014	Governing Rules and Regulations of the National Solid Waste Management Commission-Technical Working Group (NSWMC-TWG)	Date of Approval: April 29, 2014 Signed by USec Manuel D. Gerochi
79 series of 2014	Amending Resolution No. 26 series of 2009, Changing the Term Ecology Park or Eco-Park to Ecological Solid Waste Management Park or Eco-SWM Park and Providing Clarifications on its Use	Date of Approval: April 29, 2014 Signed by USec Manuel D. Gerochi
80 series of 2014	Amending Resolution No. 39, Guidelines on the Review and Approval of the 10-year Solid Waste Management Plans of Local Government Units (LGUs)	Date of Approval: April 29, 2014 Signed by USec Manuel D. Gerochi
81 series of 2014	Resolution Approving the Ten-Year Solid Waste Management Plans of Municipalities of Allacapan, Baggao and Lal-lo in the Province of Cagayan and Municipality of Quirino in the Province of Isabela	Date of Approval: April 29, 2014 Signed by USec Manuel D. Gerochi
82 series of 2014	Resolution Adopting the NSWM Comprehensive Plan as basis for Budget Proposal	Date of Approval: June 24, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
83 series of 2014	Resolution supporting the programs of NSWMC submitted to NEDA INFRACOM for Public Investment in CY 2015	Date of Approval: June 24, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
84 series of 2014	Resolution in Adopting the Implementing Guidelines of the National Ecosaver's Program	Date of Approval: June 24, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
85 series of 2014	Resolution creating a Multi-Agency Sub-Group (MASG) to develop the guidelines on the Waste Analysis and Characterization Study (WACS) and Computation of Waste Diversion	Signed by Commissioner Date of Approval: June 24, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair,

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		NSWMC and Representative, Recycling Sector
86 series of 2014	Resolution creating a Multi-Agency Sub-Group (MASG) to develop the guide-lines On Composting, Compost Quality and Market Development (CCQMD)	Date of Approval: August 12, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
87 series of 2014	NSWMC Resolution granting the extension of the Conditional Approval of the Ten-Year SWM Plan of the Municipality of Carmona, Cavite	Date of Approval: August 12, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
88 series of 2014	NSWMC Resolution granting the extension of the Conditional Approval of the Ten-Year SWM Plan of the Municipality of the City of Malabon, Metro Manila	Date of Approval: August 12, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector

90 series of 2014	Resolution creating a Multi-Agency Sub-Group (MASG) to develop the guide-lines on the establishment and operation of best available Waste to Energy (WTE) Technologies for the Country	Date of Approval: August 12, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
91 series of 2014	Resolution creating a Multi-Agency Sub-Group to develop/adopt Solid Waste Management Training Modules and Formulate a Training/Accreditation/ Certification System for SWM Practitioners and Experts	Date of Approval: August 12, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
92 series of 2014	Resolution Creating a Sub-Group to prepare the Communications Plan and the Vision and Mission for NSWMC	Date of Approval: August 12, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
93 series of 2014	Resolution Approving the Ten-Year SWM Plan of Municipalities in Laguna, Rizal and Quezon	Date of Approval: September 30, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
94 series of 2014	NSWMC Resolution Granting the Extension of the Conditional Approval of the Ten-Year Solid Waste Management Plan of the City of Manila	Date of Approval: September 30, 2014

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		Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
95 series of 2014	NSMWC Resolution Granting the Extension of the Conditional Approval of the Ten-Year Solid Waste Management Plan of the City of Navotas	Date of Approval: September 30, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
96 series of 2014	Resolution Authorizing the Presiding Officer of the NSWMC September 30, 2014 Meeting to sign and attest on behalf of the Chairman the Resolutions Approved in 2010-2013	Date of Approval: September 30, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
97 series of 2014	NSWMC Resolution granting the Extension of the Conditional Approval of the Ten-Year Solid Waste Management Plan of the Municipality of Camaligan, Camarines Sur	Date of Approval: October 28, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
98 series of 2014	NSWMC Resolution granting the Extension of the Conditional Approval of the Ten-Year Solid Waste Management Plan of the Municipality of San Miguel, Bohol	Date of Approval: October 28, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
99 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Nabunturan, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
100 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Pantukan, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
101 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Compostela, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
102 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of New Bataan, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative,

		Recycling Sector
103 series of 2014	Resolution Granting the request for extension of the Submission of Ten-Year Solid Waste Management Plans to Local Government granted with Conditional Approval	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
104 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Laak, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
105 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Mabini, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
106 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Maco, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
107 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Mawab, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
108 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Montevista, Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
109 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Province of Compostela Valley	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector

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110 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the Municipality of Bacarra, Province of Ilocos Norte	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
111 series of 2014	Resolution approving the Ten-Year Solid Waste Management Plan of the City of Bacoor, Province of Cavite	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
112 series of 2014	Resolution Creating A Multi-Agency (MASG) on Recognition and Awards	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
113 series of 2014	Resolution Granting the request for extension of the Submission of Ten-Year Solid Waste Management Plans to Local Government Units with Final Notice	Date of Approval: December 10, 2014 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector

114 series of 2015	Resolution Supporting and Endorsing to TESDA Board the Training Regulations for Garbage Collection NC I and Training Regulations for Sanitary Landfill Operations NC III	Date of Approval: January 27, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
115 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Calauan, Province of Laguna	Date of Approval: January 27, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
116 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Victoria, Province of Tarlac	Date of Approval: January 27, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
117 series of 2015	Resolution Endorsing the Implementation to the Memorandum of Agreement between the NSWMC through the DENR and the Tarlac College of Agriculture for a Satellite Ecology Center	Date of Approval: January 27, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector

118 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Baco-Iod City, Province of Negros Occidental	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
119 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Manapla, Province of Negros Occidental	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
120 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of La Carlota, Province of Negros Occidental	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
121 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Hinobaan, Province of Negros Occidental	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
122 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Enrique B. Magalona, Province of Negros Occidental	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
123 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of the City of Bago, Province of Negros Occidental	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
124 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Bamban in the Province of Nueva Viscaya	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
125 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Parañaque	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector

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126 series of 2015	Granting Authority to the EMB Director to issue Notice to Sue to Non-Complying LGUs to RA 9003	Date of Approval: February 24, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
127 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Valenzuela City, Metro Manila	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
128 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Solana, Cagayan	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
129 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of San Jose City, Nueva Ecija	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
130 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Malvar, Batangas	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
131 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Luisiana, Laguna	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
132 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Carmona, Cavite	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
133 series of 2015	Resolution Adopting the Full Waste Recovery and Recycling Program	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
134 series of 2015	Resolution providing the Final Non-Extendable Deadline to Submit the Ten-Year Solid Waste Management Plans of Local Government Units	Date of Approval: March 31, 2015 Signed by Commissioner Crispian N. Lao, Vice Chair, NSWMC and Representative, Recycling Sector
135 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Caraga, Davao Oriental	Date of Approval: April 28, 2015

National Solid Waste Management Status Report [2008-2018]

		Signed by USec. Manuel D. Gerochi on April 28, 2015
136 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Sulop, Davao del Sur	Date of Approval: April 28, 2015 Signed by USec. Manuel D. Gerochi on April 28, 2015
137 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Matanao, Davao del Sur	Date of Approval: April 28, 2015 Signed by USec. Manuel D. Gerochi on April 28, 2015
138 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Pilar, Bataan Province	Date of Approval: April 28, 2015 Signed by USec. Manuel D. Gerochi on April 28, 2015

139 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Maria Aurora, Aurora Province	Date of Approval: April 28, 2015 Signed by USec. Manuel D. Gerochi on April 28, 2015
140 series of 20105	Resolution Approving the Ten-Year Solid Waste Management Plan of San Juan City, Metro Manila	Date of Approval: May 26, 2015 Signed by USec. Manuel D. Gerochi
141 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality La Paz, Tarlac Province	Date of Approval: May 26, 2015 Signed by USec. Manuel D. Gerochi
142 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Trento, Agusan del Sur Province	Date of Approval: May 26, 2015 Signed by USec. Manuel D. Gerochi
143 series of 2015	Resolution Engaging the Metropolitan Manila Development Authority (MMDA) in the Review and Evaluation of 10 Year SWM Plans of LGUs in Metro Manila	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Representative, Recycling Sector
144 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Roxas, Province of Isabela	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N.

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		Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
145 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Rosario, Province of La Union	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
146 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Cityof Panabo, Province of Davao del Norte	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
147 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Cityof Mabalacat, Province of Pampanga	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
148 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Cityof Panabo, Province of Davao del Norte	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
149 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Dinalupihan, Bataan	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
150 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Conception, Romblon	Date of Approval : June 30, 2015 Signed by: Commissioner Crispian N. Lao , Vice Chairman, NSWMC and Repe-sentative, Recycling Sector
151 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Hinundayan, Southern Leyte	Date of Approval : July 28, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repe- sentative, Recycling Sector
152 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Rizal, Laguna	Date of Approval : July 28, 2015

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		Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
153 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Antipolo, Rizal	Date of Approval : July 28, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
154 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Manila	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
155 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of San Mariano, Isabela	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization
156 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of San Mateo, Isabela	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization
157 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Plaridel, Bulacan	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization
158 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Guagua, Pampanga	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization
159 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Motiong, Samar	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization
160 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Limasawa, Southern Leyte	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization
161 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Angono, Rizal	Date of Approval : August 25, 2015

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		Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
162 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Sta. Maria, Davao Occidental	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
163 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Burgos, Surigao del Norte	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
164 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Remedios Trinidad Romualdez, Agusan del Norte	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization

165 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Lanuza, Surigao del Sur	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
166 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Malabon, Metro Manila	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
167 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of San Fernando, Pampanga	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
168 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of San Rafel, Bulacan	Date of Approval : August 25,2015 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organization
169 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Las Piñas, Metro Manila	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representa-tive, Recycling Sector

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170 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Pasig, Metro Manila	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
171 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of San Carlos, Negros Occidental	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
172 series of 2015	resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Cabanglasan, Bukidnon	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
173 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Las Nieves, Agusan del Norte	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
174 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Barobo, Surigao del Sur	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
175 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Vigan, Ilocos Sur	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
176 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Jabonga, Agusan del Norte	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
168 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of San Rafael, Bulacan	Date of Approval : August 25, 2015 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organization

169 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Las Piñas, Metro Manila	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
170 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Pasig, Metro Manila	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
171 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of San Carlos, Negros Occidental	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
172 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Cabanglasan, Bukidnon	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
173 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Las Nieves, Agusan del Norte	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
174 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Barobo, Surigao del Sur	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
175 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Vigan, Ilocos Sur	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector

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176 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Jabonga, Agusan del Norte	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representa-tive, Recycling Sector
177 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Magallanes, Agusan del Norte	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representa-tive, Recycling Sector
178 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Sta. Cruz, Davao del Sur	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representa-tive, Recycling Sector
179 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of San Miguel, Bulacan	Date of Approval : September 29, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representa-tive, Recycling Sector

180 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Lian, Batangas	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
181 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of City of Muntinlupa	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
182 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Surallah, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector

183 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Banga, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
184 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Norala, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
185 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Sto. Niño, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
186 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Tantaran, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
187 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Lake Sebu, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
188 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of T'boli, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
189 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of Koron-adal City, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector

190 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Polomolok, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
191 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Tupi, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector

