

ANNEX K.9

DRAFT RESETTLEMENT ACTION PLAN

**THE RESETTLEMENT ACTION PLAN (RAP)
FOR THE INFORMAL SETTLER FAMILIES
OF ESTERO DE TRIPA DE GALLINA, PASAY AND MAKATI**

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**THE RESETTLEMENT ACTION PLAN (RAP)
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I. Introduction

Flood is one of the major threats to social and economic development, particularly in the urban areas. Several flood control and drainage improvement facilities and measures were established and instituted to prevent or minimize its adverse effects to the lives and properties of the populace. Despite these efforts, it was observed that the inundation problems in the core area of Metro Manila remained unresolved.

The **Study on Drainage Improvement in the Core Area of Metro Manila (DICAMM) Project**, which commenced in February 2004, covers 73 kilometers of Metropolitan Manila. The core area is vulnerable to floods, storm water and high tides of Manila Bay owing to its low-lying topography and tropical meteorological and hydrological conditions. The study areas include the City of Manila and parts of the LGUs of Caloocan, Quezon, Pasay, Makati, Muntinlupa and Taguig with total population of 2.58 million. The study aims to:

- *formulate a Master Plan on comprehensive drainage improvement in the core area;*
- *conduct feasibility study on the priority projects/areas identified in the Master Plan;*
- *prepare guidelines for comprehensive drainage improvement; and*
- *transfer technology and knowledge of the methods and management of comprehensive drainage improvement to counterpart personnel in the course of the Study.*

The rehabilitation of the **Estero de Tripa de Gallina**, a drainage channel is one of the identified priority projects for drainage improvement. The presence of informal settlements in the subject area, however, complicates the implementation of the **Project**. Relocation of informal settler families (ISFs), therefore, is deemed imperative. The formal sector, which occupies private lands/lots adjacent to the creek and the reports of their encroachments, should also be looked into

This **Resettlement Action Plan** is hereby formulated to address the issues and concerns of the project affected persons (PAPs) and the response of the government to these perceived needs.

II. The Resettlement Action Plan

A. Rationale

The implementation of the **DICAMM Project** in the **Estero de Tripa de Gallina** is expected to benefit a greater number of people but will have unfavorable or undesirable effects on its household occupants. The **Project** calls for the relocation or involuntary resettlement of families occupying the said waterway.

Inasmuch as this is the only option available to the residents, concrete measures must be undertaken to *(a) protect the lives and welfare of those to be displaced by the Project; (b) reduce and redress the loss of economic potential incurred by the affected people and (c) assist in developing the socio-economic-cultural capability of the affected people and communities.* If relocation is unavoidable, it should be well planned and executed so that socio-economic growth is enhanced and the affected households would be at least well-off as they would have been in the absence of the **Project**.

The **Resettlement Action Plan (RAP)** is a comprehensive and integrated framework of standardized relocation and resettlement principles. It includes policies and procedures with realistic and workable action plans

It addresses the concerns of project affected persons (PAPs) who stand to lose, as a consequence of the **Project**, all or part of their physical and non - physical assets, either permanently or temporary.

The **RAP** shall use consensus-building mechanisms and strategies whereby options of different individuals or groups with respective constraints, interests and concerns are identified and mutually acceptable outcomes are generated to mitigate adverse effects of the **Project**.

Further, the **RAP** provides resettlement and rehabilitation packages designed to generally improve or at least restore the social and economic base of those to be relocated.

B. Objectives of the Resettlement Action Plan

The RAP aims to:

- Facilitate the humane, peaceful and orderly relocation of informal settler families (ISFs) affected by the Project;
- Offer workable shelter options and other mitigating measures that provide improved housing, better socio-economic living conditions and secured land tenure;
- Provide clear institutional linkages among government and non-government stakeholders to ensure efficient delivery of services and maximization of resources; and
- Provide opportunities for the PAPs to participate in resettlement planning and implementation

C. Scope and Coverage

The **Drainage Improvement in the Core Area of Metro Manila (DICMM) PProject** is aimed at mitigating flood occurrences in Metro Manila as these affect the and prevents the damaging effects of high waters to the lives and properties of its residents. The **Estero de Tripa de Gallina**, a drainage channel is one of the priority areas included in the **Project** that need to be rehabilitated and improved. Although this particular creek cuts across several cities and municipalities in Metro Manila, only two (2) cities are covered by the **Project** namely: **Makati** and **Pasay**. The creek in the said LGUs, however, is characterized by the presence of informal settlements which must be addressed by the **Project**.

Six (6) barangays in **Tripa de Gallina** are included in the **Project** and **663** residing households whose structures are encroaching into the creek are affected. These areas and the number of households are shown in the next table:

BARANGAY	TOTAL NO. OF STRUCTURES	NO. OF HOUSEHOLDS			
		Residing		Non-Residing	Total
		Interviewed	Not Interviewed		
PASAY CITY					
BARANGAY 43	71	85	6	6	97
BARANGAY 46	111	126	17	22	165
BARANGAY 51	53	70	1	3	74
BARANGAY 54	20	28	1	3	32
<i>sub-total</i>	255	309	25	34	368
MAKATI CITY					
PALANAN	107	194	20	17	231
SAN ISIDRO	80	108	7	7	122
<i>sub-total</i>	187	302	27	24	353
TOTAL	442	611	52	58	721

A total of 721 households is registered in the *2004 Households' Survey* in Estero de Tripa de; 663 are residing households composed of structure owners/co-owners, renters, sharers or rent-free-occupants and caretakers and 58 are non-residing or absentee house owners (AHOs). Of the 663 residing households, 611 were interviewed and the remaining 52 were either out during the survey or refused to be interviewed.

For the purpose of the RAP, the 663 residing households shall be considered and will be used as basis in planning and implementing the relocation and resettlement operations.

III. Resettlement Principles

A. General Policies and Strategies

The Resettlement Action Plan shall be guided by the following general policies and strategies:

1.0 Determination of Project Beneficiaries

- The Project's authorized census or survey of informal settler families (ISFs) conducted in November - December 2004 shall be the official reference in determining potential beneficiaries. Selection shall be generally based on the provisions of the *Urban Development and Housing Act of 1992 (UDHA)* and qualification standards or criteria prescribed and approved by the Project.

2.0 Housing Packages/Options

- A menu of housing options shall be provided to the affected families of the Project.
- The housing options shall be based not only on their families' acceptability and affordability but also on the availability of government resources and Project's implementation schedule.
- The promotion of the peoples' *right to housing* shall be an overriding principle, interpreted as the right to live in a place where there is security, peace and dignity.

3.0 Production of Housing Lots/Units and Relocation and Resettlement Schedules

- The Project shall determine the relocation and resettlement schedules, taking into account the timetable on drainage improvement and the availability and readiness of the resettlement sites.

4.0 Timing and Coordination

- The actual relocation of the informal dwellers should be scheduled before the onset of the rainy season. It should also consider the education of the children and minimize its disruption.

5.0 Relocation and Resettlement Procedures

- The procedures on the relocation and resettlement of affected families shall likewise be in accordance with the provisions of RA 7279 and its Implementing Rules and Regulations.
- The implementing agency shall likewise secure a Certification of Compliance from the Presidential Commission for the Urban Poor (PCUP) and comply with the relocation and resettlement requirements as stipulated in the Executive Order No. 152.

6.0 Dislocation Benefits

- Basic relocation benefits such as food subsidy, transportation to resettlement site and manpower assistance in dismantling the structures shall be standardized for all areas covered by the **Project**. Sending LGUs, however, are encouraged to provide additional benefits to their constituents.
- The **Project** may likewise offer supplementary benefits and entitlements to qualified families, if funds are available such as the provision of financial assistance to families opting NOT to be relocated to resettlement site, provision of Housing Materials Loan Program (HMLP) for families who will opt to avail of lots only and livelihood loan to assist them restore their economic bases.
- The disqualified households, on the other hand, shall be assisted in accordance with existing laws and regulations.

7.0 Gender Equality

- Gender equality shall be promoted and upheld where women shall have equal access to opportunities and benefits. They shall be empowered to participate in decisions that affect their lives.
- Households headed by women shall not be discriminated, but instead, mainstreamed into the Project development cycle.

8.0 Multi - Stakeholders' Participation

- The primary stakeholders are the informal settlers, national government and the affected local government units (LGUs). Other stakeholders include the private sector, non - government organizations (NGOs) and the financial institutions. Multi - stakeholders' participation ensures that the interests and contribution of each are recognized and efforts are exerted to identify and consider common denominators and achievable goals as well as work within certain non - negotiables.
- The active participation of the stakeholders will only be realized if there is full information/disclosure on the **Project**.

9.0 Integration and Resource Complementation

- Based on past relocation efforts and experiences in massive dismantling operations, no single entity or agency can undertake this task single handedly. Combined authority and shared resources will ensure a successful relocation; thus a well - coordinated approach is necessary. All government agencies, NGOs, and private sector entities need to focus their interventions on agreed scope/coverage and principles of the **Project**.

10.0 Parity/Resource Complementation

- As the government utilizes all the resources at its disposal, it will introduce and encourage the concept of parity where the benefits and costs of relocation are shared by both the sending and receiving LGUs.
- Resource complementation of the national and local government agencies shall be mandatory particularly in the provision of socio - economic services and programs particularly on education, health care, sanitation and livelihood.

11.0 Incentives to Receiving LGUs

- Receiving LGUs shall be granted appropriate incentives to facilitate the acceptance of resettlement Projects in their respective localities which will ensure maintenance thereof.
- Continuous support of the national government in providing socio - economic infrastructures/facilities and services to the resettlement sites shall be ensured until such time that the receiving LGUs can sufficiently and adequately provide the same.

12.0 Sustainability

- Sustainability of the housing solutions for informal settler families shall be ensured. On the part the resettlers, sustainability means that their new homes must be affordable, income is maintained or restored and access to essential social services like education, health care and transport is adequate. For the government, sustainability means, to the extent possible, costs are recovered so that it can make use of these resources to replicate or expand its housing programs for similarly in-need informal settlers.

13.0 Development and/or Maintenance of Cleared Areas

- After the removal of the affected structures, the development of the cleared areas shall be done immediately to prevent its re-occupation by family returnees or new informal settlers.
- Concerned LGUs and barangays shall be mobilized to maintain the area cleared of any informal structure in case implementation of the Project is delayed.

IV. Related Laws and Other Legal Bases

The following laws, legal issuances and related materials are presented as legal bases for the relocation and resettlement of informal settler families:

A. 1987 PHILIPPINE CONSTITUTION

1.0 **Article XIII, Section 9.** *The State shall, by law and for the common good, undertake, in cooperation with the private sector, a continuing program of urban land reform and housing which will make available at affordable cost decent housing and basic services to underprivileged and homeless citizens in urban centers and resettlement areas. It shall also promote adequate employment opportunities to such citizens, in the implementation of such program; the State shall respect the rights of small property owners.*

2.0 **Article XIII, Section 10.** *Urban poor dwellers shall not be evicted nor their dwellings demolished, except in accordance with law and in a just and humane manner.*

No resettlement of urban and rural dwellers shall be undertaken without adequate consultation with them and the communities where they are to be relocated.

B. Republic Act No. 7279, otherwise known as the **URBAN DEVELOPMENT AND HOUSING ACT OF 1992** states the following:

1.0 **Article IV, Section 8 (Identification of Sites for Socialized Housing).** *Lands identified for socialized housing and resettlement areas for the immediate and future needs of the underprivileged and homeless in the urban areas shall take into consideration the degree of availability of basic services and facilities, their accessibility and proximity to job sites and other economic opportunities and the actual number of registered beneficiaries.*

2.0 **Article V, Section 16 (Eligibility Criteria for Socialized Housing Program Beneficiaries).** *To qualify for the housing program, a beneficiary:*

- a. Must be a Filipino citizen;
- b. Must be an underprivileged and homeless citizen;
- c. Must not own any real property whether in the urban or rural areas; and
- d. Must not be a professional squatter or a member of squatting syndicates.

3.0 **Article V, Section 21 (Basic Services).** *Socialized housing or resettlement areas shall be provided by the local government unit or the National Housing Authority in cooperation with the private developers and concerned agencies with the following basic services and facilities:*

- a. Potable water;
- b. Power and electricity and adequate power distribution system;
- c. Sewerage facilities and efficient and adequate solid waste disposal system; and
- d. Access to primary roads and transportation facilities

The provision of other basic services and facilities such as health, education, communications, security, recreation, relief and welfare shall be implemented and given priority for implementation by the local government unit and concerned agencies in cooperation with the private sector and the beneficiaries themselves.

4.0 **Article V, Section 22 (Livelihood Component).** *To the extent feasible, socialized housing and resettlement Projects shall be located near areas where employment opportunities are accessible. The government agencies dealing with the development of livelihood programs and grant of livelihood loans shall give priority to the Program beneficiaries.*

5.0 **Article V, Section 23 (Participation of Beneficiaries).** *The local government units, in coordination with PCUP and concerned government agencies shall afford Program beneficiaries or their duly designated representatives an opportunity to be heard and to participate in the decision making process over matters involving the protection and promotion of their legitimate collective interests which shall include appropriate documentation and feedback mechanisms. They shall also be encouraged to organize themselves and undertake self-help cooperative housing and other livelihood activities. They shall assist the Government in preventing the incursion of professional squatters and members of squatting syndicates into their communities.*

6.0 **Article VII, Section 26 (Urban Renewal and Resettlement).** *The resettlement of beneficiaries of the Program from their existing places of occupancy shall be undertaken only when on - site development is not feasible and after compliance with the procedures laid down in Section 28 of the Act.*

7.0 **Article VII, Section 28 (Eviction and Demolition).** *Eviction or demolition as a practice shall be discouraged. Eviction or demolition, however, may be allowed under the following situations:*

- a. When persons or entities occupy danger areas such as esteros, railroad tracks, garbage dumps, riverbanks, shorelines, waterways and other public places such as sidewalks, roads, parks and playgrounds;
- b. When government infrastructure Projects with available funding are about to be implemented; or
- c. When there is a court order for eviction and demolition.

In the execution of eviction or demolition orders involving underprivileged and homeless citizens, the following shall be mandatory:

- a. Notice upon the affected persons or entities at least thirty (30) days prior to the date of eviction or demolition;

- b. Adequate consultations with the duly designated representatives of families to be resettled and affected communities in the areas where they are to be relocated;
- c. Presence of local government officials or their representatives during eviction or demolition;
- d. Proper identification of all persons taking part in the demolition;
- e. Execution of eviction or demolition only during regular office hours from Mondays to Fridays and during good weather; unless the affected families consent otherwise;
- f. No use of heavy equipment for demolition except for structures that are permanent and of concrete materials;
- g. Proper uniforms for members of the PNP who shall occupy the first line of law enforcement and observe proper disturbance control procedures; and
- h. Adequate relocation, whether temporary or permanent.

8.0 **Section 3 of the Implementing Rules and Regulations (IRR) to Ensure Observance of Proper and Humane Relocation and Resettlement Procedures.** *LGUs and/or government agencies authorized to demolish shall conduct information campaign and consultation meetings on available options other than resettlement, possible relocation sites to include facilities/services, tenure, mode of payment, and other problems and issues to ensure peaceful and orderly relocation operation.*

C. **Republic Act No. 8974, known as AN ACT TO FACILITATE THE ACQUISITION OF RIGHT - OF - WAY, SITE OR LOCATION FOR NATIONAL GOVERNMENT INFRASTRUCTURE PPROJECTS AND FOR OTHER PURPOSES.**

1.0 **Section 9 (Squatter Relocation).** *The government through the National Housing Authority, in coordination with the local government units and*

implementing agencies concerned shall establish and develop squatter relocation sites, including the provision of adequate utilities and services, in anticipation of squatters that have to be removed from the right - of -way or site of future infrastructure projects. Whenever applicable, the concerned local government units shall provide and administer the relocation sites.

D. Executive Order No. 152, DESIGNATING THE PRESIDENTIAL COMMISSION FOR THE URBAN POOR (PCUP) AS THE SOLE CLEARING HOUSE FOR THE CONDUCT OF DEMOLITION AND EVICTION ACTIVITIES INVOLVING THE HOMELESS AND UNDERPRIVILEGED CITIZENS AND ESTABLISHING FOR THE PURPOSE OF A MECHANISM TO ENSURE STRICT COMPLIANCE WITH THE REQUIREMENTS OF JUST AND HUMANE DEMOLITION AND EVICTION UNDER THE URBAN DEVELOPMENT AND HOUSING ACT OF 1992

1.0 Section 1 (Clearing House for Demolition and Eviction). *Require the concerned departments and agencies, including concerned local government units (LGUs), proposing to undertake demolition and eviction activities to secure first from either the PCUP Central Office (in the case of regional or national projects) the checklists, guidelines and compliance certificates on demolition and eviction prior to the actual implementation thereof and thereafter, submit to the PCUP the completed checklist, attested to under oath the proponent and indicating that:*

- a. Adequate consultations with the affected families have already been undertaken;
- b. Adequate resettlement site and relocation facilities are available; and
- c. The provisions of Section 3, paragraph 1 of the Implementing Rules and regulations of Section 28 of RA 7279 (Pre-Relocation) have been complied with.

E. Presidential Decree No. 1067 (THE WATER CODE OF THE PHILIPPINES). A DECREE INSTITUTING A WATER CODE, THEREBY REVISING AND CONSOLIDATING THE LAWS

GOVERNING THE OWNERSHIP, APPROPRIATION,
UTILIZATION, EXPLOITATION, DEVELOPMENT,
CONSERVATION AND PROTECTION OF WATER RESOURCES.

- 1.0 **Chapter IV, Article 51 (Utilization of Waters)** *The banks or rivers and streams and the shores of the seas and lakes throughout their entire length and within a zone of three (3) meters in urban areas, twenty (20) meters in agricultural areas and forty (40) meters in forest areas, along their margins, are subject to the easement of public use in the interest of recreation, navigation, flottage, fishing and salvage. No person shall be allowed to stay in this zone longer than what is necessary for recreation, navigation, flottage, fishing or salvage or to build structures of any kind.*

V. Socio - Economic Profile of the Affected Communities

The 2004 TRIPA DE GALLINA Households' Survey conducted in November - December 2004 which aimed to determine the actual number and location of structures encroaching into the estero/creek and identify the households residing thereat generated the following data:

A. On the Structures

- 1.0 The survey covered the six barangays (Barangays 43, 46, 51 and 54 in Pasay City and Palanan and San Isidro in Makati City) where 442 structures were identified encroaching into the ESTERO DE TRIPA DE GALLINA.
- 2.0 Of the 442 structures, only 249 (56%) are identified for total dismantling and the rest (193 or 44%) is for chopping of some portions of the structures, which are mostly kitchens and comfort rooms.
- 3.0 *One hundred percent (100%)* of the structures in Barangay 46 and 82% in Barangay 43 are totally affected by the Project.
- 4.0 Generally, most of the structures are either single detached or extended housing, made of mixed housing materials and used primarily for residential purpose. However, the presence of structures with light materials is abundant in Barangay 51, Palanan and San Isidro.
- 5.0 Majority (62.5%) of those structures was built more than ten (10) years.
- 6.0 The residential structures numbering 392 are occupied by 663 households (includes 611 who were interviewed and 52 who were not, the 58 absentee house owners are considered non - residents), giving a 1.7 number of households per residential structure.
- 7.0 The affected areas are overcrowded, congested and structures were built close to one other. The structures in Barangays 51, 54, Palanan and San Isidro can be reached by using private lots and passing through alleys/footpaths, which are too narrow and

unlit. Only those structures in **Barangays 43 and 46** are accessible because the easement of the creek had been paved and being used as a road network.

B. On the Households

- 1.0 The survey generated a total of **721** households, of which **611 (85%)** were interviewed while **110 (15%)** were not interviewed.
- 2.0 In terms of actual occupancy, **663 (92%)** are residing households and **58 (8%)** are non - occupants of the area since they are considered absentee house owners.
- 3.0 Majority of the households claimed to be residents of the affected LGUs for more than **five (5)** years who settled thereat because of proximity to their sources of livelihood.
- 4.0 *Ninety four percent (94%)* of the households are Roman Catholics.
- 5.0 The Tagalogs dominate the affected areas followed by those who came from the Visayan region.
- 6.0 The mean household size is **4.00**, which is lower than the average size of a Filipino household of **4.92** per the *2000 National Census*.

C. On the Household Members

- 1.0 The combined population of the **six (6)** barangays in the **ESTERO DE TRIPA DE GALLINA** reached **2,449**, of which **1,161 (47%)** are children.
- 2.0 The **2,449** persons occupying the **392** occupied residential structures translate the average number of occupants per residential structure at **6.2**.
- 3.0 **Palanan**, which has the most number of residential structures in the area, has also the biggest population, while **Barangay 54** is the least populated.

- 4.0 The household occupants constitute an almost balanced population in terms of age since half the household members is **below 21 years** old and the other half is aged **above 22 years old**.
- 5.0 In terms of gender, the population is almost evenly distributed between the males with **1,243** or **51%** and the females at **1,206** or **49%**.
- 6.0 Over one - half (**54%**) of the population is single while **26%** is married, **18%** is either separated or living - in and the remaining **2%** is widowed.
- 7.0 The affected areas are inhabited by educated/learned individuals with **82%** undergoing or have received formal education. This is attributed to the presence of educational facilities in the said barangays.
- 8.0 A little over **1/3** of the population is of school age. From the total of **827** individuals who are of school age, almost three out of four are currently enrolled.
- 9.0 Majority of the students go to schools (elementary, and high school) located within their respective communities.
- 10.0 There are **35** household members who are with disabilities (deaf, mute, lame and blind).
- 11.0 The survey also identified **57 (9%)** households headed by women. They became single/solo parents either because of the death of their spouses or have been separated from their husbands.

