

PASIG CITY DISASTER RISK REDUCTION & MANAGEMENT PLAN 2017 – 2022 and Annexes



Prepared & Compiled By:
**PASIG CITY DISASTER RISK REDUCTION
& MANAGEMENT COUNCIL**
CITY OF PASIG
2017-2022

With contributions from the Pasig City Resilience
to Earthquakes and Floods Project, EMI, 2012



SEPTEMBER 14, 2012 1st Edition
MARCH 10, 2017 2nd Edition



About this Document

The Pasig City Disaster Risk Reduction and Management Plan (PC-DRRMP) is a document specifying policies, platforms, priorities, action plans and mechanisms pertaining to the implementation and institutional basis of disaster management in Pasig City. It describes the responsibilities of all stakeholders developed under the concepts, mandates and principles of the NDRRMP, SNAP, DRRM Act 2010, the Hyogo Framework for Action and to comply with SENDAI Framework 2015.

Pasig City has several plans aimed at preparing, managing and reducing the impact of disasters. The most prominent of these plans is the PC-DRRM Plan published under Pasig City Disaster Risk Reduction and Management Plan 2013-2018 as first edition. The PC-DRRMP 2017-2022 was developed as part of revisiting and updating by the Pasig City Disaster Risk Reduction and Management Office (PC-DRRMO) under the supervision and contributions of the Pasig City Disaster Risk Reduction and Management Council (PC-DRRMC), with guidance from the Office of Civil Defense (OCD) NCR.

One of the tasks of the Pasig City Resilience to Earthquakes and Floods project was to review the PC-DRRM Plan 2013-2015 and other related plans and to improve on its structure, content and recommendations based on the findings and recommendations of the Pasig City Resilience to Earthquakes and Floods project. The goal is to provide up-to-date and Pasig-City specific information on hazard, vulnerability and risk, and to develop sectoral DRRM elements of the plan that would inform on key sectors of activity and responsibility of the city which after 4 years the City Government updated and evaluated the plan for the next 5 years. These elements includes:

- Legal and Institutional Arrangements (LIA)
- Emergency Management (EM)
- Land Use Planning and Construction Codes and Standards (LUP-CCS)
- Hazard, Vulnerability and Risk Assessment (HVRA)
- Training and Capacity Building
- Geographical Information Systems (GIS)
- Information, Education and Communications (IEC)
- Urban Disaster Risk Reduction Indicators (UDRRI)

The sectoral elements of the PC-DRRM Plan includes several recommendations with rationales for each recommendation including suggested priorities and process of implementation. The recommendations are based on the analysis of data that were gathered, the inputs collected during the consultations with different agencies and the focus groups, and on the identification of gaps related to national and international standards and guidelines. These recommendations provide the framework for disaster risk reduction and for working towards building the resiliency of Pasig through coherent short, medium, long-term actions.





Pasig City Disaster Risk Reduction and Management Plan

The sectoral elements are followed by the General Elements of the Plan, which were originally developed by Pasig City and which have remained unchanged in this Plan.

The entire PC-DRRM is presented following this introduction. The full content of the sectoral elements of the PC-DRRM Plan are reproduced under separate reports of the Pasig City Resilience to Earthquakes and Floods Project. The readers and users of the PC-DRRM Plan are encouraged to review these sectoral reports for a full understanding of these elements and for the benefit of the additional data and information that is presented in these reports.

The Plan is updated after 4 years since its implementation validating gaps and improvements.





Key References to the Pasig City Disaster Risk Reduction and Management Plan

The PC-DRRM Tool Kit is a guide for city officials to implement disaster risk reduction activities in Pasig City. It briefly discusses the disaster risks that Pasig City faces and summarizes its major accomplishments in disaster risk reduction. The Pasig DRM Tool kit contains a set of prioritized action items for Pasig City to build its resiliency to disasters. These action items are organized along the key elements of the Ten Essentials for Making Cities Resilient ¹ and are likewise aligned with the priority areas of the Hyogo Framework for Action (HFA). Each action item comes with a short description to guide city officials on how to implement them. A list of indicators is also provided for benchmarking and measuring progress over time. Finally, the tool kit contains an index of all pertinent references on disaster risk reduction for easy access by city officials. They include individual summaries of various reports produced in the <i>Pasig City Resilience to Earthquakes and Floods Project</i> .	
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¹ <http://www.unisdr.org/campaign/resilientcities/>





	<p>The Pasig City Risk Profile and Atlas constitutes a collection of pertinent information about the City such as governance structure, demography, infrastructure, land use, essential and critical facilities, disaster management, and information on hazards, vulnerability and risks. This set of information is processed along the lenses of Disaster Risk Reduction (DRR), thus providing the reader with a single reference for key information relating human and physical exposure to hazard and vulnerability parameters, instead of searching through multiple documents and references.</p> <p>The City Risk Profile and Atlas contains a multitude of charts and maps that collates key statistics as well as fundamental information on hazards and risks for the city as a whole and for each of the 30 barangays of the city. In particular, it provides the following data and information</p>	
2.	<p>The DRRM Specific Applications contains three specific applications that support and complement the Plan.</p> <p>a) Legal and Institutional Arrangement application, which discusses the effectiveness of the legislative framework and institutional arrangements and processes in enabling PCG to undertake its DRRM mandate and programs. It serves as a quick guide on the existing legislative framework from national down to the local level within the international DRRM context.</p> <p>b) The application of resiliency indicators which were employed in Pasig City namely (1) Disaster Risk Resiliency Indicator (DRRI) and (2) Urban Disaster Risk Indicator (UDRI). The former is a self-assessment tool to establish an initial benchmark and track progress on how a city mainstreams risk reduction. While the UDRI presents the relative risks between the 30 barangays in the city for flood and earthquake.</p> <p>c) Four Narrative scenarios for earthquake and flood are discussed. The narrative scenario is an essential disaster planning application that facilitates the communication of risk, and for interactive tabletop</p>	





	exercises and training.															
4	<p>The Pasig City Disaster Risk Geo-Spatial (DRGS) database is compilation of the reference geo-spatial datasets. The DRGS Database contains the following data sets. The development of a GIS database is an integral part in the Geographic Information System (GIS) component for Disaster Risk Reduction and Management (DRRM).</p> <table border="1"><thead><tr><th>Data Categories</th><th>Description</th></tr></thead><tbody><tr><td>Reference data</td><td>Contains barangay boundaries, elevation models, and true color aerial photography</td></tr><tr><td>Natural environment</td><td>Contains physical data sets, including hydrography, geology, and topography</td></tr><tr><td>Built environment</td><td>Physical infrastructures and land use data</td></tr><tr><td>Emergency support</td><td>Critical facilities, potential evacuation centers, and open spaces</td></tr><tr><td>Socio-demographic</td><td>Spreadsheets of population, health, and crime data</td></tr><tr><td>Hazards, vulnerability, and risk assessment (HVRA)</td><td>Earthquake related hazards and risk, and flood susceptibility map.</td></tr></tbody></table>	Data Categories	Description	Reference data	Contains barangay boundaries, elevation models, and true color aerial photography	Natural environment	Contains physical data sets, including hydrography, geology, and topography	Built environment	Physical infrastructures and land use data	Emergency support	Critical facilities, potential evacuation centers, and open spaces	Socio-demographic	Spreadsheets of population, health, and crime data	Hazards, vulnerability, and risk assessment (HVRA)	Earthquake related hazards and risk, and flood susceptibility map.	
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Pasig City Disaster Risk Reduction and Management Plan

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Acronyms

BAO	Barangay Affairs Office
BCEO	Batas Ciudad Enforcement Office
BDRRMC	Barangay DRRM Committees
BERT	Barangay Emergency Response Teams
BFP	Bureau of Fire Protection
C3	Command Control and Communication
CCC	Climate Change Commission
CCS	Construction Code and Standards
CENRO	City Environmental and Natural Resources Office
CPDO	City Planning and Development Office
CSO	Civil Society Organizations
DepEd	Department of Education
DILG	Department of Interior and Local Government
DPWH	Department of Public Works and Highways
DRM	Disaster Risk Management
DRRI	Disaster Risk Reduction Indicators
DRRMO	Disaster Risk Reduction and Management Office
EFCOS	Effective Flood Control System
EM	Emergency Management
EMI	Earthquakes and Megacities Initiative
EO	Executive Order
GAD	Gender and Development
GIS	Geographic Information System
HFA	Hyogo Framework for Action
HVRA	Hazard, Vulnerability and Risk Assessment
IC3IS	Control Center Information System
IDNDR	International Decade for Natural Disaster Reduction
IEC	Information, Education and Communication
IRR	Implementing Rules and Regulations
LDRRMC	Local Disaster Risk Reduction and Management Council
LIA	Legal and Institutional Arrangements
LUP	Land Use Planning
MC	Memorandum Circular
MISO	Management Information System
MMDA	Metro Manila Development Authority
MMEIRS	Metro Manila Earthquake Impact Reduction Study





Pasig City Disaster Risk Reduction and Management Plan

MOA	Memorandum of Agreement
NDRRMC	National Disaster Risk Reduction and Management Council
NDRRMP	National Disaster Risk Reduction & Management Plan
NGA	National Government Agency
OCAI	Ortigas Center Associations Inc.
PC-DRRMP	Pasig City Disaster Risk Reduction and Management Plan
PCFB	Pasig City Fire Brigade
PCG	Pasig City Government
PCGH	Pasig City General Hospital
PCSR	Pasig City Search and Rescue
PEU	Pasig Emergency Unit
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PNP	Philippine National Police
RDRRMC	Regional Disaster Risk Reduction Management Council
BDC	Barangay Development Councils
REDAS	Rapid Earthquake Disaster Assessment System
SNAP	Strategic National Action Plan
SWMO	Solid Waste Management Office
SWOC	Strengths, Weaknesses, Opportunities and Challenges
TF	Task Force
TPMO	Traffic Police and Management Office
UDRI	Urban Disaster Risk Indicators
USAR	Urban Search and Rescue
WASAR	Water Search and Rescue





Definition of Terms

Hazard

A dangerous natural phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Vulnerability

The characteristics and circumstances of an exposed asset that make it susceptible to the damaging effects of a hazard. Sometimes also identified with “Fragility” of an asset.

Exposure

The totality of assets (i.e., people, property, infrastructure, cultural heritage, natural and biological systems, services, institutions, or other material elements) present in hazard zones that are thereby subject to potential losses.

Risk

The probability (or likelihood) of any exposed asset to sustain a loss should an event happen.

Capacity

The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.

Critical Infrastructure

The primary physical structures, technical facilities and systems whose disruption, failure or destruction have a serious impact on the functioning of society, the economy or the state within a natural hazard induced disaster context.

Risk Identification & Assessment

A structured analytical process designed to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.

Social Impacts

Consequences of a hazardous event on the physical, economic and psychological well-being of individuals and on the functioning of a community. Features of a social system that help to avoid losses and maintain or recover satisfying living conditions after a shock.





Resilience

The ability of a community, society, institution, or individual to cope and recover from the negative impact of hazardous events.

Vulnerable Population

The segments of the population which exhibit a greater vulnerability due to their socio-economic conditions or health limitations.

High loss facility

High loss facilities are facilities whose failure carries a large potential for loss of life. Typically they include gas stations and other industrial facilities which contain hazardous materials, schools, markets, malls, hotels and high occupancy buildings, hospitals, and assembly halls such as churches, sport arenas, and others.

Critical facility

Critical facilities are facilities needed for emergency response such as hospitals, fire stations, emergency centers, police stations, certain public buildings that house functions needed by the public, data centers, and powerplant.





Table of Contents

About this Document	ii
Contributors	vi
Definition of Terms.....	x
List of Tables	xv
List of Figures.....	xv
BACKGROUND AND EXECUTIVE SUMMARY.....	xvii
Legal and Institutional Context	xvii
Purpose and Objective.....	xix
Scope	xx
Concerned Stakeholders.....	xx
PASIG CITY DISASTER RISK REDUCTION AND MANAGEMENT PLAN	1
1. Introduction.....	1
1.1. Scope and Organization of the PCDRRM Plan	1
1.2. Relationship to Other Plans, Guidelines and Directives	2
a. Earthquake Plan 2011	2
b. Search and Rescue Plan	2
c. Command, Communication and Control Back-up Plan	2
d. Pasig City Flood Plan 2012.....	2
e. Major Disaster Response Action Checklist	2
1.3. Basis and Process for Plan Development.....	2
a. OCD Guidance.....	2
b. National Basis	3
c. The DRRMP Process – Pasig City Resilience to Earthquakes and Floods Project ...	3
1.4. PCDRRM Plan Implementation and Update	4
2. Legal, Institutional and Organizational Arrangements for the PCDRRM Plan...5	5
2.1. National Framework for Disaster Risk Reduction and Management	5
a. Institutional Mechanisms	6
b. Other Pertinent Laws, Regulations and Issuances for DRRM.....	6
c. Coordination during Emergencies	7
2.2. Funding Sources: DILG Memorandum Circular No. 2012-73	7
2.3. Institutional and Organizational DRRM Arrangements in Pasig City.....	8
a. Related PCG Resolutions, Executive Orders and Ordinances	8
b. Pasig City Disaster Risk Reduction and Management Council	8





Pasig City Disaster Risk Reduction and Management Plan

c.	Pasig City Disaster Risk Reduction and Management Office	10
3.	Overview and Profile of Pasig City	11
3.1.	Key Demographic Data.....	11
3.2.	SWOC	14
4.	Pasig City Risk Profile	20
4.1.	Earthquake Hazard, Vulnerability and Risk	20
4.2.	Earthquake Key Results.....	21
a.	City Level.....	21
b.	Barangay Level and Hotspots	26
4.3.	Effects of Aftershocks.....	34
4.4.	Recommendations for Reducing Earthquake Risk	34
4.5.	Flood Hazard, Vulnerability and Risk	35
4.4.	Key Flood Results.....	39
a.	City-level.....	39
b.	Barangay-level and Hotspots	42
4.5.	Recommendations for Flood Risk	45
5.	DRRM Capacity of Pasig City.....	46
5.1.	Organizational Structure	46
5.2.	Human and Material Resource.....	46
5.3.	Facilities: Pasig City Emergency Operations Center (C3)	48
5.4.	Facilities: Rescue Emergency and Disaster (RED) Training Center	49
5.5.	Facilities: Incident Command Post	49
5.6.	Communication (Refer to Pasig City Communication Plan for details).....	49
5.7.	Response Staging Areas, Camps, and other Facilities	50
5.8.	Back-up Power Generation	50
5.9.	Public Health.....	51
5.10.	Public Safety	51
5.11.	Responding to Hazardous Materials	51
5.12.	Training and Drills	51
5.13.	Warnings and Alerts	52
5.14.	Existing Emergency Response Mechanisms	53
6.	Pasig City DRRM Plan Elements.....	55
6.1.	Vision	55
6.2.	Key Sectoral Elements of the Plan.....	55
a.	Pasig City Risk Atlas and Profile.....	55
b.	Legal and Institutional Arrangements on DRRM	55





Pasig City Disaster Risk Reduction and Management Plan

LIA Recommendations	56
c. Emergency and Management and Disaster Response	57
d. Information, Education and Communication.....	59
IEC Recommendation.....	60
f. GIS, Data Sharing and Management	60
GIS Key Results	61
GIS Recommendations	61
g. Land Use Planning and Construction Code and Standards	64
LUP-CCS Recommendations	68
h. Training and Competency Building.....	71
Training and Capacity Building Recommendations.....	72
7. Other Relevant Elements	86
7.1. Disaster Prevention and Mitigation	86
7.2. Disaster Preparedness	90
7.3. Disaster Response	95
7.4. Rehabilitation and Recovery.....	98
8. Plan Implementation, Monitoring and Evaluation	102
a. Indicators.....	102
Megacity Indicator System for Pasig.....	102
UDRI Key Results	102
b. Implementation Plan	118
c. Implementation Process	119
d. Monitoring and Evaluation	120
9. References.....	173
Annexes	175
Annex A: Twenty-Six (26) functions of the LDRRMO as Specified by RA10121.....	175
Annex B: Key Activities Conducted in the Development of the Pasig City Resilience to Earthquakes and Floods Project	177
Annex C: Various emergencies and incidents related to DRR-CCA since 2008 to 2016	





List of Tables

Table 1. SWOC Matrix	14
Table 2. Important Facilities, Buildings, Population, and Road Affected by Moderate, High and Very High Severity Earthquake Shaking	27
Table 3. Hotspot Barangays.....	28
Table 4 Flood Hazard Susceptibility Classification based on Inundation Depth (Modified from Flood Fighting Act, Japan 2001 (Source: JICA, 2010).....	36
Table 5. Summary of GIS Recommendations	62
Table 6. Gaps and Strategies for Land Use and Urban Planning.....	64
Table 7. Gaps and Strategies for Processing Development Permits	66
Table 8. Trainings Conducted by EMI for PCG	71
Table 9. Trainings Conducted by PCG	72
Table 10. Monitoring and Evaluation	159
Table 11. DRRI Results	171

List of Figures

Figure 1: National Disaster Risk Reduction and Management Framework	5
Figure 2. Organizational Structure of Pasig City Disaster Risk Reduction and Management Council.....	9
Figure 3. Organizational Structure of the Pasig City Disaster Risk Reduction and Management Office	10
Figure 4. Percent Distribution of Population in Pasig	11
Figure 5. Age Sex Pyramid.....	11
Figure 6. Marital Status of the Population	12
Figure 7.Fault Zone Map	21
Figure 8. Ground Shaking Hazard Map	22
Figure 9. Damage Distribution Map	23
Figure 10. Fire Following Map	24
Figure 11. Combined Risk Map.....	25
Figure 12. Ranking of Barangays in Pasig based on Earthquake Impact	26
Figure 13. Brgy. Rosario Ground Shaking Map	29
Figure 14. Brgy. Maybunga Ground Shaking Map	30
Figure 15. Brgy. Manggahan Ground Shaking Hazard	31
Figure 16. Brgy. Pinagbuhanan Ground Shaking Map.....	32





Pasig City Disaster Risk Reduction and Management Plan

Figure 17. Brgy. Santolan Ground Shaking Hazard Map	33
Figure 18. Flood Susceptibility Map	37
Figure 19. Ondoy Flood Depths Map	38
Figure 20. Low-Rise Residential Buildings and Flood Susceptibility Map	40
Figure 21. Ranking of the top 7 Barangays by flood impact on buildings with high loss potential.....	41
Figure 22 Hot Spot Ranking of Barangays in Pasig. Barangays with the highest score have the highest flood impacts. The length of each bar is proportional to the impact of the respective indicator for that Barangay.	43
Figure 23. Organizational Chart of Pasig City Task Force USAR	53
Figure 24: Comprehensive emergency management and a few examples during each phase where GIS plays a role	61
Figure 25. UDRI ranking for Barangays in Pasig with respect to earthquake impact scenario (left) and flood susceptibility (right).....	103
Figure 26. Combined (earthquake and flood) UDRI rankings for all Barangays in Pasig. Physical Risk (Red) and Impact Factor (Green)	104
Figure 27. Shaking Severity Distribution in Pasig (represented in terms of peak ground acceleration or PGA) (source: MMEIRS Study)	105
Figure 28. Flood Susceptibility Map in Pasig (represented in terms of very low to high flood susceptibility based on repeat of 2009 Ondoy floods and the flood hazard scenarios from the Master Plan for Flood Management in Metro Manila and Surrounding Areas from the World Bank, courtesy of DPWH.	106
Figure 29.Ranking of Barangays in Pasig based on Earthquake Impact.	107
Figure 30. Ranking of Barangays in Pasig based on Flood Impact	108
Figure 31. Ranking of Earthquake Impact on Critical Facilities (Left) and High Loss Potential Facilities (Right)	109
Figure 32. Ranking of Flood Impact on Critical Facilities (Left) and High Loss Potential Facilities (Right)	110
Figure 33. Sensitivity Graph showing changes in rankings of Barnagays based on different weight assignment to the “Population Affected” indicator for earthquakes (left) and flood (right) hazard.....	110
Figure 34. Ranking of the Social Fragility Index (Left) and (lack of) Coping capacity Index (Right)	111
Figure 35. Ranking of Impact Factor for all Pasig Barangays.....	112
Figure 36. Ranking of Barangays with respect to ‘Vulnerable Population’ composite index	114
Figure 37. Ranking of Pasig Barangays with Respect to Development Level Score	117
Figure 38. Aims, strategic goals and key areas for mainstreaming of the DRR Indicators...169	169
Figure 39. Disaster Risk Resiliency Indicator	169





PASIG CITY DISASTER RISK REDUCTION AND MANAGEMENT PLAN

BACKGROUND AND EXECUTIVE SUMMARY

Legal and Institutional Context

Disaster risk reduction awareness campaign has become a priority since the declaration of the International Decade for Natural Disaster Reduction (1990-1999). The need for integrated effort in disaster risk reduction requires a shared understanding and commitment by all stakeholders particularly policy & decision makers, business and community leaders.