192 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Tampakan, South Cotabato	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
193 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of SOUTHCOTABATO PROVINCE	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
194 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of San Nicolas, Ilocos Norte	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
195 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Laur, Nueva Ecija	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
196 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of Angeles City, Pampanga	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC

		and Repre- sentative, Recycling Sector
197 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of City of San Jose del Monte, Bulacan	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
198 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of Baguio City, Benguet	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
199 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu- nicipality of Aliaga, Nueva Ecija <i>(pending submission of copy of the Resolution from the Sangguniang Bayan for their final disposal to Metro Clark SLF including its budget allocation within 90 days)</i>	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
200 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu- nicipality of Sta. Rita, Pampanga	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
201 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu- nicipality of Sta. Maria, Bulacan <i>(pending submission of (1) corrected waste diversion target (2) annual budget including the MOOE and Investment Cost correspondent to the adjustment made to the waste diversion target)</i>	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Repre- sentative, Recycling Sector

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202 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Aloran, Misamis Occidental <i>(pending submission of adjusted waste diversion target extracted from the entirety of the total waste generation including programs and strategies and annual budget reflective of the activities)</i>	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
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203 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Dangcagan, Bukidnon	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
204 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Leyte, Leyte	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
205 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of La Paz, Agusan del Sur	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
206 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Tagbina, Surigao del Sur	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
207 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Ballesteros, Cagayan Date of Approval : October 27, 2015 Signed by: , Vice Chairman, NSWMC	Date of Approval : October 27, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
208 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Alaminos, Pangasinan Province	Date of Approval: November 25, 2015

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		Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
209 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Tangalan, Province of Aklan	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
210 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Navotas, Metro Manila	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
211 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Nasipit, Agusan del Norte	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
212 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Cagdianao, Province of Dinagat Islands	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
213 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Alitagtag, Province of Batangas	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
214 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Aritao, Province of Nueva Vizcaya	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector

215 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City of Taguig, Metro Manila	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
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216 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Esperanza, Agusan del Sur	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
217 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City ofBiñan, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
218 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Pila, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
219 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City ofSta. Rosa, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
220 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City ofCabuyao, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
221 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City ofCalamba, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
222 series of 2015		Date of Approval: November 25, 2015

National Solid Waste Management Status Report [2008-2018]

	Resolution Approving the Ten-Year Solid Waste Management Plan of SanPablo City, Province of Laguna	Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
223 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the City ofSan Pedro, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
224 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Pagsanjan, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
225 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Pangil, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
226 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Siniloan, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
227 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Alaminos Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
228 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Lumban, Province of Laguna Date of Approval : November 25, 2015	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC

National Solid Waste Management Status Report [2008-2018]

	Signed by: , Representative, Recycling Industry and Vice Chairman, NSWMC	and Repre- sentative, Recycling Sector
229 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Pakil Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
230 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Victoria Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
231 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Famy, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
232 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Liliw, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
233 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Cavinti, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
234 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Mabitac, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
235 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Paete, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC

		and Repre- sentative, Recycling Sector
236 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Majayjay, Province of Laguna	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
237 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Moncada, Province of Tarlac	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
238 series of 2015	Resolution Adopting the Study on Life Cycle Analysis (LCA) of Selected Pack-aging Products (Carrying and Polystyrene)	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector

239 series of 2015	Resolution Creating A Multi-Agency Sub-Group (MASG) for the Updating of the Recycling Market Development Study	Date of Approval: November 25, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
240 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Munic-ipality of Candaba, Province of Pampanga	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector
241 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Munic-ipality of Macrohon, Southern Leyte	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao,Vice Chairman, NSWMC and Repre- sentative, Recycling Sector

242 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Lupon, Davao Oriental	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
243 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Lupon, Davao Oriental	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
244 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of San Isidro, Davao Oriental	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
245 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Tarragona, Davao Oriental	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
246 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Dinagat, Dinagat Islands	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
247 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Tubajon, Dinagat Islands	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector

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48 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Loreto, Dinagat Islands	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
249 series of 2015	Resolution Supporting and Endorsing to TESDA Board the Training Regulations for Sanitary Landfill Operators (NC II)	

250 series of 2015	Resolution Approving the Ten-Year Solid Waste Management Plan of the Municipality of Baganga, Davao Oriental	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
251 series of 2015	Resolution Authorizing the Official Representative from Non-Government Organization (NGO) to the National Solid Waste Management Commission, to Issue Endorsements and Represent the Commission to the Environmental Ombudsman Pertaining to Non-Compliance of LGUs within the Provisions of RA 9003	Date of Approval: December 11, 2015 Signed by: Commissioner Crispian N. Lao, Vice Chairman, NSWMC and Representative, Recycling Sector
252 series of 2016	Resolution Adopting the Guidelines in the Selection of a Representative from the Recycling Sector	Date of Approval : January 26, 2016 Signed by: Crispian N. Lao, Representative, Recycling Industry and Vice Chairman, NSWMC
253 series of 2016	Resolution providing Citations and Special Recognition to Acknowledge Exceptional Contribution and Unwavering Support to Local Government Units in the Implementation of the RA9003	Date of Approval : January 26, 2016 Signed by: Crispian N. Lao, Representative, Recycling Industry and Vice Chairman, NSWMC
254 series of 2016	Resolution Adopting the Memorandum of Understanding to Strengthen the Implementation of Waste Recovery Program with the Private Sector	Date of Approval : January 26, 2016 Signed by: Crispian N. Lao, Representative, Recycling

		Industry and Vice Chair- man, NSWMC
255 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Makati City, Metro Manila	Date of Approval : February 23, 2016 Signed by: Manuel D. Gerochi, CESO I, Undersecretary for Policy, Planning and Foreign Assisted Programs
256 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Manda-luyong City, Metro Manila	Date of Approval : February 23, 2016 Signed by: Manuel D. Gerochi, CESO I, Undersecretary for Policy, Planning and Foreign Assisted Programs
257 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Marikina City, Metro Manila	Date of Approval : February 23, 2016 Signed by: Manuel D. Gerochi, CESO I, Undersecretary for Policy, Planning and Foreign Assisted Programs
258 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Pasay City, Metro Manila	Date of Approval : February 23, 2016 Signed by: Manuel D. Gerochi, CESO I, Undersecretary for Policy, Planning and Foreign Assisted Programs
259 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Calocan City, Metro Manila	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
260 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Baras, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC

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261 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Cainta, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
262 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Cardona, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC

263 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Rodriguez, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
264 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of San Mateo, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
265 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Tanay, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
266 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Binangonan, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
267 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Morong, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC

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268 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Jala-jala, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
269 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Pililia, Province of Rizal	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
270 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Magdalena, Province of Laguna	Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
270 A	Resolution Approving the Ten-Year Solid Waste Management Plan of the Mu-nicipality of Magdalena, Province of Laguna	Date of Approval : August 30, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
271 series of 2016		Date of Approval : March 29, 2016 Signed by: Crispian N. Lao, Representa-tive, Recycling Industry and Vice Chair- man, NSWMC
481 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipal-ity of Lemery, Batangas	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Repre-sentative, Non-Government Organiza-tions, NSWMC
482 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of City of Balanga, Bataan	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Repre-sentative, Non-Government Organiza-tions, NSWMC

483 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Mariveles, Bataan	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
484 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Isulan, Sultan Kudarat	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
485 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of San Jose, Dinagat Islands Province	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
486 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Hinatuan, Surigao del Sur	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
487 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Kitcharao, Agusan del Norte	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
487 A	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Kitcharao, Agusan del Norte	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
488 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Buenavista, Agusan del Norte	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC
489 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipality of Santiago, Agusan del Norte	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Representative, Non-Government Organizations, NSWMC

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490 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipal-ity of Dapa, Surigao del Norte	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organizations, NSWMC
491 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipal-ity of Surigao City, Surigao del Norte	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organizations, NSWMC
492 series of 2016	Resolution Approving the Ten-Year Solid Waste Management Plan of Municipal-ity of Roseller T. Lim, Zamboanga Sibugay	Date of Approval : April 26, 2016 Signed by: Romeo G. Hidalgo, Repre- sentative, Non-Government Organizations, NSWMC

669 series of 2016	Resolution Adopting the Guidelines Governing the Establishment and Operation of Waste to Energy Facilities for Municipal Solid Wastes	Date of Approval: June 9, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
670 series of 2016	Resolution Endorsing the Second National Integrated Waste Management Exhi-bition on June 21-24, 2016	Date of Approval: June 9, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
671 series of 2016	Resolution Approving the Ten-Year SWM Plan of Bauan Province of Batangas	Date of Approval: June 9, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
672 series of 2016	Resolution Approving the Ten-Year SWM Plan of San Francisco, Agusan del Sur	Date of Approval: June 9, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
673 series of 2016	Resolution Approving the Ten-Year SWM Plan of Rosario Province of Batangas	Date of Approval: June 9, 2016 Signed by: Crispian N. Lao, Vice Chair and

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		Representative, Recycling Industry
674 series of 2016	Resolution Approving the Ten-Year SWM Plan Province of Batangas	Date of Approval: June 9, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
759 series of 2016	Resolution Approving the Ten-Year SWM Plan Province of Rizal	Date of Approval: July 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
760 series of 2016	Resolution Approving the Ten-Year SWM Plan of Jaen, Nueva Ecija	Date of Approval: July 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
761 series of 2016	Resolution Approving the Ten-Year SWM Plan of Libjo, Dinagat Islands	Date of Approval: July 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
762 series of 2016	Resolution Approving the Ten-Year SWM Plan of San Jose, Batangas	Date of Approval: July 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
763 series of 2016	Resolution Approving the Ten-Year SWM Plan of Minalin, Pampanga	Date of Approval: July 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
764 series of 2016	Resolution Authorizing the Office of the Solicitor General to represent and/or deputize a Legal Counsel or Representative to represent the National Solid Waste Management Commission on Present Actions Filed and Future Actions to be Prosecuted Against Local Government Units that Violate Provisions of RA9003, otherwise known	Date of Approval: July 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry

	as the Ecological Solid Waste Management Act of 2000	
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782 series of 2016	Resolution Approving the Ten-Year SWM Plan of Sindangan, Zamboanga del Norte	Date of Approval: August 30, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
783 series of 2016	Resolution Approving the Ten-Year SWM Plan of Cuenca, Batangas	Date of Approval: August 30, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
784 series of 2016	Resolution Approving the Ten-Year SWM Plan of Lobo, Batangas	Date of Approval: August 30, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
785 series of 2016	Resolution Approving the Ten-Year SWM Plan of San Juan, Batangas	Date of Approval: August 30, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
792 series of 2016	Resolution Approving the Ten-Year SWM Plan of Kalamansig, Sultan Kudarat	Date of Approval: September 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
793 series of 2016	Resolution Approving the Ten-Year SWM Plan of Tarlac Province	Date of Approval: September 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
794 series of 2016	Resolution Adopting the State of the Brown Environment for the Solid Waste Management Sector	Date of Approval: September 26, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry

		Representative, Recycling Industry
817 series of 2016	Resolution Approving the Ten-Year SWM Plan of Cabadbaran City, Agusan Del Norte	Date of Approval: November 3, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
818 series of 2016	Resolution Approving the Ten-Year SWM Plan of Padre Burgos, Southern Leyte	Date of Approval: November 3, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
819 series of 2016	Resolution Approving the Ten-Year SWM Plan of Maddela, Quirino	Date of Approval: November 3, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry

771-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Iguig, Cagayan	Date of Approval: November 3, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
819 – A series of 2016	Resolution Approving the Ten-Year SWM Plan of Maddela, Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
820 series of 2016	Resolution Approving the Ten-Year SWM Plan of Province of Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
821 series of 2016	Resolution Approving the Ten-Year SWM Plan of Aglipay, Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry

822 series of 2016	Resolution Approving the Ten-Year SWM Plan of Diffun, Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
823 series of 2016	Resolution Approving the Ten-Year SWM Plan of Saguday, Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
308-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Cabarroguis, Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
497-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Maddela, Quirino	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
652-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Libagon, Southern Leyte	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
287-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Pintuyan, Southern Leyte	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
535-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Province of Dinagat Islands	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
828 series of 2016	Resolution Approving the Ten-Year SWM Plan of Province of General Santos City	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
829 series of	Resolution Approving the Ten-Year SWM Plan of Pagadian City, Zamboanga del Sur	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and