D. On Land/Structure Ownership

- 1.0 **Sixty one (61%)** of the respondent households owned the structures they occupy while **39%** comprises the aggregate number of renters, sharers or rent - free occupants and caretaker.
- 2.0 Most of the households (**44%**) occupy one-floor structures while **31%** live in two-floor dwelling units.
- 3.0 Some **269** households (**44%**) reside in structures with an estimated floor area of 5 to 10 square meters

while 177 or (29%) families live in structures with floor area of less than 5 square meters.

- 4.0 Out of the 611 households, 237 are non - owners: the renters, sharers/rent-free occupants and the caretakers. The renters pay P1, 000 to P1, 500 a month and the caretakers are being allowed by their relatives to stay for free in exchange for consideration such as house maintenance, among others.
- 5.0 Majority of the households occupy an average area of less than 10 square meter government land, which is rent-free.

E. Assets and Amenities

- 1.0 Majority of the households possess only simple and basic appliances such as radio, television, stove and electric fan.
- 2.0 Only 12% of the households own transportation. Most of them reside in **Barangay 46** and **Palanan**.
- 3.0 *Ninety two percent (92%)* have **NO** other real property while 8% admitted that they own other properties (structure or land only, or both).

F. Information on Family Living

- 1.0 Almost 80% of the households are of the nuclear type of family living, composed of parents and their children.
- 2.0 Almost 78% of the households spend their leisure time by watching television. Television is also the primary source of information of the majority of the households.
- 3.0 Majority (82%) of the families depends on the Local Water District for their water supply while 17% buys their own water.
- 4.0 Liquid and solid wastes of the majority of the households (87%) are deposited directly to the creek through a small hole on the floor of makeshift toilets.

- 5.0 **Eighty five percent (85%)** of the households depend on the garbage collector provided by the concerned LGUs to dispose their household wastes/garbage while **12%** dump their wastes into the creek.
- 6.0 Most of the families (**390** or **64%**) use Liquefied Petroleum Gas (LPG) for cooking while **155 (25%)** households rely on kerosene.
- 7.0 Electricity is the major source of power/light of the **600 (98%)** families and the rest, **11 (2%)** use kerosene, battery, oil and candles.
- 8.0 The **male household head** is the main person whom the members of the family solicit for assistance in times of financial, physical, spiritual and emotional crisis/need.
- 9.0 The **mother**, on the other hand is identified as the primarily responsible person doing household tasks such as cooking, washing clothes, child care, cleaning the house, fetching water and purchase of house needs.
- 10.0 **Both the father and mother** decide on the aspects of livelihood, family, financial and barangays affairs.
- 11.0 The survey also established the **father** as the one who has access and control of resources and benefits such as land, use of house, income, and borrowing from bank/cooperative or loan sharks.

G. On Employment and Income

- 1.0 The survey registered a potential labor force (15 - 65 years old) of **1,522** persons, which represents **62%** of the entire population.
- 2.0 The preceding information illustrates that for every **two (2)** employable household members; only **one (1)** is engaged in income generating activity.
- 3.0 This data also implies that only **one (1)** household member is working and paying for the costs of all household expenditures.

- 4.0 Of this, only **853** are employed and most of them are drivers, construction workers, vendors, store owners and laundrywomen.
- 5.0 A total of **351** or **41%** of the **853** individual income earners has a monthly income between **P5, 001.00** and **P10, 000.00** while **326** or **38%** earn between **P2, 000.00** to **P5, 000.00**.
- 6.0 Most (**32%**) of the employed members receive compensation on a bi-monthly basis. Although, majority of them (**65%**) are employees of private companies/groups/individuals, only **32%** is permanently employed.
- 7.0 **Thirty nine percent (39%)** are members of the Social Security System (SSS). However, **45%** of those employed are **NOT** members of any government financing institution.
- 8.0 The mean average total monthly household income is between **P6, 001.00 - P7, 000.00** per month, while the total monthly household expense is between **P4, 001.00 - P5, 000.00**. The monthly net income is between **P2, 000.00 - P3, 000.00**.
- 9.0 Despite the economic crisis, **438 (72%)** of the households have declared net incomes. The rest (**28%**), however, reported to have no savings at all.
- 10.0 A total of **223** families (**36%**) live below the poverty threshold for urban areas as their monthly income is below the **P5, 547.00** required for a family of five (i.e. *national average household size*) to meet its food and non - food basic needs. (*The annual per capita poverty threshold for the country was estimated at P11, 906.00 in 2002 and a family of five should have monthly income of P4, 961.00 to be able to satisfy its food and non-food requirements.*)

H. On Skills, Needs and Interests

- 1.0 **Cooking, driving and carpentry** are the top three (3) skills possessed by the household members while **driving, sewing and cooking** are the preferred skills.
- 2.0 The business interests are **sari - sari store, carinderia/restaurant** and grocery and the training

needs, on the other hand, are **business management, culinary arts and driving/auto mechanic.**

I. On Health

- 1.0 **Diarrhea** is the top common illness and **water contamination** is the primary cause of illness.
- 2.0 Majority of the households seek medical help from the community health centers.

J. On the Community

- 1.0 Of the **611** households, only **104 (17%)** are presently engaged in business ventures, which are mostly in trading and home/small - scale industry and have been in existence for more than one year.
- 2.0 Most of these businesses have capital investments of less than P5, 000.00 and employ only one (1) worker.
- 3.0 Majority of the **basic socio-economic facilities** such as **health center, private clinic, government hospital, police outpost, market/talipapa, barangay center, roads, drainage, place of worship, day care center and schools** (pre - school, elementary, high school and college) are considered **adequate**. The only facility which is considered **non -existent** is the **recreational facility**.
- 4.0 In terms of basic socio-economic services, the following are available and adequate: **health, nutrition, education, communications, transportation, livelihood, power and water**. The only service, which is **inadequate**, is **sanitation**.
- 5.0 The household members ranked the **poor peace and order, drug addiction, improper garbage disposal/poor sanitation, security of tenure and unemployment** as the **five (5)** major problems of **ESTERO DE TRIPA DE GALLINA**.
- 6.0 The recognized community officials such as the barangay chairmen and other officers are the primary persons the residents consult for assistance. Most of

the barangay consultations are conducted through meetings, which are being held on a monthly basis.

- 7.0 Majority of the households (545 or 89%) participate in various community activities. such as: attendance in meetings, cleaning, repairs works and community socials. The female spouse represents the household in meetings, cleaning and community socials while the male spouse does repair works in the community.

L. On the Community Association

- 1.0 Of the 611 households interviewed, only 133 (22%) are members of various community associations. Majority of the families (478 or 78%) are NOT affiliated with any community organizations.
- 2.0 Of the 133 who joined the community associations, only the spouses (male - 50%; female - 47%) and the elderly male (3%) are members.
- 3.0 More than half of the respondents are affiliated with organizations that are socio - civic in nature.

VI. Resettlement Components

A. Housing Options

1.0 Resettlement at Kasiglahan Village 1 (KV1) in Barangay San Jose, Rodriguez, Rizal

- KV1, a National Housing Authority (NHA) - administered resettlement project in Rodriguez, Rizal was established in 2000. It has 9,915 house and lot packages built on a 57.90 hectare of land with a present occupancy of 9,426 families from various LGUs affected by the rehabilitation of the Pasig River System and other national/local government projects.
- The site has the following community facilities:
 - *Schools (elementary and high school)*
 - *Health Center*
 - *Day Care Center*
 - *Market*
 - *Multi Purpose Center (Clubhouse)*
 - *Livelihood Center*
 - *Swimming Pools (adult and kiddie)*
 - *Parks, playground and basketball court*
 - *Jeepney Terminal*
- The average lot size of the house and lot package is 32.00 square meters with floor area of 20.00 square meters.
- Present house and lot packages cost P165,000.00 each.
- The mode of disposition of the housing units shall be through lease with option to purchase. The lease shall be for a period of ten (10) years with no extension or renewal of contract. After the 10th year lease period, beneficiaries deemed not qualified for end - buyer's financing may opt for a Conditional Contract to Sell (CCS) at 6% per annum or a fixed monthly amortization of P825.00 payable in 20 years
- The lease rate is computed in consideration of the affordability level of the beneficiaries.

The updated monthly lease rates as of June 2004 are as follows:

Year	Monthly Lease Rate
1 - 3	P 250.00
4 -10	P500.00

- Lease payments exclusive of delinquency charges, made during the ten (10) year lease period shall be credited as payment to the selling price. The purchase options are as follows:
 - Outright sale through cash payment directly to NHA
 - Availment of buyer's financing from any of the government - designated financial institutions where terms and conditions shall be prescribed by the latter.

2.0 Housing Financial Assistance

- Qualified families who opt NOT to avail of the government resettlement assistance shall be provided housing financial assistance, which is a non - recoverable cash assistance in the maximum amount of Thirty Thousand Pesos (P30,000). It is intended for the purpose of providing start - up cash in settling to other places or can also be used as equity or down payment for acquiring a housing unit/lot of their choice.

B. Livelihood Program

- 1.0 The Project recognizes the importance of ensuring that livelihood opportunities are available in the resettlement site and present employment are preserved/maintained for those who will be affected by the relocation operations. Income protection and enhancement is the key to the development of the resettlement sites into viable and self -sufficient

communities and at the same time, prevent or at the minimum, reduced the level of attrition of those employed and employable members of the household.

- 2.0 Income restoration programs are integral components of sustainable resettlement and rehabilitation efforts. They should also address gender issues adequately by providing the women, especially those female-headed households, livelihood opportunities.

C. Social Services

- 1.0 The provision of basic social services is anchored on the following considerations:

- Responsive to the five (5) basic community needs such as education, health, environmental sanitation, peace and order and infusion of community integration and value development.
- Preference for long - term service providers although entities with short - term operations but with relevant programs shall be sought to complement the services of the core or stable agencies/organizations.
- Maximum utilization of the existing socio - economic infrastructures in the resettlement sites by mobilizing the resources of the government and the private sector to provide the required services and programs.
- Continuous research and study on social service to identify gaps between what is required and available in the resettlement community.
- Organization of the Inter - Agency Committee on Social Services to plan, implement and monitor the delivery of social services to the resettled families.

D. Community Development

- 1.0 The affected families who will be resettled shall be integrated socially and economically into host

communities. Appropriate patterns of social organization shall also be maintained or promoted.

- 2.0 Their participation in community affairs and their contribution to the improvement of the resettlement area shall be solicited.
- 3.0 They will either join the existing homeowners' association or will be assisted to form one. Continuous community building activities shall be implemented.

E. Grievance Machinery

- 1.0 The Project shall establish a **Grievance Committee** that will handle complaints, issues and concerns related to relocation and resettlement of the affected households. This committee is inter-agency in nature with membership from participating government agencies and non-government organizations. The peoples' organizations (POs) shall also be included in the committee.

VII. Relocation and Resettlement Incentives and Entitlements

A. For Qualified Families

Qualified families are those who satisfy the selection criteria set by the Project taking into consideration the existing laws and regulations. They will be provided with the following:

1.0 Housing

All qualified families of the **Project** shall be offered a menu of socialized housing options as follows:

- House and lot packages will be available for lease with option to purchase. Initially identified as the resettlement site is the Kasiglahan Village 1 in Rodriguez, Rizal.
- Initiatives of the concerned groups (LGUs, barangays or community associations) for other housing options shall be encouraged such as, but not limited to the following:
 - Community Mortgage Program an innovative concept of low - income home financing whereby an undivided tract of land may be acquired by several households through community ownership.
 - Lots only shall also be offered to families who would like to construct their own dwelling units. The provision of Housing Materials Loan Program (HMLP) can also be explored for those availing of lots only.

2.0 Transport Assistance

- Transport cooperatives shall be organized in the resettlement projects. In cases where cooperatives have not been established, the Project shall either mobilize existing transport

services in the resettlement site or provide shuttle bus services for special groups such as the workers with jobs and students who go to schools in Metro Manila.

3.0 Livelihood Development

Various livelihood support programs in the resettlement projects, in coordination with various agencies, both government and private shall be implemented, to wit:

- Vocational skills training geared to the needs of the families and/or communities
- Organizations of workers' guilds for contract/subcontracting purposes
- Small business development training
- Micro - credit financing
- Job placement / referral to local employers
- Establishment of cooperatives for service providers, producers, consumers, transport and credit associations

4.0 Food Assistance

- In coordination with DSWD (both at the national and local levels), food assistance for one (1) week through food - for - work program shall be extended to families while constructing their houses or developing/improving their new environment.

5.0 Educational Assistance

- Elementary and high school students affected by the Project will be guaranteed enrollment or absorption in public schools in the resettlement project provided that the required school credentials such as Form 138 or Report Card and Letter of

Recommendation/ Certification from previous school are presented upon enrollment or transfer to the resettlement project.

- Conduct of make - up classes in coordination with the Department of Education (DepEd) shall be provided, if warranted.
- Out - of - school youths shall be encouraged to participate in socio - economic activities.

6.0 Health Services

- Medical assistance shall be provided to relocatees on a regular basis.
- Existing health centers shall be provided additional medical supplies and personnel to be able to service the health needs of the household relocatees. Medical missions shall also be organized to provide supplementary health services.

B. For Disqualified Families

1.0 Families disqualified by the Project because of their failure to satisfy the criteria for selection of beneficiaries shall **NOT** receive government resettlement assistance. However, they will be entitled to other dislocation benefits such as:

- Manpower assistance to enable them to dismantle their structures;
- Transportation assistance to transfer them to their destination provided that the location shall be within the 50 - km radius from their place of origin; and
- Cash assistance of P5, 000.00 for their other household expenses.

2.0 Identified professional squatters or members of squatting syndicates shall **NOT** be accorded any government housing benefit. The assistance of the

HUDCC, which is tasked to lead per **Executive Order 153 (*Instituting the National Drive to Suppress and Eradicate Professional Squatting and Squatting Syndicates*)** in the identification of professional squatters and squatting syndicates, monitoring and curtailing their nefarious activities, shall be solicited.

C. Special Vulnerable Groups

- 1.0 Appropriate programs and services that will respond to the long term needs of the select target clientele groups (poorest of the poor, women especially the female - headed households, elderly, and children) shall be provided. These programs are aimed at strengthening the absorptive capacities of these vulnerable groups to minimize the adverse effects of relocation by providing counseling services and other social support mechanisms.
- 2.0 The Project shall encourage the presence and active participation of women in all its activities. It will ensure that women are considered for:
 - compensation for lost assets, incomes and livelihoods;
 - assistance for relocation; and
 - assistance for rehabilitation.

VIII. Relocation and Resettlement Procedures and Guidelines

The relocation and resettlement activities are detailed below:

Phase	Activity	Responsible Agency
<i>Pre - Relocation</i>	Identification of resettlement sites and other housing options	<i>Implementing Agency in coordination with government housing agencies</i>
	Coordination/Consultation with host LGU/community for the development of resettlement sites	<i>Implementing Agency in coordination with government housing agencies</i>
	Site development and housing construction	<i>Implementing Agency in coordination with government housing agencies</i>
	Identification of affected families through conduct of census or occupancy verification	<i>Implementing Agency in coordination with sending LGUs</i>
	Formulation of relocation/resettlement assistance package	<i>Implementing Agency in coordination with sending LGUs and concerned government agencies</i>
	Organization of the Awards and Arbitration Committee (AAC) for redress of grievances, census claims, etc	<i>Implementing Agency in coordination with sending LGUs</i>
	Social preparation to include field trips to identified resettlement sites and consultation with affected communities/families as well as receiving communities/families	<i>Implementing Agency in coordination with sending LGUs, PCUP and government housing agencies</i>

Inter - agency coordination for resource mobilization (trucks, buses, manpower assistance, security, food assistance, etc.) as well as provision of social development

Implementing Agency in coordination with sending LGUs

Completion of relocation documents and other requirements

Implementing Agency in coordination with sending LGUs

Secure Certificate of Compliance from PCUP per EO 152

Implementing Agency in coordination with sending LGUs

Issuance of 30 - day dismantling notices

Implementing Agency in coordination with sending LGUs

Voluntary dismantling of structures

Implementing Agency in coordination with sending LGUs and concerned housing agencies

Actual - Relocation

Ensure availability of all required resources and necessary relocation documents

Implementing Agency in coordination with sending LGUs and concerned housing agencies

Dismantling of structures

Implementing Agency in coordination with sending LGUs

Loading of housing materials, personal belongings and transporting of families

Implementing Agency in coordination with sending LGUs

Issuance of resettlement papers (entry pass/permit to resettlement site) and release of benefits or entitlements (cash/food assistance /packs, etc.)

Implementing Agency in coordination with sending LGUs and housing agencies

Monitoring and documentation

Implementing Agency in coordination with sending LGUs, PCUP and CHR

**Post - Relocation/
Settlement Phase**

Place of Origin	Clearing/cleaning of the affected areas	<i>Implementing Agency in coordination with sending LGUs</i>
	Development of the area or Implementation of the Project	<i>Implementing Agency in coordination with sending LGUs</i>
	Maintenance of the cleared area through conduct of surveillance and preventive actions	<i>Implementing Agency in coordination with sending LGUs</i>
Resettlement Site	Welcome and acceptance of family relocatees	<i>Concerned housing agencies and receiving LGUs</i>
	Award Documentation	<i>Concerned housing agencies</i>
	Orientation on estate management to include cost recovery and occupancy rules and regulations	<i>Concerned housing agencies</i>
	Community organization and integration	<i>Concerned housing agencies</i>
	Ensure provision of basic social and economic services and programs	<i>Concerned housing agencies in cooperation with DSWD, DTI and other livelihood agencies, both government and private entities</i>
	Continuous monitoring and evaluation	<i>Concerned housing agencies</i>

IX. Relocation and Resettlement Cost Components

The cost of relocation and resettlement of 721 households affected by the rehabilitation or improvement of the **Estero de Tripa de Gallina** shall require an estimated amount of **P176,855,000.00**. The breakdown is as follows:

	<i>Component per Family</i>	<i>Cost (P)</i>
1.0	Housing (resettlement lot & house) @ P225, 000.00 x663 residing households	149,175,000
2.0	Relocation to include social preparation and dismantling of structures @ P15, 000.00 x 663 households	9,945,000
3.0	Social Services and Livelihood Support Programs @ P25, 000.00 x 663 households	16,575,000
4.0	Financial assistance to the Disqualified Families @ P5, 000.00 x 58 AHOs	290,000
5.0	Transportation and Dismantling Costs of the 58 structures owned by non-residing owners @ P15,000.00	870,000
	Grand Total	P176, 855,000

The above figures (nos. 1, 2 and 3 only) indicate an average cost of **P265, 000.00** per qualified family.

Further, cost of housing will depend on the option chosen by the affected households, provided however, that the scheme chosen does not exceed the maximum ceiling price of P225, 000.00 for a socialized housing unit. The following are the schemes/options:

	<i>Scheme</i>	<i>Cost/Unit</i>
1.0	Serviced Lot only	P 75,000.00
2.0	Serviced Lot with HMLP worth P50,000	125,000.00

3.0	Row House (Lot and Unit)	225,000.00
4.0	Housing Financial Assistance (HFA)	30,000.00

The above costs, which are computed based on existing government prices, hence, subject to change if relocation is scheduled two (2) years from now.

X. Proposed Work Program /Schedule

The relocation and resettlement of the affected families shall be implemented in accordance with the schedule/priority of the **Drainage Improvement in the Core Area of Metro Manila (DICAMM) Project** and availability of the resettlement site. It is ideally hoped that the schedule of operations is based on the socio - economic readiness of the affected households.

Development of the resettlement site shall be implemented simultaneously with the socio - economic preparation stage. Inasmuch as the implementation of the Project, however, is expected to commence in 2007, it is strongly recommended that pre - relocation activities previously enumerated be conducted earlier to provide opportunities for the households to participate in planning and implementing the relocation and resettlement operations.

Following is the proposed timetable per phase:

Phase	Activity	Estimated No. of Months Required to Complete
<i>Pre - Relocation</i>	Resettlement site identification, acquisition and development	<i>6 - 12 months</i>
	Socio - economic preparation to include issuance of notices	<i>2 months</i>
<i>Actual Relocation</i>	Dismantling of structures and movement of families	<i>1 month</i>
<i>Post - Relocation</i>	Clearing and Cleaning of the affected areas	<i>1/2 month</i>

XI. Possible Sources of Funds

A. Government

- 1.0 The national government shall appropriate and release the required funds for the relocation and resettlement of families to the *Implementing Agency*. The latter is tasked to coordinate the activities with other government agencies or instrumentalities and subsequently make available the funds required for these agencies to implement the services/programs for the affected households

B. Private

- 1.0 The *Implementing Agency* shall tap the resources of the private sector for the provision of required services/programs. The private sector includes the non-government organizations and financing institutions, among others.

C. Foreign

- 1.0 The national government through its *Implementing Agency* may request through loan/grant from foreign funding agencies such as ADB, World Bank and JBIC for select components of the relocation and resettlement costs.

XII. Cost Recovery Scheme

The affected households who will be provided with resettlement assistance *except* those who will avail of the HFA, which is non-recoverable, shall be made to pay for the option they will choose. It is the intention of the government to recover the cost of resettlement, as it believes in inculcating the concept of shared responsibility. Further, government can make use of the recovered costs to replicate its housing programs for those equally in - need homeless and underprivileged citizens.

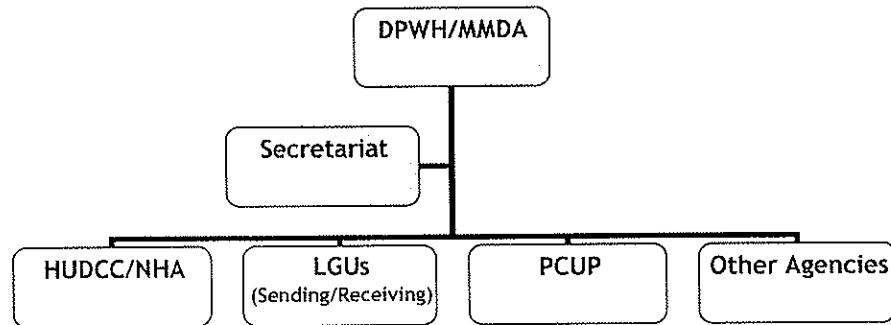
XIII. Institutional Arrangements

The *Implementing Agency (IA)* shall ensure that necessary institutional linkages are established so as to maximize the resources of the government and private organizations and at the same time optimize their existing programs and services for efficient and effective delivery of the same.