The UN Economic and Social Council's Resolution Number 63/1999 calls for world governments to formulate and implement a National Action Plan for Disaster Risk Reduction to support and ensure the attainment of the objectives and targets of sustainable development. As a country invested in disaster-prone areas, in 2010 the Philippines issued the country's Strategic National Action Plan 2009-2019 or SNAP to respond to such a call.

Similarly, the Hyogo Framework for Action 2005-2015 and the SENDAI Framework, an agreement among 168 countries including the Philippines, urges all countries to prepare an integrated disaster risk reduction mechanism that is supported by a proper institutional basis and adequate resources. Identify, assess and monitor disaster risks and enhance early warning, reduce the underlying risks factors, and strengthen disaster preparedness for effective response is among the recommended actions. These issues have become a priority in our country especially after the onslaught of Typhoon Ondoy in 2009 and most recently Habagat in 2012.

The adoption of Republic Act 10121 or Disaster Risk Reduction Management Act of 2010 provided a new impetus for pro-active disaster risk management and reduction mandate for the country in which the role and responsibility of local government is prominent. The development of the resulting National Disaster Risk Reduction & Management Plan (NDRRMP) involved a process that engaged national, regional, provincial, city/municipality and barangay stakeholders' form of government, civil society and the private sector. The participatory approach was employed because DRRM Act calls for an integrated plan that includes physical, social, economic and environmental aspects. The SNAP and NDRRMP were developed within the context of regional and international disaster risk reduction plans. The community occupies a crucial position in NDRRMP, SNAP and DRRM Act, given that it is a subject, object and main target of disaster risk reduction efforts.





Pasig City Disaster Risk Reduction and Management Plan

The Pasig City Disaster Risk Reduction and Management Plan (PCDRRMP) find its principles, foundations, and structure from the above referenced acts, standards, and guides. It intends to support Pasig City Government fulfill its legal obligations while at the same time providing a clear road map on actions and decisions to reach the DRRM objectives set up by the country in the specific context and parameters of Pasig City. Based on scientific knowledge and collective experience, the PC DRRM Plan provides a city-wide analysis of the risks and capacities for balanced and effective DRRM investments and decisions. The government is expected to provide accessibility of facilities and infrastructure as well as adequate resources to implement the Pasig City DRRM Plan. Enhanced access to all formal and informal information sources will allow for direct involvement of the community and the private sector in disaster risk reduction.

In sustaining and enhancing local and community capacity, disaster risk reduction efforts as much as possible will use and empower local resources. This includes financial resources, trainings and seminars, equipment, technology, natural resources, skills and economic and social processes.

Having SNAP and NDRRMP and the Sendai Framework as guide for the City's DRRM Plan, the effective implementation of such Plan still requires the involvement of the city, provincial, national as well as international actors. Collaboration and cooperation among different stakeholders in disaster risk reduction is crucial as disasters extend beyond administrative and territorial boundaries. City, provincial, national and international cooperation is therefore one form of cross-jurisdictional disaster risk reduction that demonstrates mankind's solidarity and togetherness.

City DRRM Plan is a component of the Pasig City Local Development Plan which is considered as an effective means in ensuring that risk-sensitive local development objectives are attained. Considering the high exposure of Pasig City to natural and man-made hazards, success in local development will be very much dependent on success in disaster risk reduction. It would only be sensible if the local short, medium and long-term development plans address and integrate disaster risk reduction considerations.

City DRRM Plan also reflects a paradigm shift in disaster management in Pasig City. There are three important aspects to this paradigm shift:

1. Instead of focusing merely on post-event emergency response, disaster management now represents all aspects of risk management (prevention, mitigation, preparedness; response and recovery)
2. Protection against disaster threats must be provided for by the government not out of obligation but for the fulfillment of the basic human rights of the people;
3. Responsibility for disaster management lies no longer with the government alone, but a shared responsibility of all elements of the society.





Bearing in mind that DRRM is the responsibility of all, and that safety of the people from any disasters is a priority, Pasig City pursued a participatory process in the development of the City DRRM Plan, by engaging the government, the civil society, non-government organizations (NGOs), the private sector, international organizations and other stakeholders concerned with disaster management.

Pasig City DRRM Plan will first of all illustrate disaster context in Pasig City including factors contributing to disaster; international and national platforms of the action plan; and priorities, efforts and action plans for local disaster risk reduction.

Purpose and Objective

The purpose of the Pasig City DRRM plan is to provide the necessary and required elements to understand, communicate, and manage the various hazards and risks faced by the city by optimizing its existing capacities to reduce risks and protect its assets and communities. The Pasig City DRRM Plan will inform policy and decision makers to optimize investments in DRRM and to guarantee commitments to integrated Disaster Risk Reduction priority programs.

The specific objectives include:

- a.) Identification of hazards, vulnerabilities, risks and capacities;
- b.) Assessment of the local capacity to manage risk and reduce vulnerability at the local level (i.e., barangay and community);
- c.) Application of a gender-responsive DRRM and climate change adaptation (CCA) approaches and strategies in managing said hazards and risks;
- d.) Identification and clarification of department roles, responsibilities and line of authority at all government offices;
- e.) Vertical and horizontal coordination of DRRM/CCA in the pre-disaster and post-disaster phases; and,
- f.) Evaluation and monitoring tools to benchmark and measure progress.

It lends the document a regulatory authority in maintaining the activities within the right direction, integrated and sustainable.





Scope

City DRRM Plan is a document specifying policies, platforms, priorities, action plans and mechanisms pertaining to the implementation and institutional basis of disaster management in Pasig City. It describes interests and responsibilities of all stakeholders develop under the concepts, mandates and principles of the NDRRMP, SNAP, DRRM Act 2010, the Hyogo Framework for Action and Sendai Framework.

Concerned Stakeholders

The DRMM Plan's primary concerned stakeholders are the members of the DRRM council under the leadership of the City Mayor. It also concerns all City Departments under their respective department's heads and the supervisors and staff, barangay leadership and senior staff and officials, ancillary and auxiliary agencies including all service providers and utility companies, national and provincial agencies involved in preparedness and response as well as in public safety, and representatives of civil society, private sector, media, international partners, and other communities and organizations which provide their knowledge, support, services for the general good. The DRRM Plan is a public document developed to support the city's and the nation's effort to plan, reduce, respond and recover from the occurrence of hazardous events. Organizations and institutions are encouraged to study the plan and be familiar with its provisions as well as use the plan to develop their own DRRM plan and agenda in support for the welfare and well-being of all citizens of Pasig.





PASIG CITY DISASTER RISK REDUCTION AND MANAGEMENT PLAN

1. Introduction

1.1. Scope and Organization of the PCDRRM Plan

Pasig City DRRM Plan is a document specifying policies, platforms, priorities, action plans and mechanisms pertaining to the implementation and institutional basis of disaster management in Pasig City. It describes interests and responsibilities of all stakeholders develop under the concepts, mandates and principles of the NDRRMP, SNAP, DRRM Act 2010, the Hyogo and Sendai Framework for Action.

The document is composed of 6 Chapters:

Chapter 1 is an overview of the plan, purpose and objectives, scope, basis and process for plan development.

Chapter 2 discusses the Legal and Institutional Arrangements for the PCDRRMP particularly the legal basis for adopting the plan at both national and local levels.

Chapter 3 provides an Overview and Profile of Pasig City consisting of key demographic data and SWOC matrix formulated by the PCDRRM council.

Chapter 4 presents the risk profile of the city which focuses on hazards, vulnerability and risk.

Chapter 5 describes the existing capacity of the city in terms of disaster preparedness and response.

Chapter 6 highlights the sectoral elements of the Plan and provides key information, findings and recommendations. These elements include:

1. Pasig City Risk Atlas and Profile
2. Emergency Management
3. Information, Education and Communication
4. Geographic Information System, data sharing and management
5. Land Use Planning and Construction Code and Standards
6. Training and Competency Building
7. DRM tool kit
8. Urban Disaster Risk Reduction Indicators.





1.2. Relationship to Other Plans, Guidelines and Directives

The Pasig City DRRM Plan is complemented by several other plans, guidelines and directives, which should together be considered as elements of the Plan

a. Earthquake Plan 2016-2021

The Earthquake Plan contains planning assumptions, concept of operations under various situation assessments, and departmental roles and responsibilities. This plan is intended to serve as the base document for the eventual development of all-hazards Pasig City Emergency Operations Plan (EOP).

b. Search and Rescue Plan

The content of the Search and Rescue Plan is derived from the Earthquake Plan with emphasis only on the role of Pasig City Search and Rescue.

c. Command, Communication and Control Back-up Plan

This plan is a work in progress. C3 has an existing set of standard procedures for handling exchanges of communications and equipment. The finalized document will have significance in the formulation of a unified communications plan of offices involved in emergency response for Pasig City.

d. Pasig City Flood Plan 2016-2021

The flood plan includes concept of operations under different circumstances as well as departmental roles and responsibilities given the alert warning and levels. Similarly, it is intended to serve as a reference document for the city's EOP.

e. Major Disaster Response Action Checklist

Information on agency roles is found in the Major Disaster Response Action Checklist. The document as indicated by its name is a mere checklist of possible and expected actions from the Pasig City Government Departments, the Philippine National Police and the Bureau of Fire Protection offices of Pasig City.

1.3. Basis and Process for Plan Development

a. OCD Guidance

The plan follows general guidance and an instruction provided by the Office of Civil Defense (OCD), but adds other relevant data and context specific to Pasig City. The OCD also facilitated a 5-day workshop at Zambales for drafting the Pasig DRRMP together with the PCDRRMC members. The workshop outputs such as SWOC and Monitoring and Evaluation were incorporated in the plan (See Chapter 3.2 and 8). The OCD facilitated the 3 day workshop revisit of the DRRMP at Marco Polo Ortigas.





b. National Basis

The NDRRMP, adopted and approved by the NDRRMC on December 2011, serves as a reference for the development of the local DRRM plans (LDRRMP) by the local government units. Mandated by RA 10121, the LDRRMP will guide the DRRM implementation at the local level. (Refer to Section 2 on Legal and Institutional Arrangements for a complete discussion on this topic.)

c. The DRRMP Process – Pasig City Resilience to Earthquakes and Floods Project

The Pasig City Resilience to Earthquakes and Floods Project undertaken as a partnership between Pasig City Government and EMI (Earthquakes and Megacities Initiative) provides several components and elements of the Pasig City DRRM Plan. The project focuses on earthquake and flood risks with in-depth analysis of impacts on population, housing and shelter, infrastructure, important and critical facilities for each of the 30 barangays of the city identifying hotspot barangays where the needs for preparedness and mitigation are the greatest. The Pasig City Resilience to Earthquakes and Floods project is a benchmark study for the Pasig City Government where scientific information is used together with national and international standards to establish an assessment of the current DRRM practice, identify the gaps, and provide a set of recommendations to improve resilience and reduce risk to the city. The findings and recommendations were validated with the key stakeholders including many of the key city government departments and agencies.

The project generated significant amount of consolidated hazard, vulnerability, risk and capacity data, as well as in depth understanding of the arrangements, plans, and experiences of the city to manage and prepare for disasters. The project is anchored on scientific understanding, data, and evidence to provide sound bases, processes and recommendations for the DRRM Plan. In particular the project covered the following areas:

- Data Collection and Geographic Information System
- Hazards, Vulnerability and Risk Assessment (HVRA) related to flood and earthquake hazards and identification of risk by barangay and hotspots
- Land Use Planning & Construction and Code and Standards (LUP-CCS)
- Legal and Institutional Arrangements (LIA)
- Emergency Management (EM), and
- Information, Education and Communication (IEC).

The project provided an integrated geospatial database for real-time access to comprehensive and accurate information on exposure, hazards and risks, with full integration is a GIS system that enables spatial views and mapping any area of interest. The data is organized by barangay so that each barangay can develop its own relevant information. It produced a City Risk Profile and Atlas as a single reference relating vital





city data (e.g., demography, geography, buildings, infrastructure, critical facilities, and others) to hazards and risks for each barangay and for the city as a whole. It produced a City DRRM tool kit as a single catalogue of all information related to DRRM in the city to facilitate sharing of information, enacting policy, and facilitating decision-making. The project suggested a re-alignment of the emergency management and response system of the city along international standards and equipped key stakeholders and DRRM focus group members of Pasig City with the competency and skills to support implementation of the suggested re-alignment. It also provided an analysis of the legal and institutional arrangements related to DRRM in the city and their relationship to the higher level governmental institutions. Further, the project included a review of the city's comprehensive land use plan for risk sensitivity and a review of the process of building code implementation. Twelve field investigations and several technical orientations, workshops, and trainings were conducted for focus group members over the course of the project to build the institutional capacity of Pasig City on DRRM.

1.4. PCDRRM Plan Implementation and Update

Pasig City recognizes that a plan remains a plan unless there is willingness, mobilization of resources, and engagement to implement it. Pasig City has put in place significant resources and an organization to improve its capabilities for preparing and responding to disasters. There is a high level of awareness and a strong political will from the City's leadership to put the best knowledge and commit resources to reduce the risk to the City. Nonetheless, disaster risk reduction is a long term process that requires sustained action, constant engagement and a high level of participation from all stakeholders. The Pasig City DRRM Plan provides a uniform vision for coordinated action to ensure optimization of resources and effective action. It contains key recommendations to improve readiness, reduce risk and build resiliency. However, there should be discipline in the implementation of the plan. The plan should be regularly updated as soon as new information is available. It should remain a living document to be constantly improved. The PCDRRM Plan should be reviewed and updated at least once every two years or whenever relevant new information is available.

Indicators are provided at the end of the plan to provide a benchmark on the state of disaster risk reduction and management practice in the City. The indicators provide a rational and coherent way to measure progress. They also represent a tool for risk communication and for engagement of the stakeholders. Workshops should be organized once a year to go over the indicators and review the benchmarks and monitor progress.





2. Legal, Institutional and Organizational Arrangements for the PCDRRM Plan

The Legal and Institutional Arrangements (LIA) report completed as part of the Pasig City Resilient to Earthquake and Flood Project provides a complete analysis of this topic as regards to Pasig City Government DRRM arrangements in the context of national laws and regulations as well as international standards.² The main summary is presented below. The reader is referred to this particular report for a complete discussion on LIA.

2.1. National Framework for Disaster Risk Reduction and Management

The Pasig City DRRM Plan is anchored on the vision and legal provision of **Republic Act No. 10121 (RA 10121)**, otherwise known as the National Disaster Risk Reduction and Management Act of 2010, which was enacted on May 27, 2010. The change of focus came from the United Nations Hyogo Framework of Action (HFA) to which the Philippines is a signatory. The major goal of RA10121 and HFA is to shift the paradigm from disaster relief and response to disaster risk reduction and preparedness.

The Pasig City DRRM Plan is further anchored on the **National DRRM framework** depicted in Figure 1 which indicates the paradigm shift towards a proactive and preventive approach to disaster management. This conceptual representation emphasizes that resources invested in disaster prevention, mitigation, preparedness and climate change adaptation will be more effective towards attaining the goal of adaptive, disaster resilient communities and sustainable development. It also highlights the need for effective and coordinated humanitarian assistance and disaster response to save lives and protect the more vulnerable groups during and immediately after a disaster. Further, building back better after a disaster will lead to sustainable development after the recovery and reconstruction process.

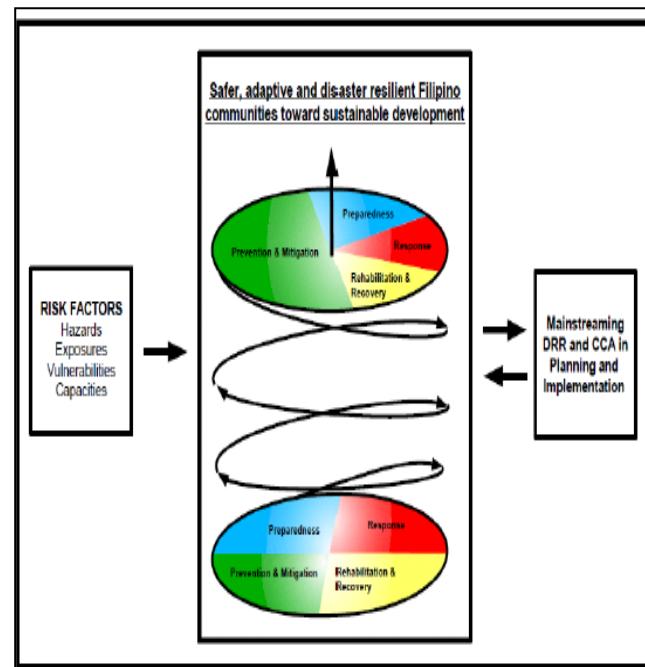


Figure 1: National Disaster Risk Reduction and Management Framework

² Legal and Institutional Arrangements Report, Earthquakes and Megacities Initiative (EMI), September 2012





a. Institutional Mechanisms

RA 10121 clearly defined the organizational structure of the DRRM System in the Philippines from the national down to the local government units and communities.³

- National Disaster Risk Reduction and Management Council (NDRRMC)

The National Disaster Risk Reduction and Management Council (NDRRMC) serves mainly as an oversight body in the promotion of DRRM at the national level; and hence, it reports directly to the President of the Philippines.