National Solid Waste Management Status Report [2008-2018]

2016		Representative, Recycling Industry
830 series of 2016	Resolution Approving the Ten-Year SWM Plan of Batangas City, Batangas Province	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
831 series of 2016	Resolution Approving the Ten-Year SWM Plan of Tanauan City, Batangas	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
236 A series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Majayjay, Laguna	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
832 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Sta. Maria, Province of Laguna	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
833 series of 2016	Resolution Approving the Ten-Year SWM Plan of City of General Trias, Prov-ince of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
834 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Indang, Prov-ince of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
835 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Maragondon, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
836 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Rosario, Prov-ince of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and

National Solid Waste Management Status Report [2008-2018]

		Representative, Recycling Industry
837 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Silang, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
838 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Tanza, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
839 series of 2016	Resolution Deputizing the Metropolitan Manila Development Authority (MMDA) as an implementing agency, as well as its officials and personnel as Solid Waste Management Officers, to enforce provisions of RA 9003 and its Implementing Rules and Regulations, and for other purposes	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
538-A series of 2016	Resolution Approving the Ten-Year SWM Plan of City of Dasmariñas, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry

692-A Series of 2016	Resolution Approving the Ten-Year SWM Plan of City of Imus, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
840 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Naic, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry
841 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of General Emilio Aguinaldo, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao, Vice Chair and Representative, Recycling Industry

537-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Amadeo, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
842 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Mataas na Kahoy, Province of Batangas	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
314-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Magallanes, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
316-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Kawit, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
843 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Ternate, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
844 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Noveleta, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
845 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Alfonso, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
846 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of General Mariano Alvarez, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
847 series of	Resolution Approving the Ten-Year SWM Plan of City of Cavite, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and

2016		Representative, Recycling Industry
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848 series of 2016	Resolution Approving the Ten-Year SWM Plan of City of Tagaytay, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
849 series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Bay, Province of Laguna	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
722-A series of 2016	Resolution Approving the Ten-Year SWM Plan of Municipality of Mendez Nuñez, Province of Cavite	Date of Approval: December 13, 2016 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
865 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of La Trinidad, Province of Benguet	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
866 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Janiway, Province of Iloilo	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
867 series of 2017	Resolution Approving the Ten-Year SWM Plan of Laguna Province	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
868 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Taytay, Rizal	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry

National Solid Waste Management Status Report [2008-2018]

579-A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Hilongos, Leyte	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
581-A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Palo, Province of Leyte	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
648-A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Calbiga, Province of Samar	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
720-A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Cabugayan, Province of Biliran	Date of Approval: February 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
877 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of President Carlos P. Garcia, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
740 A series of 2017	Resolution Approving the Ten-Year SWM Plan of City of Bislig, Province of Surigao del Sur	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

805 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Santo Tomas Province of Davao del Norte	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
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879 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Toboso, Province of Negros Occidental	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
880 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Calanasan, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
881 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Conner, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
882 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Flora, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
883 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Kabugao, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
884 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Luna, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
885 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Pudtol, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In-

National Solid Waste Management Status Report [2008-2018]

		digenous Peoples Concern, DENR
886 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sta. Marcela, Province of Apayao	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
774 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Doña Remedios Trinidad, Province of Bulacan	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
887 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Ibajay, Province of Aklan Peoples Concern, DENR	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR
908 series of 2017	Resolution Approving the Ten-Year SWM Plan of City of Tabuk, Province of Kalinga	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and In- digenous Peoples Concern, DENR

909 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Anda, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indig- enous Peoples Concern, DENR
890 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Dimiao, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indig- enous Peoples Concern, DENR
851 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Trinidad, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indig- enous Peoples Concern, DENR

891 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Corella, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
892 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Dagohoy, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
893 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Antequera, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
894 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Loay, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
895 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bien Unido, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
896 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Albuquerque, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
897 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Jagna, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
898 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Duero, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

899 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Daus, Prov-ince of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
900 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Calape, Prov-ince of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
901 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Catigbian, Province of Boho	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
902 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Maribojoc, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
903 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Balilihan, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
904 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Guindulman, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
905 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bilar, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

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906 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sikatuna, Province of Bohol	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
907 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Miguel, Province of Bohol	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
843 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Ternate, Prov-ince of Cavite	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>

845 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Alfonso, Prov-ince of Cavite	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
847 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Cavite City, Province of Cavite	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
692 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Imus City, Province of Cavite	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
316 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Kawit, Prov-ince of Cavite	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for</p>

		Local Government and Indigenous Peoples Concern, DENR
722 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mendez Nunez, Province of Cavite	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
840 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Naic, Province of Cavite	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
844 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Noveleta, Province of Cavite	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
848 A series of 2017	Resolution Approving the Ten-Year SWM Plan of City of Tagaytay, Province of Cavite	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
537 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Amadeo, Province of Cavite	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
314 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Magallanes, Province of Cavite	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
849 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bay, Province of Laguna	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

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868 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Taytay, Province of Rizal	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
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42 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mataas na Kahoy, Province of Batangas	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
802 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Braulio E. Dujali, Province of Davao del Norte	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
878 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Isidro, Province of Davao del Norte	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
910 series of 2017	Resolution Approving the Ten-Year SWM Plan of Province of Apayao	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
911 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Taysan, Province of Batangas	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
912 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sto. Tomas, Province of Batangas	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR</p>
913 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Alicia, Province of Bohol	<p>Date of Approval: April 25, 2017</p> <p>Signed by: Atty. Noel K. Felongco, Under-secretary for</p>

		Local Government and Indigenous Peoples Concern, DENR
914 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Lila, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
915 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Isidro, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
916 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Buenavista, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

917 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Clarin, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
918 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Batuan, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
919 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Pilar, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
920 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Carmen, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

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921 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Cortes, Province of Bohol	ate of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
922 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Talibon, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
923 series of 2017	Resolution Approving the Ten-Year SWM Plan of Tagbilaran City Province of Bohol	ate of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
790 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Panglao, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
752 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Inabanga, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
924 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sierra Bullones, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

925 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Tubigon, Province of Bohol	Date of Approval: April 25, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
941 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bontoc, South-ern Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

942 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Ricardo, Southern Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
775 A series of 2017	Resolution Approving the Ten-Year SWM Plan of City of Ligao, Province of Albay	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
737 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Binalonan, Province of Pangasinan	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
517 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Liloan, Southern Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
789 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Hinunangan, Southern Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
717 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Maripipi, Biliran	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
578 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Jaro, Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
421 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Culaba, Biliran	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

645 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Villareal, Sa-mar	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
715 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Kawayan, Biliran	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
716 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Almeria, Biliran	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
461 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Francisco, Southern Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
719 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Biliran, Biliran	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
614 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Catbalogan City, Samar	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
523 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of St. Bernard, Southern Leyte	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
919 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Pilar, Bohol	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

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920 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Carmen, Bohol	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
922 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Talibon, Bohol	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

925 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Tubigon, Bohol	Date of Approval: May 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
865 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of La Trinidad, Province of Benguet	Date of Approval: June 27, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
291 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Carmen, Province of Agusan del Norte	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
910 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Province of Apayao	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
872 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Cabagan, Province of Isabela	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
	Resolution Approving the Ten-Year SWM Plan of Municipality of Dulag, Province of Leyte	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for

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577 A series of 2017		Local Government and Indigenous Peoples Concern, DENR
791 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Malitbog, Province of Southern Leyte	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
911 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Taysan, Province of Batangas	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
912 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sto. Tomas, Province of Batangas	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
755 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bogo, Province of Cebu	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

963 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Cortes, Province of Bohol	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
964 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Laurel, Province of Batangas	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

965 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mankayan, Province of Benguet	Date of Approval: August 30, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
983 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Francisco, Province of Cebu	Date of Approval: October 24, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
693 A series of 2017	Resolution Approving the Ten-Year SWM Plan of City of Passi, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
742 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Banate, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
397 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Tubungan, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
387 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Lambunao, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
391 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of New Lucena, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry

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976 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Pavia, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
396 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sta. Barbara, Province of Iloilo	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
347 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Kalibo, Province of Aklan	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
975 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Samal, Province of Bataan	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
973 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bagac, Province of Bataan	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
974 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Orion, Province of Bataan	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
972 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Lamut, Province of Ifugao	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry

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930 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mayoyao, Province of Ifugao	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
961 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Siocon, Province of Zamboanga del Norte	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
295 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Prosperidad, Province of Agusan del Norte	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
571 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Remigio, Province of Cebu	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
570 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Ginatilan, Province of Cebu	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
985 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Cordova, Province of Cebu	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry

984 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Consolacion, Province of Cebu	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
		Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand

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852 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sogod, Prov-ince of Cebu	Representative, Recycling Industry
982 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Madridejos, Province of Cebu	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
965 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mankayan, Province of Benguet (with Additional Information [AI])	Date of Approval: October 24,2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indig- enous Peoples Concern, DENR
384 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Dueñas, Prov-ince of Iloilo (with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
977 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sibalom, Prov-ince of Antique (with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
987 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Tabuelan, Province of Cebu(with AI)	ate of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
988 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Boljoon, Prov-ince of Cebu (with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry

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991 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Ronda, Prov-ince of Cebu (with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
989 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Borbon, Prov-ince of Cebu (with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry

986 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Tudela, Prov-ince of Cebu (with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
402 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Pinamungajan, Province of Cebu(with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
513 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Carmen, Province of Cebu(with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
990 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Alegria, Province of Cebu(with AI)	Date of Approval: October 24, 2017 Signed by: Crispian N. Lao , Vice Chairand Representative, Recycling Industry
1004 series of 2017	Resolution Adopting the Freedom of Information (FOI) Manual of the NSWMC	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indig-enous Peoples Concern, DENR

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1005 series of 2017	Resolution Adopting the Work Program of the National Solid Waste Management Commission to Operationalize the National Solid Waste Management Fund	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
959 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mauban, Province of Quezon (with AI)	Date of Approval: November 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
1001 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mallig, Province of Isabela (with AI)	Date of Approval: November 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
977 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Sibalom, Province of Antique (AI submitted)	Date of Approval: November 28, 2017 Signed by: Crispian N. Lao , Vice Chair and Representative, Recycling Industry
384 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Dueñas, Province of Iloilo (with AI)	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
1002 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Tineg, Province of Abra	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
786 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Tuguegarao City, Province of Cagayan	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR

519 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Silago, Province of Southern Leyte	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for
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		Local Government and Indigenous Peoples Concern, DENR
965 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Mankayan, Province of Benguet (AI submitted)	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
509 B series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Miagao, Province of Iloilo (AI submitted)	Date of Approval: November 28, 2017 Signed by: Atty. Noel K. Felongco, Under-secretary for Local Government and Indigenous Peoples Concern, DENR
356 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Caluya, Province of Antique	Date of Approval: December 22, 2017 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
357 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Laua-an, Province of Antique	Date of Approval: December 22, 2017 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
392 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Pototan, Province of Iloilo	Date of Approval: December 22, 2017 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1011 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Igbaras, Province of Iloilo	Date of Approval: December 22, 2017 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
339 A A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Calinog, Province of Iloilo	Date of Approval: December 22, 2017 Signed by: Crispian N. Lao, Representative

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		tive, Recycling Sector and Vice Chairman,NSWMC
1012 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Dingle, Prov-ince of Iloilo	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
286 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Zarraga, Prov-ince of Iloilo	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC

348 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Lezo, Province of Aklan	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
352 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of New Washing-ton, Province of Aklan	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
560 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of San Juan,Province of Abra	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
936 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Bangued,Province of Abra	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
563 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Licuan-Baay,Province of Abra	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa-