A. Organization

1.0 An **Inter - Agency Committee (IAC)** shall be organized to serve as the policy and program coordinating body of the **Project**. It shall be responsible for the following:

- Program Direction
- Fund Sourcing
- Coordination with Stakeholders and other Entities
- Monitoring of Program Implementation



2.0 The IAC shall be composed of the representatives of the following agencies:

Chairman	:	DPWH
Co-Chairman	:	MMDA
Members	:	HUDCC
		NHA
		LGUs (Sending and Receiving)
		PCUP

3.0 Other government agencies such as DepED, DILG, DSWD, DTI, DOTC, DBM, DOJ and CHR, among others

shall be tapped to provide support to the **Project** by making available their resources and services.

4.0 The participation of the NGOs shall be harnessed in the implementation of the Project. The proposed responsibilities of the NGOs are as follows:

- Provide inputs for the preparation of the relocation plans;
- Develop and implement complementary programs and services in response to community needs
- May serve as the representative upon written consent of the affected households

5.0 The *Implementing Agency* shall organize a Secretariat that will assist the IAC in the execution of its duties and responsibilities.

XIV. Monitoring and Evaluation

The Project shall develop an effective performance monitoring and evaluation system that will allow up-to-date feedback on the implementation of its programs and services. Performance benchmarks shall be formulated against which to measure the outputs and impact of the assistance programs.

A. Internal

- 1.0 An internal monitoring and evaluation of all assistance packages shall be undertaken monthly by the IAC particularly the Implementing Agency to determine the responsiveness of the programs and services to the households' socio - economic status.
- 2.0 The scope of the monitoring shall include the following:
 - *Budget and implementation schedule;*
 - *Assistance package*
 - *Community participation and grievance resolution*
 - *Benefits and entitlements*
- 3.0 Quantitative and qualitative monitoring shall be conducted through focus group discussions (FGDs), interviews with select key informants and structured surveys.

B. External

- 1.0 It is suggested, if funds are available that the Project engages the services of a qualified and experienced independent organization to provide external monitoring and evaluation of the operation and management of the resettlement sites, and the delivery and responsiveness of the entitlement/benefit package.

The Formal Sector* in the Estero de Tripa de Gallina

The Estero de Tripa de Gallina, one of the priority areas of the Study on Drainage Improvement Project in the Core Area of Metro Manila (DICAMM) Project is inhabited mostly by the informal sector¹. The formal sector, on the other hand, occupies private lots/lands which are located adjacent to the creek. There are cases, however, that this sector has extended their property lines and encroached into the estero.

The survey was aimed at identifying these encroachments and determining the owners of the structures/lands. For this purpose, the Study Team decided to use the sheet piles constructed at the banks of the creek as the possible original alignment of the estero in the absence of official data on the same. Although, Estero de Tripa de Gallina covers six (6) barangays in the Cities of Makati and Pasay, the encroachments are found only in Barangay Palanan in Makati City.

The survey identified forty two (42) structures, which are built allegedly on privately - owned lots. The breakdown is as follows:

1.0 Number of Formal Structures

BARANGAY/AREA	No. of Formal Structures		
	<i>Affected</i>	<i>Potentially Affected</i>	<i>Total</i>
PALANAN	23	19	42

Of the 42 structures, 23 (55%) were reported to have encroached into the estero and directly affected by the project. The remaining 19 (45%) have no encroachments but considered "potentially affected" because of its proximity to the Estero de Tripa de Gallina.

*Formal Sector refers to the individuals/groups that have proprietary rights over the lands/lots.

(¹ The profile of the informal settler families whose structures are protruding into the creek is included in a separate report.)

2.0 Type of Structure

Thirty eight (38 or 90%) structures are used for residential purpose and the remaining 4 (10%) are classified as non - residential.

3.0 Number of Households

More than 50 households reside in the 38 residential structures. The accurate number of households residing in these structures can not be determined since 12 (28%) of the household occupants refused the entry of the survey team and declined to provide information on the household/structure.

Recommendations:

- 1.0 It is imperative that a study on the formal sector occupying the Estero de Tripa de Gallina be conducted to determine with accuracy whether the identified structures are directly affected by the DICAMM Project or not. Corollary to this is the establishment of the original alignment of the creek, particularly its width.
- 2.0 If the results of the in - depth study would confirm that these private lands/lots have encroached into the original alignment of the Estero de Tripa de Gallina, the property owners may need to remove such encroachments.
- 3.0 Further, the owners who have extended their property lines by reclaiming portion/s of the creek have to surrender voluntarily to the government the reclaimed portion including the legal and prescribed easement of the estero.
- 4.0 In cases where government needs the private lands in the implementation of the DICAMM Project as confirmed during the detailed design, appropriate laws attendant to this have to be observed/applied.

**PROFILE OF FAMILIES
AND RESETTLEMENT AND COMPENSATION PLAN
FOR DICAMM PROJECTS IN BLUMENTRITT AND
FARADAY STREETS AND OUTLET of NEW BLUMENTRITT
INTERCEPTOR**

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PROFILE OF FAMILIES AND RESETTLEMENT AND COMPENSATION PLAN FOR DICAMM PROJECTS IN BLUMENTRITT AND FARADAY STREETS AND OUTLET OF NEW BLUMENTRITT INTERCEPTOR

I. INTRODUCTION

The Study on Drainage Improvement in the Core Area of Metro Manila (DICAMM) Project, which commenced in February 2004, covers 73 kilometers of Metropolitan Manila. The core area is vulnerable to floods, storm water and high tides of Manila Bay owing to its low-lying topography and tropical meteorological and hydrological conditions. The study areas include the City of Manila and parts of the LGUs of Caloocan, Quezon, Pasay, Makati, Muntinlupa and Taguig with total population of 2.58 million. The study aims to:

- *formulate a Master Plan on comprehensive drainage improvement in the core area;*
- *conduct feasibility study on the priority projects/areas identified in the Master Plan;*
- *prepare guidelines for comprehensive drainage improvement; and*
- *transfer technology and knowledge of the methods and management of comprehensive drainage improvement to counterpart personnel in the course of the Study.*

The implementation of the DICAMM Project in the select areas identified for this purpose is expected to have positive impacts on a greater number of people who for long have suffered the disastrous effects of floods. The directly affected persons/communities however, will have to bear the negative consequences or adverse effects of the project since this will call for either the temporary or permanent relocation or involuntary resettlement of families occupying the select areas.

Inasmuch as this is the only option available to the residents, concrete measures must be undertaken to *(a) protect the lives and welfare of those to be temporarily or permanently displaced by the Project; (b) reduce and redress the loss of economic potential incurred by the affected people and (c) assist in developing the socio-economic-cultural capability of the affected people and communities.* If relocation is unavoidable, it should be well planned and executed so that socio-economic growth is enhanced and the

affected households would be at least as well-off as they would have been in the absence of the **Project**.

II. SCOPE AND COVERAGE

The **Drainage Improvement in the Core Area of Metro Manila (DICAMM) Project** is aimed at mitigating flood occurrences in Metro Manila as these affect the and prevents the damaging effects of high waters to the lives and properties of its residents. The **select areas** of the **DICAMM Project** covered by the **Occupancy Survey** include the following:

- 1.0 **Faraday Street** - located at Bgy. Pio del Pilar in Makati City and involves declogging of the drainage main. The study area cuts across the Sergio Osmena Sr. Highway and directly affects several informal structures in the PNR railroad tracks.
- 2.0 **Blumentritt Street** - located in Manila near the North Green Cemetery in Andres Bonifacio Street and will also involve declogging of the drainage main. It will affect a number of formal structures including a residential-commercial structure inhabited by 26 renter families.
- 3.0 **Outlet of New Blumentritt Interceptor** - in Barangay 183, also in Manila and dredging activities have to be undertaken thereat. The area is characterized by the presence of institutional structures such as the barangay hall and day care center as well as informal structures.

These areas and the number of households are shown in the next table:

BARANGAY	TOTAL NO. OF STRUCTURES			NO. OF HOUSEHOLDS				
	Formal	Informal	Total	Residing			Non-Residing	Total
				Interviewed	Not Interviewed	Sub Total		
MANILA CITY								
BLUMENTRITT STREET	4	0	4	12	14	26	1	27
OUTLET OF NEW BLUMENTRITT INTERCEPTOR	2	2	4	1	1	2	0	2
<i>sub-total</i>	<i>6</i>	<i>2</i>	<i>8</i>	<i>13</i>	<i>15</i>	<i>28</i>	<i>1</i>	<i>29</i>
MAKATI CITY								
FARADAY STREET	0	7	7	10	0	10	1	11
<i>sub-total</i>	<i>0</i>	<i>7</i>	<i>7</i>	<i>10</i>	<i>0</i>	<i>10</i>	<i>1</i>	<i>11</i>
<i>TOTAL</i>	<i>6</i>	<i>9</i>	<i>15</i>	<i>23</i>	<i>15</i>	<i>38</i>	<i>2</i>	<i>40</i>

A total of 40 households is registered in the *2004 Occupancy Survey* in the select areas; 38 are residing households composed of structure owners/co-owners, renters, sharers or rent-free-occupants and caretakers and 2 are non-residing or absentee house owners (AHOs). Of the 38 residing households, 23 were interviewed and the remaining 15 were out during the survey.

III. BASIC PROFILE OF SELECT AREAS

A. Information on Structures

1.0 Total Number of Structures

1.1 The survey registered a total of 15 structures in the select areas and the distribution of which, is shown below:

Table 1. TOTAL NUMBER OF STRUCTURES

BARANGAY	TOTAL NO. OF STRUCTURES		
	<i>Formal</i>	<i>Informal</i>	<i>Total</i>
MANILA CITY			
BLUMENTRITT STREET	4	0	4
OUTLET OF NEW BLUMENTRITT INTERCEPTOR	2	2	4
<i>sub-total</i>	6	2	8
MAKATI CITY			
FARADAY STREET	0	7	7
<i>sub-total</i>	0	7	7
TOTAL	6	9	15

1.2 Faraday Street in Makati City, which has 7 structures, registered the most number of structures while both Blumentritt Street and Outlet of New Blumentritt Interceptor in Manila City have 4 structures.

1.3 All the structures in Faraday Street are considered informal while all those in Blumentritt Street are formal structures. The structures in Outlet of New Blumentritt Interceptor are combination of informal and institutional structures. The latter is composed of one barangay hall and one day care center.

1.4 Formal structures are those that are built on private lands/lots and owned by individuals and groups who have secured the necessary legal building permits/licenses from concerned LGUs. Informal structures are those that are constructed on lands not owned by the individuals/groups and generally lack the required permits. The occupants of the informal structures are usually categorized as "squatters".

2.0 Effect of the Project on the Structure

2.1 The possible consequence of the **Project** on the structure, whether it is for total dismantling or chopping of its part/s, is shown below:

Table 2. EFFECT OF THE PROJECT ON THE STRUCTURE

EFFECT OF THE PROJECT ON THE STRUCTURE	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Total Dismantling	3	3	6	12	80.00
Chopping	1	1	1	3	20.00
TOTAL	4	4	7	15	100.00

2.2 Of the 15 structures, 12 or **80%** are to be dismantled completely, while portions of the remaining 3 structures (**20%**) need to be chopped or demolished.

3.0 Type of Structure

3.1 The distribution by type of structures is indicated in *Table 3*.

Table 3. TYPE OF STRUCTURE

TYPE OF STRUCTURE	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Single-Detached	3	4	5	12	80.00
Duplex	0	0	2	2	13.33
Extended Housing	1	0	0	1	6.67
TOTAL	4	4	7	15	100.00

3.2 *Eighty percent (80%)* of the structures is single - detached and the rest (*20%*) accounts for the duplex and extended housing.

4.0 Type of Housing Materials

4.1 The type of housing materials of the 15 structures, regardless of use is distributed in *Table 4*.

Table 4. TYPE OF HOUSING MATERIALS

TYPE OF HOUSING MATERIALS	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Salvaged	0	0	6	6	40.00
Light	0	1	0	1	6.67
Strong	3	2	1	6	40.00
Mixed	1	1	0	2	13.33
TOTAL	4	4	7	15	100.00

4.2 The structures on these areas are made of either salvaged or strong housing materials (*40% each*).

4.3 The remaining 20% is distributed between light and mixed housing materials.

4.4 Structures made of strong housing materials are mostly common in **Blumentritt Street**, while those of salvaged materials are located in **Faraday Street**.

5.0 Use of Structure

5.1 *Table 5* shows that majority of the structures, 11 out of 15 or *73%*, is used for residential purpose.

Table 5. USE OF STRUCTURE

USE OF STRUCTURE	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Residential					
Purely Residential	1	2	6	9	60.00
Residential-Commercial	1	0	0	1	6.67
Residential-Institutional	0	0	1	1	6.67
Sub-Total	2	2	7	11	73.33
Non-Residential					
Commercial	2	0	0	2	13.33
Institutional	0	2	0	2	13.33
Sub-Total	2	2	0	4	26.67
TOTAL	4	4	7	15	100.00

5.2 The above table also includes those structures with mixed residential use for commercial and institutional purposes. The residential-commercial structure in **Blumentritt Street** housed several stores and shops, being built on a corner lot adjacent to business establishments / institutions such as hospital, school and cemetery, The residential-institutional structure in **Faraday Street**, on the other hand, is used by the **Metro Manila Development Authority (MMDA)** as Flood Control Field Office.

5.3 The non - residential structures (27%) include purely commercial and institutional. The two (2) commercial structures in **Blumentritt Street** are used as carinderias (eateries) / restaurant while the other two (2) structures in **Outlet of New Blumentritt Interceptor** are composed of a barangay hall and a day care center.

6.0 Age of Residential Structure

6.1 *Table 6* below presents the age distribution of the 11 structures, which is the aggregate of purely residential and mixed residential in use. Majority (64%) of those structures were built on the affected areas more than six (6) years ago.

Table 6. AGE OF RESIDENTIAL STRUCTURE

AGE OF RESIDENTIAL STRUCTURE	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Less than 1 Year	0	0	2	2	18.18
1-5 Years	0	2	0	2	18.18
6-10 Years	0	0	5	5	45.45
More than 30 Years	2	0	0	2	18.18
TOTAL	2	2	7	11	100.00

6.2 The residential structures in Blumentritt were constructed more than thirty (30) years ago while the two (2) residential structures in Outlet of New Blumentritt Interceptor are recently built having been there for at least 5 years.

7.0 Number of Households per Residential Structure

7.1 *Table 7* presents the distribution of the number of households for every residential structure.

Table 7. NUMBER OF HOUSEHOLDS PER RESIDENTIAL STRUCTURE

NO. OF RESIDING HOUSEHOLDS	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
1	1	2	4	7	63.64
2	0	0	3	3	27.27
25	1	0	0	1	9.09
Not Applicable					
TOTAL	2	2	7	11	100.00

7.2 Of the 11 residential structures, 7 or 64% indicate a single household occupancy while the 4 or 36% registered a doubled - up occupancy (more than 1 household).

7.3 The highest number of doubled - up occupancy is found in Blumentritt wherein the structure, an old building, is partitioned into smaller rooms rented out to families / professionals / students.

8.0 Status of Occupancy of Residential Structure Owner

8.1 *Table 8* presents vital information on owners' status of occupancy.

Table 8. STATUS OF OCCUPANCY OF STRUCTURE OWNERS

OCCUPANCY STATUS OF RESIDENTIAL STRUCTURE OWNER	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Residing	1	2	6	9	81.82
Not Residing	1	0	1	2	18.18
TOTAL	2	2	7	11	100.00

8.2 Nine (9 or 82%) of the residential structures are presently occupied by their respective owners while 2 or 18% are not inhabited by their owners.

8.3 These absentee residential structure owners are found in **Blumentritt** and **Faraday Streets**.

B. BASIC PROFILE OF HOUSEHOLD RESPONDENTS

1.0 Classification of Households

1.1 *Table 9* shows the distribution of households' classification.

Table 9. CLASSIFICATION OF HOUSEHOLDS

TENURIAL STATUS OF HOUSEHOLDS	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
INTERVIEWED	12	1	10	23	57.50
NOT INTERVIEWED	15	1	1	17	42.50
TOTAL	27	2	11	40	100.00

1.2 The survey listed a total of **40** households, of which **23 (57.5%)** were interviewed while **17(42.5%)** were not.

1.3 Those not interviewed are mostly residing in **Blumentritt** since most of the families were out during the survey.

2.0 Tenurial Status of Interviewed Households

2.1 *Table 10* presents the distribution of the tenure of the **23** respondent households as follows:

Table 10. TENURIAL STATUS OF INTERVIEWED HOUSEHOLDS

TENURIAL STATUS	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
Owner	1	1	6	8	34.78
Co-Owner	0	0	2	2	8.70
Renter	11	0	0	11	47.83
Sharer/Rent-Free Occupant	0	0	1	1	4.35
Caretaker	0	0	1	1	4.35
TOTAL	12	1	10	23	100.00

2.2 *Forty eight (48%)* of the respondent households are renters while *52%* comprises the aggregate number of owners, co-owners, sharers or rent - free occupants and caretaker.

3.0 Reasons for Households Not Interviewed

3.1 *Table 11* details the reasons why *42.5%* of the potential household respondents were not interviewed:

Table 11. REASONS FOR HOUSEHOLDS NOT INTERVIEWED

TENURIAL STATUS OF HOUSEHOLDS	BLUMENTRITT	OUTLET OF NEW BLUMENTRITT INTERCEPTOR	FARADAY	TOTAL	%
AHO	1	0	1	2	11.76
ODS-Owner	0	1	0	1	5.88
ODS-Renter	13	0	0	13	76.47
ODS-Sharer/RFO	1	0	0	1	5.88
TOTAL	15	1	1	17	100.00

3.2 **Out during survey (ODS)** ranked as the most predominant reason followed by the absentee house owners (AHOs).

- 3.3 Blumentritt has more households NOT interviewed (15) since most of them were working and unavailable during the survey.

IV. RESETTLEMENT AND COMPENSATION POLICIES

A. For the Informal Settler Families

- 1.0 The Project's authorized census or survey of *informal settler families* (ISFs) conducted in December 2004 shall be the official reference in determining potential socialized housing beneficiaries. Selection of these beneficiaries shall generally be based on the provisions of the *Republic Act No. 7279* also known as *Urban Development and Housing Act of 1992 (UDHA)* and qualification standards or criteria prescribed and approved by the Project.
- 2.0 A menu of housing options shall be provided to the affected informal settler families of the Project. The housing options shall be based not only on their families' acceptability and affordability but also on the availability of government resources and Project's implementation schedule.
- 3.0 The Project shall determine the relocation and resettlement schedules, taking into account the timetable on drainage improvement and the availability and readiness of the resettlement sites.
- 4.0 The procedures on the relocation and resettlement of affected informal settler families shall likewise be in accordance with the provisions of RA 7279 and its Implementing Rules and Regulations.
- 5.0 The implementing agency shall likewise secure a **Certification of Compliance** from the **Presidential Commission for the Urban Poor (PCUP)** and comply with the relocation and resettlement requirements as stipulated in the *Executive Order No. 152*.
- 6.0 Basic relocation benefits for the informal settler families such as food subsidy, transportation to resettlement site and manpower assistance in dismantling the structures shall be standardized for all areas covered by the Project. Sending LGUs, however,

are encouraged to provide additional benefits to their constituents.

- 7.0 The active participation of the stakeholders will only be realized if there is full information/disclosure on the **Project**.
- 8.0 Resource complementation of the national and local government agencies shall be mandatory particularly in the provision of socio - economic services and programs particularly on education, health care, sanitation and livelihood.
- 9.0 Continuous support of the national government in providing socio - economic infrastructures/facilities and services to the resettlement sites shall be ensured until such time that the receiving LGUs can sufficiently and adequately provide the same.

B. For the Formal Sector

- 1.0 Private property owners of the formal structures and lots/lands shall be properly identified and the required just compensation and entitlements shall be provided.
- 2.0 The government shall ensure that owners of real property acquired for national government infrastructure projects are promptly paid just compensation in accordance with appropriate laws and ordinances.
- 3.0 The standards for the assessment of the value of the land as prescribed in **RA 8974** shall be considered.
- 4.0 The *Implementing Agency* shall determine the valuation of the improvements and/or structures on the land to be acquired using the replacement cost method. *Replacement cost method* is the amount necessary to replace the improvements/structures, based on the current market prices for materials, equipment, labor, contractor's profit and overhead, and all other attendant costs associated with the acquisition and installation in place of the affected improvements/structures.

V. RESETTLEMENT AND COMPENSATION COMPONENTS

A. For the Informal Settler Families

1.0 Housing Options for the Informal Settler Families

1.1 Resettlement at Kasiglahan Village 1 (KV1) in Barangay San Jose, Rodriguez, Rizal

KV1, a National Housing Authority (NHA) -administered resettlement project in Rodriguez, Rizal established in 2000. It has 9,915 house and lot packages built on a 57.90 hectare of land with a present occupancy of 9,426 families from various LGUs affected by the rehabilitation of the Pasig River System and other national/local government projects.

The site has the following community facilities:

- *Schools (elementary and high school)*
- *Health Center*
- *Day Care Center*
- *Market*
- *Multi Purpose Center (Clubhouse)*
- *Livelihood Center*
- *Swimming Pools (adult and kiddie)*
- *Parks, playground and basketball court*
- *Jeepney Terminal*

The average lot size of the house and lot package is 32.00 square meters with floor area of 20.00 square meters. And present house and lot packages cost P165, 000.00 each.