- Regional Disaster Risk Reduction Management Council

At the regional level, the Regional Disaster Risk Reduction Management Council (RDRRMC) is in charge of the coordination of DRRM activities and policy. Note that in the case of Metro Manila, it is the Metro Manila Development Authority (MMDA) Chairman that heads the Metro Manila DRRM Council unlike in other regions where the Chair is the OCD Regional Director.

- Local Disaster Risk Reduction and Management Council (LDRRMC)

At the province, city, and municipal levels, the Local Disaster Risk Reduction and Management Council (LDRRMC), under the chairmanship of the Local Chief Executive takes on the responsibility for coordination of DRRM policy and activities.

Section 12.d of RA 10121 states that at the barangay level, the functions of the former Barangay Disaster Coordinating Councils shall now be transferred to the Barangay Development Councils (BDC). Under the BDC, the Barangay DRRM Committees (BDRRMCs) are to be established (Sec 12.a) with at least two members representing civil society organizations (CSOs).

Section 4 of RA 10121 enumerates twenty-six (26) functions of the LDRRMO. These are reproduced in Annex A of this Plan.

b. Other Pertinent Laws, Regulations and Issuances for DRRM

These include:

- Republic Act No. 9729, or the Climate Change Act of 2009.⁴ The Climate Change Act, passed on 27 July 2009, mandates the LGUs as the front line agencies in the planning and implementation of Climate Change (CC) action plans in their respective areas, consistent with the provisions of the LGC, the National CC Framework, and the

³ The full text of Republic Act No. 10121 and its Implementing Rules and Regulations can be found in the website of the National Disaster Risk Reduction and Management Council (www.ndrrmc.gov.ph/attachments/045_RA%2010121.pdf and www.ndrrmc.gov.ph/attachments/095_IRR.pdf).

⁴ The full text of Republic Act No. 9729 can be found in this link:

http://www.lawphil.net/statutes/repacts/ra2009/ra_9729_2009.html and its Implementing Rules and Regulations in this link: <http://www.scribd.com/doc/38617291/Philippine-Climate-Change-Act-RA-9729>.





Pasig City Disaster Risk Reduction and Management Plan

National Climate Action Plan. This Act also provides for the legal basis for the creation of the Philippine Climate Change Commission, who shall be in-charge with the preparation of the National CC Framework and Climate Action Plan. It shall be the responsibility of the Commission to extend technical assistance to LGUs for the accomplishment of their Local Climate Change Action Plans.

- Other relevant laws prior to the passage of the abovementioned legislations and aside from basic law of the land, the Philippine Constitution of 1987, are Republic Act No. 7160 (Local Government Code of 1991), land use-related laws, orders and issuances such as Republic Act No. 7279 (Urban and Development Housing Act), Executive Order No. 72 (Preparation and Implementation of the Comprehensive Land Use Plan), Executive Order No. 648 (Promulgation of Zoning and Other Land use Control Standards and Guidelines). Refer to Annex 3 of the Legal and Institutional Framework Report for an overview of these legislations with access links to their respective full text.

c. Coordination during Emergencies

During emergencies, it shall be the role of the LDRRMCs to lead in preparing for, responding to, and recovering from the effects of any disaster based on the following criteria:

- The BDC, if a barangay is affected;
- The City/Municipal DRRMC, if two (2) or more barangays are affected;
- The provincial DRRMC, if two (2) or more cities/municipalities are affected;
- The regional DRRMC, if two (2) or more provinces are affected;
- The national DRRMC, if two (2) or more regions are affected.

Supporting the LDRRMCs are the NDRRMC, intermediary LDRRMCs, private sector and civil society groups. The two latter organizations shall work in accordance with the coordination mechanism and policies set by the NDRRMC and concerned LDRRMCs.

2.2. Funding Sources: DILG Memorandum Circular No. 2012-73

Pursuant to RA 10121, the Department of Interior and Local Government Secretary issued Memorandum Circular (MC) No. 2012-73 which provides for the guidelines in the utilization of the Local Disaster Risk Reduction and Management Fund, which shall not be less than five percent (5%) of the estimated revenue from regular sources.

Thirty percent (30%) of the 5% LDRRMF shall be allocated for Quick Response Fund (QRF) or stand-by fund for relief and recovery projects and activities while the remaining seventy percent (70%) shall be the Mitigation Fund (MF) for pre-disaster preparedness activities, post-disaster activities and other related activities including payment of premium on calamity insurance.





2.3. Institutional and Organizational DRRM Arrangements in Pasig City

a. Related PCG Resolutions, Executive Orders and Ordinances

DRRM policy and practice in Pasig City is regulated and organized by several related Resolutions. The most pertinent of these are⁵:

- Resolution No. 2011-02, Resolution endorsing and approving the Pasig City Disaster Risk Reduction and Management Plan as amended and discussed by the members of the City Disaster Risk Reduction and Management Council and Local Development Council with the Pasig City Disaster Risk Reduction and Management Council Office for Calendar Year 2012 and appropriating funds thereof out of the 5% Disaster Risk Reduction and Management Fund in the Annual Budget of Pasig City for CY 2012.
- Resolution No. 242, Series of 2007, Resolution authorizing the Honorable City Mayor to enter into Contract or Memorandum of Agreement (MOA) with any duly licensed individual/person or group for the development, implementation and maintenance of a computerized integrated emergency command and control center information system to be known as Pasig City Command Center.
- Executive Order No. 7, Series of 2011, EO Renaming the Pasig City Disaster Coordinating Council (PCDCC) to Pasig City Disaster Risk Reduction and Management Council (PCDRRMC)
- Ordinance No. 18, Series of 2010, Ordinance Creating the Pasig City Disaster Risk Reduction and Management Office (PCDRRRMO), Defining its function and prescribing personnel complement, salary grade, qualifications and appropriating fund therefor
- Ordinance No. 19, Series of 2006, Ordinance authorizing the use of (20%) of the calamity fund of the City Government for Disaster Preparedness and for other purposes
- Ordinance No. 2, Series of 2015 Ordinance Creating the Pasig City Disaster Risk Reduction and Management Office (PCDRRRMO), Defining its function and prescribing personnel complement, salary grade, qualifications and appropriating fund therefor
- Ordinance no. 08, Series of 2016 Ordinance adopting the Pasig City Earthquake and Flood Contingency Plan for CY 2016-2021, subject to applicable laws, rules and regulations

b. Pasig City Disaster Risk Reduction and Management Council

Pasig City Executive Order No. 07, March 29, 2011, renaming Pasig City Disaster Coordinating Council (PCDCC) as PCDRRMC. Figure 2 shows the Organizational Structure of the Council.

⁵ A more complete list can be found in the DRM-Specific Applications, EMI, September 2012





Pasig City Disaster Risk Reduction and Management Plan

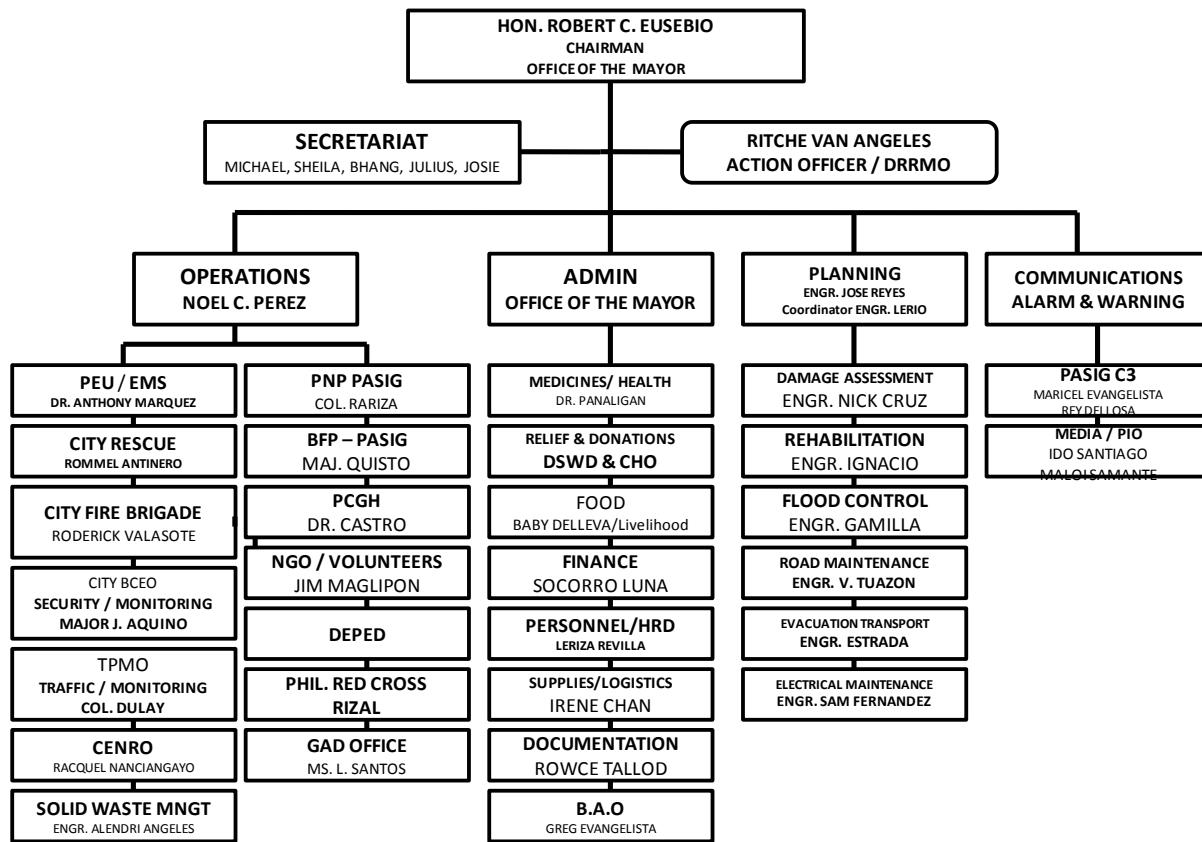


Figure 2. Organizational Structure of Pasig City Disaster Risk Reduction and Management Council





Pasig City Disaster Risk Reduction and Management Plan

c. Pasig City Disaster Risk Reduction and Management Office

Figure 3 below shows the basic organizational structure of the LDRRMO as prescribed by RA 10121.

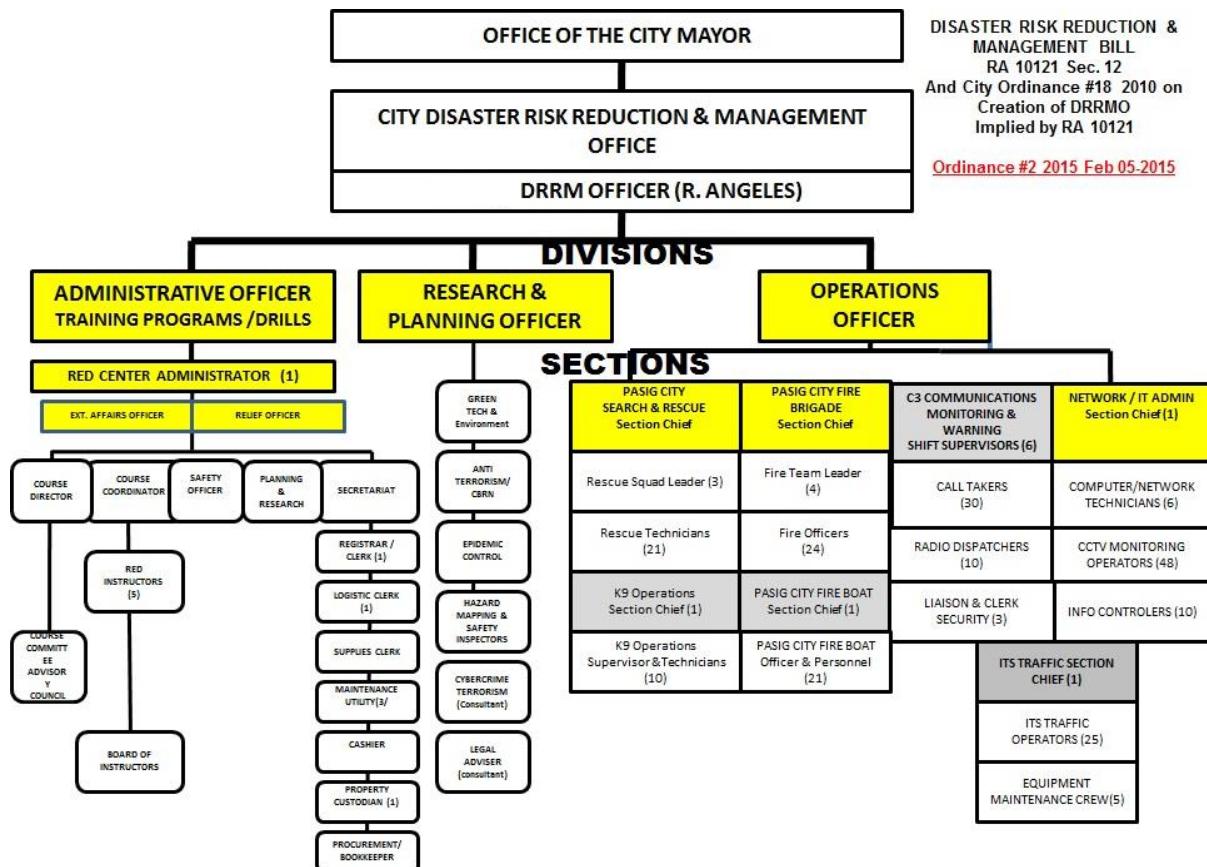


Figure 3. Organizational Structure of the Pasig City Disaster Risk Reduction and Management Office





3. Overview and Profile of Pasig City⁶

This section provides an excerpt of demographic data as well as Strengths, Weaknesses, Opportunities, and Challenges (SWOC) identified by the PCDRRM council members.

3.1. Key Demographic Data

City Population

In 2008, the population of Pasig City totalled 667,331 which accounted for 18% of the population in Metro Manila.⁷ The city's population density was approximately 21,527 persons per square km or 215 persons per hectare. The total number of households was 153,673, based on an average household size of 4.

Figure 4 shows that the most populated barangay was Pinagbuhanan, followed by Manggahan and Rosario, while the least dense barangay was Katipunan, and followed by Sta. Rosa and San Nicolas, respectively.

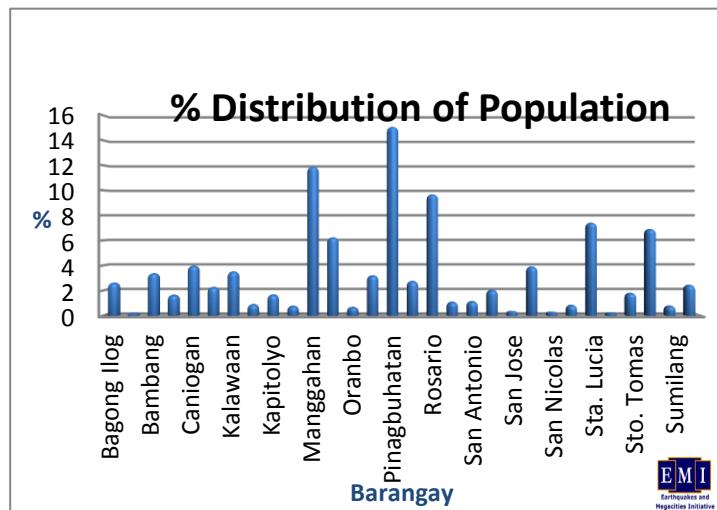


Figure 4. Percent Distribution of Population in Pasig

Economically Active Population and Dependency Levels

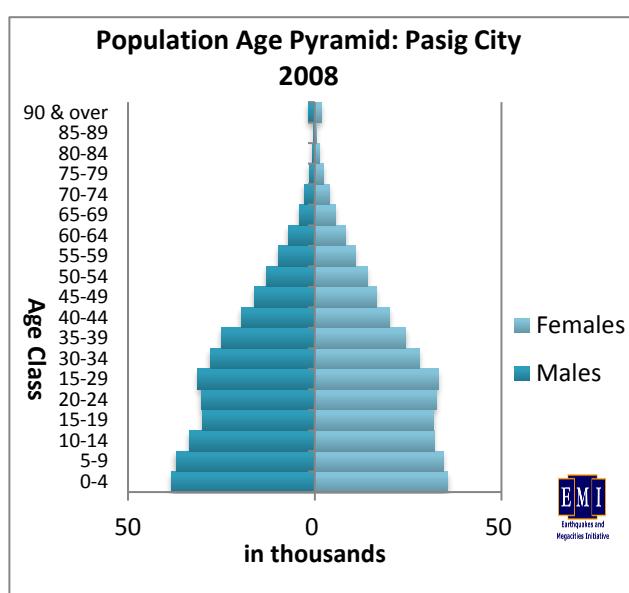


Figure 5. Age Sex Pyramid

Figure 5 indicates that the proportion of young dependents (0 to 14 years) was 49%, while the proportion of old dependents (65 years and over) accounted for 6% of the city population. The proportion of the economically active population (15 to 64 years) to the total number of residents was 45%. The overall dependency ratio in 2008 was 55, meaning that there were about 55 dependents (51 young dependents and four old dependents) for every 100 persons aged 15 to 64 years. The median age was 25 years, signifying that half of Pasig City's population was

⁶ Pasig City Risk Profile and Atlas, EMI, June 14, 2012

⁷ Raymundo, et al, Pasig City Census (PCC) 2008-2009





below 25- 29 years old.

Pasig's population is generally young, with the prevalence of the population in the young age groups, particularly in the bracket for 0-34 years of age. The fact that the groups for 0-4 and 5-9 year of age constitute respectively 11.1% and 10.7% of the population shows the high fertility rate. Senior citizens composed 6.3% of the total population or a total of approximately 41,704 people who were 60 years of age and older, while the population under five years of age was 11.1%, representing the number of children who are the target of early childhood development programs, health programs such as immunization and other related initiatives.

Marital Status and Other Relationship Arrangements

As shown in Figure 6, about 56% of the total population 10 years old and over were single, while 32% were married. The remaining 12% were either widowed separated/ divorced, in live-in arrangements, or with unknown marital status.