National Solid Waste Management Status Report [2008-2018]

		tive, Recycling Sector and Vice Chairman,NSWMC
1013 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Danglas, Prov-ince of Abra	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1014 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Manukan,Province of Zamboanga del Norte	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
927 A series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Banaue, Prov-ince of Ifugao	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1015 series of 2017	Resolution Approving the Ten-Year SWM Plan of Municipality of Ampatuan,Province of Maguindanao	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1017 series of 2017	Adopting the Guidelines on Composting and Market Development for Compost	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1016 series of 2018	Resolution Approving the Ten-Year SWM Plan of City of Lipa, Province of Ba-tangas	Date of Approval: December 22,2017 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC

927 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Banaue, Prov-ince of Ifugao	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa-
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		<p>tive, Recycling Sector and Vice Chairman, NSWMC</p>
560 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of San Juan, Province of Abra	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>
1013 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Danglas, Province of Abra	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>
563 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Licuan-Baay, Province of Abra	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>
936 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Bangued, Province of Abra	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>
565 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of La Paz, Province of Abra	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>
286 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Zarraga, Province of Iloilo	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>
339 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Calinog, Province of Iloilo	<p>Date of Approval: February 27, 2018</p> <p>Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC</p>

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384 C series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Dueñas Prov-ince of Iloilo	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
392 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Pototan, Prov-ince of Iloilo	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
395 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of San Rafael,Province of Iloilo	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
357 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Lauan, Prov-ince of Antique	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC

356 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Caluya, Prov-ince of Antique	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
53 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Anini-y, Prov-ince of Antique	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
352 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of New Washing-ton, Province of Aklan	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
348 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Lezo, Province of Aklan	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa-

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		tive, Recycling Sector and Vice Chairman,NSWMC
380 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Badiangan,Province of Iloilo	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1010 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Batad, Prov-ince of Iloilo	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
10111 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Igbaras, Prov-ince of Iloilo	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1012 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Dingle, Prov-ince of Iloilo	ate of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1014 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Manukan,Province of Zamboanga del Norte	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
1015 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Ampatuan,Province of Maguindanao	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC
841 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of General EmilioAguinaldo, Province of Cavite	Date of Approval: February 27,2018 Signed by: Crispian N. Lao, Representa- tive, Recycling Sector and Vice Chairman,NSWMC

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959 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Mauban, Prov-ince of Quezon	Date of Approval: February 27, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1032 series of 2018	Resolution Adopting the Partnership with the Philippine Alliance for Recycling and Materials Sustainability (PARMS) Adopting the Full Waste Recovery and Recycling Program	Date of Approval: February 27, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1033 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Bombon, Prov-ince of Camarines Sur	Date of Approval: February 27, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1034 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Datu Odin Sinsuat, Province of Maguindanao	Date of Approval: February 27, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1035 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Parang, Prov-ince of Maguindanao	Date of Approval: February 27, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1036 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Abdullah Sang-ki, Province of Maguindanao	Date of Approval: February 27, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
929 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Alfonso Lista, Province of Ifugao	Date of Approval: August 28, 2018 Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government

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504 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Dilasag, Province of Aurora	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
502 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Dipaculao, Province of Aurora	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
857 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of San Luis, Province of Aurora	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
303 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Bacnotan, Province of La Union	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
957 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of General Nakar, Province of Quezon	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p>

		Units Concerns and Alternate of the Chair-man to the NSWMC
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993 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Mangaldan, Province of Pangasinan	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1001 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Mallig, Province of Isabela	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1073 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Lagawe, Province of Ifugao	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1074 series of 2018	Resolution Approving the Ten-Year SWM Plan of Quezon City	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1075 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Bongabon, Province of Nueva Ecija	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p>

		Units Concerns and Alternate of the Chair-man to the NSWMC
1076 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of General Mamerto Natividad, Province of Nueva Ecija	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1077 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Guimba, Province of Nueva Ecija	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1078 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Talugtug, Province of Nueva Ecija	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1079 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Angat, Province of Bulacan	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p> <p>Units Concerns and Alternate of the Chair-man to the NSWMC</p>
1080 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Guiguinto, Province of Bulacan	<p>Date of Approval: August 28, 2018</p> <p>Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government</p>

		Units Concerns and Alternate of the Chair-man to the NSWMC
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1081 series of 2018	Resolution Establishing the Executive Committee for the Review and De-liberation of the 10-year Solid Waste Management Plans	Date of Approval: September 13, 2018 Signed by: Benny D. Antiporda, DENR Undersecretary for Local Government Units Concerns and Alternate of the Chair-man to the NSWMC
1083 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Morong, Province of Bataan	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1084 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Orani, Province of Bulacan	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
653 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Baliuag, Province of Bulacan	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1082 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Calumpit, Province of Bulacan	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
499 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Hagonoy, Province of Bulacan	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC

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1085 series of 2018	Resolution Approving the Ten-Year SWM Plan of Science City of Muñoz, Province of Nueva Ecija	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1086 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Quezon, Province of Nueva Ecija	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1087 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of San Leonardo, Province of Nueva Ecija	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
684 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Floridablanca, Province of Pampanga	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1088 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Lubao, Province of Pampanga	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1089 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Anao, Province of Tarlac	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1090 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Camiling, Province of Tarlac	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC

313 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Balete, Province of Batangas	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1091 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Mabini, Province of Batangas	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1092 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Padre Garcia, Province of Batangas	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1093 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of San Pascual, Province of Batangas	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1094 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Taal, Province of Batangas	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
379 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Anilao, Province of Iloilo	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
776 A series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of Concepcion, Province of Iloilo	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative, Recycling Sector and Vice Chairman, NSWMC
1095 series of 2018	Resolution Approving the Ten-Year SWM Plan of Municipality of San Dionisio, Province of Iloilo	Date of Approval: September 25, 2018 Signed by: Crispian N. Lao, Representative

		utive, Recycling Sector and Vice Chairman, NSWMC
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4.2 Institutional arrangements

Among the provisions of RA 9003 is the establishment of an institutional support mechanism necessary to effectively implement the law. Solid waste management functions are distributed among national, regional and local government entities wherein the participation of relevant stakeholders is highly encouraged.

National and regional levels

National level oversight and policy formulation is provided by Sections 4-6 of RA 9003 through the creation of the NSWMC. RA 9003 also creates a NEC under the Commission to provide capacity building services on SWM. The NEC is to be supported by Regional Ecology Centers (RECs) as mandated under Rule V, Section 1 of DAO 2001-34, which is the implementing rules and regulations (IRR) of RA 9003.

National Solid Waste Management Commission (NSWMC)

The NSWMC is chaired by the DENR Secretary and co-chaired by a representative from the private sector. The DENR-EMB provides secretariat support to the NSWMC, which is headed by an executive director who is nominated by Commission members and appointed by the chairperson.

Under Section 4 of RA 9003, the NSWMC was established with fourteen (14) members from the government sector and three (3) members from the private sector, who have different roles and mandates. The following agencies and organizations are members of the NSWMC:

- Department of Environment and Natural Resources (DENR),
- Department of Health (DOH),
- Department of Agriculture (DA),
- Metro Manila Development Authority (MMDA),
- Department of Science and Technology (DOST),
- Department of Interior and Local Government (DILG),
- Department of Public Works and Highways (DPWH),
- Department of Trade and Industry (DTI),
- Technical Education and Skills Development Authority (TESDA),
- Philippine Information Authority (PIA),
- League of Cities in the Philippines (LCP),

- League of Municipalities in the Philippines (LMP),
- League of Provinces in the Philippines (LPP),
- Liga ng mga Barangay (LnB),
- Non-Government Organization (NGO),
 - Non-Government Organization (NGO),
 - Recycling Industry,
 - Manufacturing and Packaging Industry.

National Ecology Center (NEC) and the Regional Ecology Centers (RECs)

Section 7 of RA 9003 requires the establishment of a NEC under the Commission, which shall be headed by the Director of the EMB. The NEC shall provide consulting, information, training, and networking services necessary in implementing the Act.

Rule V, Section 1 of DAO 2001-34 also mandates the establishment of RECs, which shall be headed by the EMB Regional Directors in their *ex officio* capacities. The RECs shall maintain a multi-sectoral, multi-disciplinary pool of experts, including those from the academe, business and industry; inventors, practicing professionals, youth, women; and other concerned sectors, who shall be screened according to qualifications set by the Commission.

The IRR stipulates that the NEC and the RECs shall make accessible to the general public all related information generated, collected, recorded, and stored, as well as data for solid waste management plans, the National Framework, the National Status Report, and all other relevant information necessary for ecological SWM.

Local government level

RA 7160 stipulates that basic services and facilities shall be provided by the LGUs. The services include the provision of solid waste disposal system or environmental management system and services or facilities related to general hygiene and sanitation.

Section 10 of RA 9003 reiterates these RA 7160 provisions that the LGUs shall be primarily responsible for the implementation and enforcement of the provisions of this Act within their respective jurisdictions. Segregation and collection of solid waste shall be conducted at the barangay level specifically for biodegradable and recyclable wastes, provided that the collection of non-recyclable materials and special wastes shall be the responsibility of the municipality or city.

Provincial Solid Waste Management Boards

Section 11 of RA 9003 requires the establishment of Provincial Solid Waste Management Boards (SWMBs). Among its principal functions are: to develop a Provincial SWM Plan from the submitted SWM Plans of the city/municipal SWMBs and ensure that these complement each other; oversee the implementation of the Provincial SWM plans and provide necessary logistical and operational support to its component LGUs; and al-

City and Municipal Solid Waste Management Boards

Section 12 of RA 9003 requires the establishment of city or municipal SWMBs, which shall prepare, submit and implement a plan for the safe and sanitary management of solid wastes generated in areas under its geo- graphic and political coverage.

Table 4b shows the number of provincial, city and municipal SWMBs that have been created and active in 2010 as well as the status of barangay solid waste management committees (SWMCs) in the Philippines. Usually, the most tangible indication if a SWMB or SWMC has been created is the issued executive order, memorandum or any legal instrument that identifies the members and specifies the roles of each representative. A board or a committee is deemed active when it has produced a local SWM Plan or at least meets regularly within the calendar year to plan, deliberates and issues policies, and monitors the implementation of SWM Plans. **Figure 4a** shows the percentage of compliance of LGUs nationwide.

Table 4b. Number of created and active LGU SWM boards and committees in 2010, per region.