The mode of disposition of the housing units shall be through lease with option to purchase. The lease shall be for a period of ten (10) years with no extension or renewal of contract. After the 10th year lease period, beneficiaries deemed not qualified for end - buyer's financing may opt for a Conditional Contract to Sell (CCS) at 6% per annum or a fixed monthly amortization of P825.00 payable in 20 years

The lease rate is computed in consideration of the affordability level of the beneficiaries. The updated monthly lease rates as of June 2004 are as follows:

Year	Monthly Lease Rate
1 - 3	P 250.00
4 -10	P 500.00

Lease payments exclusive of delinquency charges, made during the ten (10) year lease period shall be credited as payment to the selling price. The purchase options are as follows:

- Outright sale through cash payment directly to NHA
- Availment of buyer's financing from any of the government - designated financial institutions where terms and conditions shall be prescribed by the latter.

2.0 Livelihood Program

2.1 The Project recognizes the importance of ensuring that livelihood opportunities are available in the resettlement site and present employment are preserved/maintained for those who will be affected by the relocation operations. Income protection and enhancement is the key to the development of the resettlement sites into viable and self - sufficient communities and at the same time, prevent or at the minimum, reduced the level of attrition of those employed and employable members of the household.

2.2 Income restoration programs are integral components of sustainable resettlement and rehabilitation efforts. They should also address gender issues adequately by providing the women, especially those female-headed households, livelihood opportunities.

3.0 Social Services and Community Development

3.1 Maximum utilization of the existing socio - economic infrastructures in the resettlement sites by mobilizing the resources of the government and the private sector to provide the required services and programs.

3.2 The affected families who will be resettled shall be integrated socially and economically into host communities. Appropriate patterns of social organization shall also be maintained or promoted.

4.0. Grievance Machinery

4.1 The **Project** shall establish a **Grievance Committee** that will handle complaints, issues and concerns related to relocation and resettlement of the affected households. This committee is inter-agency in nature with membership from participating government agencies and non-government organizations. The peoples' organizations (POs) from the project areas shall also be included in the committee.

B. For the Formal Sector

1.0 The formal sector shall be treated in accordance with appropriate laws and legal issuances of the Philippine Government in determining just compensation.

VI. INCENTIVES AND ENTITLEMENTS

A. Informal Sector

1.0 For Qualified Families

Qualified families are those who satisfy the selection criteria set by the Project taking into consideration the existing laws and regulations. They will be provided with the following:

1.1 Housing

- All qualified families of the Project shall be offered government resettlement assistance in any of its relocation site.

1.2 Livelihood Development

- Access to various livelihood support programs in the resettlement projects shall be provided.

1.3 Food Assistance

- In coordination with DSWD (both at the national and local levels), food assistance for one (1) week through food - for - work program shall be extended to families while constructing their houses or adapting to their new environment.

1.4 Educational Assistance

- Elementary and high school students affected by the Project will be guaranteed enrollment or absorption in public schools in the resettlement project.
- Conduct of make - up classes in coordination with the Department of Education (DepEd) shall be provided, if warranted.
- Out - of - school youths shall be encouraged to participate in socio - economic activities.

1.5 Health Services

- Medical assistance shall be provided to relocatees on a regular basis.
- Existing health centers shall be provided additional medical supplies and personnel to be able to service the

health needs of the household relocatees. Medical missions shall also be organized to provide supplementary health services.

2.0 Special Vulnerable Groups

2.1 Appropriate programs and services that will respond to the long term needs of the select target clientele groups (poorest of the poor, women especially the female - headed households, elderly, and children) shall be provided. These programs are aimed at strengthening the absorptive capacities of these vulnerable groups to minimize the adverse effects of relocation by providing counseling services and other social support mechanisms.

2.2 The **Project** shall encourage the presence and active participation of women in all its activities. It will ensure that women are considered for:

- compensation for lost assets, incomes and livelihoods;
- assistance for relocation; and
- assistance for rehabilitation.

B. **Formal Sector**

1.0 Payment of just compensation to property owners for the lands and improvements thereat shall be strictly observed in accordance with existing laws.

2.0 Structures in **Blumentritt Street** shall be assessed/valuated using government standards (*RA No. 8974*) such as the following:

2.1 Classification and use for which the property is suited;

2.2 Development costs for improving the land;

2.3 Value declared by the owners;

- 2.4 Current selling price of similar lands in the vicinity;
- 2.5 Reasonable disturbance compensation for the removal and/or demolition of certain improvements on the land and for the value of improvements thereon;
- 2.6 Size, shape or location, tax declaration and zonal valuation of the land;
- 2.7 Price of the land as manifested in the ocular findings, oral as documentary evidence presented; and
- 2.8 Such facts and events as to enable the affected property owners to have sufficient funds to acquire similarly-situated lands of approximate areas as those required from them by the government, and thereby rehabilitate themselves as early as possible.

C. Institutions

- 1.0 The institutional structures such as the barangay hall and day care center in **Outlet of New Blumentritt Interceptor** will be directly affected by **Project** and eventually dismantled. The government (*local or national*) shall provide assistance to the concerned Barangay in the reconstruction of said government infrastructure facilities.

VII. PROCEDURES AND GUIDELINES

The relocation and resettlement activities are detailed below:

Phase	Activity	Responsible Agency
<i>Relocation</i>	Identification of resettlement sites and other housing options	<i>Implementing Agency in coordination with government housing agencies</i>
	Coordination/Consultation with host LGU/community for the development of resettlement sites	<i>Implementing Agency in coordination with government housing agencies</i>
	Site development and housing construction	<i>Implementing Agency in coordination with government housing agencies</i>

Identification of affected families through conduct of census or occupancy verification	<i>Implementing Agency in coordination with sending LGUs</i>
Formulation of relocation/resettlement assistance package	<i>Implementing Agency in coordination with sending LGUs and concerned government agencies</i>
Organization of the Awards and Arbitration Committee (AAC) for redress of grievances, census claims, etc	<i>Implementing Agency in coordination with sending LGUs</i>
Social preparation to include field trips to identified resettlement sites and consultation with affected communities/families as well as receiving communities/families	<i>Implementing Agency in coordination with sending LGUs, PCUP and government housing agencies</i>
Inter - agency coordination for resource mobilization (trucks, buses, manpower assistance, security, food assistance, etc.) as well as provision of social development	<i>Implementing Agency in coordination with sending LGUs</i>
Completion of relocation documents and other requirements	<i>Implementing Agency in coordination with sending LGUs</i>
Secure Certificate of Compliance from PCUP per EO 152	<i>Implementing Agency in coordination with sending LGUs</i>
Issuance of 30 - day dismantling notices	<i>Implementing Agency in coordination with sending LGUs</i>
Voluntary dismantling of structures	<i>Implementing Agency in coordination with sending LGUs and concerned housing agencies</i>
<i>Actual Relocation</i>	
Ensure availability of all required resources and necessary relocation documents	<i>Implementing Agency in coordination with sending LGUs and concerned housing agencies</i>
Dismantling of structures	<i>Implementing Agency in coordination with sending LGUs</i>
Loading of housing materials, personal belongings and transporting of families	<i>Implementing Agency in coordination with sending LGUs</i>
Issuance of resettlement papers (entry pass/permit to resettlement site) and release of benefits or entitlements	<i>Implementing Agency in coordination with sending LGUs and housing agencies</i>

	(cash/food assistance /packs, etc.)	
	Monitoring and documentation	<i>Implementing Agency in coordination with sending LGUs, PCUP and CHR</i>
<i>Post - Relocation/ Settlement Phase</i>		
Place of Origin	Clearing/cleaning of the affected areas	<i>Implementing Agency in coordination with sending LGUs</i>
	Development of the area or Implementation of the Project	<i>Implementing Agency in coordination with sending LGUs</i>
	Maintenance of the cleared area through conduct of surveillance and preventive actions	<i>Implementing Agency in coordination with sending LGUs</i>
Resettlement Site	Welcome and acceptance of family relocatees	<i>Concerned housing agencies and receiving LGUs</i>
	Award Documentation	<i>Concerned housing agencies</i>
	Orientation on estate management to include cost recovery and occupancy rules and regulations	<i>Concerned housing agencies</i>
	Community organization and integration	<i>Concerned housing agencies</i>
	Ensure provision of basic social and economic services and programs	<i>Concerned housing agencies in cooperation with DSWD, DTI and other livelihood agencies, both government and private entities</i>
	Continuous monitoring and evaluation	<i>Concerned housing agencies</i>

VIII. COST COMPONENTS

A. For the Informal Settler Families

For this purpose, only two (2) informal settler families residing in Outlet of New Blumentritt Interceptor shall be considered in the Project fund requirement since the 10 families in Faraday Street will eventually be relocated as they will be affected by the rehabilitation of the South Manila Commuter Line Project of the government owing to their occupancy of the PNR right-of-way. Said project may commence either in the later part of 2005 or in early months of 2006.

Hence, the cost of relocation and resettlement of the two (2) informal settler families affected by the rehabilitation or improvement of the DICAMM Project in Outlet of New Blumentritt Interceptor and Faraday Street shall require an estimated amount of P 530,000.00. The breakdown is as follows:

	<i>Component per Family</i>	<i>Cost (P)</i>
1.0	Housing (resettlement lot & house) @ P225, 000.00 x 2 residing households	450,000
2.0	Relocation to include social preparation and dismantling of structures @ P15, 000.00 x 2 households	30,000
3.0	Social Services and Livelihood Support Programs @ P25, 000.00 x 2 households	50,000
	<i>Grand Total</i>	<hr/> <i>P 530,000</i>

The above figures indicate an average cost of P265, 000.00 per qualified informal settler family.

The above costs, which are computed based on existing government prices, hence, subject to change/adjustment if relocation is scheduled two (2) years from now.

IX. PROPOSED WORK PROGRAM /SCHEDULE

The relocation and resettlement of the affected families shall be implemented in accordance with the schedule/priority of the Drainage Improvement in the Core Area of Metro Manila (DICAMM) Project and availability of the resettlement site. As experienced in several previous resettlement undertakings, the schedule of operations is hinged on the socio - economic readiness of the affected households as well as timely payment of just compensation for the formal sector.

Following is the proposed timetable per phase:

Phase	Activity	Estimated No. of Months Required to Complete
<i>Pre - Relocation</i>	Resettlement site identification	<i>1 month</i>
	Socio - economic preparation to include issuance of notices	<i>2 months</i>
<i>Actual Relocation</i>	Dismantling of structures and movement of families	<i>1 month</i>
<i>Post - Relocation</i>	Clearing and Cleaning of the affected areas	<i>1/2 month</i>

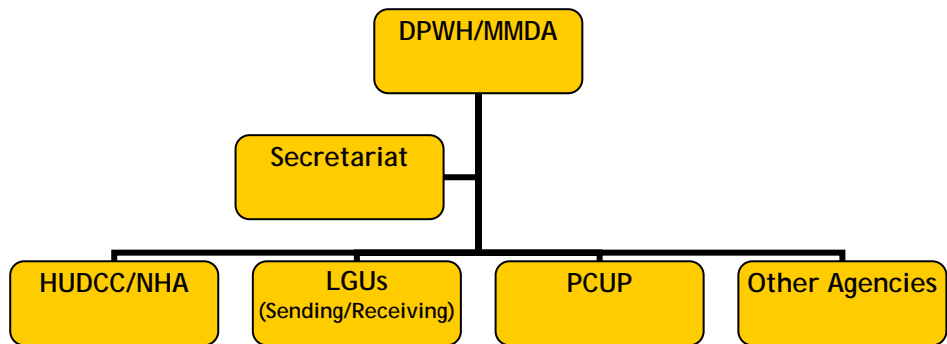
X. INSTITUTIONAL ARRANGEMENTS

The *Implementing Agency (IA)* shall ensure that necessary institutional linkages are established so as to maximize the resources of the government and private organizations and at the same time optimize their existing programs and services for efficient and effective delivery of the same.

A. Organization

1.0 An Inter - Agency Committee (IAC) shall be organized to serve as the policy and program coordinating body of the Project. It shall be responsible for the following:

- Program Direction
- Fund Sourcing
- Coordination with Stakeholders and other Entities
- Monitoring of Program Implementation



2.0 The IAC shall be composed of the representatives of the following agencies:

Chairman	:	DPWH
Co-Chairman	:	MMDA
Members	:	HUDCC NHA LGUs (Sending and Receiving) PCUP

3.0 Other government agencies such as DepED, DILG, DSWD, DTI, DOTC, DBM, DOJ and CHR, among others shall be tapped to provide support to the **Project** by making available their resources and services.

4.0 The participation of the NGOs shall be harnessed in the implementation of the Project. The proposed responsibilities of the NGOs are as follows:

- Provide inputs for the preparation of the relocation plans;
- Develop and implement complementary programs and services in response to community needs
- May serve as the representative upon written consent of the affected households

5.0 The *Implementing Agency* shall organize a Secretariat that will assist the IAC in the execution of its duties and responsibilities.

XI. MONITORING AND EVALUATION

The Project shall develop an effective internal and external performance monitoring and evaluation system that will allow up-to-date feedback on the implementation of its programs and services. Performance benchmarks shall be formulated against which to measure the outputs and impact of the assistance programs.

L. SOLID WASTE SURVEY ON ESTEROS

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L.1 BACKGROUND

The problem of flooding in Metro Manila has long engaged the attention of the Government of the Philippines. Various flood control and drainage improvement projects have been implemented. Finding appropriate solutions to the recurrent floods in Metro Manila the national government previously prepared a “Plan for the Drainage of Manila and Suburbs”. Drainage system improvement projects have been implemented since then, the greater number of which were concentrated in Manila and Suburbs (the core area of Metro Manila, covering the City of Manila and its adjacent cities and municipalities), in consideration of this area’s national importance.

The core area has still severe drainage problems, which have been frequently disturbing its heavy traffic and commercial activities and urban lives, and require urgent improvement of drainage system in order to promote sustainable development. In addition the core area requires improving the solid waste management practice and relocating informal settlers along the drainage channels, which disturbing so much drainage capacities. A large amount of solid waste and solid waste is dumped to the drainage channels from the residential area.

The informal settlers are of major concern, not only in regard to the encroachment on waterways but also in compounding the lack of public services such as solid waste collection. Where informal settlements are present, it is the prevailing practice to dispose of solid waste indiscriminately and directly to waterways, adding to pollution and public health hazards, and making regular maintenance of drainage channels more difficult.

In view of the above problem, the solid waste survey was conducted to reveal the actual conditions of solid waste on esteros.

L.2 CONTENTS OF SURVEY

The survey consists of the following works:

Table L.2.1 Contents of Survey

	Sampling	Remarks
1. Floating solid waste analysis		
a. Solid waste amount at pumping stations	5p/s, 2 or 3 days	Each day
b. Solid waste composition analysis at pumping stations	5p/s, each 1 sample	Divided into 10 items
c. Solid waste amount data collection and analysis	15p/s, for 10 years	Data collected by each pumping station
d. Floating solid waste survey	1 sample	Length of channel is 100m
2. Deposited solid waste analysis		
a. Deposited solid waste sampling at drainage using shovel	20 samples	Solid waste/silt ratio
b. Deposited solid waste composition and analysis at drainage	5 samples (5 out of 20)	Solid waste/silt ratio Solid waste composition analysis Ignition loss

Note: p/s: pumping station, 5p/s: Tripa de Gallina, San Andres, Binondo, Aviles, Vitas, 10 items: paper, metal, food waste, glass&glass bottle, textile, stone&ceramics, grass&wood, plastic, rubber and leather.

L.3 FLOATING SOLID WASTE ANALYSIS

The Study Team selected five different (5) Pumping Stations (Aviles, Binondo, San Andres, Tripa de Gallina and Vitas) as sampling points for the floating solid waste survey.

The survey was conducted from March 15 to 19, 2004. This included the solid waste amount measurement and solid waste composition analysis for each pumping station.

L.3.1 SOLID WASTE AMOUNT AND COMPOSITION ANALYSIS AT PUMPING STATIONS

(1) Solid Waste Amount Survey

1) Methodology

The survey team conducted a two-day survey for San Andres p/s, Tripa de Gallina p/s, and Vitas p/s and three days for Aviles p/s and Binondo p/s. The floating solid waste was collected daily for each pumping station using a trash rake and conveyor. The collected solid waste was drained and air-dried for 12 to 24 hours, and its volume and weight were measured using 50-liter plastic containers and a 30-kg weighing scale. *Table L.3.1* shows the survey details. *Table L.3.2* shows the specifications of the equipment used in the survey.

Table L.3.1 Details of Survey

Pumping Stations	Date of Sampling	Collection of Samples	Solid Waste Amount Determination	Solid Waste Composition Survey
Aviles p/s	March 16-18, 2004	By trash-rake and conveyor	By using a 30-kg weighing scale and 50-liter plastic container	Analysis Items: • ASW (Apparent Specific Weight in g/li) • Physical Composition - Kitchen Waste - Paper - Textile - Plastics - Glass - Grass/Wood - Leather & Rubber - Metal - Ceramic/Stone - Others
Binondo p/s	March 15-17, 2004	By trash-rake and conveyor	By using a 30-kg weighing scale and 50-liter plastic container	
San Andres p/s	March 15-16, 2004	By trash-rake and conveyor	By using a 30-kg weighing scale and 50-liter plastic container	
Tripa de Gallina p/s	March 16-17, 2004	By trash-rake and conveyor	By using a 30-kg weighing scale and 50-liter plastic container	
Vitas p/s	March 15-16, 2004	By trash-rake and conveyor	By using a 30-kg weighing scale and 50-liter plastic container	

p/s – Pumping Station

Table L.3.2 Specifications of Equipment Used in the Survey

30-kg weighing scale (graduation = 100g)
2-kg weighing scale (graduation = 10 g)
50-liter plastic container
Small plastic basins
Shovel

Sampling quantities are summarized in *Table L.3.3*.

Table L.3.3 Sampling Quantities

Pumping Stations	Samples per day	Survey Days	Total Samples
Aviles p/s	1	3	3
Binondo p/s	1	3	3
San Andres p/s	1	2	2
Tripa de Gallina p/s	1	2	2
Vitas p/s	1	2	2
TOTAL	5		12

2) Results

A summary of collection rates as obtained from the solid waste amount survey for the selected pumping stations are presented in *Table L.3.4*. The summary of average daily volume of solid waste for the selected pumping stations is presented in *Table L.3.5*.

Table L.3.4 Collection Rates at Selected Pumping Stations

Pumping Station	Collection Rate (kilograms/day)
Aviles Pumping Station	557.10
Binondo Pumping Station	1102.43
San Andres Pumping Station	1138.72
Tripa de Gallina Pumping Station	4004.59
Vitas Pumping Station	3569.88
AVERAGE	2,074.54

Table L.3.5 Average of Daily Collected Volume of Solid Waste for each Pumping Station

Pumping Station	Average Daily Collected Volume (m³/day)
Aviles Pumping Station	2.003
Binondo Pumping Station	2.856
San Andres Pumping Station	3.208
Tripa de Gallina Pumping Station	17.623
Vitas Pumping Station	12.221
AVERAGE	7.58

Tripa de Gallina Pumping Station collected the highest daily amount of solid waste among the selected pumping stations (17.623 m³) followed by Vitas Pumping Station (12.221 m³). The reason behind the large amount of solid waste in Tripa de Gallina pumping station is that it is the longest estero and has the largest watershed area. Estero de Tripa de Gallina and its tributaries are mostly occupied by informal settlers that contribute to the huge solid waste amount collected at the pumping station. The average daily collection of floating solid waste at pumping stations is 2.07 tons or 7.58 m³. Based on these figures, the specific weight can be estimated at 0.274 tons/m³.

(2) Solid Waste Composition Survey

1) Methodology

After weighing the samples as mentioned above, they were subjected to “Quartering Method”. This method is done in order to get the desired volume of solid waste, approximately 50-liters, to be subjected to physical composition analysis. The procedure of the “Quartering Method” is described as follows:

- Mixing – solid waste samples that contained large items such as cardboard, textile, etc., were cut into smaller pieces and mixed again.
- Dividing – once the solid wastes were mixed well, these were divided into equal quarter parts.
- Reducing –the two diagonally opposite quarters of solid wastes were removed and the remaining solid wastes were mixed again.

The method was continued until the volume of the remaining solid wastes was reduced to the desired amount for the solid waste composition analysis. The solid wastes were loaded into a 50-liter plastic container and dropped to the ground three (3) times from a height of 30 cm. Then the volume was measured using the graduation on the 50-liter plastic container and the weight was measured using a 30-kg weighing scale.

For the physical composition analysis, the sample solid waste volume was weighed first and then sorted into ten (10) items shown in *Table L.3.6*. After which the 10 items were weighed individually.

The ASW (Apparent Specific Weight) is calculated through the following formula:

$$\text{ASW} = [\text{Weight of Solid Waste (g)} / \text{Volume of Solid Waste (liters)}]$$

Table L.3.6 Solid Waste Composition

Kitchen Waste (Fruit and Vegetable Peelings and Left-over)
Paper (cardboard, office paper, coupon bonds, receipts, cartons, etc.)
Textile (clothing, rags, jacket, bags, etc.)
Plastic (Soft and Hard) (soft plastics-plastic bags, straws, candy wrappers, snack food wrappers, etc.; hard plastics-shampoo bottles and caps, plastic toys, plastic tubes, plastic basins, etc.)
Grass and Wood (backyard wastes, construction wood, wooden stick, etc.)
Leather and Rubber (leather belt, wallet, slippers, rubber bands, etc.)
Metal (Aluminum and Tin) (cans, spoon and fork, scrap metals, nails, etc.)
Glass (food bottles, medicine bottles, window glass, mirrors, etc.)
Ceramic and Stone (concrete, brick, natural stone, marbles, etc.)
Others (soil, baby diapers, sanitary napkins, inert/fine materials, etc.)

2) Results for Physical Composition

Figures L.3.1 to L.3.5 show the percentage distribution values of floating solid waste for each pumping station.

Figure L.3.6 shows the average percentage distribution values of floating solid waste for the selected pumping stations.