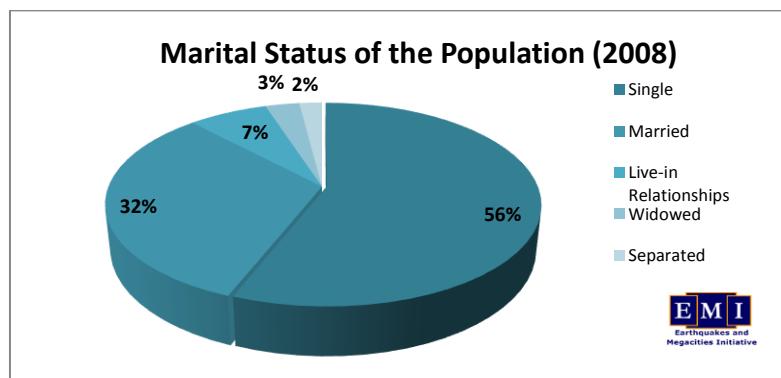


Figure 6. Marital Status of the Population

Sex Ratio

Pasig City had a sex ratio of 97 males for every 100 females, based on the Pasig Census of 2008.

Persons with Disability

Based on 2010-2011 Pasig City Social Welfare and Development data, there were 348 registered Persons with Disability (PWDs) in Pasig City. The highest number of PWDs can be found in Barangay Manggahan and Pinagbuhatan with 49, followed by Brgy. Santolan and Sta. Lucia with 35 and 22 PWDs, respectively.





Pasig City Disaster Risk Reduction and Management Plan





3.2. SWOC

The Strengths, Weaknesses, Opportunities and Challenges (SWOC) matrix below was formulated jointly among the Pasig City Disaster Risk Reduction and Management Council (PCDRRMC) members. The members who provided substantial input include the city department heads/chiefs of office and representatives from NGOs and CSOs.

Table 1. SWOC Matrix

Components	Strengths	Weaknesses	Opportunities	Challenges
Prevention & Mitigation	<p>Internal Analysis:</p> <ol style="list-style-type: none">1. Institutionalized offices, councils, groups for Climate change mitigation and control.2. Implementation of the following PPA's: Non-structural: recycling, waste segregation, smoke belching, tree planting, environment sustainable transport programs, building safety inspection, etc. Structural: engineering works, construction of pumping stations, upgrading of roads, improvement of drainage, canals, creeks, dikes and construction of new revetment wall.3. Identified vulnerable groups and hazard areas.4. Relocation of informal settlers	<ol style="list-style-type: none">1. Some barangay leaders are simply apathetic and insensitive to disaster risk reduction and control.2. To remove the illegal structures on the Buli creek and on the side of the creek .3. Pumping stations are all manual and difficulty in monitoring presence of operators.4. Required structure monitoring required by DPWH is not yet fully implemented and not connected to the City.5. Full implementation of houses or structures on top of the fault line with 5 meters safety from both sides as required by PHIVOLCS.6. Still some schools and government facilities need to	<ol style="list-style-type: none">1. Empowered and capacitated community organized group on disaster preparedness.2. Committed leadership.3. Availability of resources (financial and human).	<ol style="list-style-type: none">1. Encouraged and enhanced community involvement.2. To awaken and stimulate barangay leaders to cooperate and catch up to the city program on disaster preparedness.3. To remove illegal structure along Buli Creek.4. Establish an effective monitoring tools and feedback mechanisms for program implementation.5. Conflicting policies of various agencies on relocation of informal settlers along hazard zones.6. Further Expansion of EWS CCTV monitoring system and PA in other areas not covered by existing facilities.7. Improve the pumping stations





Pasig City Disaster Risk Reduction and Management Plan

Components	Strengths	Weaknesses	Opportunities	Challenges
	<p>along endangered areas.</p> <p>5. Formed an active and operational Pasig City DRRM Plan and barangay DRRM Plan.</p> <p>6. Established networking, partnership and alliance building with multi-sectoral groups.</p> <p>7. Availability of funds.</p> <p>8. Well trained and efficient human resources.</p> <p>9. Regular updating of database information including hazard maps, SEP, CDP, CLUP and other related database.</p> <p>10. A centralized and intelligent traffic management system to complement the existing CCTV system.</p> <p><u>External Analysis:</u></p> <ul style="list-style-type: none">1. Installation of initial technology-based disaster forecasting facilities.2. Committed leadership with strong political will supported by a responsive constituency / community.3. Initiated livelihood and gender sensitive programs relative to poverty alleviation and waste reduction.	enhance its safety features against fire.		<p>capabilities into automated and sensor activated to further improve monitoring and operations.</p> <p>8. Provide sensors or monitoring system in monitoring high rise buildings for earthquake resilience purposes.</p>
Preparedness	<ul style="list-style-type: none">1. Established institutional framework.2. All offices mandated by the City	<ul style="list-style-type: none">1. Conflicting interpretation of policies regarding disbursements and	<ul style="list-style-type: none">1. Empowered and capacitated community organized group on disaster preparedness.	<ul style="list-style-type: none">1. How to disseminate accurate information without generating negative public responses





Pasig City Disaster Risk Reduction and Management Plan

Components	Strengths	Weaknesses	Opportunities	Challenges
	<ul style="list-style-type: none">1. Mayor to participate.3. Different IEC Campaign.4. Strict implementation of ordinances relative to disaster mitigation and emergency response.5. Construction of RED (Rescue and Emergency Disaster Training Center) to house the existing city DRR/CCA/gender sensitive training program.6. Training of professional rescuers on city level and volunteers from the community.7. Availability of sufficient logistics (relief goods, medicines, supplies).	<ul style="list-style-type: none">1. expenditures.2. Some barangay leaders are simply apathetic and insensitive to disaster risk reduction and management.3. "Bahala na/Devil May Care" attitude of Pinoys.4. Garbage disposal system5. Existing RED facility needs to upgrade and be ISO compliant along with International Standards for a Training Facility.6. Back Up systems still need to be expanded for continuity.	<ul style="list-style-type: none">2. Committed leadership.3. Availability of resources (financial and human).	<ul style="list-style-type: none">1. (e.g. West valley fault).2. How to increase awareness on solid waste management, CCA/DRR environment protection.3. How to find and identify acceptable relocation site for informal settlers.4. Modernization of existing response equipment, details and facilities.5. Continuous updating of database.6. To modernize the training facility up to international standards and ISO requirements.7. Further enhance existing IEC materials and ways to improve awareness.8. Improve the safety features or programs of all government facilities and public schools.
Response	<ul style="list-style-type: none">1. Established and functional C3, ICS, Fire and rescue, organized volunteer groups, social workers and medical team.2. Established early warning device for flood and typhoon.3. Organized Pasig City employees disaster taskforce.4. Strong political will.	<ul style="list-style-type: none">1. Lack of adequate hospital facilities and morgues in case of major disaster.2. Availability of facilities for pets and Animals.3. Lack of back-up batteries/UPS during major disaster.	<ul style="list-style-type: none">1. Availability of resources.2. Job opportunities from the private sector.	<ul style="list-style-type: none">1. Prompt and adequate response.2. Continuing modernization of equipment and facilities.3. Expand the siren or PA system up to communities and public schools.4. Use of Internet or Social media and other IT related





Pasig City Disaster Risk Reduction and Management Plan

Components	Strengths	Weaknesses	Opportunities	Challenges
	<ul style="list-style-type: none">5. Availability of funds.6. Program, Projects, Activities.7. Acquired rescue equipment at par with international standards.8. Established a rescue and retrieval contingency plan.9. Established a working evacuation plan.10. Prompt delivery of needs.11. Medical, nutritional teams.12. Psycho-social programs and referral.13. Established an engineering contingency plan.14. Provision of working opportunities while at the evacuation centers.15. Ensure provision for the availability of basic commodities in the public market, price monitoring mechanisms.16. Gender responsive relative to evacuation plan.17. Financial and logistic assistance from different sectors.	<ul style="list-style-type: none">4. Weak in chemical fire and hazmat incident.5. Insufficient number of potable water purifier.6. Insufficient siren alarm system7. Utilities failure8. Limited number of breaching tools or hand tools for collapsed structure scenario to cater more teams or squads in operations.		<ul style="list-style-type: none">products and services.5. Further expand the capabilities of fire, rescue and medical responders.6. Multiple back ups for Command Centers and Communication Facilities.7. Provide specific protocols for responders and barangays.8. Expand the ICs to all responders, barangays, schools and private sectors.
Rehabilitation and Recovery	<ul style="list-style-type: none">1. Sufficient and working garbage and waste disposal system.2. Able and ready workforce .3. Accurate and rapid post disaster needs assessment.4. Identified available relocation sites.5. Availability of livelihood and employment programs e.g.	<ul style="list-style-type: none">1. Lack of proper documentation of a written massive recovery plan.2. Delay in the implementation of the recovery and rehab plan due to COA rules.and guidelines.3. Lack of life and non-life insurance for personnel and	<ul style="list-style-type: none">1. Strong political will.2. Availability of funds.	<ul style="list-style-type: none">1. Strict implementation of approved engineering design for the construction of disaster resilient housing and other infrastructures.2. Encourage participation of financing institution.3. How to convince/entice international financing





Pasig City Disaster Risk Reduction and Management Plan

Components	Strengths	Weaknesses	Opportunities	Challenges
	<p>T.U.P.A.D., Food/Cash for Work.</p> <ul style="list-style-type: none">6. Tax relief/discount.7. Immediate restoration and rehab of damaged public facilities/damaged infrastructure.8. Financial assistance to relocated affected victims.9. Strong tie-ups/relationships with utility companies.10. Rehabilitation programs e.g. Supplemental feeding for affected children/victims.	facilities to support disaster impact.		institutions in building disaster preventive infrastructures and programs like desilting of Pasig-Marikina river and other waterways.





4. Pasig City Risk Profile

Based on the result of the Hazard, Vulnerability and Risk Assessment (HVRA) conducted by EMI from the period January-September 2012, Pasig City is considered to be susceptible to hazards such as earthquake and floods.⁸ Both are detrimental and critical to the lives of the people including infrastructures and other lifelines, having a massive damage potential in terms of casualty and destruction.

The HVRA study was undertaken at the Barangay level to aligned with the city administrative and governance structure. It includes identification of critical information such as the spatial delineation of the earthquake fault trace, earthquake severity zones, flood intensity zones, as well as the locations of critical and high loss facilities relative to these hazard zones. One major outcome of the study is the identification of hotspot barangays where the combined risk elements and the concentration of critical and high low facilities indicate areas of the cities that need utmost attention both in terms of emergency planning, preparedness, and disaster risk reduction investments.

4.1. Earthquake Hazard, Vulnerability and Risk

Based on the MMEIRS Study on earthquake models, Model 08 with a Magnitude of 7.2 on the West Valley Fault is expected to cause the largest impact in the metropolis. The West Valley Fault is one of the faults being monitored by experts that could trigger earthquakes in Metro Manila.

Pasig City is located on the West Valley fault (WVF) system thus making it more highly exposed to earthquakes. It has endured five earthquakes since 1824, the last one was in 1968 with a magnitude of 7.3.

The earthquake risk is driven by two major factors making the Pasig City particularly vulnerable to earthquakes:

- The West Valley Fault directly transacts the city causes severe ground motion but also ground rupturing in the immediate vicinity to the fault trace.
- The presence of soft unconsolidated alluvial deposits from the Marikina River, Pasig River and their tributaries will amplified the earthquake shaking over large areas of the cities. These deposits will also be prone to liquefaction, a phenomenon by which soil loses its bearing capacity from ground shaking, which will further aggravate the damage

⁸ For more details see Hazard, Vulnerability and Risk Assessment Report, EMI, March 14, 2012



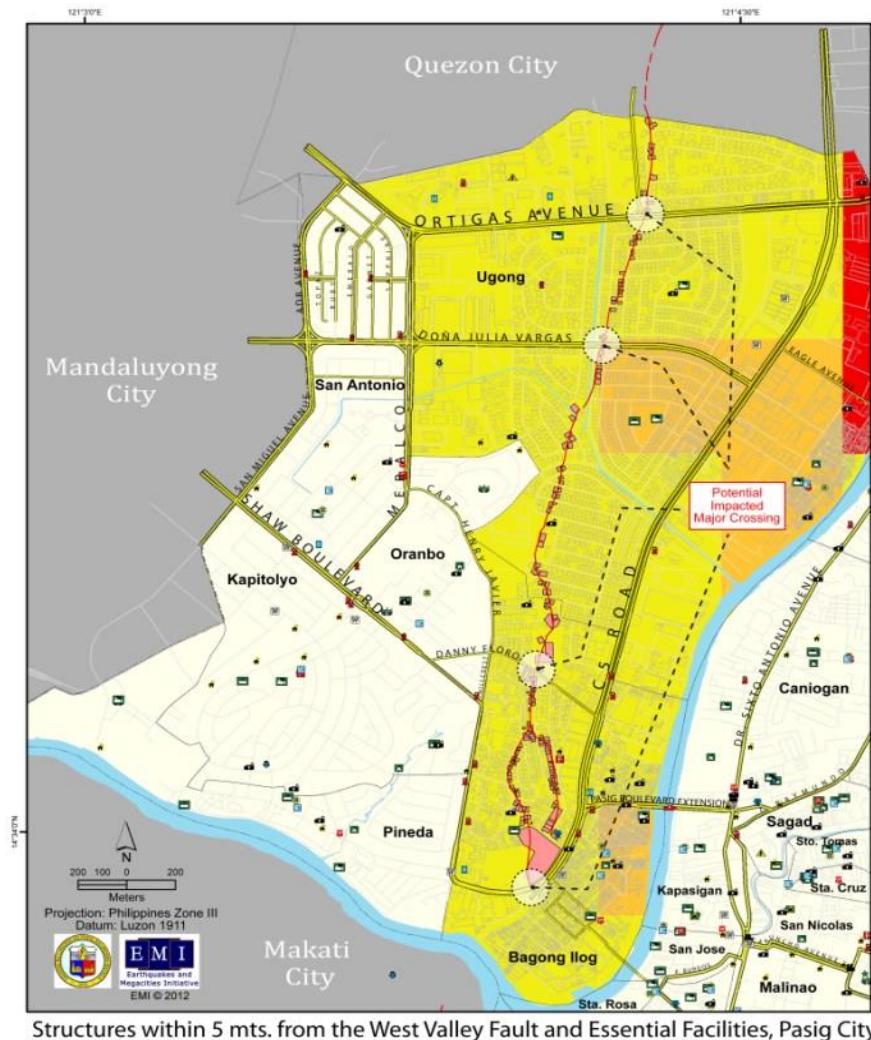


Pasig City Disaster Risk Reduction and Management Plan

4.2. Earthquake Key Results

a. City Level

The fault zone map in Figure 7 below shows that the affected barangays for potential ground rupture are Brgy, Bagong Ilog and Ugong. There are approximately 137 buildings and critical facilities within the 10-meter easement from the WVF. The potential roads that will be affected include Ortigas Avenue, Doña Julia Vargas Avenue, Danny Floro St., and Pasig Boulevard.



Structures within 5 mts. from the West Valley Fault and Essential Facilities, Pasig City
based on Metro Manila Earthquake Impact Reduction Study, Model 8, Magnitude 7.2 West Valley Fault

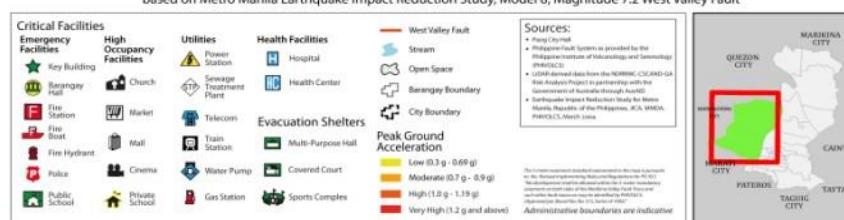


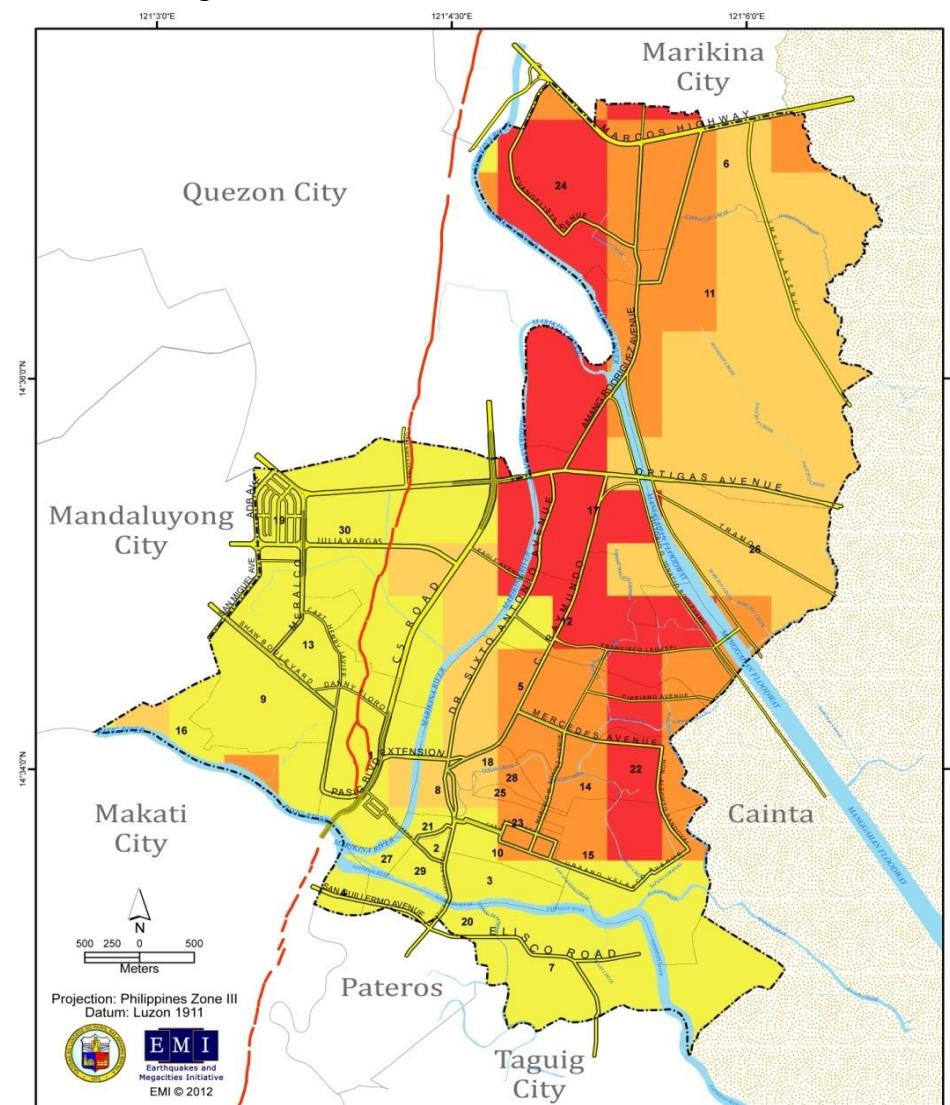
Figure 7.Fault Zone Map





Pasig City Disaster Risk Reduction and Management Plan

The ground shaking hazard map in Figure 8 below depicts the areas of most severe intensity are indicated in dark red – around Northern Marikina River and S-E part of the city. It causes damage to buildings and infrastructure and secondary hazards such as liquefaction, landslide and fire following.