Region	Provincial SWM Boards			City/Municipal SWM Boards			Barangay SWM Committees		
	P	Created	Active	C/M	Created	Active	B	Created	Active
NCR	1*	1	1	17	17	17	1706	1509	No data
CAR	6	6	6	77	77	77	1176	1174	1174
I	4	4	4	125	9	9	3265	No data	No data
II	5	4	3	93	64	49	2311	917	473
III									No data

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	7	7	3	130	130	34	3102	No data	
IV-A	5	5	5	142	123	86	4011	3247	678
IV-B	5	5	5	73	73	35	1458	1457	575
V	6	6	6	114	57	57	3471	177	161
VI	6	6	1	133	123	97	4051	4039	30
VII	4	4	4	132	No data	5	3003	No data	15
VIII	6	3	3	143	95	52	4390	928	262
IX	3	3	3	72	60	50	1904	1300	850
X	5	3	No data	93	5	No data	2022	48	No data
XI	4	4	3	49	46	28	1162	1152	806
XII	4	4	3	50	44	No data	1195	886	No data
XIII	5	5	5	73	73	18	1311	1310	420
ARMM	5	No data	No data	118	No data	No data	2490	No data	No data
TOTAL	81	70	55	1634	902	520	42028	15461	4270

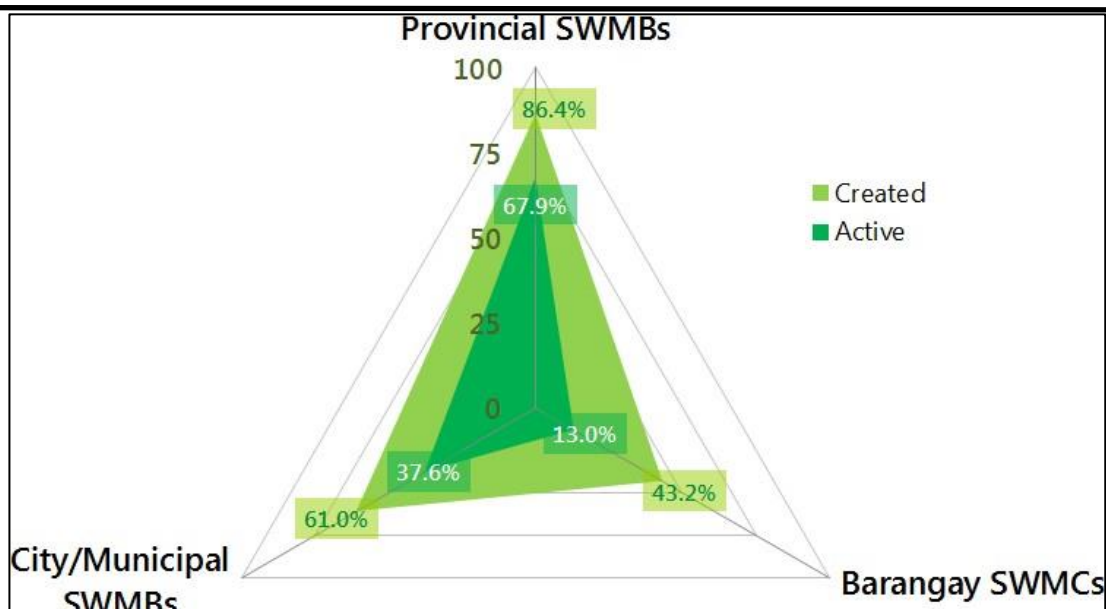


Figure 4a. Percentage of LGUs with created and active SWM Boards/Committees in 2010

5. Other issues

5.1 . Informal waste sector

Considered as the most vulnerable group in municipal solid waste management, the informal waste sector (IWS) consists mainly of waste pickers in dumpsites and communal waste collection points, informal waste collectors, itinerant waste buyers, small junkshop dealers, “jumpers” (those who jump into collection trucks to recover recyclables), and paleros (garbage trucks crew). Communities who live within or near the SWM facilities are likewise considered vulnerable.

There are thousands of informal waste workers, among them women, children and elderly, who depend on informal waste collection due to poverty and lack of livelihood and education. They are subject to livelihood insecurity, unsafe working conditions and health hazards. Yet, LGUs acknowledge that their work has contributed to savings in waste collection and disposal.

In May 2009, the NSWMC, with support from United Nations Environment Programme and development partners, prepared the National Framework Plan for the Informal Sector in Solid Waste Management, which recognizes their important contribution and hence formulated a holistic plan for their development. LGUs have yet to develop and implement their plans for this sector.

5.2 Special waste management

Special waste, which consists of healthcare waste, waste electrical and electronic equipment (WEEE) and other hazardous materials, accounts for about 1.93% of municipal solid waste.

A large portion of WEEE is either disposed along with the waste stream or recovered through a haphazard recovery process resulting to resource loss and exposure of workers to health hazards.

The DENR-EMB's Hazardous Waste Management Section has finalized its revised procedural manual on hazardous waste management and proposes that certain hazardous components of any waste stream be properly handled according to RA 6969 policies.

5.3 Climate change: mitigation and adaptation

Poor waste management practices such as open burning, dumping in creeks and water bodies, as well as non-segregation of waste result in GHG emissions. Landfilling of biodegradables wastes and continued operation of open and controlled dumpsites lead to the release of GHGs. Thus, waste prevention, recycling and composting are effective ways to mitigate climate change.

Similarly, waste management systems and infrastructures may also be prone to disasters. Climate change causes extreme rainfall in some areas and effects can be compounded by uncollected waste, exposing the dangers of mismanaged garbage. This results in massive flooding that cause damages to properties and human lives.

Thus, there is a continuous need to clean up, declog and dredge waterways and climate-proofing infrastructure and waste management facilities in particular.

5.4 Regional best practices and lessons learned

Region 4A

Creative waste recycling practices have been demonstrated by LGUs and academic institutions across Region 4A:

- Basuranihan – coined from basura (waste) and bayanihan (cooperative effort) – involves individuals or groups who register with the environment and natural resources officer of Sta. Rosa, Laguna to bring re-cyclable waste materials during the monthly Basuranihan Day. The recyclables are sold to a selected junkshop where points are earned at the same time. The points are used to redeem items and qualify the participants for the top three prizes at yearend.
- Tuition fees of several deserving students in Laguna Bel Air School in Sta. Rosa have been subsidized from the selling of polyethylene terephthalate (PET) bottles collected and dropped into large bins within the campus.

- Eco-Bank project in Calatagan, Batangas was initiated by the LGU in 2010 for all public and private schools. It is being implemented by the Calatagan Ecosavers School Association to raise funds through the selling of recyclable materials. The funds are used to support environmental activities and other school programs.
- The Institute of Silang, Cavite has been using recyclable materials to set up a Scholarship “Thrash Fund”. The peso value of the recyclables is recorded in the parents/students’ “thrash card” and the accumulated peso value is deducted from the tuition fees of students.
- Diaper composting in Malvar, Batangas began in 2013 to reduce the volume of diapers at the landfill. There are three (3) compost pits where soiled diapers are placed and composted using vermiworms. Ver-micasts are distributed free to neighboring towns.

Region 5

Magarao, Camarines Sur was declared lone winner in the 4th to 6th class municipality category in the first Zero Basura Olympics (ZBO) in 2008. ZBO is a nationwide contest to promote the most innovative and effective approaches in managing solid wastes.

The Plastic for Rice program is jointly undertaken by Legazpi City, EMB Region 5 and local junkshop operators to enable people to exchange recyclable wastes for rice or money. Recyclables include paper, bottles, scrap iron, aluminum and special waste such as broken appliances.

Region 6

The Negros Occidental Provincial Solid Waste Management Board exemplified steadfast financial and technical support to the component municipality SWM Boards. This includes regular quarterly meetings with mayors or their representatives to address concerns and issues related to the implementation of SWM programs and the scheduled monitoring of compliance with RA 9003. Consequently, the province had the highest number of LGUs that submitted SWM plans.

Region 7

An alternative waste management program with emphasis on decentralized composting and resource recovery system at source has been scaled-up throughout Cebu City. It features:

- Adoption and strict enforcement of a “no segregation no collection policy” in 2011.
- Recruitment and deployment of Barangay Environmental Officers (BEO) to act as information providers, enforce municipal policies, monitor proper waste collection, assist in establishing MRFs and manage the composting schemes.
- Provision of financial and technical assistance by the city to establish MRFs and composting centers

in barangays.

- Strengthened partnership between the city and other stakeholders such as the Women's Network, home-owners associations, local NGOs, waste pickers, academic institutions, private entrepreneurs and the media. Additionally, a series of awareness campaigns was organized with these stakeholders covering all municipalities.
- Promotion of composting schemes at different scales or levels such as households, neighborhoods, barangays, small-scale private businesses and enterprises and institutions.
- Distribution of composting baskets to individual households for the conversion of organic waste into compost used to grow vegetables and herbal plants in their home gardens. The dissemination of composting know-how and follow-up visits are done by the BEOs.
- Barangay composting schemes that are small in scale (less than one ton per day). Compost is produced using fast-reproducing types of worms such as redworms, African nightcrawler and European crawler; and/or windrow method using native microorganisms. The compost product is either sold or used for the greening of the neighborhood.
- Enterprise-based waste management in which individual entrepreneurs, NGOs and cooperatives in barangays have turned composting and recycling into business ventures. Composting at this level depended on pure organic waste streams such as waste from vegetable, fruit and flower markets and organic waste from business establishments rather than households.
- Bayawan City has established the Bayawan City Waste Management Center, a 21-hectare complex of facilities that include the sanitary landfill, a central material recovery facility, composting facility and a treatment facility for sludge from septic tanks. The LGU is also implementing a "no segregation no collection" policy coupled with the adoption of the sticker system leading to a significant decrease in the volume of daily waste collected.

Region 9

Provincial SWM Boards have been established in all three provinces and 82 percent of cities and municipalities have their own SWM Boards. Ninety nine percent (99%) of cities and municipalities have completed their 10-year SWM plans with the assistance of EMB Region 9 and submitted them to the NSWMC for approval.

Region 11

All municipalities in the region have created their SWM Boards. Likewise, all municipalities have established their MRFs. Segregation of wastes has been advocated by all LGUs, some of which had started implementing a "no segregation, no collection" policy.

Lower income municipalities are converting their controlled dumpsites into ecological parks instead of sanitarylandfills as a cost-effective measure.

Region 12

The municipality of Surallah, South Cotabato has established the first successful LGU-initiated clustered SLF in the country. The Category 2 SLF, which was completed in 2011, serves the 7 municipalities of Surallah, Norala, T'boli, Banga, Sto. Nino and Lake Sebu. The facility is financially supported by the South Cotabato provincial government with technical assistance from EMB, Mines and Geosciences Bureau and United States Agency for International Development. This successful undertaking has been gaining recognition and multiple awards.

Surallah has a model Ecopark and set up MRFs with composting facilities at the municipal environment and natural resources office, public market and all barangay centers.

The Category 1 SLF in Polomolok, South Cotabato, which was completed in 2008, was a product of partnership between Polomolok LGU and Dole Philippines. It also serves neighboring municipalities. Polomolok also has a 4-hectare central MRF with 48 twin vermin-beds and recycling shops for waste packaging materials operated by a barangay women's organization. MRFs are present in most of the schools, hospitals, industriesand barangay halls.

National Capital Region

Marikina

In the last quarter of the year 2014, the City Government of Marikina began the Food Waste Truck Program. Through the implementation of the Program, kitchen wastes are being collected from restaurants and food stalls, and are being converted into fertilizers to be used for the City's urban garden.

Further, since the year 2004, the City has also been implementing the Eco-savers Program in the City's elementary and secondary schools to raise environmental awareness among children and youth through their active involvement in the recyclable trading activity. The activity is one of the strategies employed by the City to support its goal to implement segregation at source.

Business establishment owners are also mandated to attend an annual Waste Management Seminar as a prerequisite to the issuance of business permits.

Quezon City

Given its land area and population, Quezon City is known as one of the most challenged cities in terms of solid waste management. Although this is the case, the Quezon City Government has advanced its strategiesto meet the standards set by RA 9003.

Quezon City implements a “No Segregation, No Collection” Policy, wherein the collection of biodegradable and non-biodegradable wastes is done in separate days every week. Recyclable trading activities such as Ecosavers Program in schools and Waste Market in malls are also being conducted to increase the City’s waste diversion rate from final disposal to the Payatas Sanitary Landfill.

Given also that the City Government has contracted private haulers for the collection of solid wastes, the said private haulers are also instructed to incorporate Information, Education and Communication campaign on proper solid waste management during their regular operations in households where the policy is not being strictly followed. This way, the residents are given the right information on how they can improve their waste disposal within their respective homes.

Makati

Since the year 2003, the Makati City has been implementing its Solid Waste Management Code which was enacted through Ordinance No. 2003-095. Various strategies on solid waste reduction were included in the Code, wherein the main objective is to increase the waste diversion rate of the City.

Like other cities in Metro Manila, the City also has its own version of a Plastic Ban Ordinance, as well as prohibition on the use of styrofoam and other non-biodegradable packaging materials. To ensure that the said laws are being complied with, a Plastic Monitoring Task Force was also created. Its main task is to monitor the implementation of the said laws in all business establishments within Makati.