As illustrated in the graphs, it is apparent that “Soft Plastic” dominates the floating solid waste collected at the pumping stations followed by “Grass and Wood”. “Kitchen Wastes” such as “Left-Over” and “Fruit and Vegetable Peelings” also have considerable percentages in the composition of floating solid waste. It should be noted that the “Left-Over” and “Fruit and Vegetable Peelings” wastes were mostly placed inside plastic bags, indicating that most of the solid waste thrown in esteros comes from the residents living along or near the waterways.

3) Results for Apparent Specific Weight (ASW)

The Apparent Specific Weight (ASW) is used to convert weight into volume or volume into weight. Table L.3.7 summarizes the ASW results of the solid waste composition survey. As presented, the ASW for the floating solid waste on pumping stations ranges from 196 to 465 g/liter.

Table L.3.7 Apparent Specific Weight of Floating Solid Waste for each Pumping Station

Pumping Stations	Apparent Specific Weight (g/liter)
Aviles Pumping Station	356
Binondo Pumping Station	465
San Andres Pumping Station	196
Tripa de Gallina Pumping Station	270
Vitas Pumping Station	267
AVERAGE	310 g/liter or 0.31 tons /m³

It is observed that the ASW of floating solid waste collected from the pumping stations varies. This is on account of ASW being dependent on the physical composition of the solid waste.

Taking into account the physical composition of floating solid waste in Binondo Pumping Station, wherein there is a high percentage of “Grass and Wood” at 29%. This explains why the ASW for the said pumping station is high at 465 g/liter. The physical composition for the San Andres Pumping Station, which has the lowest ASW at 196 g/liter, shows that “Soft Plastic” has the majority of percentage composition at 61%, thus explaining the low value for the ASW in the said pumping station. As shown in Table L.3.7, the ASW is 0.31 tons/m³ on the average.

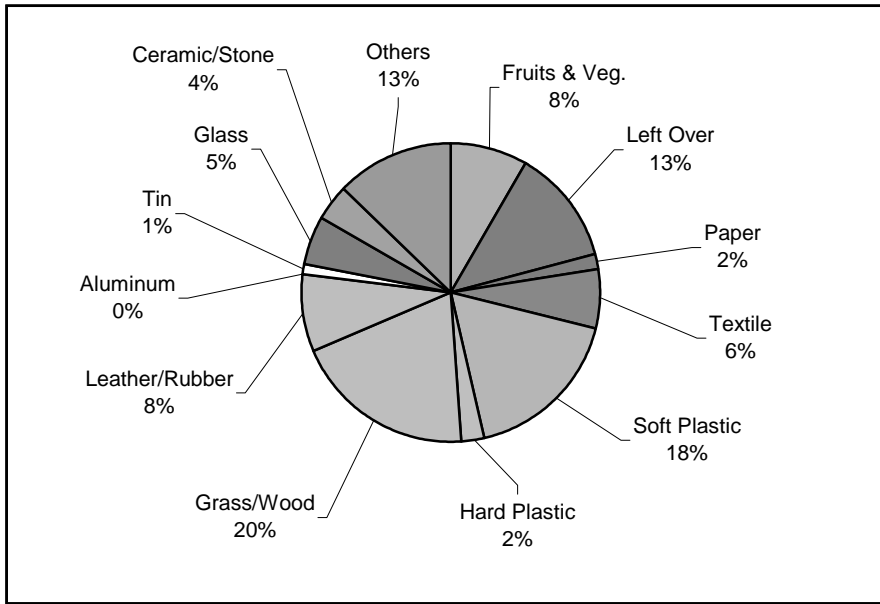


Figure L.3.1 Physical Composition of Floating Waste in Aviles Pumping Station (air-dried basis)

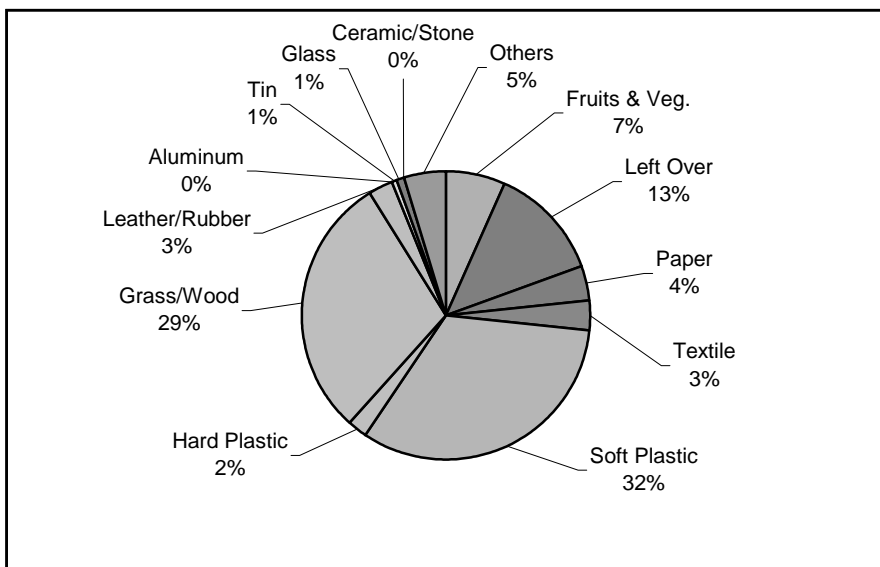


Figure L.3.2 Physical Composition of Floating Solid Waste in Binondo Pumping Station (air-dried basis)

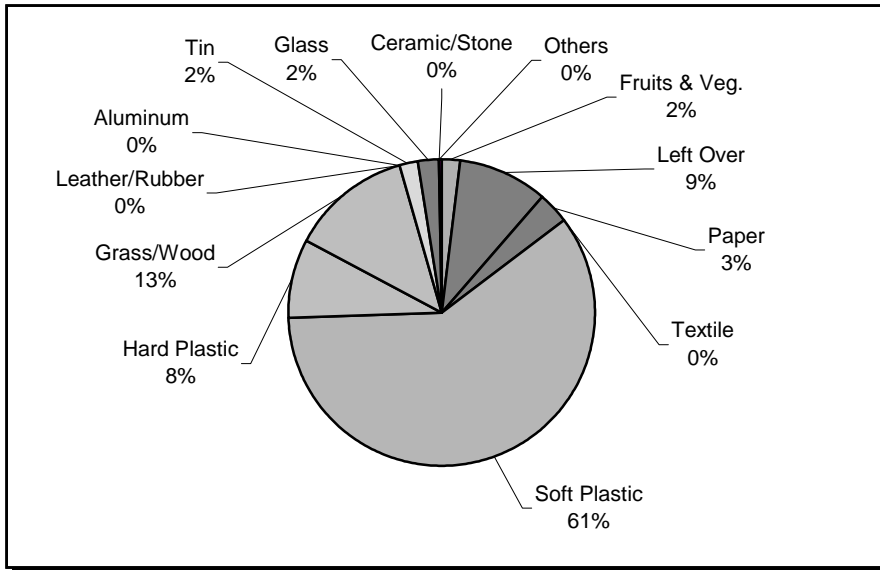


Figure L.3.3 Physical Composition of Floating Solid Waste in San Andres Pumping Station (air-dried basis)

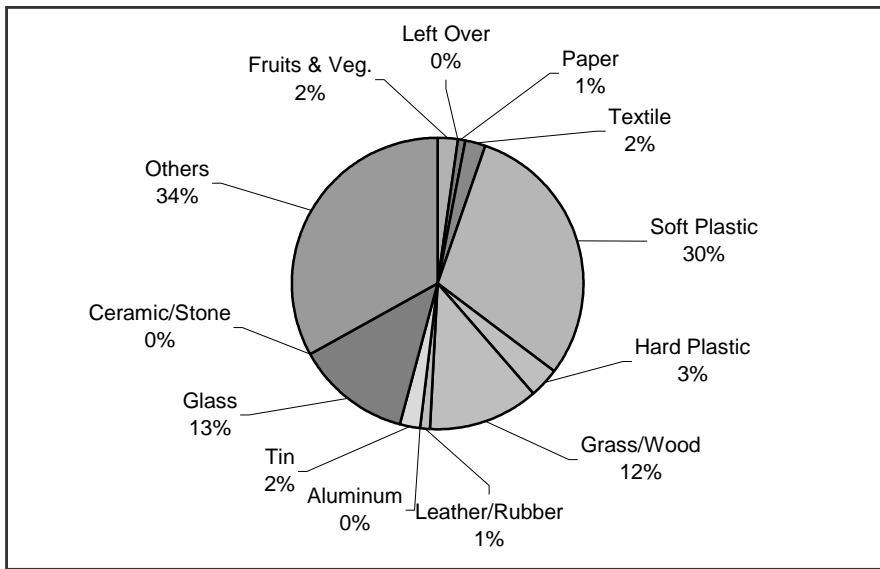


Figure L.3.4 Physical Composition of Floating Solid Waste in Tripa de Gallina Pumping Station (air-dried basis)

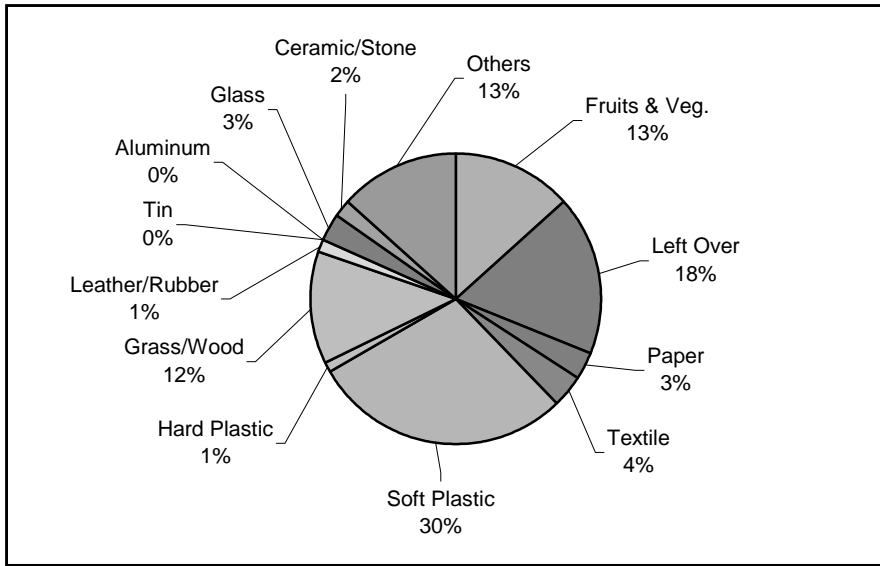


Figure L.3.5 Physical Composition of Floating Solid Waste in Vitas Pumping Station (air-dried basis)

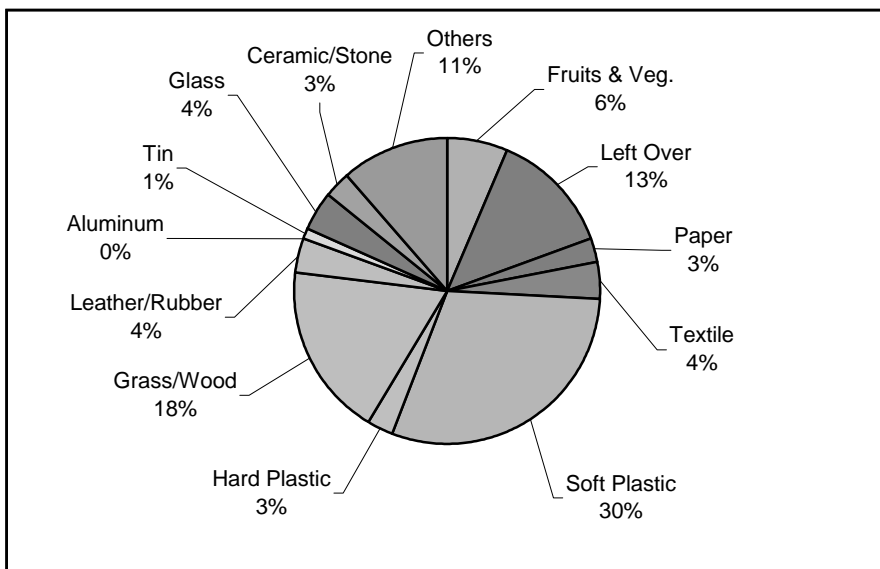
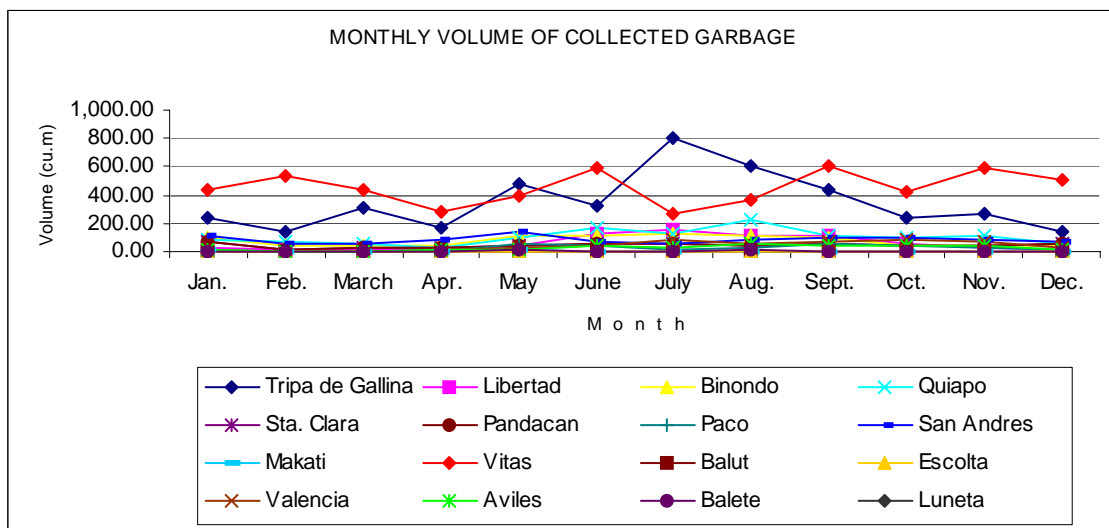


Figure L.3.6 Average Physical Composition of Floating Solid Waste at Selected Pumping Stations in Metropolitan Manila (air-dried basis)

L.3.2 SOLID WASTE AMOUNT DATA AT PUMPING STATIONS

Based on the collected daily solid waste data from Metropolitan Manila Development Authority (MMDA) for available years of record from each pumping station (15 in total), the total volume of floating solid waste were estimated.

Figures L.3.7 shows the monthly volume of collected solid waste for all pumping stations, which indicates that there is an increase in volume of solid waste accumulated during the rainy months of June to September compared to the volume amassed during the dry season months.



Source: MMDA

Figure L.3.7 Monthly Volume of Collected Solid Waste by MMDA for Year 2003

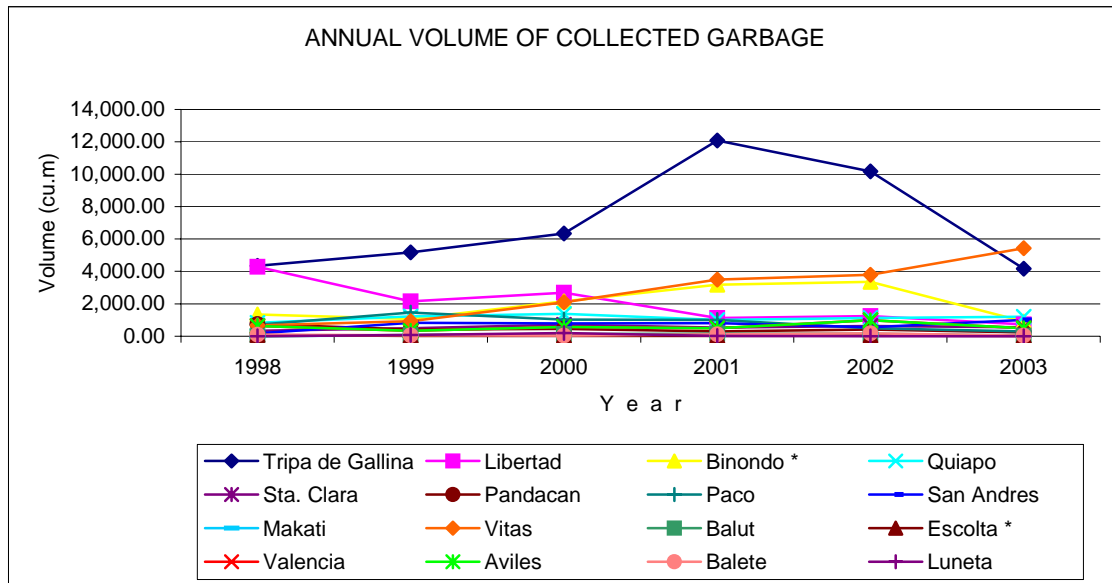
Figures L.3.8 and Table L.3.8 show the annual volume of collected solid waste for all pumping stations. From Figure L.3.8, it is evident that Tripa de Gallina and Vitas Pumping Stations are at the top when it comes to annual volume of collected solid waste, while Escolta and Balete Pumping Stations have the least in numbers. The volume of collected solid waste at pumping stations depends on the watershed area and number of waste generators.

As seen also in Figure L.3.8, there is an increase in the volume of collected waste in years 2000 and 2001. This increase is brought about by the “Garbage crisis” in Metro Manila, which started in 1999 when the San Mateo Landfill had a forced suspension of operations. At these times, Metro Manila was out of options for disposal, and solid waste went largely uncollected.

It can also be noticed from the same figure that the volume of solid waste decreased in 2002 and 2003. The reduction of volume of solid waste collected from the pumping stations, as explained by the MMDA, may be brought about by the following: the enactment of RA 9003 which led to the opening of additional dumpsites for disposal of solid waste; the massive clean-up of waterways by various District Engineering Offices concerned where solid waste are automatically hauled-up; the massive information drive of the MMDA relative to the illegal dumping of solid waste on the waterways; and the little number of weather disturbances that passed through the Manila area.

The 6-year average total volume of solid waste collected from the 16 pumping stations is 18,938

m³.



Source: MMDA

Figure L.3.8 Annual Volume of Collected Solid Waste by MMDA for Years 1998-2003

Table L.3.8 Annual Volume of Accumulated/Collected Solid Waste in Various Pumping Stations from 1998-2003 (m³)

PUMPING STATION	YEAR						6-year Average
	1998	1999	2000	2001	2002	2003	
Tripa de Gallina	4,345	5,170	6,340	12,085	10,168	4,162	7045
Libertad	4,284	2,146	2,690	1,126	1,245	721	2035
Binondo *	1,338	1,062	2,150	3,175	3,356	902	1997
Quiapo	824	1,234	1,373	1,003	1,122	1,205	1127
Sta. Clara	336	484	720	533	636	562	545
Pandacan	756	412	456	292	415	242	429
Paco	708	1,454	1,025	1,014	492	294	831
San Andres	172	832	790	813	548	1,013	695
Makati	28	39	50	67	70	47	50
Vitas	670	926	2,096	3,503	3,796	5,432	2737
Balut	-	82	136	149	155	42	94
Escolta *	74	22	19	21	41	19	33
Valencia	636	334	570	495	984	500	586
Aviles	226	1,724	478	464	357	323	595
Balete	90	55	43	116	183	41	88
Luneta	-	88	190	20	-	-	50
TOTAL	14,487	16,064	19,126	24,876	23,568	15,505	18,938

Source: MMDA

L.4 FLOATING SOLID WASTE SURVEY

(1) Case 1

1) Methodology

Period and Schedule of the Survey

The survey was conducted from March 28 to 30, 2004. This included the clean up of the estero, solid waste sample collection, composition analysis of samples, throwing of samples to the estero, and final composition analysis of floating solid waste.

Selection of Sampling Area

A site reconnaissance was made in order to determine the site for the conduct of the survey. Once the preferred site was chosen, the surveyors informed the barangay officials regarding the procedures of the survey.

The selected area for the survey was the Estero de San Lazaro in Barangay 313 in the City of Manila. The survey team considered an 85.02 m length along Estero de San Lazaro as the site for the floating solid waste survey. The area was ideal for the survey because of the presence of informal settlers living along the estero. An estimated 200 families are said to be living in the area.

Also, the barangay officials conduct a clean-up drive every Sunday wherein they had already put up a screen located at the bottom of the bridge to capture the floating solid waste in their area. Volunteers from the barangay collect the solid waste by the use of a raft and some improvised collection equipment.

In this connection, the survey team conducted a clean-up drive, which started on a Sunday (March 28, 2004) to have the estero cleaned before conducting the sampling. Then the following day the survey was implemented.

Collection of Solid Waste Samples from the Surrounding Residences

Ten (10) households were selected as sources of waste samples to be used in the survey. Each household was given one (1) solid waste bag into which they would place their solid waste for the day. On the next day, the solid waste bags were collected using a pick-up vehicle.

Physical Composition of Solid Waste Samples

After the collection of solid waste samples from the ten households, physical composition was conducted. The samples were sorted into eleven (11) and weighed individually. The category of "Waste inside plastic bags" is described as household waste, usually plastic, paper, and kitchen waste, that are placed inside plastic bags.

Throwing of Solid Waste to Esteros

After the composition analysis, the solid waste samples were thrown to the estero (Estero de San Lazaro) to observe the floating materials. To hasten the flow of water, the Binondo Pumping Station, which is the nearest in the area, was asked to operate their pumps. The solid waste traveled a distance of 77.38 m from its original position in a speed of 0.043 m/s for 30 min (from 10:15am to 10:45am). Volunteers from the barangay collected the solid waste samples that were captured by the screen located at the bottom of the bridge along Recto Avenue. The samples were placed in solid waste bags and then

transported to Binondo Pumping Station for a 24-hour air-drying.