Ground Shaking Hazard, Pasig City

based on Metro Manila Earthquake Impact Reduction Study, Model 8, Magnitude 7.2 West Valley Fault



Figure 8. Ground Shaking Hazard Map





Pasig City Disaster Risk Reduction and Management Plan

Figure 9 below shows that damage in Pasig is mostly concentrated in areas East of the Marikina River where the soil conditions are the poorest. Approximately 40% of the structures in these areas will be heavily damaged.

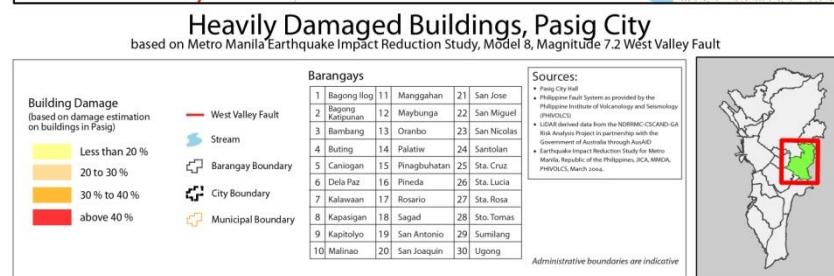
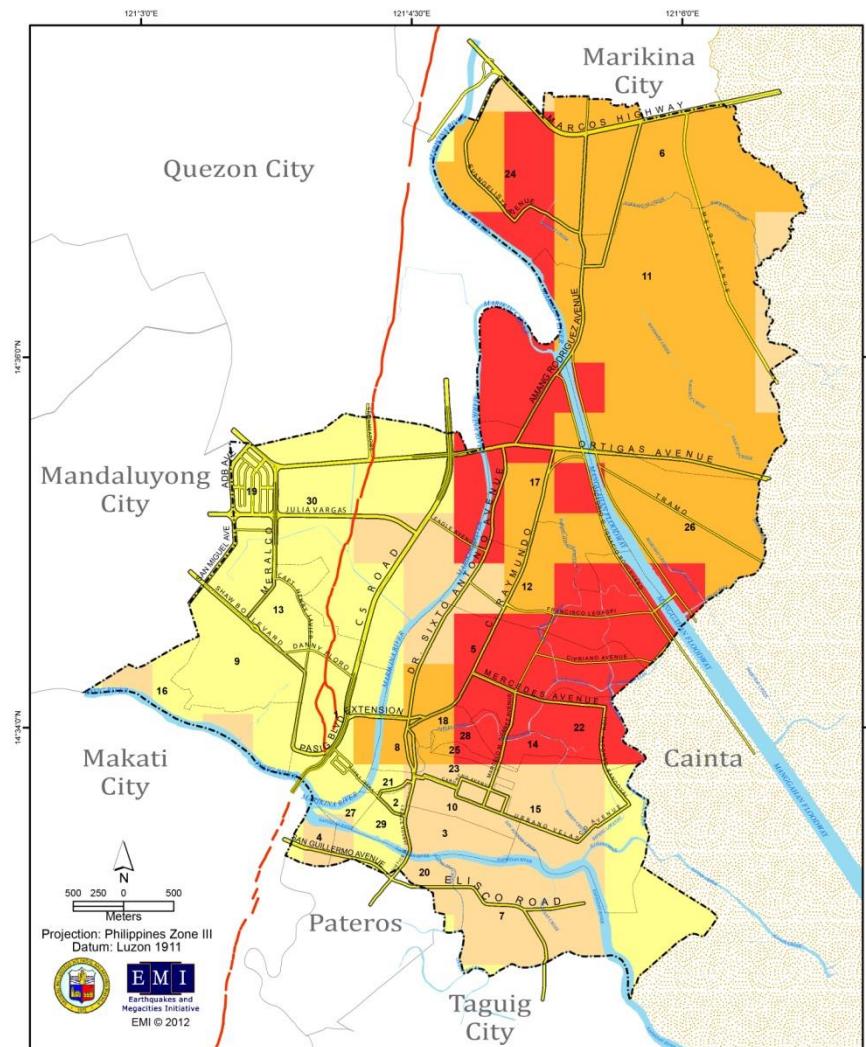


Figure 9. Damage Distribution Map





Pasig City Disaster Risk Reduction and Management Plan

Figure 10 below is based on the MMEIRS analysis of Fire Following which may have high uncertainty and may not be up-to-date. Other areas could also suffer from fire following mostly in informal settlements where houses are made of light materials.

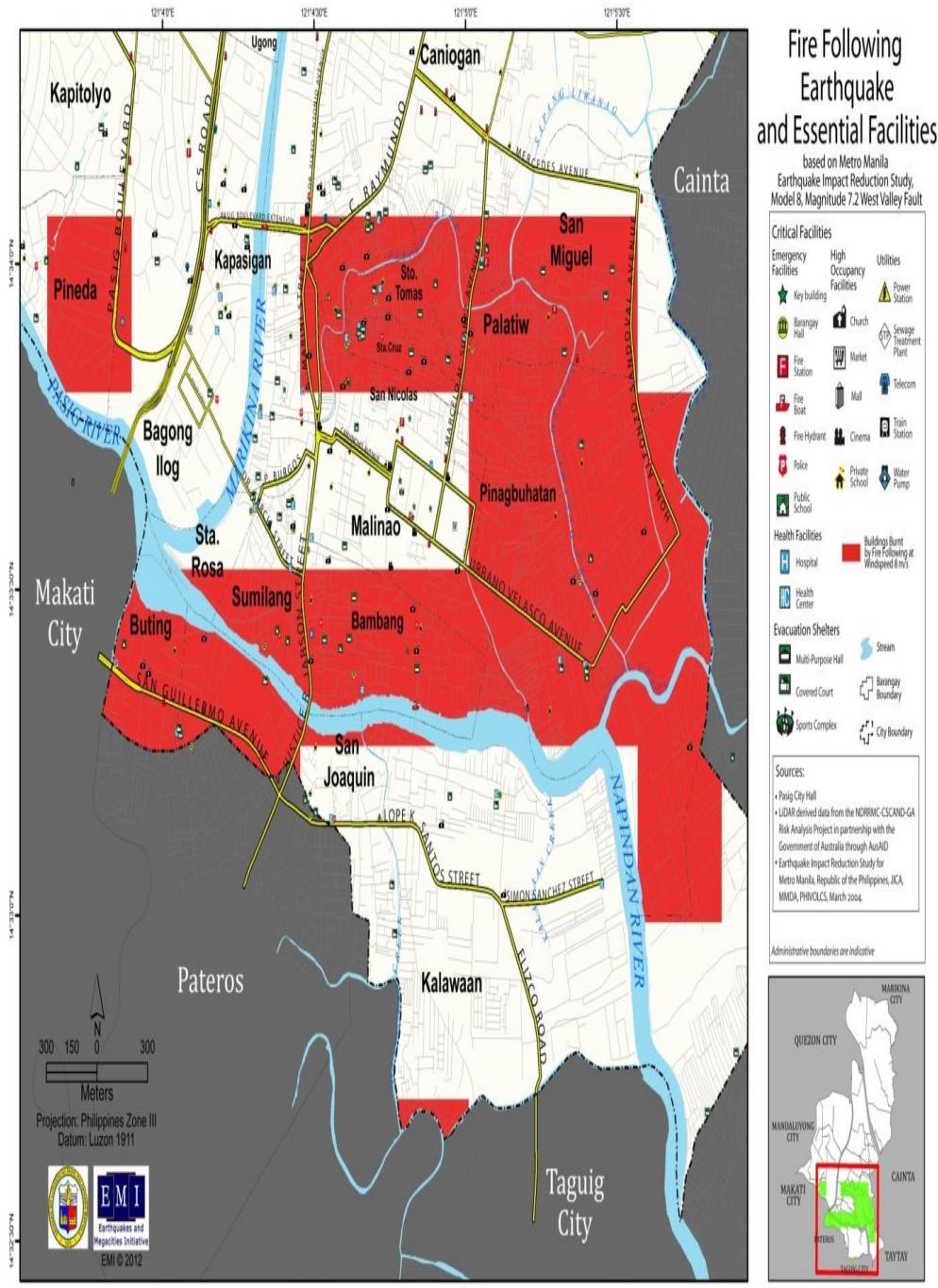


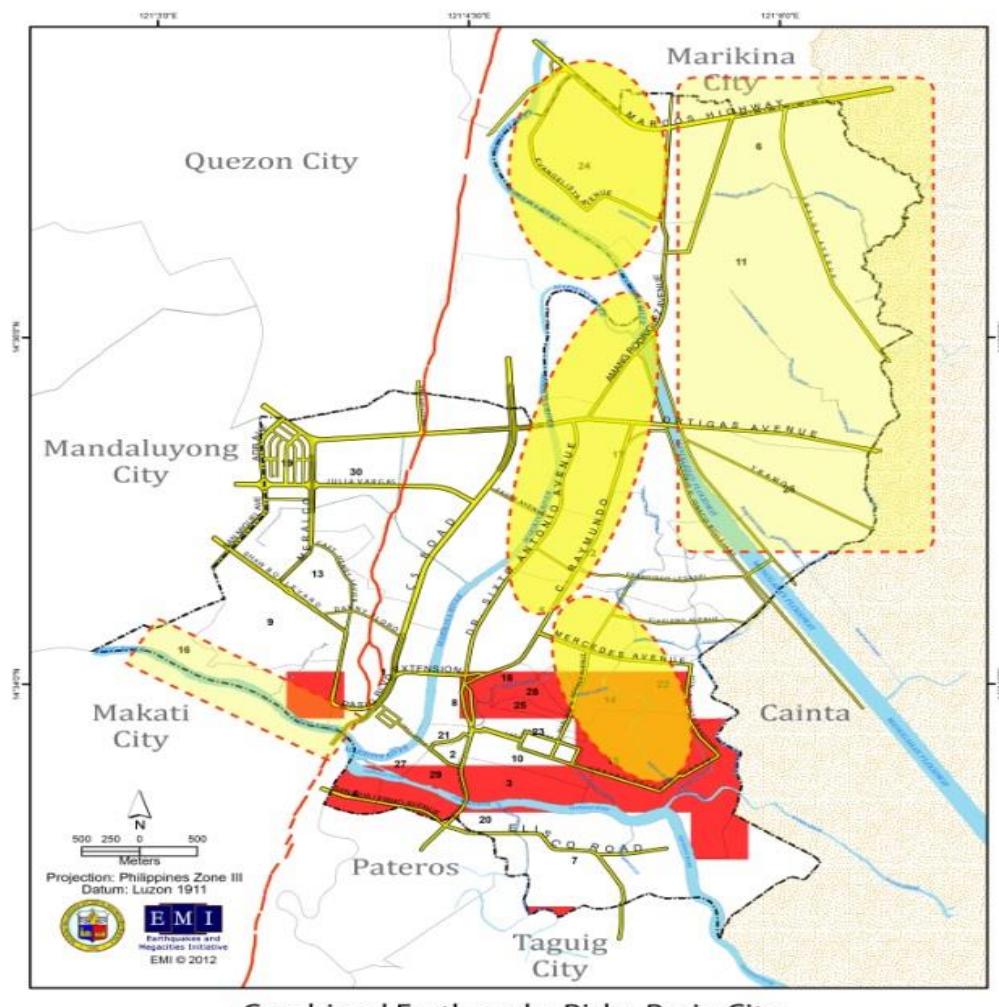
Figure 10. Fire Following Map





Pasig City Disaster Risk Reduction and Management Plan

The combined risk map in Figure 11 below is a primary reference to understand the overall earthquake and flood risk of the city Pasig. It is relevant to overall city-level planning, priority setting, emergency management and education and awareness purposes.



Combined Earthquake Risks, Pasig City



Figure 11. Combined Risk Map





b. Barangay Level and Hotspots

A hot spot analysis was undertaken to establish the most exposed barangays. For the ranking of Barangays in Pasig based only on the direct impact of the earthquake, four key indicators representing the impact of each of the respective hazards on population, roads, critical facilities and high loss potential facilities in Pasig were selected. As the impact on population is highly correlated with the impact on buildings this indicator was left out in order not to duplicate its effect. The methodology for the development of the hotspots is derived from the development of the Urban Disaster Risk Reduction Indicators (UDRI).⁹ contributing factors were normalized using the transformation functions to obtain the rankings of direct impact of earthquakes (Figure 12). The top five Barangays in terms of earthquake impact include: Manggahan, Rosario, Maybunga, Sta. Lucia, Dela Paz and Santolan.

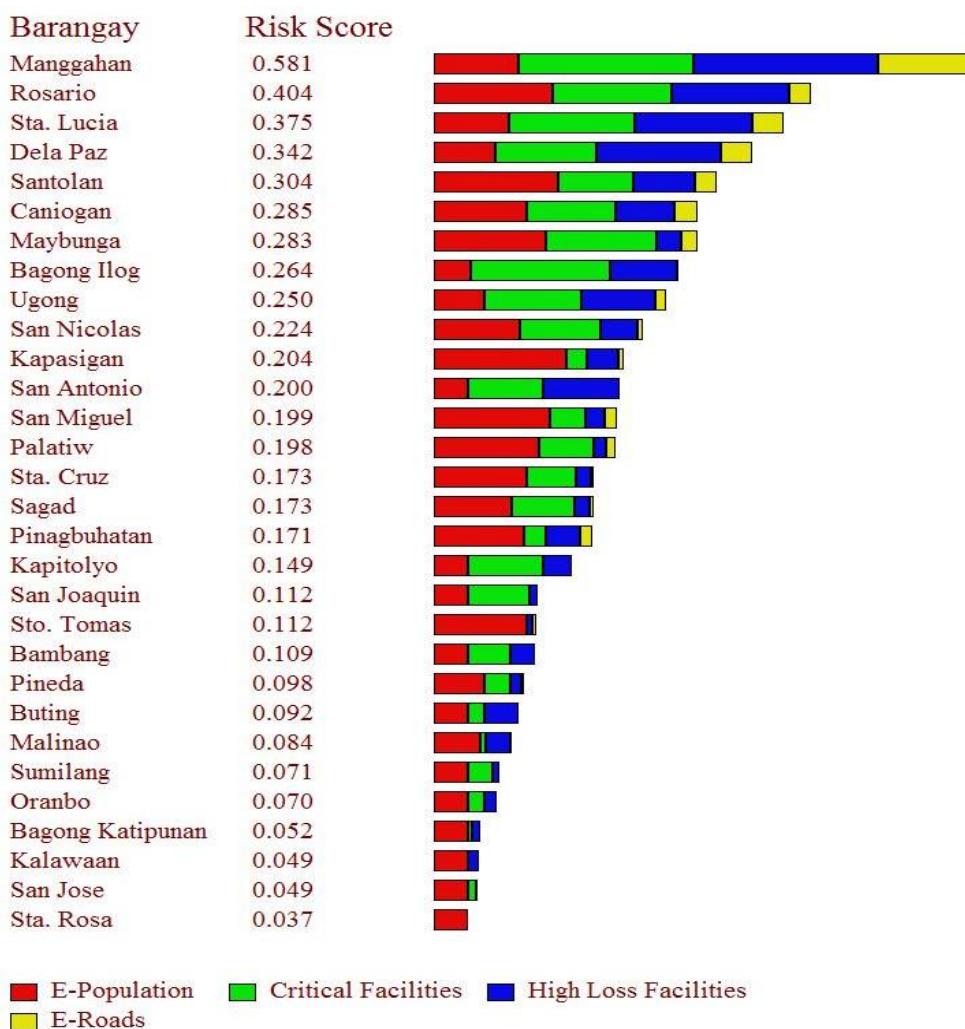


Figure 12. Ranking of Barangays in Pasig based on Earthquake Impact

⁹ Application of the Urban Disaster Risk Reduction Indicators to Pasig City, *The Pasig City Resilient to Earthquake and Flood Project*, EMI-PCG, 2012.





Pasig City Disaster Risk Reduction and Management Plan

The composite index for critical facilities and high loss potential facilities is obtained through a number of sub-indicators belonging to each category. For both floods and earthquakes the following facilities were considered to be critical: hospitals, clinics, health centers, police stations, fire stations, gas stations and power stations. The impact to a number of facilities, such as schools, markets, malls and churches was also considered to obtain the composite index for impact on high loss facilities in Pasig for earthquakes and floods.

Further analysis of the results provided by the UDRI methodology, resulted in a re-adjustment of the barangay risks to develop the Hotspots. The analysis is based on judgment and experience and is subjective in nature. The key element to the adjustment is to take into consideration impact on hospitals and critical facilities in areas where intensity of ground motion is considered to be most severe. Observations from past earthquakes have shown that damage to facilities increases significantly in areas of very high shaking intensity. Based on these considerations, a final ranking of the 30 barangays with respect to earthquake risk is accomplished and shown in Table 2. The top 10 barangays can be considered as hotspots and are shown in Table 3.

Table 2. Important Facilities, Buildings, Population, and Road Affected by Moderate, High and Very High Severity Earthquake Shaking

ID	BARANGAY	Hospitals	Police Stations	Fire Stations	Schools	Malls	Motels/High Rise	Gas Stations	Total(1)	Buildings	Population	Road Affected
1	Rosario	2	3	0	8	1		5	17	2554	25,048	27.0
2	Maybunga	3	2	0	3	0		2	7	1850	17,345	25.7
3	Manggahan	2	4	0	23	0		5	32	1275	15,620	39.9
4	Pinagbuhanan	0	1	0	4	0		0	5	2164	53,524	22.4
5	Santolan	0	0	1	10	0	1	2	14	1729	24,963	39.9
6	Dela Paz	1	2	1	7	4		3	17	560	4,924	27.0
7	San Miguel	0	0	0	2	1		4	7	1636	18,839	23.1
8	Caniogan	0	3	1	11	0		4	19	1363	7,258	22.7
9	Palatiw	0	1	1	1	0		0	3	1028	12,009	17.8
10	Sta. Lucia	0	3	1	13	1		1	19	625	4,784	6.8
11	San Antonio	0	0	0	0	0	200	0	0	965	583	0.0
12	Bambang	0	0	0	0	0		0	0	588	5,543	0.0
13	Ugong	0	1	0	0	0		0	1	495	2,295	0.7
14	Sto. Tomas	0	0	0	1	0		0	1	396	3,691	5.3
15	Buting	0	0	0	0	0		0	0	277	2,558	0
16	Pineda	0	1	0	3	0	1	0	4	270	2,661	4.5
17	Sagad	0	1	0	1	0		1	3	183	2,497	2.8
18	San Joaquin	0	0	0	0	0		0	0	179	2,299	0
19	Sumilang	0	0	0	0	0		0	0	152	1,388	0
20	Bagong Ilog	0	0	0	1	0		0	1	136	911	0
21	Oranbo	0	0	0	0	0		0	0	115	220	0
22	San Nicolas	1	1	1	1	0		2	5	115	588	7.1
23	Kapitolyo	0	0	0	0	0		0	0	103	523	0
24	Malinao	0	0	0	0	0		1	1	85	1,192	2.7
25	Sta. Cruz	0	1	0	0	0		1	2	83	2,450	3.9
26	Kapasigan	0	0	0	1	0		0	1	77	751	0
27	Kalawaan	0	0	0	0	0		0	0	70	1,803	0
28	Sta. Rosa	0	0	0	0	0		0	0	16	181	0
29	San Jose	0	0	0	0	0		0	0	11	117	0
30	Bagong Katipunan	0	0	0	0	0		0	0	5	60	0
Total		9	24	6	90	7	1	31	159	19,106	216,625	279
(1) Total does not include number of hospitals												





Pasig City Disaster Risk Reduction and Management Plan

The top five hotspot barangays for earthquake impact are:

1. Rosario
2. Maybunga
3. Manggahan
4. Pinagbuhanan
5. Santolan

Barangays Rosario, Maybunga and Manggahan are the most problematic in terms of severity of building damage, population affected, potential for fire following, and concentration of critical and high loss facilities, including having 7 out of the 8 major hospitals in Pasig City.