Recyclable trading activities namely the *Baratilyo ng Basura sa Barangay* and *Weekend Waste Market*, are also being regularly held to provide additional income for constituents while at the same time, to increase the City’s solid waste diversion rate.

The City Government conducts regular seminars to update the knowledge of its barangays with regards to the implementation of the Solid Waste Management Code.

Muntinlupa

The City Government of Muntinlupa has been implementing the Eco-Waste Management Ordinance since the year 1999, which mandates households, business establishments and other stakeholders to practice waste segregation at source.

Muntinlupa also continues to implement the plastic ban, which is the first of its kind in Metro Manila.

The City Government is also active in the annual celebration of the Live Green Conference, a competition among the City’s youth which provides a venue for the expression of environmental perceptions through art. The event aims to increase the awareness of the youth not only on proper solid waste management, but also on the other environmental concerns which the City endeavors to address.

Taguig City

Taguig City implements *Brigada Eskwela* before the opening of classes in public elementary and secondary schools. The activity does not only aim to conduct massive clean-up operations, but to also emphasize the importance of harmony and unity among students, parents, teachers, and other school personnel in maintaining the cleanliness of school premises.

The City is also focused on decreasing dengue cases through the implementation of *4 o'clock Habit*, during which time clean-up and drainage declogging operations are done. Communities are encouraged to maintain cleanliness of their surroundings through proper disposal of wastes and regular clean-up in their respective households.

6. Challenges and recommendations

Challenges and Recommendations

The SWMD conducted the Regional Qualitative Assessment and Progress Reporting on SWM from October to December 2018. This was participated by the EMB and DENR Regional Offices (ROs), DENR Provincial Environment and Natural Resources Offices (PENROs), City Environment and Natural Resources Offices (CENRO), Provincial Environmental Management Units (PEMUs) and Environmental Monitoring Officers.

Table 5a. Challenges and recommendations on SWM

Challenges	Recommendations
Institutionalization of M/CENROs	
Solid waste management is not the priority of the Local Chief Executive. Not all LGUs have created the Municipal/City Environment and Natural Resources Office with personnel.	The LGUs must already create Municipal Environment and Natural Resources Office to address the environment concerns. Institutionalization/creation of municipal/city ENRO. Meetings/workshop with DILG to identify strategies for creation of MENRO position
Policy Support	
Absence of Buy Back mechanism by the Manufacturers	Issuance of EO from LCEs on Polluter's Pay Principle
Capacity Development in the Design of SWM Facilities	

LGU lack of technical expertise in the design and construction of the SLF	LGUs to engage/hire competent Engineers/ personnel to design and oversee the construction of the SLF.
Social Marketing and Advocacy	
Low awareness on RA 9003 at the community level	Massive and continuing IEC on ESWM
Discipline/attitude/indifference of the community for SWM	Strict enforcement of ordinances on SWM; training and deputation of enforcers; Provision of incentives for best practicing barangays
SWM Financing	
LGUs do not have available funds for establishment of MRF and procurement of equipment	Provision of appropriate programs of funding institutions that extend loans to LGUs
3 rd to 6 th class municipalities cannot afford to buy collection vehicle	EMB to link with financial resources (PCSO, etc. collection vehicle as an incentive if the municipality has already approved the 10 year SWM Plan.
Economic Issues	
Limited markets/recycling plants discourage many LGUs/individuals to practice Segregation at Source (SAS). Recovered recyclable materials still if no value, will eventually go to dumpsites	The NSWMC and the Department of Trade and Industry (DTI) shall make priority the development of the local market for recycled goods.
Marketability of the Recycled Product/ Diverted Wastes	Training on Marketability of the products through DTI, DA, DOST, TESDA , etc. Coordinate with the SMEs in the respective localities
Compliance Monitoring and Enforcement	
Disposal Facility	

<p>Closure of LGU's open/controlled dumpsites may lead to the creation of new dumpsites.</p> <p>Municipalities with open dump still on-going including open burning at dumpsite</p> <p>Closed to Open Dumpsites every after Election/new Administration</p>	<p>Concerned government agencies must properly act to ensure strict enforcement of the provisions of RA 9003.</p> <p>LGUs must be advised to establish RCA and simultaneously prepare for the establishment of the SLF.</p>
MRF	
<p>MRFs are not functional; MRF Operation</p>	<p>Training on MRF operations; Establishment of functional MRF with composting area, storage for recyclables; identify strategy to make MRF operation sustainable(identify funding source)</p> <p>MRF Operation Training- Recording and Management System</p> <p>Waste Diversion Strategic Planning/Training</p>

ACKNOWLEDGEMENT

EMB Central Office-DENR

EMB Regional Offices

EMB-DENR National Capital Region

EMB-DENR Cordillera Autonomous
Region EMB-DENR Region 1

EMB-DENR Region 2

EMB-DENR Region

3 EMB-DENR

Region 4A EMB-

DENR Region 4B

EMB-DENR Region

5

EMB-DENR Region 6

EMB-DENR Region 7

EMB-DENR Region 8

EMB-DENR Region 9

EMB-DENR Region 10

EMB-DENR Region 11

EMB-DENR Region 12

EMB-DENR Region 13

Department of Environment and Natural

Resources Department of Health

Department of Interior and Local

Government Japan International

Cooperation Agency Metro Manila

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ANNEX 3

National Solid Waste Management Commission (NSWMC) Resolution
No. 64 series of 2013 – Adoption of Modified Guidelines on Site
Identification Criteria and Suitability Assessment for Sanitary Landfills



Office of the President

NATIONAL SOLID WASTE MANAGEMENT COMMISSION

Department of Environment and Natural Resources

2nd Flr. HRDS Bldg., DENR compound, Visayas Avenue, Diliman, Quezon City, 1100

Tel. Nos. (632) 920-2252 / 920-2279



NSWMC Resolution No. 64, Series of 2013

ADOPTION OF MODIFIED GUIDELINES ON SITE IDENTIFICATION CRITERIA AND SUITABILITY ASSESSMENT PROCEDURE FOR SANITARY LANDFILLS

WHEREAS, Republic Act No. 9003, also known as the Ecological Solid Waste Management Act of 2000, provides for the adoption of a systematic, comprehensive and ecological solid waste management program;

WHEREAS, Section 5 (t) of RA 9003 and Part II, Rule IV, Section 1, (t), sub item 2 of its IRR (DAO No. 2001-34) mandates the National Solid Waste Management Commission to undertake the “study and review of criteria and guidelines for siting, design, operation and maintenance of solid waste management facilities”;

WHEREAS, Section 15 (o) of RA 9003 and Part III, Rule VII, Section 1, (e), sub item 2 of its IRR empowers NSWMC to formulate and implement a National Solid Waste Management Framework that shall consider the “aspects for standardization and measuring performance of such guidelines that shall also include minimum information for use in deciding the adequate location, design, and construction of facilities associated with SWM practices, including consideration of regional, geographic, demographic, and climatic factors”;

WHEREAS, Section 40, RA 9003 and Rule XIV of its IRR prescribe the Criteria for Siting a Sanitary Landfill, and the Minimum Considerations for Siting and Designing Sanitary Landfills, respectively;

WHEREAS, Section 48 (item 16), RA 9003 includes certain Prohibited Acts in the selection of areas for landfills or any waste disposal facility;

WHEREAS, DENR Administrative Order (DAO) No. 50, Series of 1998, is a related policy issuance “adopting the landfill site identification and screening criteria for municipal solid waste disposal facilities”;

WHEREAS, to ensure the relevance and applicability of the existing siting criteria and to determine the need to rationalize and promulgate a site suitability assessment procedure for waste management facilities particularly disposal facilities, the NSWMC conducted a series of consultations with various stakeholders and through expert’s exchange workshops and technical working group discussions of the National Solid Waste Management Commission;

WHEREAS, the proposed guidelines for siting criteria and assessment procedure are essentially consistent with Sections 40 and 48 of RA 9003 and DAO 98-50 but incorporates various inputs and recommendations gathered from sectoral consultations;

WHEREAS, there is a need to climate-proof the siting criteria and assessment procedure for sanitary landfills to integrate disaster risk reduction and other safety nets from the changing climate;

WHEREAS, the NSWMC-TWG in its June 29, 2012 meeting, has approved and endorsed the proposed guidelines to the NSWMC for adoption.

NOW THEREFORE, BE IT RESOLVED, AS IT IS HEREBY RESOLVED, to adopt the Modified Guidelines on Site Identification Criteria and Suitability Assessment Procedure for Waste Management Facilities under RA 9003 which are presented as follows:

Section 1. Landfill Site Identification Criteria and Screening Guidelines

The following parameters shall be used to identify and screen feasible sites for categorized sanitary landfill facilities:

1. Proximity to Groundwater Resources
2. Proximity to Perennial Surface Waters
3. Local Geological Conditions (Underlying Rock Formation)
4. Seismic Conditions (Proximity to Faults)
5. Soil Properties and Availability of Cover Material
6. Topography (Terrain and Slope)
7. Vulnerability to Flooding
8. Proximity to Residential Areas and Other Sensitive Land Users
9. Proximity to Ecologically Sensitive or Environmentally Critical Areas
10. Consistency with Current or Proposed Land Use Classification
11. Proximity to Airports
12. Landfill Area and Lifespan
13. Haul Distance, Accessibility and Road Conditions

These parameters have been categorized into exclusion (or absolute) and conditional (remediable) criteria as presented in Table 1. The *Exclusion Criteria* refer to the requirements that have to be fully and absolutely satisfied during the initial screening of proposed landfill sites. The establishment of any categorized sanitary landfill facility is strictly prohibited at a proposed site that fails at least one of the exclusion criteria. Therefore, the screening process shall not proceed to consider the other factors once an exclusion criterion is not met.

Whereas the *Conditional Criteria* refer to parameters for second-tier evaluation that may render a site suitable, provided that its corresponding siting considerations are complied with or applicable only in cases where the implementation of mitigating measures are within the capacity of project proponents. Modifications may be done through engineering interventions.