Physical Composition of Floating Solid Waste

After the samples were air-dried, another set of physical composition analysis was made in order to determine the amount and composition solid waste samples that floated. The samples were again sorted into the same eleven (11) categories as stated above, and then weighed individually. *Table L.4.1* shows the activities of the survey.

Table L.4.1 List of Activities for Floating Solid Waste Survey (Case 1)

Date	Activities
March 28, 2004	<ul style="list-style-type: none"> • Clean-up drive by Barangay 313 volunteers (7am to 3pm) • Distribution of waste bags to ten (10) selected households along Estero de San Lazaro
March 29, 2004	<ul style="list-style-type: none"> • Collection of waste bags • Physical composition of collected waste at Binondo P.S. • Throwing of solid waste samples in Estero de San Lazaro • Pumping operation at Binondo P.S. to hasten the flow of water • Collection of floating solid waste by barangay volunteers • 24-hr air-drying of collected floating solid waste at Binondo P.S.
March 30, 2004	<ul style="list-style-type: none"> • Physical composition of air-dried floating solid waste samples

P.S. – Pumping Station

2) Results

Solid waste samples for composition analysis were segregated into eleven (11) components: “kitchen waste”, “paper”, “textile”, “plastic”, “grass and wood”, “leather and rubber”, “metal”, “glass”, “ceramic and stone”, “waste inside plastic bags” and “others”. “Others” includes soils, inert materials, fines, shells, etc. The “waste inside plastic bags” is an additional category from the usual set of categories. It is included in this particular survey in order to determine not only the amount but also if this solid waste will float or not. *Figure L.4.1* shows the percentage distribution values of the solid waste samples collected from the ten (10) households before throwing to the estero, while *Figure L.4.2* presents the composition of household waste samples that floated.

As shown in *Figure L.4.1*, “Waste inside Plastic Bags” at 29.29% has the highest percentage composition in the sample collected, followed by “Paper” at 20.86%. The contents of the “Waste inside Plastic Bags” were observed to be “Soft and Hard Plastics” as well as “Left-Over”. Categories such as “Others”, “Fruit & Vegetable Peelings”, “Textile”, “Grass and Wood” and “Soft Plastic” also have high percentage values.

As illustrated in *Figure L.4.2*, majority of the solid waste materials were observed to have floated except for those such as “Left-Over” and “Ceramic and Stone”. Some solid waste such as “Paper”, “Tin”, “Textile” and “Fruit & Vegetable Peelings” had significantly reduced in quantity. The category “Deposited Waste”, which constitutes 23.02% of the total composition, is composed of “Left-Over”, “Ceramic and Stone”, and some quantities of “Paper”, “Tin”, “Textile” and “Fruit & Vegetable Peelings”.

The survey result has shown that 77% of the solid waste thrown to the estero floated and 23% deposited. From this result, the amount of solid waste going into the esteros yearly

can be roughly estimated to be $24,595 \text{ m}^3$, using the MMDA figures shown in *Table L.3.8*. Of which, $5,656 \text{ m}^3$ are deposited, or 1,753*** tons, i.e., using the average ASW shown in *Table L.3.7*.

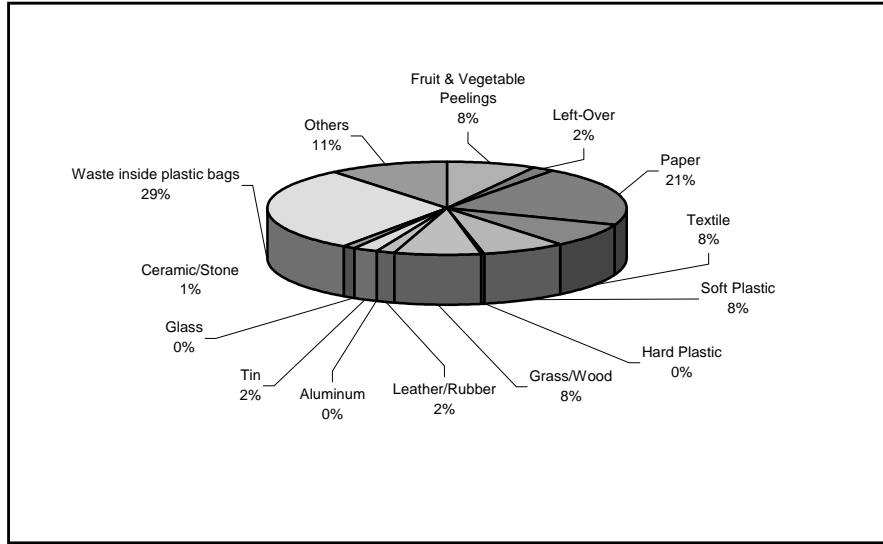


Figure L.4.1 Physical Composition of Household Solid Waste thrown in Esteros (Case 1)

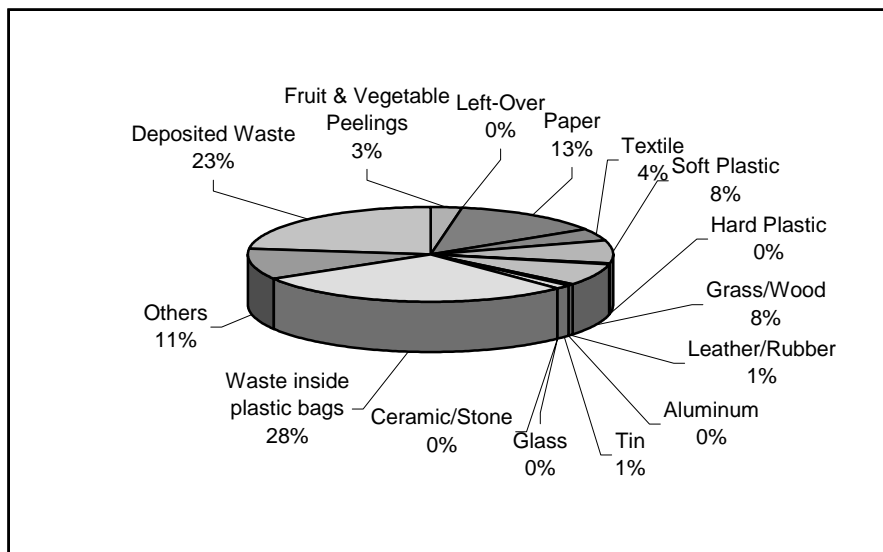


Figure L.4.2 Physical Composition of Floating Household Solid Waste thrown on Esteros (Case 1)

* $24,595 \text{ m}^3 = 18,938 \text{ m}^3$ (*Table L.3.8*) / 0.77 (percent floated waste)
 ** $5,656 \text{ m}^3 = 24,595 \text{ m}^3 \times 0.23$ (percent deposited waste)
 *** $1,753 \text{ tons} = 5,656 \text{ m}^3 \times 0.31 \text{ tons/m}^3$ (*Table L.3.7*)

(2) Case 2

1) Methodology

Period and Schedule of the Survey

The survey was conducted from April 21 to 24, 2004. This included the clean up of the estero, solid waste sample collection, composition analysis of samples, throwing of samples to the estero, 24-hour monitoring and final composition analysis of floating solid waste.

Selection of Sampling Area

For case 2, the same sampling area was chosen (Estero de San Lazaro). This time, the thrown solid waste was monitored for 24 hours to determine the floating and deposited solid waste on the specified period of time. The survey team conducted a clean-up drive, which started on a Thursday (April 22, 2004) at 6am to have the estero cleaned before conducting the sampling. The survey was implemented right after the clean-up drive.

Collection of Solid Waste Samples from the Surrounding Residences

Ten (10) households were selected as sources of solid waste samples to be used in the survey. Each household was given one (1) waste bag into which they would place their solid waste for the day. On the next day, the survey team collected the waste bags.

Physical Composition of Solid Waste Samples

After the collection of solid waste samples from the ten households, physical composition was conducted at the Binondo Pumping Station. The samples were sorted into eleven (11) categories and weighed individually.

Throwing of Solid Waste to Estero

After the composition analysis, the solid waste samples were thrown to the estero (Estero de San Lazaro) to observe the floating materials. At 10am the solid waste samples were thrown to the estero to indicate the start of the 24-hour monitoring. The estero was then almost stagnant. The samples were monitored on an hourly basis as to observe the position and movement. It was observed at 4pm that the water started to flow at a speed of 0.189 m/s. The solid waste was able to reach the screen located at the bottom of the bridge along Recto Avenue at 4:15pm with a traveled distance of 85.02 m. Then from 6:30pm to 7:00am the following day (April 23, 2004) it was observed that the solid waste samples remained at the same position near the lower right side of the screen due to stagnation of water. At 8:45am, there was a backflow of water at a speed of 0.015 m/s. These downstream-upstream movements were due to tidal fluctuation. The solid waste was collected at 10am, 24-hours after the samples were thrown to the estero. The samples were brought to the Binondo Pumping Station for a 24-hour air-drying.

Physical Composition of Floating Solid Waste

The air-dried samples were subjected to physical composition on the next day to determine the amount and characteristic of samples left. *Table L.4.2* shows the activities of the survey.

Table L.4.2 List of Activities for Floating Solid Waste Survey (Case 2)

Date	Activities
April 21, 2004	<ul style="list-style-type: none"> Distribution of waste bags to ten (10) selected households along Estero de San Lazaro
April 22, 2004	<ul style="list-style-type: none"> Clean-up drive by Barangay 313 volunteers (6am to 10am) Collection of waste bags Physical composition of collected solid waste at Binondo P.S. Throwing of solid waste samples in Estero de San Lazaro (10am) 24-hr air-drying of collected floating solid waste at Binondo P.S.
April 23, 2004	<ul style="list-style-type: none"> Collection of floating solid waste by barangay volunteers (10am) 24-hr air-drying of collected floating solid waste at Binondo P.S.
April 24, 2004	<ul style="list-style-type: none"> Physical composition of air-dried floating solid waste samples

P.S. – Pumping Station

2) Results

Figure L.4.3 shows the percentage distribution values of the solid waste samples collected from the ten (10) households before throwing to the estero, while *Figure L.4.4* presents the composition of solid waste samples that floated.

It can be gleaned from *Figure L.4.3* that the amount of deposited solid waste amounted to 35.32% of the total weight of collected solid waste samples. This percentage can be broken down into the following: 4.74% Fruit and Vegetable Peelings; 1.58% Left-Over; 10.87% Paper; 1.64% Textile; 0.32% Soft Plastic; 0.41% Hard Plastic; 1.33% Grass/Wood; 0.28% Leather/Rubber; 1.83% Tin; 1.39% Glass; 8.09% Ceramic/Stone; and 2.84% Waste inside Plastic Bags.

For the floating solid waste, all the samples under the category of “Others” floated, which consisted of baby diapers. Samples from the categories such as “Soft Plastic”, “Hard Plastic”, “Wastes inside Plastic Bags”, and “Leather/Rubber” registered high percentages at 96.72%, 95.17%, 92.86% and 82.35%, respectively.

Samples falling under the categories of “Left-Over”, “Grass/Wood”, “Tin”, and “Ceramic/Stone” were all deposited in the estero after 24 hours. High percentages were observed from samples under the categories of “Textile”, “Paper”, “Glass”, and “Fruit and Vegetable Peelings” at 92.86%, 80%, 78.57% and 78.15%, respectively.

The survey result has shown that 65% of the solid waste thrown to the estero floated and 35% deposited. From this result, the amount of solid waste going into the esterios yearly can be roughly estimated to be 29,135* m³, using the MMDA figures shown in *Table L.3.8*. Of which, 10,197** m³ are deposited, or 3,161*** tons, i.e., using the average ASW shown in *Table L.3.7*.

* 29,135 m³ = 18,938 m³ (*Table L.3.8*) / 0.65 (percent floated waste)

** 10,197 m³ = 29,135 m³ x 0.35 (percent deposited waste)

*** 3,161 tons = 10,197 m³ x 0.31 tons/ m³ (*Table L.3.7*)

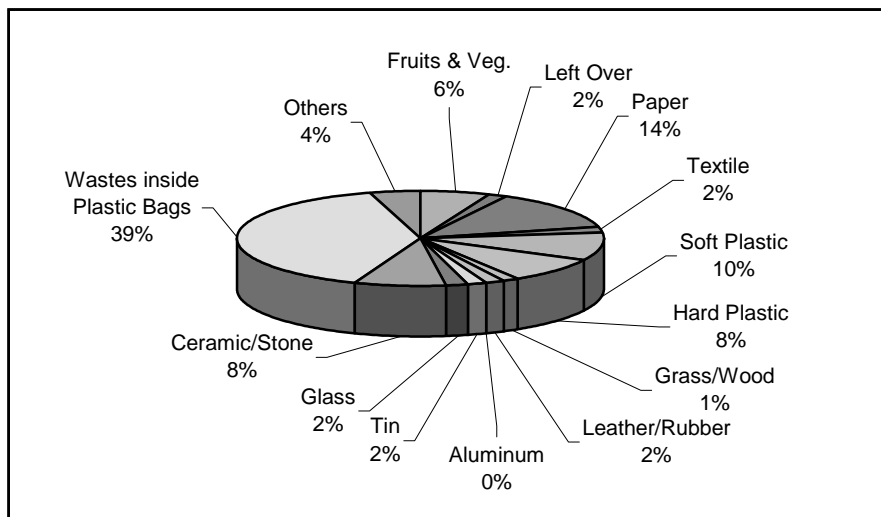


Figure L.4.3 Physical Composition of Household Solid Waste thrown in Esteros (Case 2)

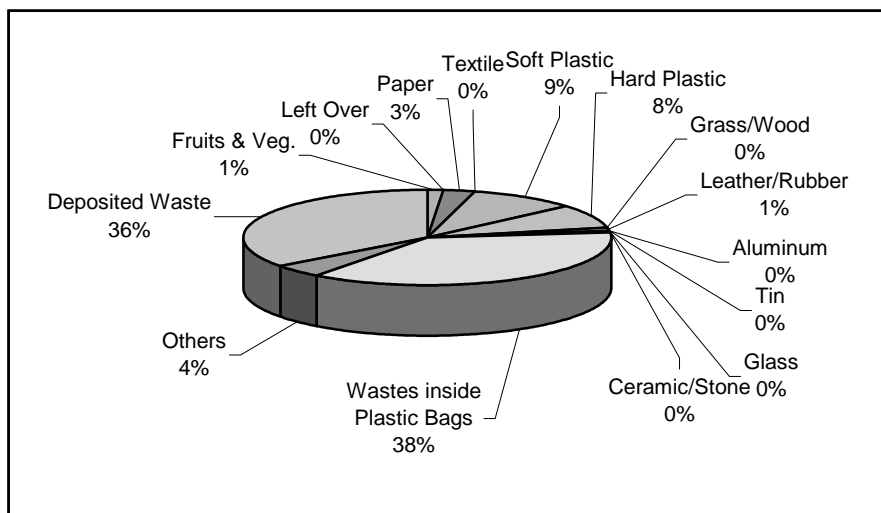


Figure L.4.4 Physical Composition of Floating Household Solid Waste thrown in Esteros (Case 2)

(3) Comparison of Case 1 and Case 2 Results

Table L.4.3 presents the comparison of results for Case 1 and Case 2.

Table L.4.3 Comparison of Results for Case 1 and Case 2

Solid waste	Case 1 Less than 1 hour	Case 2 24-hours
Floating Solid waste	77%	65%
Deposited Solid waste	23%	35%

It can be observed from the above table that the percentage of deposited solid waste for Case 2 is higher than Case 1. Majority of the deposited solid waste for both cases is composed of materials falling under the categories of “Fruit & Vegetable Peelings”, “Left-Over”, “Paper”, “Textile”, “Grass/Wood”, “Tin”, “Glass” and “Ceramic/Stone”. However, it was observed in

Case 2 that more amounts of “Textile”, “Paper”, “Grass/Wood” and “Tin” were deposited during the 24-hour monitoring. This implies that materials falling under these four (4) categories are deposited in the esteros as they become heavier because of water (saturated, soaked, or filled-in).

L.5 DEPOSITED SOLID WASTE ANALYSIS

L.5.1 METHODOLOGY

The analysis for deposited solid waste involves Waste Composition Survey (WACS) and determination of Percentage of Silt at forty- (40) sampling points located near the bank (20) and at the center (20) of selected esteros. *Table L.5.1* presents the twenty (20) sampling points, sampling area and sampling quantities. The survey was conducted from March 22 to 25, 2004 for samples collected near the bank of esteros and from April 5 to 7, 2004 for samples collected at the center of esteros. This includes the collection of solid waste and silt samples, air-drying of collected samples, collection of silt samples for ignition loss analysis and physical composition of solid waste. *Table L.5.2* presents the list of activities of the survey.

The criteria for the selection of sampling areas includes accessibility, shallow water along esteros, and safety of the survey team. *Figure L.5.1* shows the location of the selected sampling points.

There are two (2) original sampling methodologies proposed for this particular survey. These are the Rake Method and the Cylindrical Caisson Method. In some case Caisson methods was found to be difficult to implement. The reason behind is that the silt deposit was too hard, the surveyors opted to collect the samples by the use of a shovel in this case.

During the collection of samples for each sampling point, the wet weight and volume were determined before being subjected to air-drying for 24 hours. The San Andres, Tripa de Gallina and Vitas Pumping Stations were used as the staging areas for air-drying, including the determination of percent silt for the 40 samples, physical composition analysis of five (5) selected samples, and sampling for the determination of organic content of silt. The determination of percent silt was done in all 40 samples; while the physical composition and determination of organic content of silt were done in five (5) selected samples taken near the bank of the estero, namely:

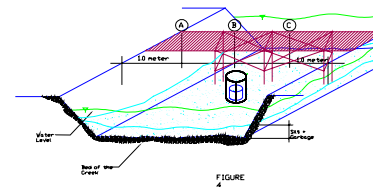
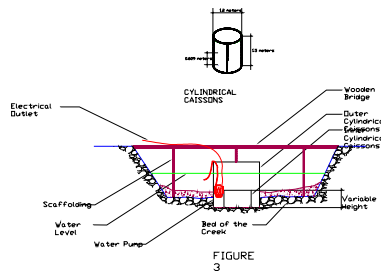
- sample no. 5 (Estero de Tripa de Gallina located at Gen. Lacuña St. Brgy. Bangkal Makati),
- sample no. 10 (Creek along Vicente Cruz Manila),
- sample no. 13 (Estero de San Miguel located at C. Aguila St. San Miguel Manila),
- sample no. 15 (Estero de Paco located along U.N. Avenue Paco, Manila), and
- sample no. 19 (Estero de Maypajo located at Abucay St., Manila).



Rake Method



Cylindrical Caisson Method



Cylindrical Caisson Method

(a) Determination of Percent Silt

After the samples have undergone air-drying, the air-dried weight and volume were measured. Then each sample was sieved using a $\varnothing 10$ mm screen to separate the silt from the solid waste. The particles that passed through the sieve were weighed. The said particles were considered as silt. However, not all of the samples pass through the sieve. The reason for this is that some of the silt was too big in size and some was still wet during the sieving process. By taking this into account, solid waste and stones were removed manually from the remaining materials and then weighed individually.

The percent silt is computed in this manner:

$$\text{Percent Silt} = [\text{Weight of Silt(kg)} / \text{Air-Dried Wt. Of Sample(kg)}] \times 100$$

(b) Physical Composition Analysis

Five (5) selected samples, taken near the bank of the estero, were individually subjected to physical composition analysis, sorting into ten categories and then weighing the ten categories individually.

(c) Determination of Organic Content of Silt

Five (5)-one (1) kg silt samples, collected near the bank of the estero, were taken from the collected samples that passed through the #10 mm sieve and brought to the laboratory for ignition loss test.

Table L.5.1 Sampling Points, Sampling Area and Sampling Quantity

No.	Sampling Points	Sampling Areas	Sampling Quantity				
			Samples Per day	Measurement Days	Total Samples	Physical Composition	Ignition Loss
1	Estero de Tripa de Gallina	Along Bac One Eleven St., Pasay City	2*	1	2	0	0
2	Dilain Creek	Pasay City	2	1	2	0	0
3	Creek	Along Raxabago Bridge, Manila	2	1	2	0	0
4	Malibay Creek	Pasay City	2	1	2	0	0
5	Estero de Tripa de Gallina	Gen. Lacuna St., Bangkal, Makati City	2	1	2	1	1
6	Estero de Tripa de Gallina	Marconi St., San Isidro, Makati City	2	1	2	0	0
7	Creek	P. Medina St., Pio del Pilar, Makati City	2	1	2	0	0
8	Creek	Brgy. San Antonio, Makati City	2	1	2	0	0
9	Estero de Tripa de Gallina	Vito Cruz, Manila	2	1	2	0	0
10	Creek	Vicente Cruz, Manila	2	1	2	1	1
11	Estero de Pandacan	Zamora St., Pandacan, Manila	2	1	2	0	0
12	Estero de Pandacan	Beata St., Pandacan, Manila	2	1	2	0	0
13	Estero de San Miguel	C. Aguila St., San Miguel, Manila	2	1	2	1	1
14	Creek	Fajardo Cor. Carola St., Manila	2	1	2	0	0
15	Estero de Paco	UN Avenue, Paco, Manila	2	1	2	1	1
16	Estero de San Miguel	San Rafael St., San Miguel, Manila	2	1	2	0	0
17	Estero de Maypajo	Brgy. 28, Zone 3, Manila	2	1	2	0	0
18	Estero Sunog Apog	Brgy. 182, Zone 16, Manila	2	1	2	0	0
19	Estero de Maypajo	Brgy. 202 Zone 18, Abucay, Tondo, Manila	2	1	2	1	1
20	Estero de Maypajo	Maligaya St., Tondo, Manila	2	1	2	0	0
Total Number of Samples					40	5	5

* one (1) sample near bank and one (1) at center of estero

Table L.5.2 List of Activities for Deposited Solid Waste Survey

Date	Activities
Samples collected near the bank of esteros	
March 22, 2004	<ul style="list-style-type: none"> • Collection of solid waste and silt samples (11 sampling points) • Air-Drying of collected samples at Tripa de Gallina P.S. (6 samples) and San Andres P.S. (5 samples)
March 23, 2004	<ul style="list-style-type: none"> • Collection of solid waste and silt samples (7 sampling points) • Air-drying of collected samples at Vitas P.S. (7 samples) • Determination of percent silt (11 samples), physical composition analysis of solid waste samples (3 samples), and collection of silt samples for ignition loss analysis (3 samples) at Tripa de Gallina P.S. and San Andres P.S.
March 24, 2004	<ul style="list-style-type: none"> • Collection of solid waste and silt samples (2 sampling points) • Air-drying of collected samples at Aviles P.S. (2 samples) • Determination of percent silt (7 samples) at Vitas P.S.
March 25, 2004	<ul style="list-style-type: none"> • Determination of percent silt (2 samples), physical composition analysis of solid waste samples (2 samples), and collection of silt samples for ignition loss analysis (2 samples) at Aviles P.S.
Samples collected at the center of esteros	
April 5, 2004	<ul style="list-style-type: none"> • Collection of solid waste and silt samples (8 sampling points) • Air-Drying of collected samples at Tripa de Gallina P.S. (8 samples)
April 6, 2004	<ul style="list-style-type: none"> • Collection of solid waste and silt samples (10 sampling points) • Air-drying of collected samples at Tripa de Gallina P.S. (10 samples) • Determination of percent silt (8 samples) at Tripa de Gallina P.S.
April 7, 2004	<ul style="list-style-type: none"> • Determination of percent silt (10 samples), physical composition analysis of solid waste samples (5 samples), and collection of silt samples for ignition loss analysis (5 samples) at Tripa de Gallina P.S.