Barangays Dela Paz, San Miguel, Caniongan, Palatiw, and Sta. Lucia complete the list of the 10 hotspots and constitute a second tier for prioritizing disaster risk reduction and management planning and preparedness actions. It could be noted that Barangay Dela Paz also has a major hospital.

Barangay San Antonio is added to the list as a special mention because of the presence of a large number of super high-rise buildings representing potential high loss facilities. Even though Barangay San Antonio has relatively lower risk, a single collapse could result to a major loss of lives.

Table 3. Hotspot Barangays

ID	BARANGAY	Hospitals	Police Stations	Fire Stations	Schools	Malls	Motels /High Rise	Gas Stations	Total(1) Buildings	Popula-tion	Road Affected
1	Rosario	2	3	0	8	1		5	3	2554	25,048
2	Maybunga	3	2	0	3	0		2	2	1850	17,345
3	Manggahan	2	4	0	23	0		5	4	1275	15,620
4	Pinagbuhanan	0	1	0	4	0		0	1	2164	53,524
5	Santolan	0	0	1	10	0	1	2	2	1729	24,963
6	Dela Paz	1	2	1	7	4		3	3	560	4,924
7	San Miguel	0	0	0	2	1		4	2	1636	18,839
8	Caniogan	0	3	1	11	0		4	3	1363	7,258
9	Palatiw	0	1	1	1	0		0	1	1028	12,009
10	Sta. Lucia	0	3	1	13	1		1	3	625	4,784
11	San Antonio	0	0	0	0	0	200	0	0	965	583
											0.0





Pasig City Disaster Risk Reduction and Management Plan

Barangay Rosario ranks first for the hotspot barangays in Pasig. Figure 13 shows that the major roads which will likely be affected by ground shaking include Ortigas Avenue, Rosario Village Southwest Street, C. Raymundo , Dr. Sixto Antonio Avenue, West bank Road and Amang Rodriguez Avenue. The hospitals exposed to such hazard consist of Mother Regina Hospital and Rosario Specialist Hospital. While the affected schools include Rosario Elementary School and Rizal High School Annex. The Rosario Sports Complex will also be affected.

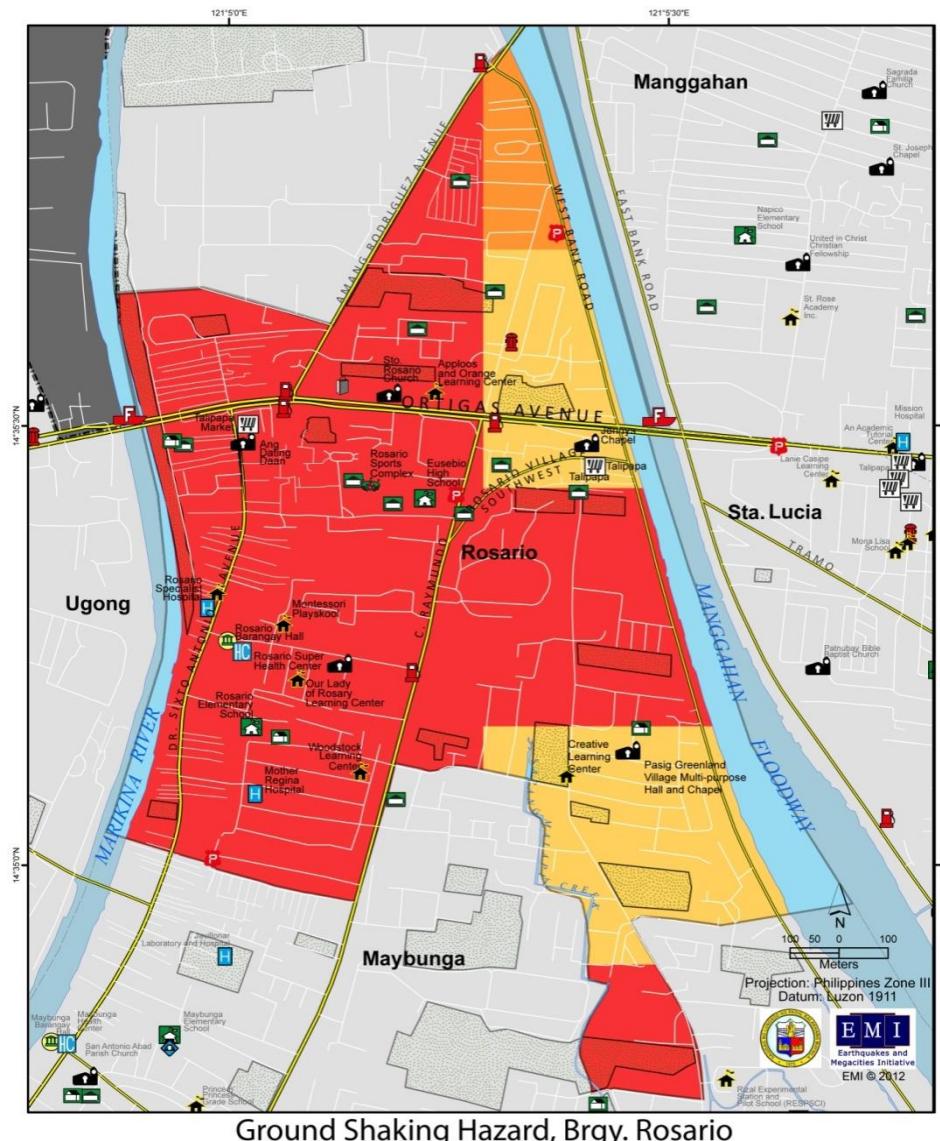


Figure 13. Brgy. Rosario Ground Shaking Map





Pasig City Disaster Risk Reduction and Management Plan

Barangay Maybunga, second in rank as hotspot barangays in the city. It is apparent from that the major roads which will be impacted include Francisco Legaspi Avenue, Stella Maris Avenue, part of Dr. Sixto Antonio Avenue, and part of C. Raymundo Avenue. One private hospital will be affected which is St. Therese Hospital. Lastly, Maybunga Elementary School will be affected by ground shaking hazard.

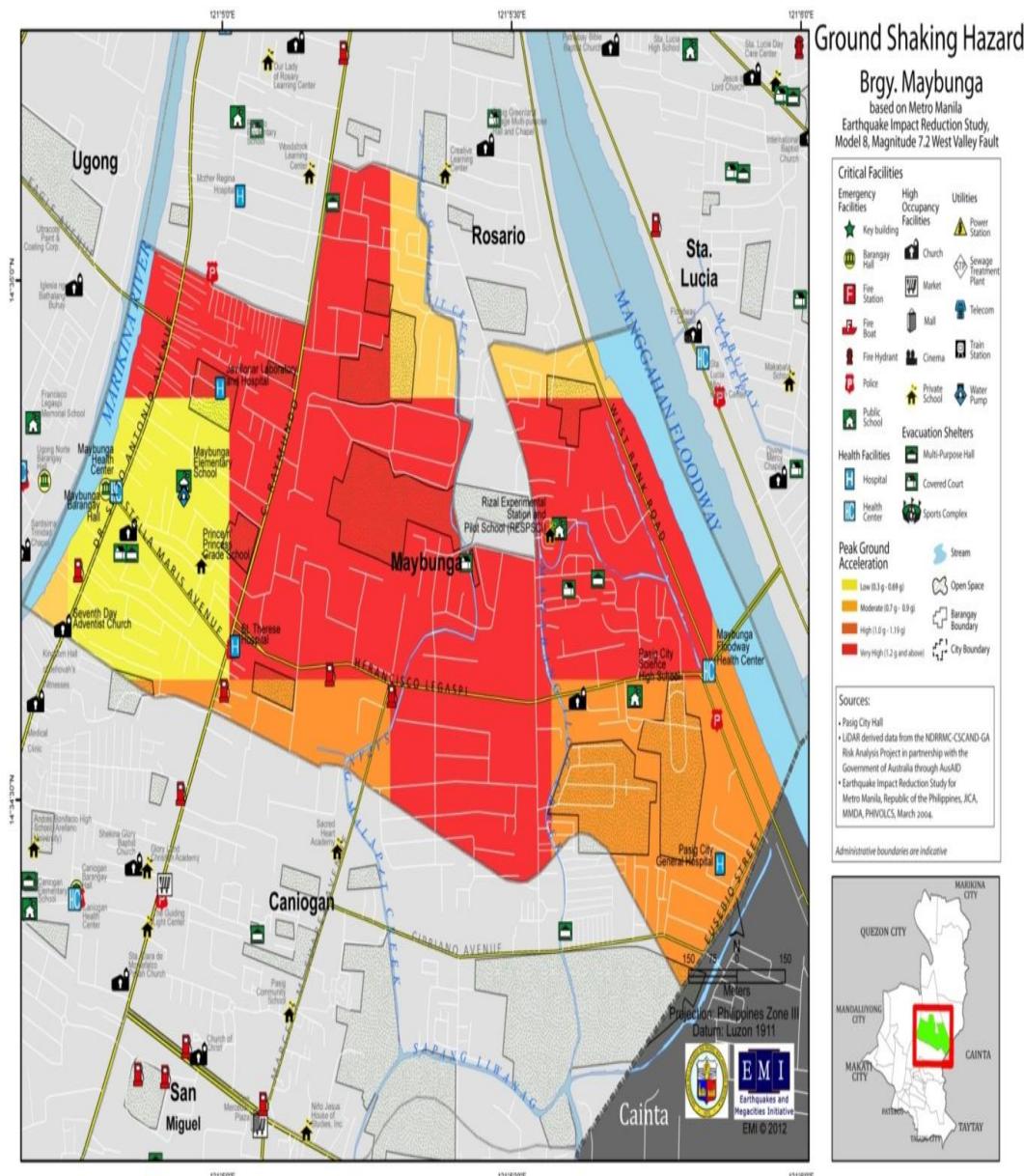


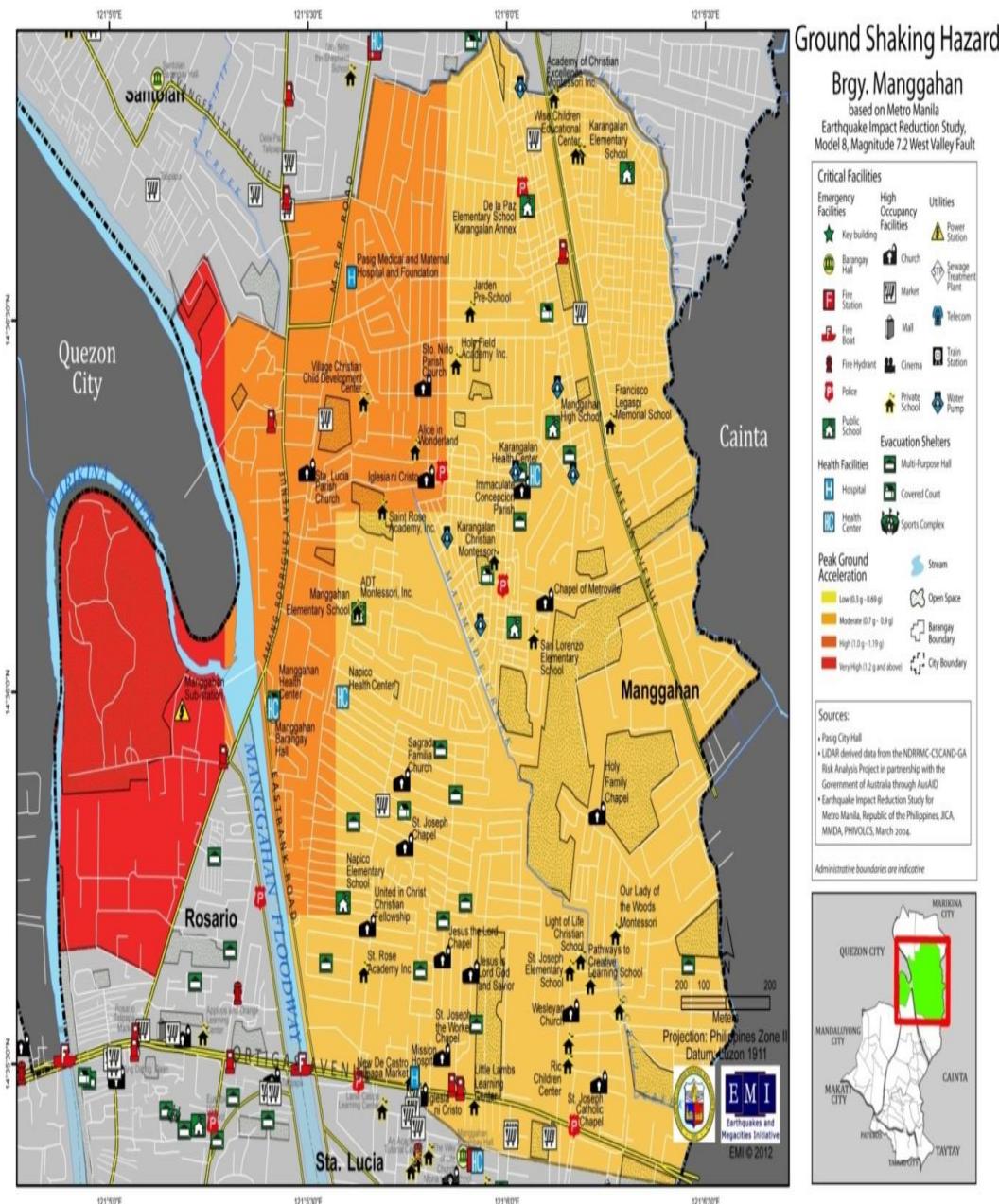
Figure 14. Brgy. Maybunga Ground Shaking Map





Pasig City Disaster Risk Reduction and Management Plan

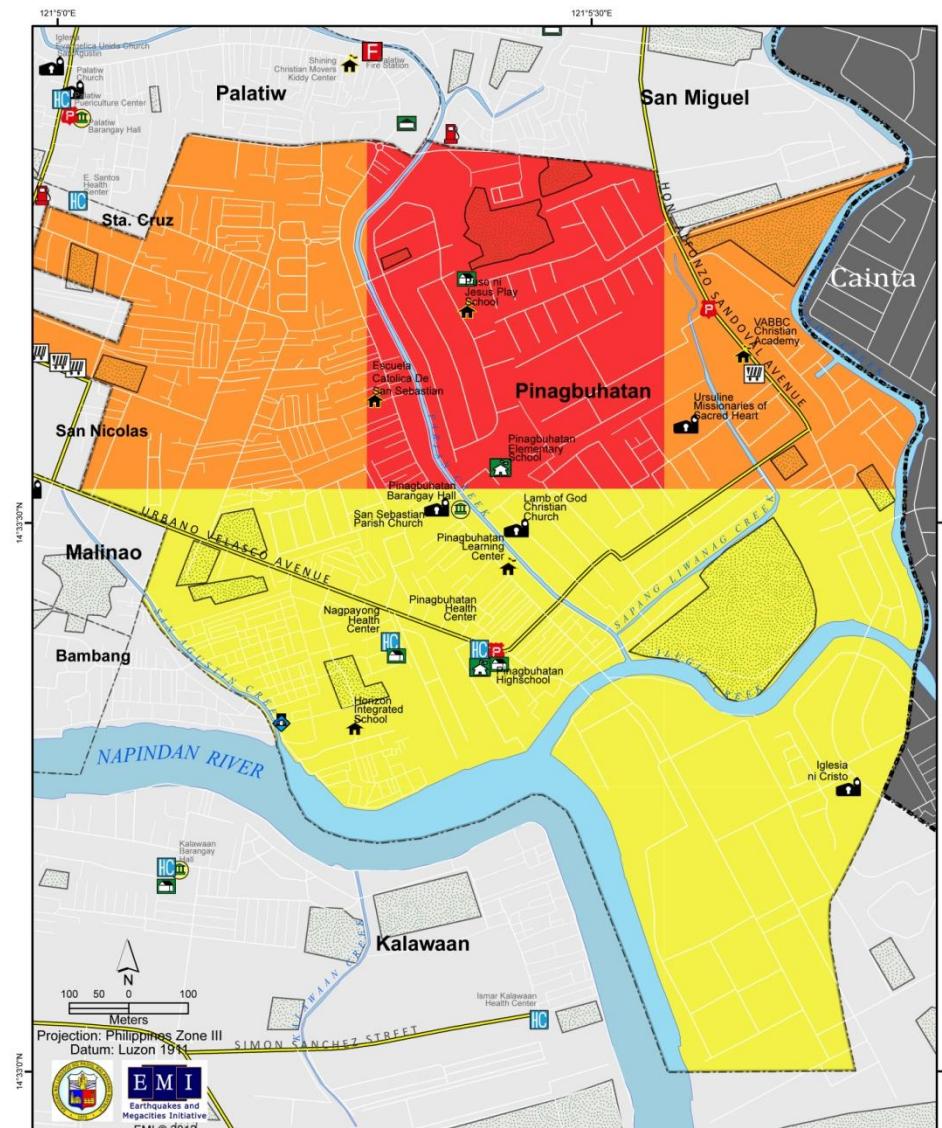
The third hotspot is Brgy. Manggahan, Figure 15 shows that the major roads exposed to severe ground shaking include Aman Rodriguez Avenue, Imelda Avenue, Ortigas Avenue and MRR Road. The hospitals include Pasig Medical and Maternal Hospital and Foundation and Mission Hospital. While the schools to be affected includes Manggahan Elementary School and Rizal High School Annex.





Pasig City Disaster Risk Reduction and Management Plan

The fourth hotspot is Brgy. Pinagbuhatan, Figure 16 shows that major roads to be affected include Hon. Antonio Sandoval Avenue and Urbano Velasco Avenue. Whereas the public schools exposed to severe ground shaking include Pinagbuhatan Elementary School and High School and Ilugin Elementary School.