Table 1 Landfill Site Identification Criteria and Screening Guidelines

Site Selection PARAMETERS		EXCLUSION (ABSOLUTE) CRITERIA	CONDITIONAL (REMEDIABLE) CRITERIA	
			CRITERIA	Considerations
1	Proximity to Groundwater Resources	The site shall not be located on shallow unconfined aquifers. Areas in or within 500 meters upgradient of groundwater reservoir or water supply intakes (water supply wells, jetmatic pumps or open dug wells) used for private or public drinking, irrigation or livestock shall also be excluded.	Avoid sites within 1 km of confined aquifers (deep wells) used as drinking water source. Also avoid major recharge areas for future potable water sources. Minimum distance of 2 meters shall be maintained between the base of the landfill liner and the highest water table (during rainy season) at the site.	If groundwater has a yield of more than five (5) liters per second, the aquifer is of major environmental and economic importance. Verify with National Water Regulatory Board (NWRB) groundwater recharge areas for existing, pending or future water sources or aquifers used for drinking water supply. Proper engineering measures are required to avoid risk of groundwater contamination. Locations of active public drinking water supply wells within one (1) kilometer (km) from the facility shall be shown on the facility map.
2	Proximity to Perennial Surface Waters	The site shall not be located within 300 meters of watershed areas or upgradient (point of intake) of any surface waters used for public or private drinking water supply, irrigation or livestock.	Avoid areas within 1 km upgradient of a perennial stream, river or lake. Observe the classification and actual use of water bodies near the site.	The conditional clause for non-potable water sources may be adjusted if it is feasible to protect surface waters and catchment basins from contamination through engineering measures. Locations of public water supply intakes within 1 km from the facility shall be shown on the facility map.
3	Local Geological Conditions (Underlying Rock Formation)	The site shall not be located on areas with underlying rocks characterized as jointed, fractured or fissured;	Avoid areas within 300 meters of jointed, fissured, fractured or porous rock formations.	Stringent engineering design will be required for facilities to be located near jointed, fissured, fractured or porous rock formations to avoid

Site Selection PARAMETERS		EXCLUSION (ABSOLUTE) CRITERIA	CONDITIONAL (REMEDIALE) CRITERIA	
			CRITERIA	Considerations
		carbonate (limestone or dolomite); karst, and other porous rock formations; or in areas with sinkholes or caverns.	Avoid areas classified as geological hazards.	groundwater contamination and reduce vulnerability to geologic hazards. Verify with DENR-MGB and DOST-PHIVOLCS the site's geo-hazard risks.
4	Seismic Conditions (Proximity to Faults)	No facility shall be constructed at a site within 75 meters from a Holocene fault (faults from 60 million years old to present) or a known recent active fault.	Avoid areas within 500 meters of active faults or in areas with an average return period between 50 to 100 years for an earthquake of magnitude 6 and above.	The facility shall be able to withstand the effects of a ground acceleration generated by an earthquake of 50 to 100 years or more recurrence interval and with a magnitude of 6 and above. Consult with references or seismic simulation tools from DENR-MGB, DOST-PHIVOLCS and other authorities.
5	Soil Properties and Availability of Cover Material	The site shall not be located in unstable, very soft and settling soils (sand, coarse sand or fine sand) with high potential for liquefaction, slumping or erosion.	Avoid areas with highly permeable soils (loamy fine sand, loamy sand, sandy loam, fine sandy loam or very fine sandy loam). Avoid areas with soil permeability values faster than 10^{-6} cm/s. The site needs to have an adequate quantity of earth cover material that is easily handled and compacted.	NSWMC Resolution No. 06 and DENR Administrative Order (DAO) 2006-10 both refer to minimum soil permeability requirements for Categories 1, 2 and 3 sanitary landfills (SLFs). For ease in compliance, clayey soil has to be available at selected site. Otherwise an offsite guaranteed clay source shall be identified. The ideal daily soil cover is sandy loam, which has good water and air permeability characteristics that allows easy leveling and compaction of the waste. If inert material is not available, an offsite guaranteed source of cover material shall be identified.

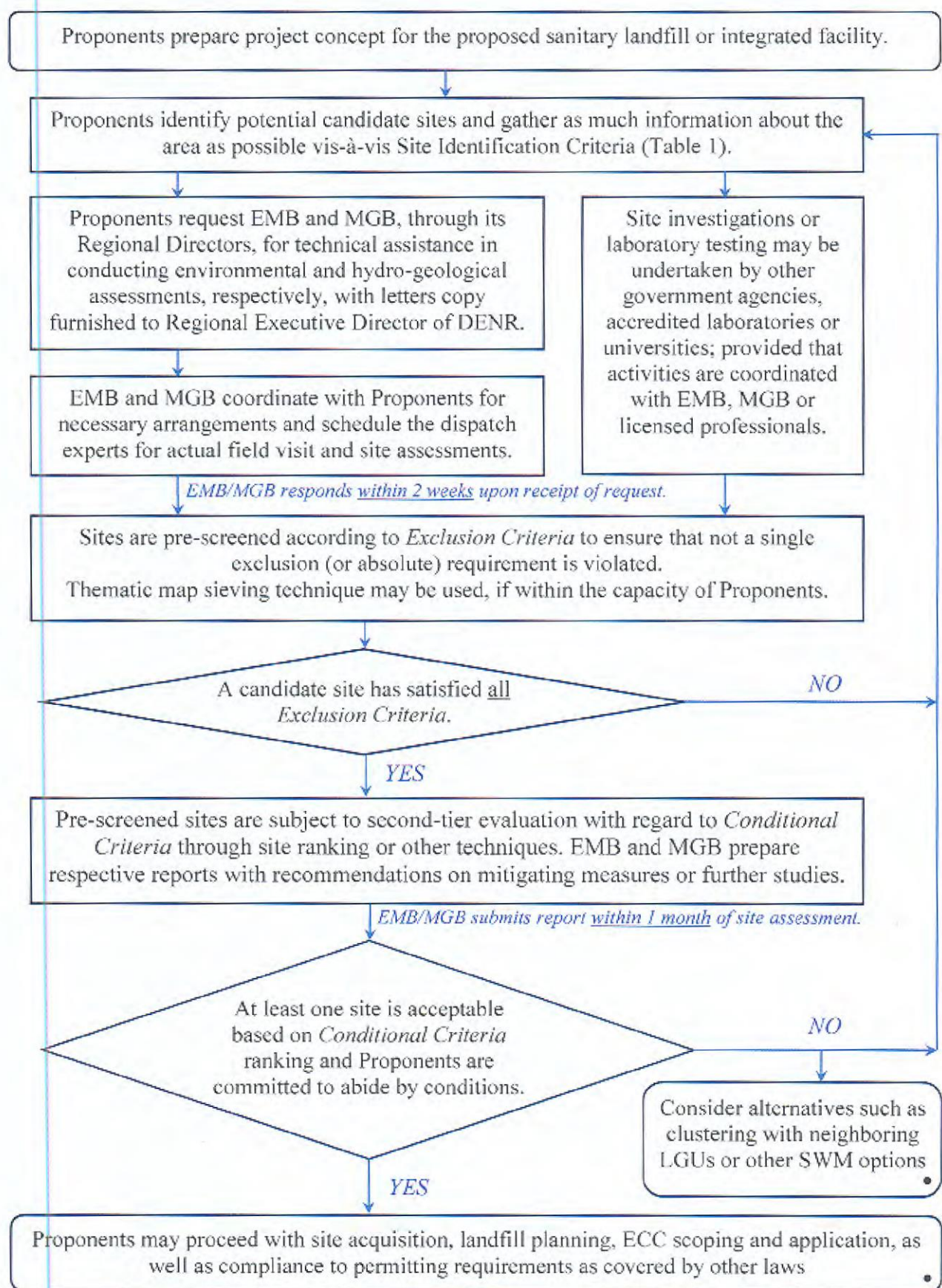
Site Selection PARAMETERS		EXCLUSION (ABSOLUTE) CRITERIA	CONDITIONAL (REMEDIABLE) CRITERIA	
			CRITERIA	Considerations
6	Topography (Terrain and Slope)	<p>The site shall not be located on a landslide-prone area with ground slopes nominally greater than 50% or 2:1 horizontal-to-vertical ratio or as determined by authorities.</p> <p>No site shall be situated in old quarries or abandoned mine pits.</p>	Avoid mountainous or hilly areas with ground slopes nominally greater than 20% or 5:1 horizontal-to-vertical ratio. Ideally, the site has a gently sloped topography.	<p>Landfilling in hilly areas is feasible but steep slopes increase the costs associated with engineering and access arrangements to minimize disaster risks. Complex topography also demands highly detailed hydro-geological investigations.</p> <p>Natural or man-made depressions or 'bowls' do not allow for free flow and collection of leachate. Its aquifer is usually very exposed and highly vulnerable to any type of contamination.</p>
7	Vulnerability to Flooding	The site shall not be located in areas prone to seasonal flooding such as swamplands, marshes and wetlands. This also includes areas that are deemed very highly susceptible to meteorologically-influenced and related natural hazards (flood-prone areas) as declared by DENR-MGB or other appropriate authorities.	<p>Avoid locating site in areas that may be subject to washout or inundation during a major flood, i.e., 100-year floodplain.</p> <p>Avoid areas with high rainfall and strong winds, such as those vulnerable to extreme weather events (i.e., more than 300 mm/day) with increasing frequency as determined by DOST-PAGASA.</p>	<p>Strict engineering measures shall be required to protect the facility against a 100-year flood, including:</p> <ol style="list-style-type: none"> The area of the <i>residual catchment basin</i> shall not be less than three (3) times the area of the landfill site. Area shall have a free draining capability (<i>drainage pattern</i>) both during construction and operation of the facility. <i>Local drainage system</i> shall be in place and functional to facilitate conveyance of discharged water from landfills. Consult with DOST-PAGASA and other authorities regarding meteorological data and projections needed for landfill design, construction, operation and disaster risk reduction.

Site Selection PARAMETERS		EXCLUSION (ABSOLUTE) CRITERIA	CONDITIONAL (REMEDIABLE) CRITERIA	
			CRITERIA	Considerations
8	Proximity to Residential Areas and Other Sensitive Land Users	The sites shall not be located in or within 250 meters of existing or proposed residential, commercial or urban development areas, and areas of historical, archaeological, cultural, geological, or scientific interests, which are more than 100 years old and declared by National Commission for Culture and the Arts, National Historical Institute or National Museum.	<p>Avoid locating the facility within 1 km of residential, commercial, industrial or urban development areas, memorial sites, churches, schools, historical sites and other public places.</p> <p>Avoid areas that encroach the boundaries of any non-participating city or municipality, e.g., not part of the cluster or shared facility.</p>	<p>The site shall be chosen with regard to sensitivities of the community's residents.</p> <p>The distance limitations in the remediable criteria may be mitigated if the site is isolated to protect sensitive receivers. Proper engineering and management measures, including visual barriers, shall be applied as the site gets nearer to sensitive land users. Measures also depend on the topography of surrounding land as well as prevailing wind direction.</p> <p>The suitability of sites encroaching political boundaries will depend on the proximity, density of nearest households and acceptability of the other political entity.</p>
9	Proximity to Ecologically Sensitive or Environmentally Critical Areas	The site shall not be located within 500 meters of the boundaries of ecologically sensitive areas proclaimed as protected areas under the National Integrated Protected Areas System (NIPAS) Act, or by any related issuances, as national parks (areas of national significance), conservation parks (areas with valuable wildlife or interesting natural features), recreation parks (areas managed primarily for public recreation with some native	Avoid areas within 500 meters of the boundaries of potentially ecologically sensitive areas that have proposed or pending declaration as national parks, conservation parks, recreation parks, forest reserves, sites of flora and fauna of national or international significance, wildlife sanctuary, mangrove areas, coral reefs, or wetlands of important biodiversity.	<p>Consideration for sites near ecologically sensitive areas will depend on the local conditions and accompanying engineering measures. The exact extent of any ecologically sensitive areas should be verified with DENR-NAMRIA, DENR-PAWB, DA-BFAR and other competent authorities.</p> <p>If the site is a habitat of listed endangered species, mitigation measures for protection of the species as required by applicable laws shall be included in the project proposal.</p>

Site Selection PARAMETERS		EXCLUSION (ABSOLUTE) CRITERIA	CONDITIONAL (REMEDIALABLE) CRITERIA	
			CRITERIA	Considerations
		vegetation), forest reserves, sites of flora and fauna of national or regional significance, wildlife sanctuary, mangrove areas, coral reefs, or wetlands of important biodiversity.		
10	Consistency with Current or Proposed Land Use Classification	The location of the facility shall be consistent with the existing or proposed land use classification or comprehensive land use plan (CLUP) of the host local government unit (LGU).	Avoid areas with valuable mineral and energy resources, tourist destinations or across major transportation routes, water, gas, electrical power or communication transmission infrastructures. Also avoid areas classified as prime agricultural land or inconsistent with the strategic agricultural zones of BSWM of DA.	The site may be located where there are existing infrastructure routes as long as their presence will not affect the landfill operation or if rerouting is economically feasible. Land purchase costs for prime agricultural land will be relatively high and a change of land use will require a permit from the Department of Agriculture (DA) and Department of Agrarian Reform (DAR). Stricter landfill operation will be required to avoid damage to crops on adjacent land.
11	Proximity to Airports	The site shall not be located within three (3) kilometers of an airport servicing turbojet aircraft or 1.6 kilometers of an airport servicing piston driven or turboprop (propeller) aircraft.	Avoid areas within 13 kilometers of the nearest airport.	Permission shall be sought from the Civil Aviation Authority of the Philippines (CAAP), formerly the ATO, if the site is located within 13 km of the nearest airport. In addition, the owner or operator of the landfill shall institute a bird control program to prevent hazards to aircraft if bird population becomes significant due to landfill operation.