P.S. – Pumping Station

* Note: Two (2) samples, namely sample nos. #3 and #4, were not collected due to difficulty in sampling procedures (for samples collected at the center of esteros).

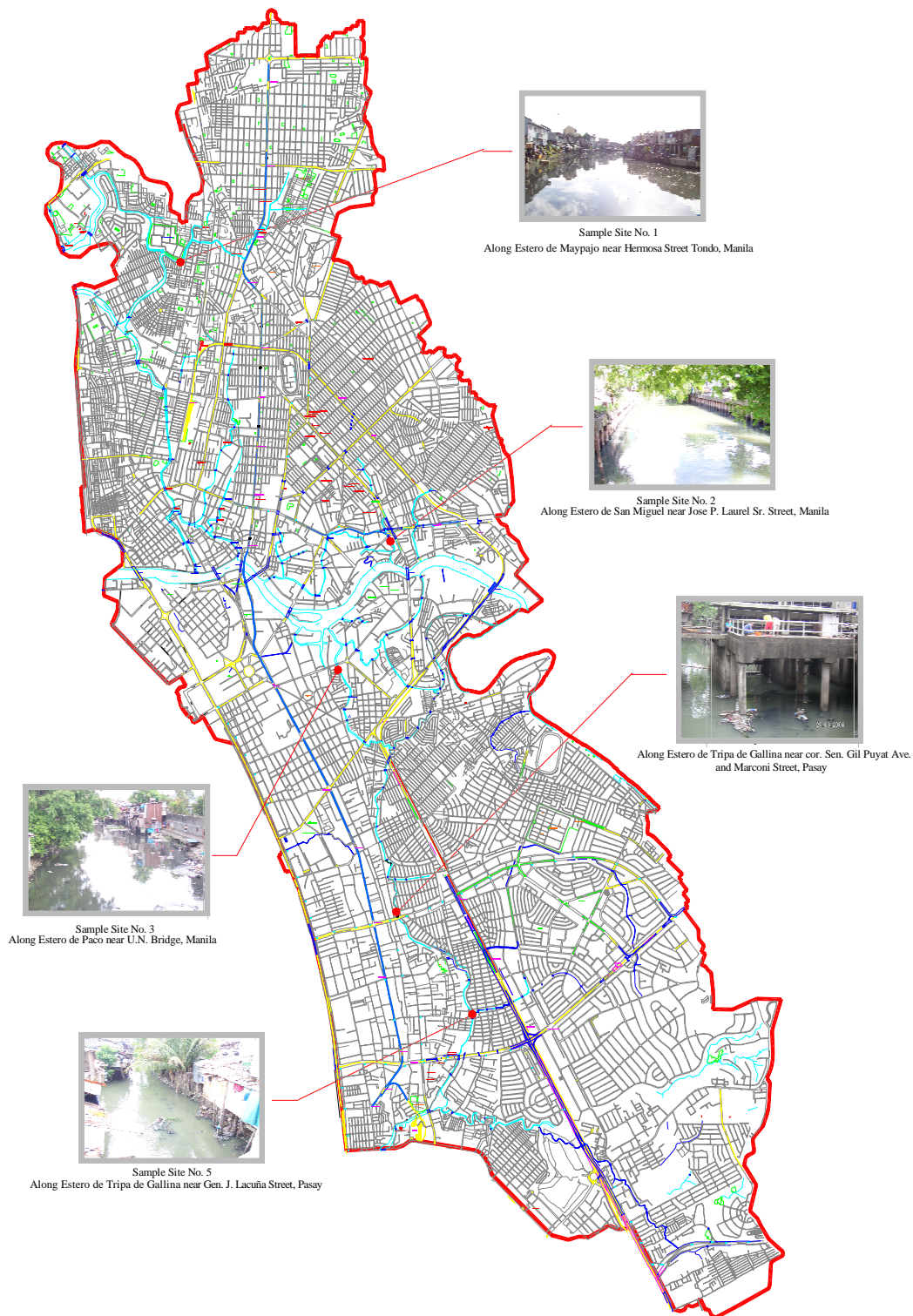


Figure L.5.1 Location of Sampling for Deposited Solid Waste on Esteros

L.5.2 PERCENTAGE OF SILT

Table L.5.3 shows that the percent silt for samples taken from near the banks of esteros varies from 10.94% (sample #8) to 77.76% (sample #7), while those derived from the center of esteros varies from 4.14% (sample #19) to 99.47% (sample #8). The average percentage of silt for samples taken near the bank of estero is 50.62%, while 65.86% for samples taken at the center of estero. Using these figures, the amount of silt can be roughly estimated as follows:

CASE	Deposited Solid Waste* (in tons)	Solid Waste and Silt** (in tons)	Amount of Silt*** (in tons)
CASE 1	1,753	5,135	3,382
CASE 2	3,161	9,259	6,098

* Subsection L.5

** $1,753 \text{ tons} / (1 - 0.6586) = 5,135 \text{ tons}$

*** $5,135 \times 0.6586 = 3,382 \text{ tons}$

Using the result that 1,753.36 tons of solid waste is deposited yearly in esteros (Case 1), the amount of solid waste and silt that go into the esteros can be roughly estimated to be 5,144 tons; of which 3,391 tons is silt. For Case 2, it is 6,098 tons.

Figures L.5.2 and L.5.3 show the range of percent of silt for samples taken near the bank and at the center of esteros, respectively.

As observed from the above table and figures, the amount of deposited solid waste and percent silt varies from estero to estero. One of the factors that greatly affect these quantities is the characteristic and kind of environment that surrounds the selected estero. It can be noted that the esteros surrounded with informal settlers are also the ones that contain enormous amount of floating solid waste. Where there is presence of floating solid waste, it can be observed that the existence of a considerable amount of deposited solid waste is at hand.

The location of where the samples have been taken is also a factor in which case it can be seen that the percent silt is greater in samples taken from the center of the esteros rather than near the banks. However, as for the amount of solid waste present, the samples taken near the banks show larger quantities against those obtained from the center of esteros.

Table L.5.3 Percent Silt from 20 Different Sampling Points

Sampling Points	Location	Condition of the Sampling Site	% Weight of Silt (near bank)	% Weight of Silt (at center)
1. Estero de Tripa de Gallina (Length = 6.20 km)	Along Bac One Eleven St., Pasay City	Convergence of Dilain creek and Paranaque River. Shallow riverbed. Floating solid waste came from the squatters residing along the estero.	70.57	64.94
2. Dilain Creek	Pasay City	Sampling point is adjacent to Ayala Sewerage Plant and surrounded by squatters. Water is flowing with floating solid waste.	64.95	79.54
3. Creek	Along Raxabago Bridge, Manila	Dredging works implemented by the local government was partially completed. Residential houses were at the both sides of the estero.	43.17	No sample
4. Malibay Creek	Pasay City	Squatters are located at both sides of the estero. Presence of solid waste in estero.	39.88	No sample
5. Estero de Tripa de Gallina (Length = 6.20 km)	Gen. Lacuna St. Bangkal, Makati City	Sampling point is located beside the wet and dry market. Presence of squatters on both sides of estero.	75.47	80.35
6. Estero de Tripa de Gallina (Length = 6.20 km)	Marconi St., San Isidro, Makati City	Located near the slaughterhouse. Solid waste also came from the squatters settled along the creek.	45.91	61.17
7. Creek	P. Medina St., Pio del Pilar, Makati City	Sampling point is located beside PNR railways and squatters area.	77.76	94.95
8. Creek	Brgy. San Antonio, Makati City	Sampling point is located near the on-going project on drainage improvement. Presence of solid waste in estero.	10.94	99.47
9. Estero de Tripa de Gallina (Length = 6.20 km)	Vito Cruz, Manila	Estero de Tripa de Gallina with residential houses at both sides and squatters residing underneath the bridge.	52.32	76.15
10. Creek	Vicente Cruz, Manila	Tributary of Estero de Sampaloc with concrete revetment wall. Sampling point is beside a basketball court and residential houses.	53.50	81.81
11. Estero de Pandacan	Zamora St., Pandacan, Manila	Downstream of Estero de Pandacan with two-meter alley maintained at the east side. Houses built beside revetment wall at the west. Presence of floating solid waste in estero.	34.82	62.97

Sampling Points	Location	Condition of the Sampling Site	% Weight of Silt (near bank)	% Weight of Silt (at center)
12. Estero de Pandacan	Beata St., Pandacan, Manila	Culvert type structure at Estero de Pandacan. Dwellers occupy the 1.5m. setback at the west side.	63.92	63.09
13. Estero de San Miguel	C. Aguila St., San Miguel, Manila	Sampling point is adjacent to public school. Estero has presence of floating solid waste.	44.42	76.05
14. Creek	Fajardo Cor. Carola St., Manila	Sampling point is near residential area.	69.60	81.62
15. Estero de Paco	UN Avenue, Paco, Manila	Sampling point is located near Unilever and along U.N. bridge. Facing downstream, there are many squatters residing along estero.	52.94	61.58
16. Estero de San Miguel	San Rafael St., San Miguel, Manila	Located at nearby schools, dormitories, clinics and commercial establishments. Estero has presence of solid waste.	50.43	82.07
17. Estero de Maypajo (Length = 1245m, Drainage Area = 324.69 ha)	Brgy. 28, Zone 3, Manila	Sampling point is located near the road-bank beside squatters' area. Presence of floating solid waste in estero.	45.65	38.84
18. Estero Sunog Apog (Length = 1800m, Drainage Area = 951.07 ha)	Brgy. 182, Zone 16, Manila	Located at the junction of Estero de Maypajo and Estero de Sunog Apog. Squatters are present on both sides.	44.46	49.92
19. Estero de Maypajo (Length = 1245m, Drainage Area = 324.69 ha)	Brgy. 202 Zone 18, Abucay, Tondo, Manila	Located at Estero de Sunog Apog. Flowing water with few squatters residing at the right bank of estero facing downstream. Presence of floating solid waste in estero.	41.40	4.14
20. Estero de Maypajo (Length = 1245m, Drainage Area = 324.69 ha)	Maligaya St., Tondo, Manila	Water is flowing downstream. Residential houses residing at left side of the bank, on the right side is a demolished residential house. Sometime when heavy rains occur this estero overflows	30.38	26.74
AVERAGE			50.62	65.86

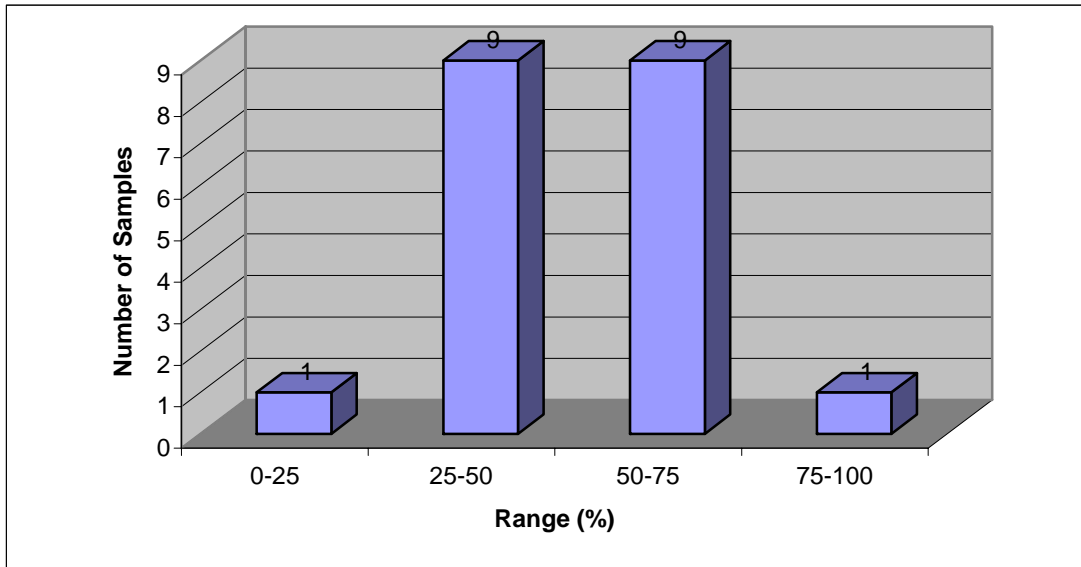


Figure L.5.2 Range of Percent of Silt (near the bank of estero)

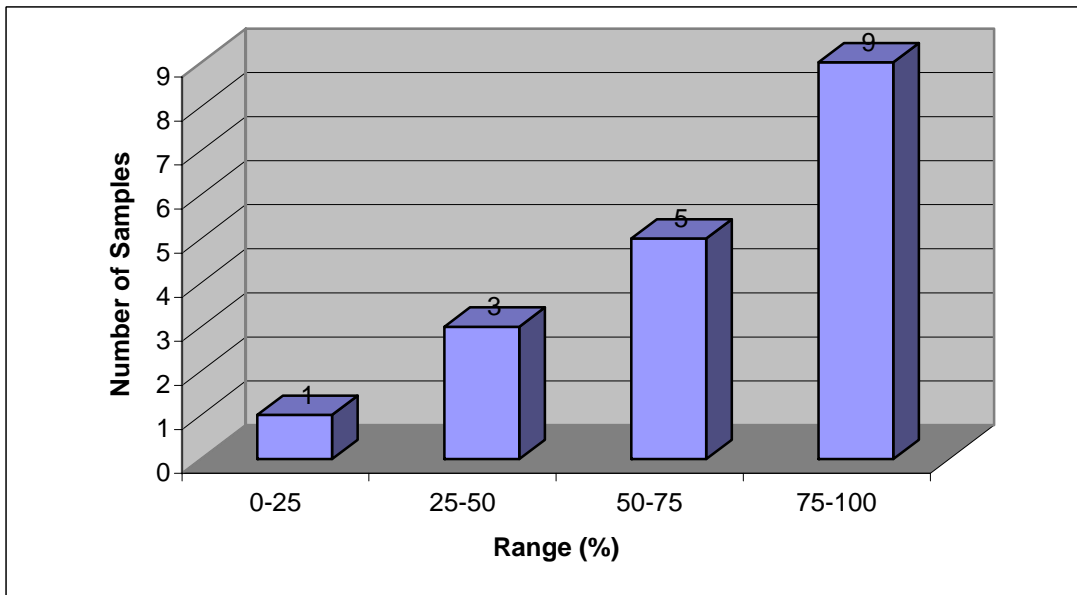


Figure L.5.3 Range of Percent of Silt (at center of estero)

L.5.3 SOLID WASTE COMPOSITION ANALYSIS

(1) Physical Composition (near the bank of Estero)

Solid waste samples for composition analysis were segregated into 10 components. *Figures L.5.4 to L.5.8* show the percentage distribution of the physical composition for five (5) selected esteros. *Figure L.5.9* shows the average percentage distribution values of deposited solid waste for the five (5) selected sampling points.

For the percentage composition of deposited solid waste, it can be observed that “Soft Plastic” and “Grass and Wood” still have large percentages at 20% and 22%, respectively. This indicates that these materials will eventually be deposited in the esteros.

It should be noted that “Textile”, “Tin Metal” and “Glass” also have large shares in the percentage composition of deposited solid waste at 13%, 15% and 21%, respectively. This is expected because these materials are heavy and solid.

Also for deposited solid waste, there are zero percentage values for “Fruits and Vegetable Peelings” as well as “Left-Over”. The reason for this is that when deposited, these materials decompose over-time and become the organic component of the silt deposited in esteros.

(2) Physical Composition (at the center of Estero)

Solid waste samples for composition analysis were segregated into 10 components. *Figures L.5.10 to L.5.14* show the percentage distribution of the physical composition for five (5) selected esteros. *Figure L.5.15* shows the average percentage distribution values of deposited solid waste for the five (5) selected sampling points.

For the percentage composition of deposited solid waste, it can be observed that “Grass and Wood” has large percentage at 54%, which is even higher than those for solid waste deposited near the bank.

It should be noted that “Textile”, “Tin Metal” and “Glass” also have large shares in the percentage composition of deposited solid waste at 6%, 8% and 10%, respectively. These percentages are lower than those for solid waste deposited near the bank.

There is zero percentage value for “Fruits and Vegetable Peelings” as in the solid waste deposited near the bank. But as the record shows “Left-Over” has a percentage of 5%, comprising mainly of seashells.

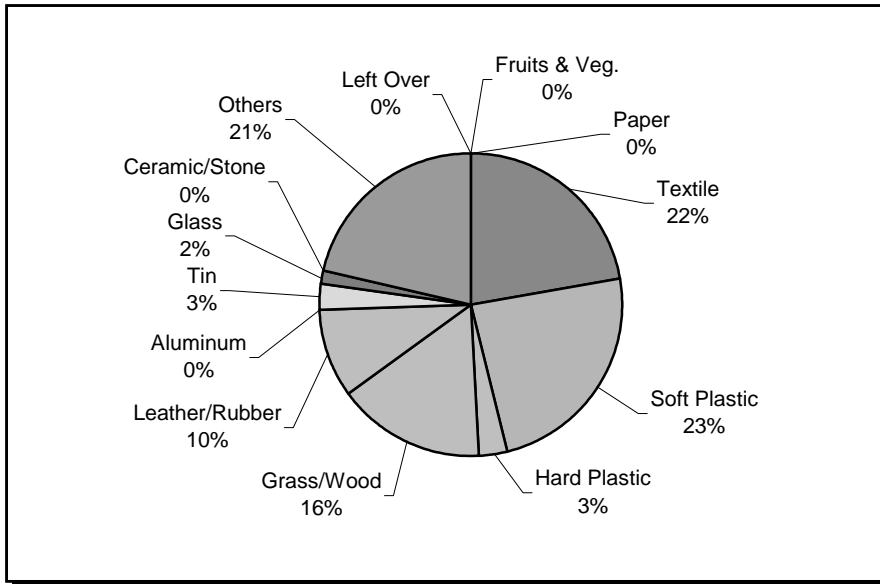


Figure L.5.4 Physical Composition of Deposited Solid Waste in Estero de Tripa de Gallina (air-dried basis)

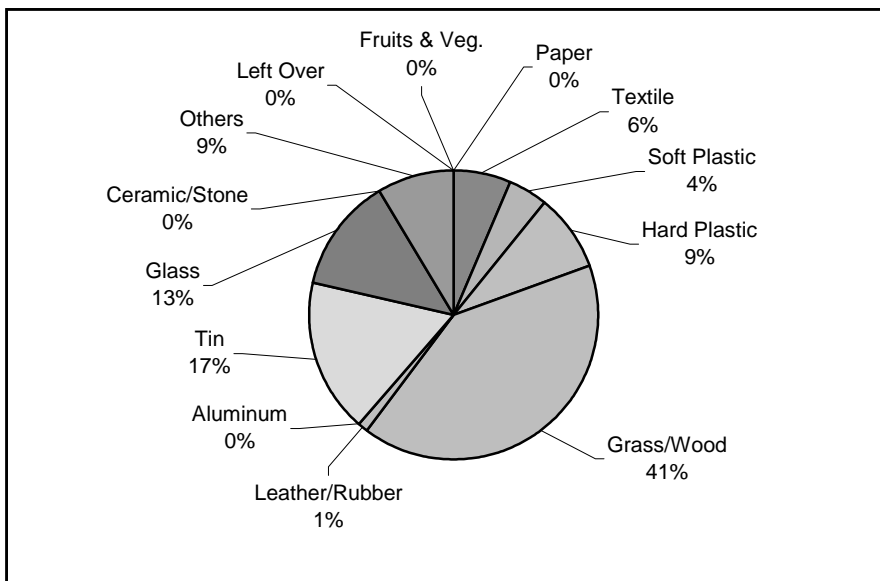


Figure L.5.5 Physical Composition of Deposited Solid Waste in Creek Along Vicente Cruz, Manila (air-dried basis)