Ground Shaking Hazard, Brgy. Pinagbuhatan

based on Metro Manila Earthquake Impact Reduction Study, Model 8, Magnitude 7.2 West Valley Fault



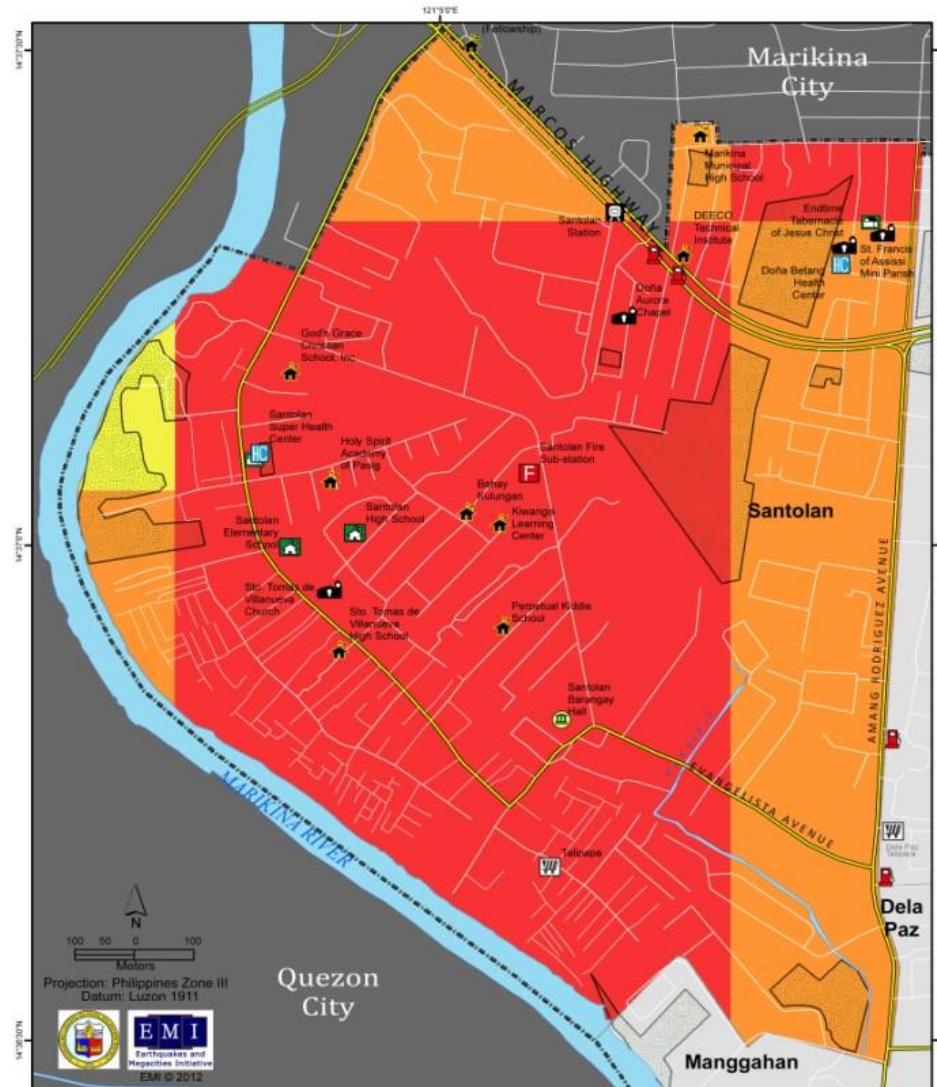
Figure 16. Brgy. Pinagbuhatan Ground Shaking Map





Pasig City Disaster Risk Reduction and Management Plan

The fifth hotspot is Barangay Santolan, Figure 17 shows that the major roads to be severely affected include Evangelista Ave., Marcos Highway, Amang Rodriguez Ave. The health centers located in the danger zone include Santolan Super Health Center and Doña Betang Health Center. The schools that fall within the very high and high shaking severity are God's Grace Christian School, Inc., Holy Spirit Academy of Pasig, Santolan High School, Santolan Elementary School, Sto. Tomas de Villanueva High School, Bahay Kulungan (Preparatory), Kiwangis Learning Center and Perpetual Kiddie School.



Ground Shaking Hazard, Brgy. Santolan

based on Metro Manila Earthquake Impact Reduction Study, Model 8, Magnitude 7.2 West Valley Fault

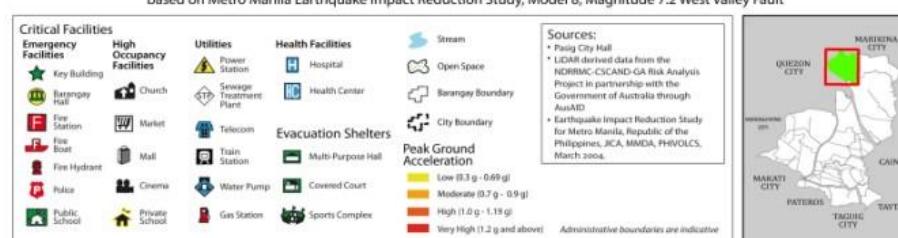


Figure 17. Brgy. Santolan Ground Shaking Hazard Map





4.3. Effects of Aftershocks

One of the main differences between earthquake and other disasters pertains to the recurrence of aftershocks. A major earthquake such as the M7.2 will typically be followed by hundreds of aftershocks; many will have damaging magnitudes of magnitude 6 or greater. The occurrence of aftershocks can last for several months.

The impacts of M7.2 on the West Valley Fault on Pasig City may cause earthquake hazards such as Surface Ground Rupture, Ground Shaking, Liquefaction and Fire Following which can pose risks and may directly affect the following assets: population, buildings, essential facilities, roads and bridges, lifelines.

4.4. Recommendations for Reducing Earthquake Risk

Earthquake risk reduction is a long term endeavor that is embedded in the notion of mainstreaming because it needs to take place along multiple sectors and receive the support of all the stakeholders. For the City of Pasig, which is highly exposed to earthquake risk, several measures can be taken to reduce the earthquake impact and be better prepared. These include the following:

Recommendation 1: Delineation of the Earthquake Rupture Fault

Properties within 5 meters of each side of the fault should be identified and their owners and tenants informed about the potential risk they incur. It must be kept in mind however that surface fault rupturing is delimited to a close band within the fault zone (about 10 meters) and that the ground only ruptures to the surface in the case of a major earthquake. Earthquake shaking causes much more damage and loss than surface fault rupturing.

Recommendation 2: Incorporate the findings on hazards, vulnerability and risk with the comprehensive land use plan and zoning ordinance. This recommendation joins the recommendations for the Land Use Planning element that prescribes risk-sensitive land use planning for the city. This includes adopted development control regulation that limits development in highly hazardous areas, such as fault zone, areas of high potential for liquefaction, and landslide.

Recommendation No. 3: Adopt Building Design Regulation that takes into consideration the distribution of earthquake hazards in the City. The areas of high earthquake severity are well identified within Pasig City. Conceivably, Pasig City could adopt its own building code to require higher design criteria for these zones, mainly for essential buildings such as hospitals, health care centers, schools, emergency centers and others. This is also true for industrial facilities.

Recommendation 4: Reduce Potential for Fire Following Earthquake Risk in the City.





This could be accomplished through three means:

- Reduce potential for fire ignitions through strict enforcement of regulation related to hazardous material and other conditions that could ignite a fire
- Improving fire fighting and fire control capabilities through strict enforcement of fire code regulation and improvement of fire fighting capabilities
- Reduce the potential of spread of fire but creating fire break zones and fire lanes, and improving access to fire engines in crowded and informal areas.

Recommendation 5: Continue and improve the preparedness campaign to raise awareness among population and institutions, especially in the hotspots barangays working with communities and engaging the barangays' DRRM Councils

Recommendation 6: Work with service providers and utility provider to assess vulnerability of core services and to develop risk reduction plans and contingency plans that will enable a faster recovery and more effective response.

Priorities for these recommendations should be first with the hotspot barangays, which are barangays that have the highest risks.

4.5. Flood Hazard, Vulnerability and Risk

Pasig City is a flood prone area in Metropolitan Manila and regularly experiences floods of different magnitudes following heavy rain mainly due to the big river discharge from Marikina River which drains flood waters from Pasig-Marikina river basin. The Pasig-Marikina River Basin is located east of Metropolitan Manila and drains through Marikina River then to Pasig River and out to Manila Bay. It serves as the head water that causes floods in the low-lying areas along the Pasig-Marikina River. Most of the flood water that cascades through the Pasig-Marikina River is runoff water from the slopes of Sierra Madre Mountains. Sierra Madre Mountain is mountain barriers in the eastern section of Luzon which stretch from north to the south of the island. This area usually receives a very large amount of rainfall especially when there is a weather disturbance in the country (Badilla, 2008). In particular, the type of flooding in Pasig is determined by the characteristics of two drainage systems: The Pasig-Marikina River System and the West Manggahan drainage area.

The Pasig-Marikina river system with a catchment area of 651km² is prone to overbanking, which includes excess flood runoff overflowing from the Pasig and Marikina riverbanks, and storm water inundation from drainage and creek networks. The total area west of the Manggahan Floodway is a flat laying 39 km² area that is a typical interior-flood-prone area along Laguna de Bay Lake. Storm rainfall and high water levels in the lake cause flooding in the area as happened in the 2009 Ondoy Typhoon and during the monsoon floods of August 2012. Although, lake stage during heavy rainfall and storms may gradually increase, the wind can cause seiches (storm surge due to wind action in fresh water) which pose danger





Pasig City Disaster Risk Reduction and Management Plan

to the people on the shorelines of the lake. The phenomena happened during the wake of typhoon Katring in October 21-22, 1994 and typhoon Rosing in November 1-2, 1995. There are a number of drainage channels and rivers discharging into Laguna de Bay Lake, however, the storm water runoff is stranded due to the high lake water level. To overcome the recurrent flooding problem, combined structural and non-structural mitigation measures were implemented in Marikina River. A discussion of these measures including the Mangahan Floodway and EFCOS follows.

A number of flood models were evaluated in order to assess potential impacts and susceptibility to floods in Pasig City. The flood hazard susceptibility map shown in Figure 18 draws on the 100 and 200-year flood simulation model produced by the 2012 World Bank Study “Master Plan for Flood Management in Metro Manila and Surrounding Areas” which is verified against Ondoy conditions. The susceptibility map shown here represents a worst-case scenario for Pasig as it combines a 100-year flood simulation with the 2009 Ondoy event inundation. The World Bank flood simulation model shows areas of potential flooding that did not occur in Ondoy, and the Ondoy event demonstrates that flooding can occur in areas not considered by the simulation model. The final flood hazard susceptibility map and the derived flood heights were classified into four categories of flood hazard susceptibility: None to Very Low (< 0.25m); Low (0.26 – 0.75m); Moderate (0.76 – 1.25m); High (>1.26m). **Error! Reference source not found.** presents a description of the flood hazard susceptibility classification based on inundation depth and human interaction with flood.

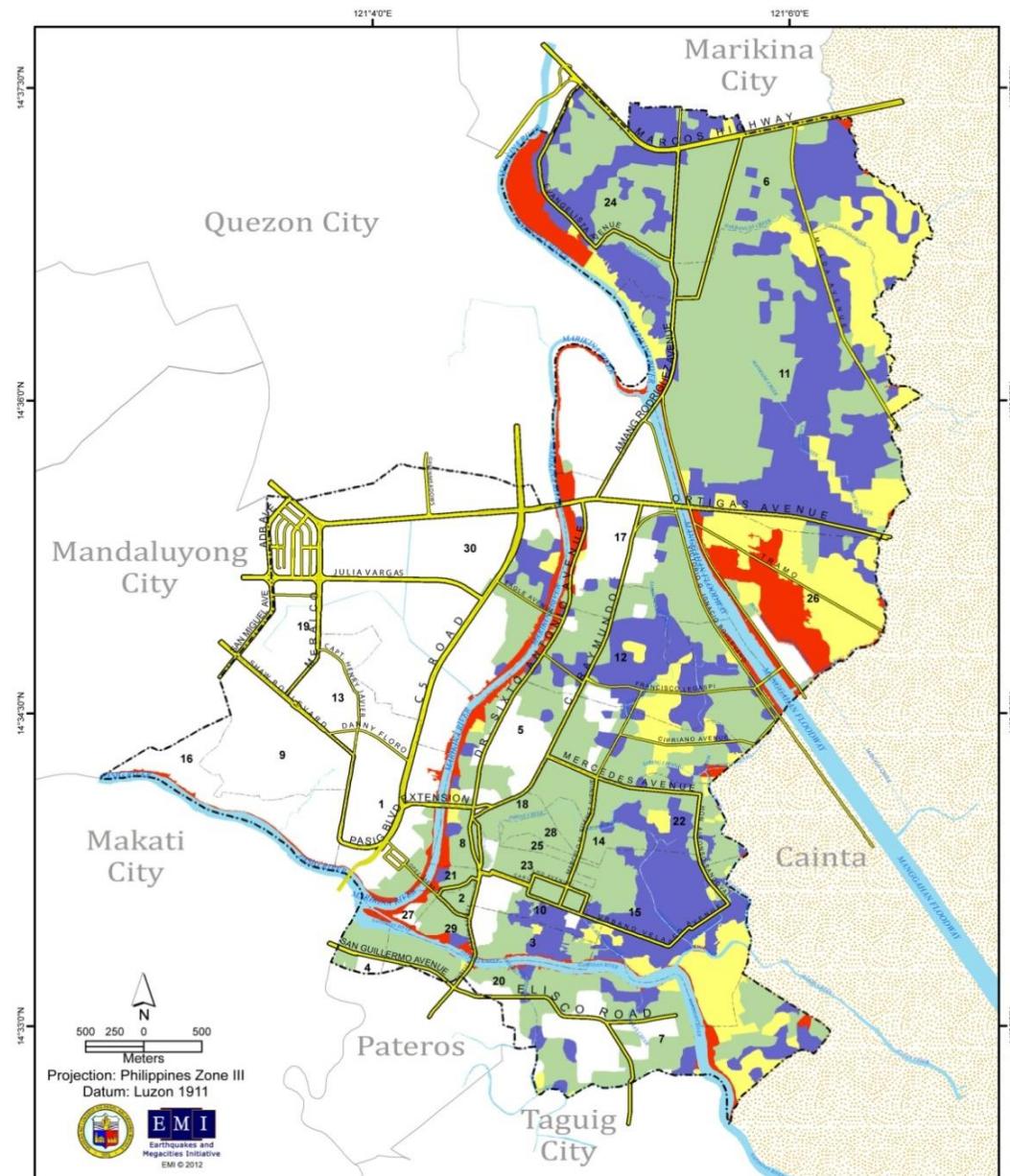
Table 4 Flood Hazard Susceptibility Classification based on Inundation Depth (Modified from Flood Fighting Act, Japan 2001 (Source: JICA, 2010)

Flood Susceptibility Level	Inundation Depth	Human interaction
None to Very Low	0 – 25cm	Typically short duration and low velocity
Low	25 – 75cm	Most houses will stay dry and it is still possible to walk through the water; Knee deep.
Moderate	75 – 125cm	The ground floor of houses will be partially flooded; anywhere from waist to shoulder deep.
High	> 125cm	Both the first floor and often the roof of low-rise buildings will be covered by water; overhead.





Pasig City Disaster Risk Reduction and Management Plan



Flood Susceptibility

based on Observed Ondoy Flood Situation and Master Plan for Flood Management in Metro Manila and Surrounding Areas (2012)



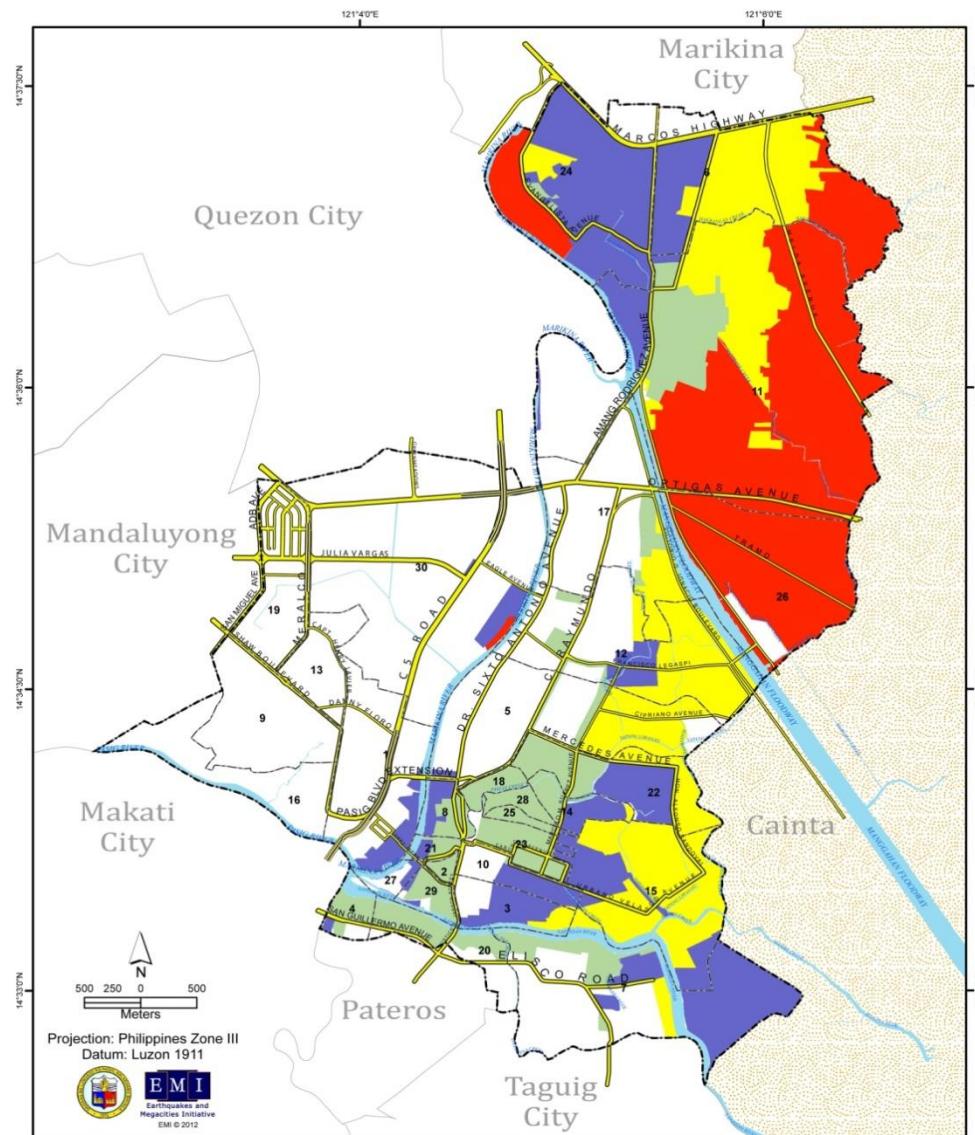
Figure 18. Flood Susceptibility Map

It is important to note here that the Ondoy Flood Situation map cannot be regarded as a hazard map as for the most part it follows roads and administrative boundaries rather than elevation contours. The flood hazard susceptibility map for Pasig in Figure 18 shows that 29.31 km² in Pasig will be flooded.