Site Selection PARAMETERS		EXCLUSION (ABSOLUTE) CRITERIA	CONDITIONAL (REMEDIALABLE) CRITERIA	
			CRITERIA	Considerations
12	Landfill Area and Lifespan	The site shall be large enough to accommodate waste for a period of five (5) years, with provision for expansion, during which people must internalize the value of environmentally sound and sustainable waste disposal.	Avoid sites where the area is insufficient for a landfill designed to have a total lifespan of at least ten (10) years.	Small areas do not normally allow for phase-wise expansion or acceptable economies of scale. The minimum land area depends on total service population, waste analysis and characterization studies, and expected landfill service life (e.g., 2.6 ha/100,000 population, 0.5 kg/person/day, 0.7 tons/m ³ bulk density and 10 m fill height). Consideration for land ownership also has to be taken into account, giving priority to publicly-owned lands.
13	Haul Distance, Accessibility and Road Conditions	The site shall be accessible from major roadways and thoroughfares, provided that if it is not accessible, the project design shall include means of access.	Areas more than 30 kilometers away or 30 minutes travel time from primary waste generation centers have to be avoided as much as possible.	<p>If the distance or travel time is more than the indicated limits, investment in either larger capacity transport vehicles or transfer stations may be necessary.</p> <p>Road and traffic conditions, including load capacity of bridges, also have to be assessed and considered. The area must be easily accessible to waste collection vehicles and all landfill machinery at all times. Access road must be all-weather and have adequate width and load capacity to cater for two-way heavy vehicle flow.</p>

ANNEX 1. Process Flow on Site Suitability Assessment and Selection Procedure



The DENR and, as may be necessary, other members of the Commission, shall issue their respective Administrative Order(s) or any appropriate issuance for the enforcement and dissemination of this Resolution.

This Resolution shall take effect upon approval.

APPROVED on this 5th day of July, 2013.

ATTESTED BY:


CRISPIAN N. LAO
Representative, Recycling Industry and
Vice Chairman, National Solid Waste Management Commission (NSWMC)

ANNEX 4

DENR Administrative Order No. 10 S. 2006
Guidelines on the categorized Final Disposal Facilities (Sanitary Landfills)



Republic of the Philippines
Department of Environment and Natural Resources
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SEP 14 2006

DENR ADMINISTRATIVE ORDER NO. 10
Series of 2006

**SUBJECT: Guidelines on the Categorized Final Disposal Facilities
(Sanitary Landfills)**

Consistent with Sections 37, 40, 41 and 42 of Republic Act 9003, otherwise known as the Ecological Solid Waste Management Act of 2000 and DENR Administrative Order No. 2001-34, the Implementing Rules and regulations of Republic Act 9003, the following guidelines on the categorized final disposal facilities are hereby promulgated:

SECTION 1. RATIONALE

RA 9003 specifically provides for the Closure of Open Dumps, Criteria for Siting, and Establishment and Operation of Sanitary Landfills, which require basic environmental and engineering safeguards.

These guidelines are based on the potential net residual solid waste generation for setting the entry level of LGUs into the various categories of disposal facilities, taking consideration the environmental, financial, socio-economic as well as the hydro-geological dimensions within the LGUs.

The categories in these guidelines are consistent with the overall objectives of RA 9003, which are to minimize waste, maximize diversion, and use disposal facilities and other ecologically-acceptable alternative technologies for the management of residual wastes.

Furthermore, these guidelines support the National Solid Waste Management Commission Resolution No. 6, the Guidelines on the Categorized Final Disposal Facilities (Sanitary Landfills, SLFs) which was approved on December 15, 2005.

SECTION 2. OBJECTIVE

These guidelines are promulgated in order to support Local Government Units in their planning and implementing strategies on ecological solid waste management through a set of categories on disposal

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facilities, specifying realistic categories and reasonable conditions for meeting legal requirements.

SECTION 3. SCOPE

The guidelines shall cover the different categories and requirements of Municipal Solid Waste (MSW) Disposal facilities and the necessary permits accorded for each category. These shall guide the LGUs, a cluster of LGUs and/or developers in the design, construction and operation of sanitary landfills.

SECTION 4. CATEGORIES OF FINAL DISPOSAL FACILITIES

The following categories of final waste disposal facilities have been developed and designed in consideration of the *net residual waste generation* of the LGUs, taking into account the environmental setting/condition of the site where the SLFs shall be established.

The category of SLF shall be based upon the determination of net residual waste, given the potential waste generation by the LGU, less waste diverted through composting, recycling and other recovery methods. It shall likewise consider the projected waste increase over a 10-year period.

Lower disposal categories may be maintained by LGUs implementing sustained and full scale diversion through recycling/ or various methods of composting.

Each LGU or cluster of LGUs may develop and operate their respective final disposal facilities and progressively move from a lower to a higher category as the amount of disposable residual waste increases over time.

4.1 Category 1

A final disposal facility applied to LGUs with net residual waste generated of less than or equal to 15 tons per day (TPD). It shall also apply to a cluster of LGUs with a collective disposable residual waste of less than or equal to 15 TPD.

4.2 Category 2

A final disposal facility applied to LGUs with net residual waste generated of greater than 15 TPD but less than or equal to 75 TPD. It shall also apply to a cluster of LGUs with a collective disposable residual waste greater than 15 TPD but less than or equal to 75 TPD.

4.3 Category 3

A final disposal facility applied to LGUs with net residual waste generated of greater than 75 TPD but less than or equal to 200 TPD. It shall also apply to a cluster of LGUs with a collective disposable residual waste greater than 75 TPD but less than or equal to 200 TPD.

4.4 Category 4

A final disposal facility applied to LGUs with net residual waste generated of greater than 200 TPD. It shall also apply to a cluster of LGUs with a collective disposable residual waste greater than 200 TPD.

SECTION 5. DEVELOPMENT AND OPERATIONAL FEATURES OF THE CATEGORIZED FINAL DISPOSAL FACILITIES

5.1 Matrix of the Implementation Features

Features	Category 1 ≤ 15 TPD	Category 2 > 15 TPD \leq 75 TPD	Category 3 > 75 TPD, \leq 200 TPD	Category 4 > 200 TPD
Daily and Intermediate Soil Cover	√	√	√	√
Embankment/Cell Separation	√	√	√	√
Drainage Facility	√	√	√	√
Gas Venting	√	√	√	√
Leachate Collection	√	√	√	√
Leachate Treatment	Pond System	Pond system	Pond system	Combination of physical, biological & chemical
Leachate Re-circulation	At a later stage of operation	At a later stage of operation	At a later stage of operation	Treatment
Clay liner	√ ¹	√ ²		
Clay liner and/or synthetic liner			√ ³	√ ⁴

¹ Clay liner be at least 60 cm thick and has a permeability of 10^{-5} cm/sec

² Clay liner must be at least 75 cm thick and has a permeability of 10^{-6} cm/sec

³ Clay liner at least 75 cm thick clay liner with a permeability of 10^{-7} cm/sec or better, if not available, an equivalent replacement would be a composite liner consisting of at least 1.5mm thick HDPE membrane over at least 60 cm thickness of compacted fine materials with permeability no more than 10^{-6} cm/sec.

⁴ Synthetic liner at least 1.5mm thick HDPE membrane over at least 60 cm thickness of compacted clay materials with permeability no more than 10^{-7} cm/sec.

5.2 Facility Development and Operating Requirements

All waste disposal facilities, regardless of category, shall satisfy the Basic Siting Criteria stated in Section 40 of RA 9003 and its IRR, and shall meet the following operating requirements, unless when otherwise specified.

1. Planned capacity with phased cell development.
2. Site preparation and containment engineering.
3. Compaction of waste to minimum specified target densities.
4. Specified operational procedures to protect amenities.
5. Fence, gate and other site infrastructure with surfaced primary access road.
6. Full record of waste volumes, types and source.
7. Separate cells for municipal solid waste, treated toxic hazardous waste (THW) or health care waste (HCW). Handling and management of THW and HCW should be in accordance with the provisions of Republic Act 6969 and Joint DENR-DOH Administrative Order No. 02, respectively.
8. Facility operation by a pool of fully-trained staff.
9. Prohibition of open burning.
10. Provision for aftercare following site restoration and closure.
11. Prohibition of waste pickers at the immediate disposal area.

SECTION 6.

PERMITTING REQUIREMENTS

The establishment and operation of the different categories therein shall be consistent with Section 38 of RA 9003 and the requirements stipulated in the Procedural Manual for DENR Administrative Order No. 30 Series of 2003 and Memorandum Circular No. _____ Series of 2006.

- 6.1 For Categories 1 and 2, the application for an Environmental Compliance Certificate (ECC) shall require the submission of an Initial Environmental Examination (IEE) Checklist. The IEE Checklist may be secured from the regional offices of the Environmental Management Bureau (EMB).
- 6.2 For Categories 3 and 4 however, the documentary requirements for the application and issuance of the ECC shall be an Initial Environmental Examination (IEE) Report.
- 6.3 In view further of the provisions of the Procedural Manual for DENR Administrative Order No. 30, ECC application for sanitary

landfill projects with a daily capacity of 1,000 metric tons and above shall be required an Environmental Impact Study (EIS).

SECTION 7. SEPARABILITY CLAUSE

If any section of these guidelines is held or declared unconstitutional or invalid by a competent court, the other sections or provisions hereof shall continue to be in force as if the sections or provisions so annulled or voided have never been incorporated herein.

SECTION 8. REPEALING CLAUSE


All pertinent guidelines, rules and regulations or portions thereof inconsistent with these Guidelines are hereby revised, amended and/or modified accordingly.

SECTION 9. AMENDMENTS

These guidelines may be amended and/or modified in whole or parts hereof from time to time by the DENR.

SECTION 10. EFFECTIVITY

This Order shall take effect fifteen (15) days after publication in two (2) newspapers of general circulation and filing with the office of the National Administrative Register.


ANGELO T. REYES
Secretary, DENR and
Chairman, NSWMC



Republic of the Philippines
DEPARTMENT OF ENVIRONMENT
AND NATURAL RESOURCES

IN REPLYING, PLS CITE:

SENRO6-004566



ANNEX 5

Sample Calculation for the Life Span of Sanitary Landfill with 10m depth

Given:

CLUSTER	Tons per day (2025)	Initial area	Depth
Pinamalayan	16.0	0.2 ha	10 m
Baco	16.0	3.1 ha	10 m
San Jose	120.97	2.0 ha	10 m
Mabini	67.84	3.8 ha	10 m

1. Conversion of hectares to square meters

$$0.2 \text{ ha} \times 10,000 \text{ m}^2/1 \text{ ha} = 2,000 \text{ m}^2$$

2. Conversion of tons per day to m3 per year

$$1 \text{ ton} = 1.133 \text{ m}^3$$

$$16 \text{ tons/day} \times 1.133 \text{ m}^3/\text{ton} = 18.128 \text{ m}^3/\text{day}$$

$$18.128 \text{ m}^3/\text{day} \times 365 \text{ days/year} = 6,616.72 \text{ m}^3/\text{year}$$

3. Convert the m2 to m3 by multiplying the given depth

$$2,000 \text{ m}^2 \times 10 \text{ m} = 20,000 \text{ m}^3$$

4. Compute the life span by dividing the volume/year to the computed volume of SLF

$$20,000 \text{ m}^3/6,616.72 \text{ m}^3/\text{year} = 3.0 \text{ years}$$



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