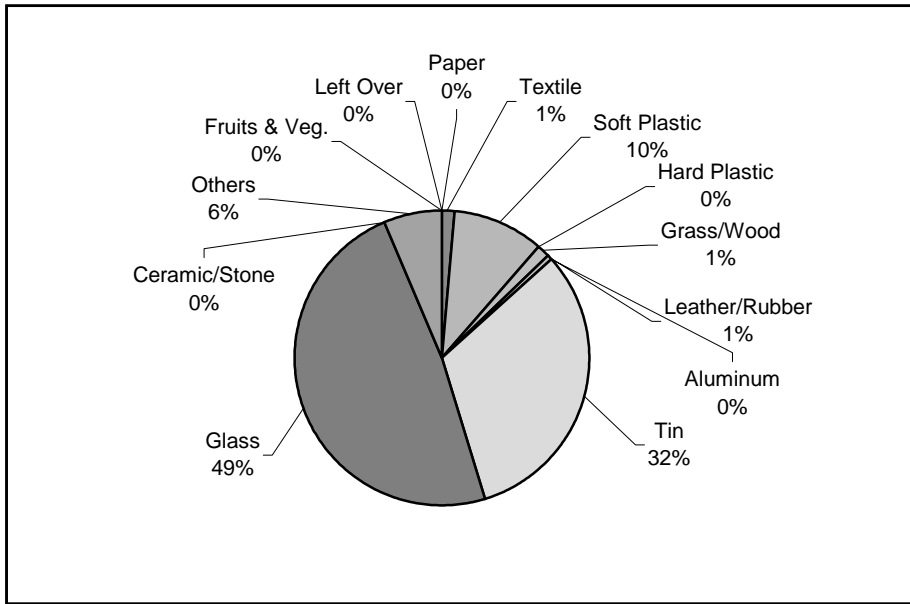


Figure L.5.6 Physical Composition of Deposited Solid Waste in Estero de San Miguel (air-dried basis)

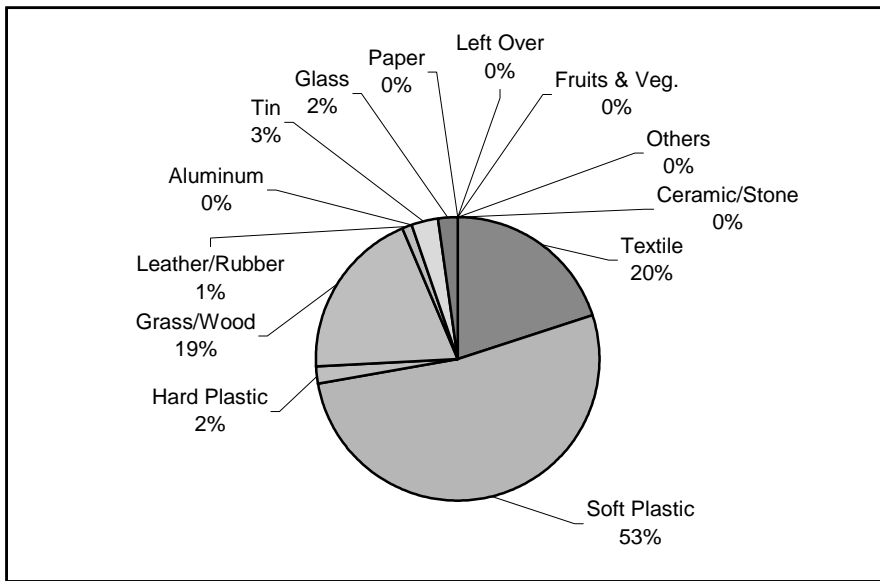


Figure L.5.7 Physical Composition of Deposited Solid Waste in Estero de Paco (air-dried basis)

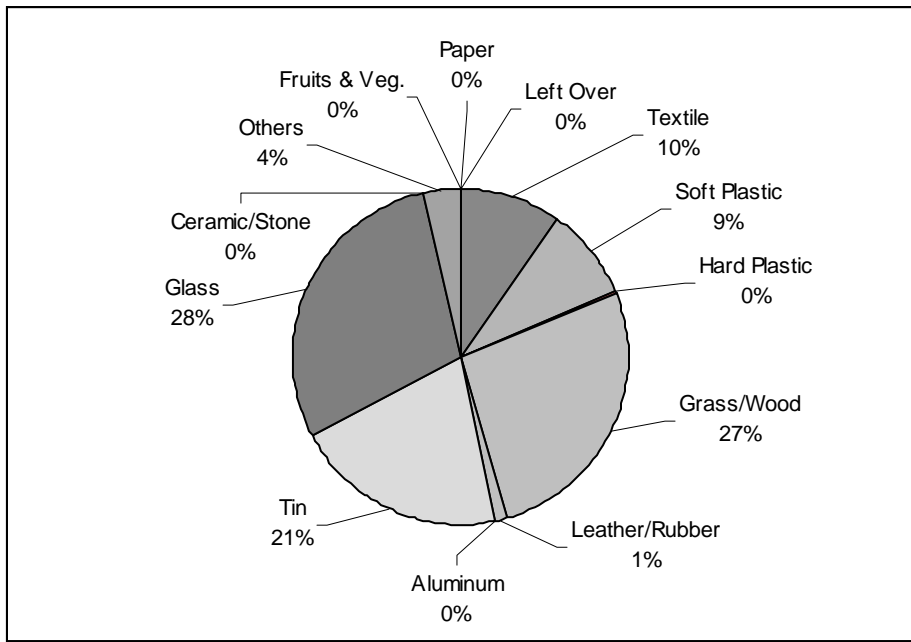


Figure L.5.8 Physical Composition of Deposited Solid Waste in Estero de Maypajo (air-dried basis)

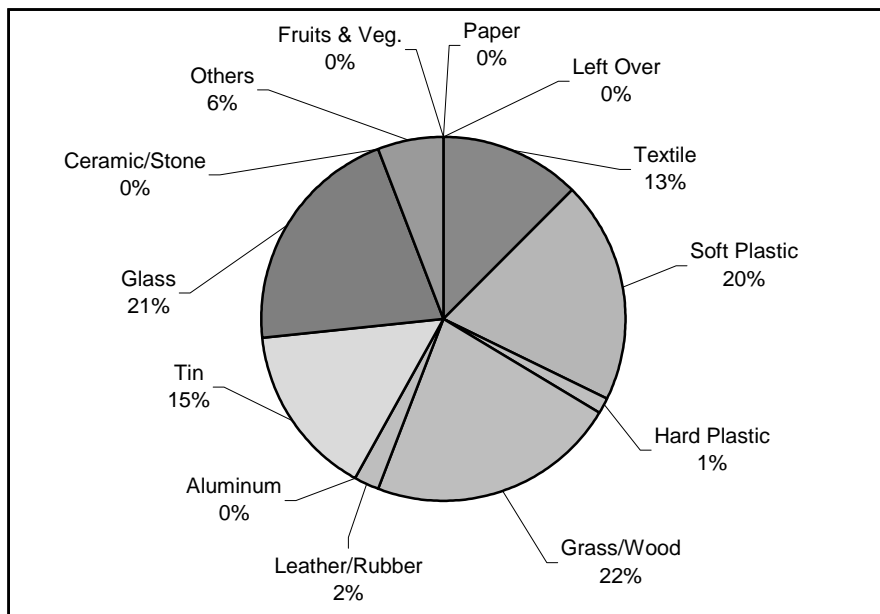


Figure L.5.9 Average Physical Composition of Deposited Solid Waste (air-dried basis)

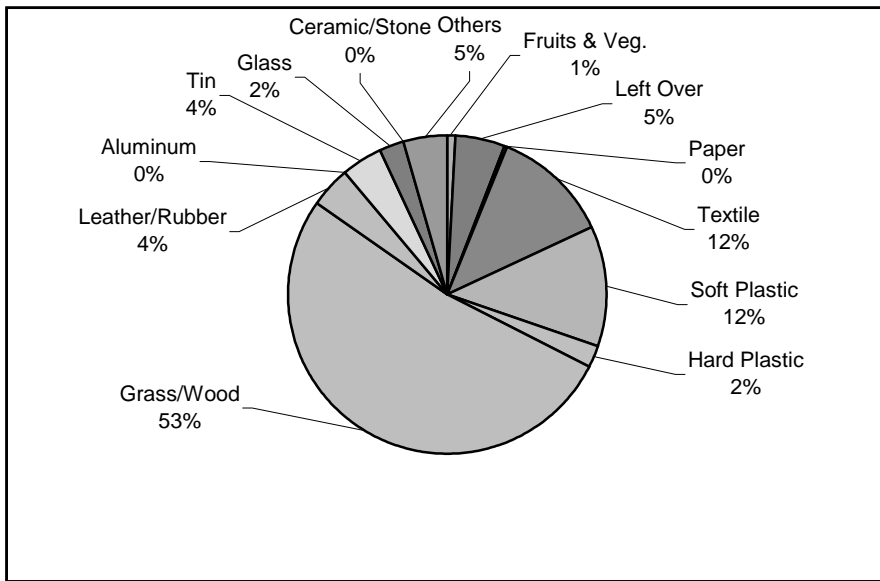


Figure L.5.10 Physical Composition of Deposited Solid Waste in Estero de Tripa de Gallina (air-dried basis)

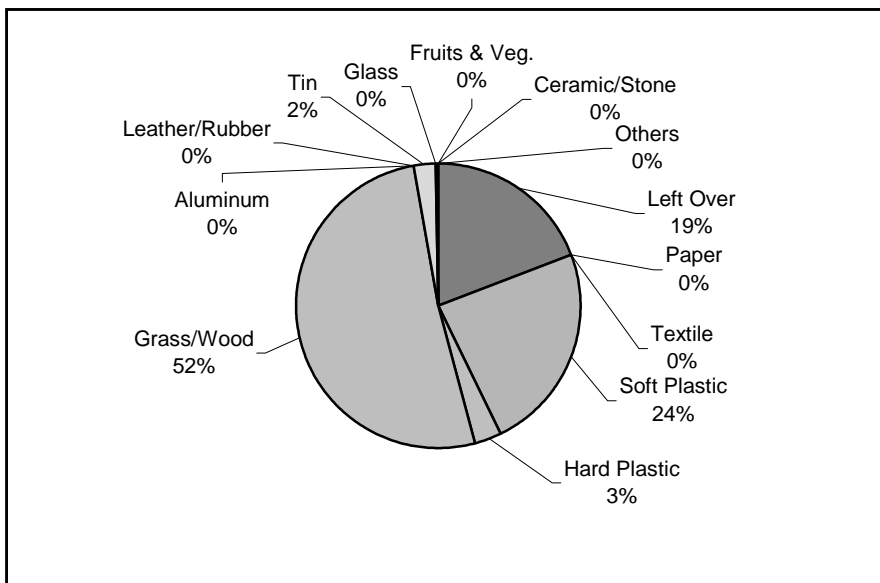


Figure L.5.11 Physical Composition of Deposited Solid Waste in Creek Along Vicente Cruz, Manila (air-dried basis)

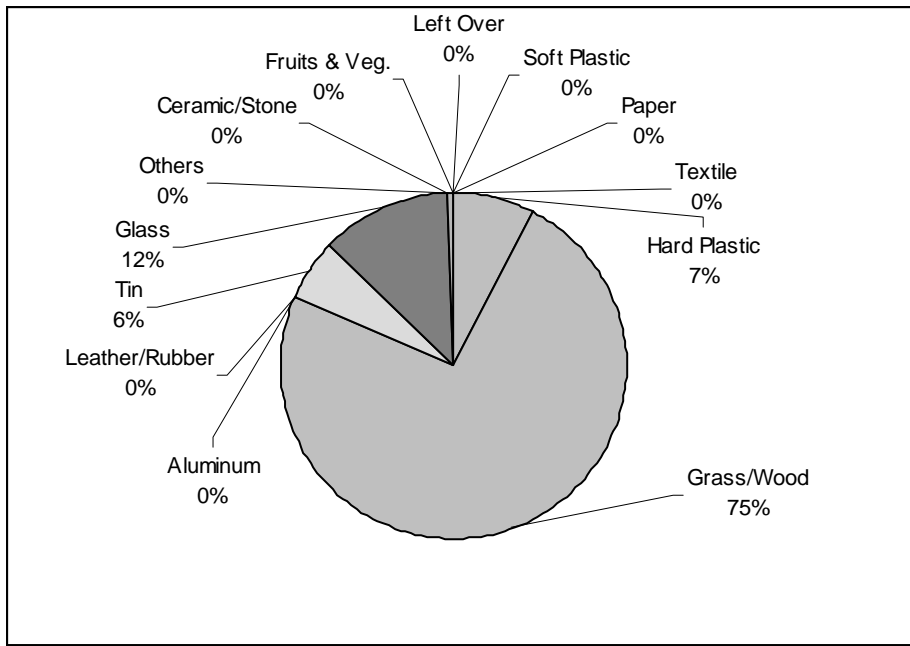


Figure L.5.12 Physical Composition of Deposited Solid Waste in Estero de San Miguel (air-dried basis)

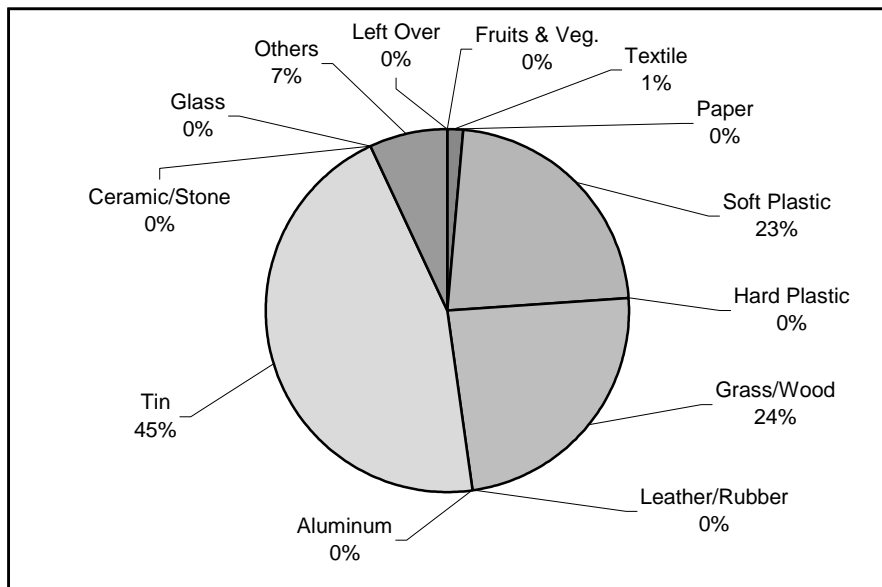


Figure L.5.13 Physical Composition of Deposited Solid Waste in Estero de Paco (air-dried basis)

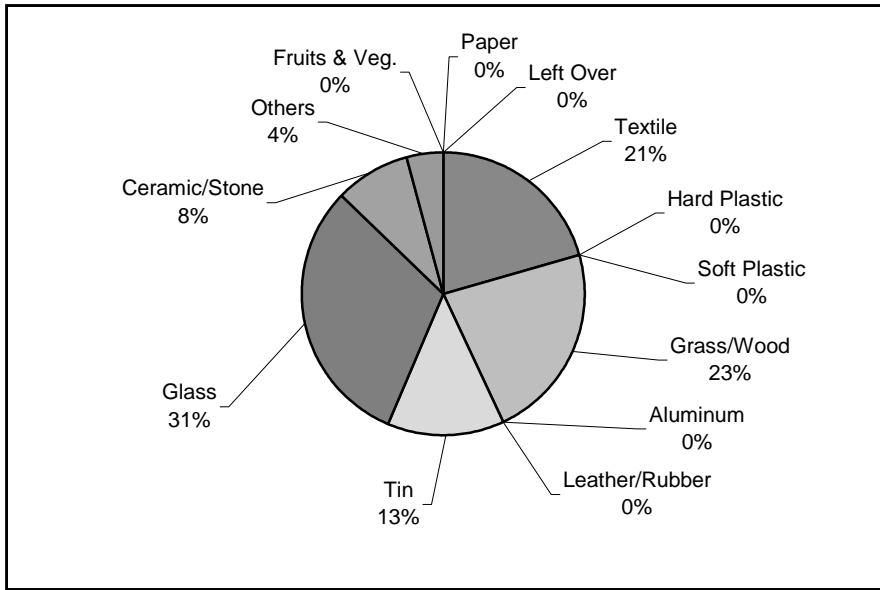


Figure L.5.14 Physical Composition of Deposited Solid Waste in Estero de Maypajo (air-dried basis)

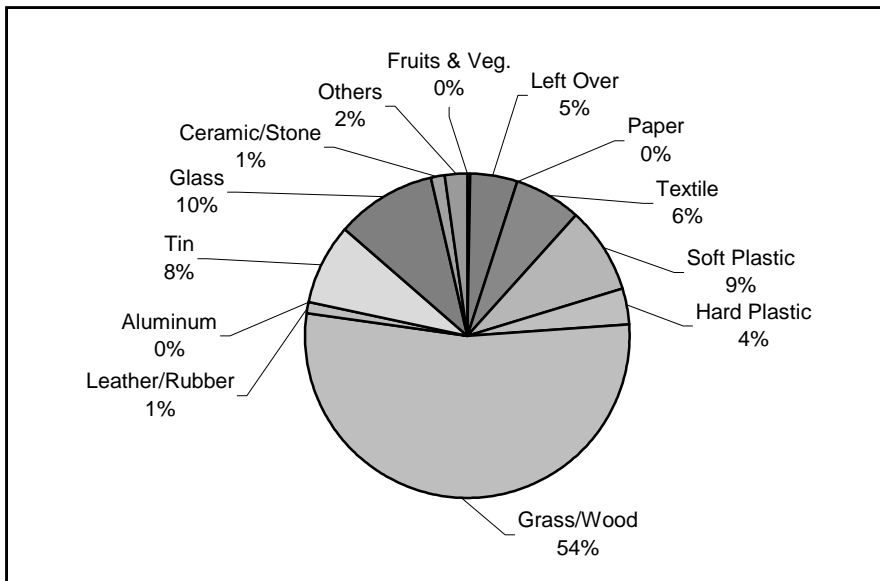


Figure L.5.15 Average Physical Composition of Deposited Solid Waste (air-dried basis)

L.5.4 ORGANIC CONTENT OF SILT

The air-dried silt samples from the five selected esteros were taken to the laboratory for ignition loss test. *Table L.5.4* shows the results of the laboratory test and the organic content of silt for each sample.

Table L.5.4 Ignition Test Results and the Organic Content of Silt of Each Sample

Sampling Points	Moisture Content, %	Ignition Loss, % (Dry Basis)
5	14.66	4.42
10	29.35	14.07
13	16.16	10.04
15	11.39	4.30
19	21.81	7.01
AVERAGE	18.674	7.968

* Loss on ignition was obtained by subjecting the dried sample to a temperature of 550°C for two (2) hours. Results were based on the analyses performed on the samples submitted to UP Environmental Engineering Laboratory.

The ignition loss in *Table L.5.4* represents the total volatile solids (TVS) of the samples analyzed. This amount also corresponds to the organic content of the silt. As observed, all of the values show very low values, thus giving us the idea that there are only few amounts of deposited organic matter. Most particles that comprise the silt may be from sand, dust and washed away soil.

The reason for this is that when deposited, “Fruit and Vegetable Peelings” and “Left-Over” decompose over-time and become the organic component of the silt deposited in esteros. The average organic content is 7.968%.

L.6 COMPARISON OF FLOATING AND DEPOSITED WASTE

Table L.6.1 shows the comparison of physical compositions for solid waste deposited near the bank and at the center of esteros and floating solid waste at pumping stations. This comparison is graphically presented in Figure L.6.1.

Table L.6.1 Physical Compositions of Deposited and Floating Solid Waste

Categories	Deposited Solid Waste near Banks	Deposited Solid Waste at Center	Floating Solid Waste at P.S.
Fruits & Vegetables. Peelings	0.0%	0.2%	6.4%
Left-Over	0.0%	4.8%	13.0%
Paper	0.0%	0.1%	2.5%
Textile	12.6%	6.4%	4.1%
Soft Plastic	19.6%	8.7%	29.8%
Hard Plastic	1.4%	3.8%	2.8%
Grass/Wood	22.3%	53.2%	18.3%
Leather/Rubber	2.2%	1.1%	3.7%
Aluminum	0.0%	0.0%	0.0%
Tin	15.4%	8.1%	1.1%
Glass	20.6%	9.9%	4.1%
Ceramic/Stone	0.0%	1.4%	2.8%
Others	5.9%	2.4%	11.5%

For deposited solid waste, composition percentages are high for “Grass/Wood”, “Glass”, “Soft Plastic”, “Tin”, and “Textile”. Except for “Textile”, all are obviously heavy materials. It is immediately apparent too that because of the organic content of materials under the categories “Fruit and Vegetable Peelings” and “Left-Over”, percentage solid waste composition corresponding to them is low or zero. This is true both for the deposited solid waste taken near the bank and at the center of esteros. **For floating solid waste**, categories such as “Grass/Wood”, “Soft Plastic”, “Fruit and Vegetable Peelings” and “Left-Over” have high percentage composition. “Tin”, “Ceramic and Stone” and “Paper” have low percentage composition.

It may be noticed that for both the deposited and floating solid waste, “Grass/Wood” and “Soft Plastics” consistently show high percentage values. It shows that some of these materials float and some sink depending on the heaviness. For “Grass/Wood”, there is more deposited than floating. On the other hand, there is more floating “Soft Plastics” than deposited. Also, “Fruit and Vegetable Peelings” and “Left-Over” are mostly floating solid waste. When deposited, these materials decompose over-time and become the organic component of the silt deposited in esteros.

L.7 CONCLUSION

Based on the observations and results of the surveys undertaken, the following conclusions are made:

- Most of the floating solid waste accumulated at the pumping stations are household wastes. Evidence is the presence of large amounts of plastic bags containing left-over, fruit and vegetable peelings and human waste; baby diapers, batteries, etc.
- Lightweight materials such as plastics are eventually deposited in the esteros.
- There are more solid wastes located near the bank of esteros than at the center. The samples taken at the center consist mostly of silt.
- Silt samples taken in esteros have low organic content, thus indicating that very small amount of organic wastes are deposited in esteros.
- “Grass/Wood” and “Soft Plastics” constitute most of the floating and deposited solid waste.
- Most of the wooden materials collected from floating solid waste are composed of construction wood, which come from households living along the esteros.