Pasig City Disaster Risk Reduction and Management Plan



Ondoy Flood Depths, September 2009, Pasig City
based on Observed Ondoy Flood Situation and validation by Pasig City Officials and EFCOS



Figure 19. Ondoy Flood Depths Map





6.4. Key Flood Results

a. City-level

Population Affected by Floods

- The top five Barangays with the biggest population consist of **Sta. Lucia, Sta. Rosa, Pinagbuhatan, Sumilang and Kalawan**. Of these over 80% of the population in Sta. Lucia is expected to be affected by a worst case scenario flood.
- As expected, less area is affected under the Masterplan conditions with implementation of the foreseen flood control projects than with the current infrastructure.
- The current population density in Pasig is 38,851 persons/km² which is the third highest population density in Metro Manila after Navotas and Manila (Source: National Statistics Office), leading to an aggravation of flood damage with respect to other Municipalities.
- The population in Pasig is increasing due to commercialization and increased settlement. From 2000 to 2010 this population increase was 18% compared to only 2.42% from 1990-2000

Building Affected by Floods

- The five barangays with the highest level of susceptibility to flood building damage include: **Sta. Lucia, Sta. Rosa, San Jose, Pinagbuhatan and Kapasigan**.
- Of these Sta. Lucia and Pinagbuhatan have among the highest building stock in Pasig City.
- The above barangays also have unusually high concentration of low-rise buildings that are exposed to moderate or high level flooding. For example over a quarter of the low rise buildings in Kapasigan are exposed to high levels (over 1.25meters) of flooding.
- The total number of damaged houses in Ondoy were 61,869 houses (6,807 totally /55,062 partially)
- The estimated cost of damage to infrastructure and agriculture in Ondoy were PhP27.297 Billion (infrastructure to include school buildings and health infrastructure PhP6.799 Billion; agriculture PhP20.495 Billion and private property PhP 0.003 Billion).





Pasig City Disaster Risk Reduction and Management Plan

Figure 20 shows the susceptibility of low-rise buildings to flooding. The bar graph represents the distribution of Low-Rise buildings in each Barangay in High, Moderate and Low flood susceptibility zones.

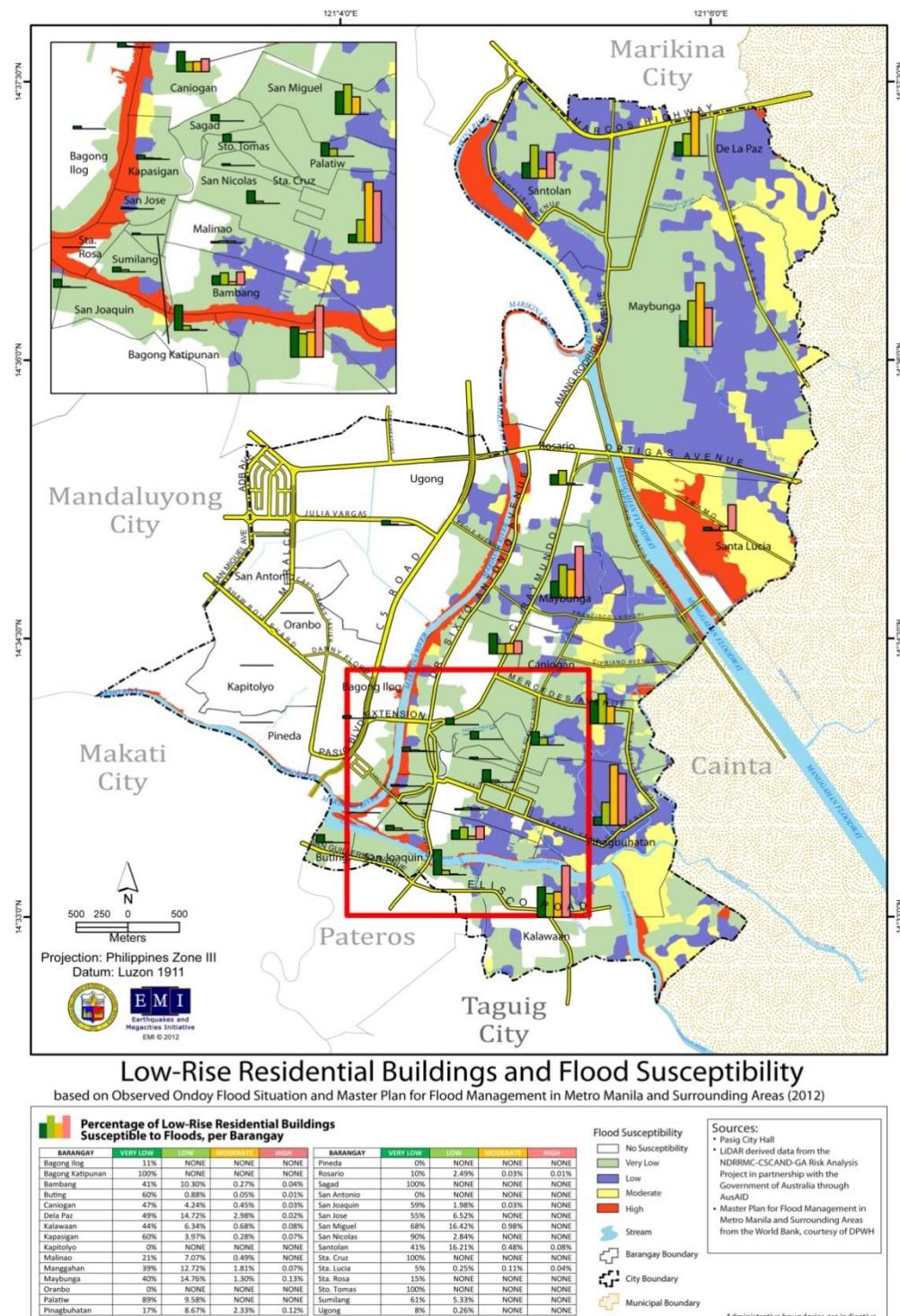


Figure 20. Low-Rise Residential Buildings and Flood Susceptibility Map





Impact on Buildings with High Loss Potential

- The flood impact on buildings with high loss potential was determined by counting the number of all High Loss Potential buildings located in high, moderate and low flood susceptibility areas; where 60% of the weight was assigned to high loss buildings in high susceptibility areas, 30% to moderate and only 10% to low susceptibility areas.
- The impact rankings from High Loss buildings affected by floods show that Manggahan is particularly exposed to flood hazards. Exposure to flooding in Manggahan include: The Mission Hospital and the Pasig Medical and Maternity Hospital; 26 schools, 8 markets and 14 churches.
- **Dela Paz and Sta. Lucia** are particularly exposed from potential flood damages to shopping malls.
- Exposures of schools in Sta. Lucia and Santolan to moderate and high flood levels determine their greater susceptibility with respect to other Barangays Equal weights of 25% were assigned to each of the high loss buildings in determining the rankings.
-



Figure 21. Ranking of the top 5 Barangays by flood impact on buildings with high loss potential.

Impact on Critical Facilities

Major hospitals including the Amang Rodriguez Medical Center (ARMC) in Marikina City, San Lazaro Hospital and Jose Reyes Memorial Hospital in Manila and the East Avenue Medical Center (EAMC) in Quezon City were affected by floods during the 2009 Ondoy Typhoon. No major hospital was reported as non-operational in Pasig City during Ondoy.

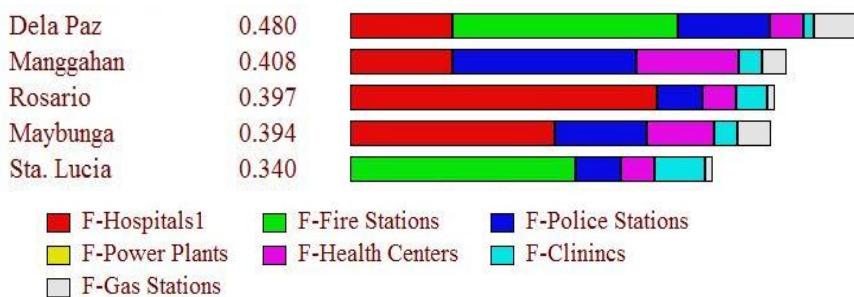
- The five barangays with the highest level of susceptibility to flood building damage includes: **Dela Paz, Manggahan, Rosario, Maybunga and Sta. Lucia**. These barangays contribute to the majority of the impact to critical facilities from all barangays in Pasig.
- The flood exposure to clinics, pharmacies and hospitals in Rosario and Maybunga contribute to the high ranking of these barangays. All 5 barangays have higher exposure of health facilities to high flood prone areas than other barangays in Pasig.





Pasig City Disaster Risk Reduction and Management Plan

- The two Meralco power plants in Sagad and San Joaquin do not influence the ranking of these Barangays very much, as exposure of other critical facilities in these two Barangays is low giving them a lower overall ranking.
- For critical facilities, even a slight chance of flooding is too great of a threat. Thus even low levels of flood susceptibility were considered in the ranking.
- Weights used in ranking of Barangays to critical facilities are: 28% for hospitals, 20% for fire stations, 17% for police stations, 14% for power plants, 9% for health centers, and 4% for clinics and gas stations each.



b. Barangay-level and Hotspots

Determination of Hotspots

The indicators are linked to the most significant quantitative outputs and analysis of the flood impact study of Pasig. They are:

- Flood Affected Population Concentration;** given as the number of people affected by flood / square area of Barangay (sq. km)
- Unusable Road Length;** given as length of minor and major roads affected by floods greater than 0.25m.
- Flood Affected Critical Facilities;** given as the weighted score of different critical facilities for different flood water inundation depths
- Flood Affected High Loss Buildings;** given as the weighted score of different high loss buildings for different flood water inundation depths

ID	Descriptor	Weight
R _{E1}	Population Affected by Flooding	0.35
R _{E2}	Roads made unusable by Flooding	0.15
R _{E3}	Critical Facilities Affected by Flooding	0.25
R _{E4}	High Loss Potential Facilities Affected by Flooding	0.25

Critical Fac.	Weight
Hospitals	0.286
Fire Stations	0.210
Police Stations	0.171
Powerplants	0.143
Health Centers	0.095
Clinics	0.048
Gas Stations	0.048

High Loss Fac.	Weight
Malls	0.25
Schools	0.25
Markets	0.25
Churches	0.25





Pasig City Disaster Risk Reduction and Management Plan

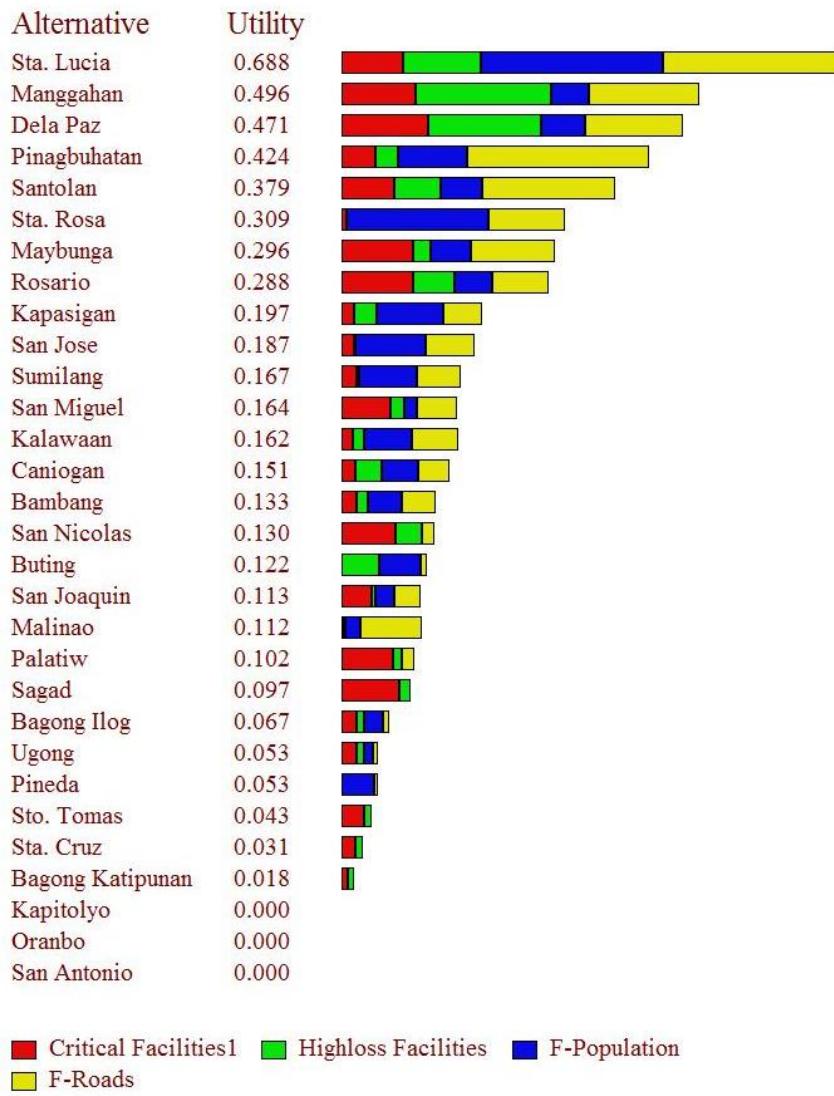


Figure 22 Hot Spot Ranking of Barangays in Pasig. Barangays with the highest score have the highest flood impacts. The length of each bar is proportional to the impact of the respective indicator for that Barangay.

- The top five barangays affected by flood damage based on a weighted average of the above four indicators are: **Sta. Lucia, Manggahan, Dela Paz, Pinagbuhatan and Santolan**.
- When considering only impact to critical facilities and high loss facilities (which together makes up half the weight of the flood impact index) then **St. Lucia, Sta. Rosa, Pinagbuhatan and Santolan** again show up in the top 5 in addition to **Sumilang and Kalawan**.
- When considering only population affected (which makes up one third of the weight of the flood impact index) then, **St. Lucia, Sta. Rosa and Pinagbuhatan** again show up at the top, but this time **San Jose and Kapasigan** are included in the top five also.
When considering the experience with historic floods such as the 2009 Ondoy floods and the August 2012 Habagat floods, then the highest level of flooding can be found for the first three days in: **Santolan, Sta. Lucia, Pinagbuhatan and Kalawan**.

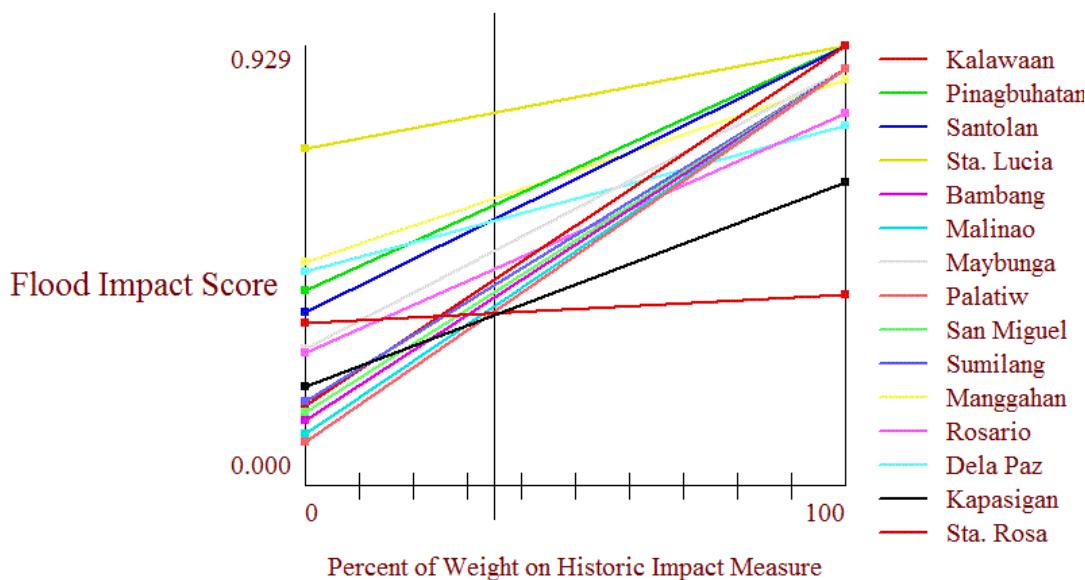




Pasig City Disaster Risk Reduction and Management Plan

A sensitivity analysis has been conducted to account for observations from recent floods on flood impact ranking of Barangays. The figure below shows how the ranking of Barangays changes by varying a weight for observations from past events from 0% to 100% (no weight is given to past event observations for the rankings shown on the left hand of the X-axis, whereas rankings are based solely on past event observations on the right side of the X-axis).

It can be seen that the rankings from impact factors agree very well with observations from events in recent history (largely due to the fact that the observations from Ondoy floods were used in the susceptibility ranking). The stability in the sensitivity analysis is shown in the figure as the relative position in the rankings does not change much from the left to the right side of the X-axis with exception of Barangays such as Kalawan which moves in ranking from the middle to the top when considering observations from recent events.



- Considering all impact factors and giving a weight of 25% to observations from recent flood events the top five Barangays to prioritize for flood impacts are therefore:
 1. St. Lucia,
 2. Manggahan,
 3. Dela Paz,
 4. Pinagbuhatan and
 5. Santolan





6.5. Recommendations for Flood Risk

Recommendations to reduce flood risk and increase resiliency of Pasig City are presented as follows:

Recommendation 1: Invest in further studies to improve the flood risk assessments and identify the sources of flood water and causes of flooding in Pasig. This would include studying the possible sources, i.e. flood coming from the upstream areas; and interventions in high flood risk areas including land use management, non-structural and structural measures such as using flood control structures in Metro Manila such as Laguna lakeshore dike.

Recommendation 2: Consider investments in projects for adaptation and mitigation to floods. These would include putting-up of footbridges, pumping of flood water, putting-up of additional pumping stations, procurement of dredging machines, and identification and setting-up of secondary catchment basins near Pasig City hall.

Recommendation 3: Coordination with national government agencies and among related agencies in municipality and barangays to strategize and avoid duplication of flood mitigation projects both in the short and medium term. This would include developing communication systems and coordination protocols among related agencies for carrying out different elements of flood management work.

Recommendation 4: Development of a drainage masterplan for Pasig City including recovery and rehabilitation of existing drainage systems as well as solid waste management to prevent illegal disposal of garbage into drainage channels.

Recommendation 5: Implement the improvement of the flood forecasting and warning system as early as possible.

Recommendation 5: Further increase the capacity for information dissemination on flood hazard areas and evacuation centers.





5. DRRM Capacity of Pasig City

The capacities of Pasig City in DRRM are embedded in organizational structure, human resources, material and equipment resources, training and capacity building, and partnerships and mutual aid agreements.¹⁰

5.1. Organizational Structure

Organizationally, Pasig City empowers the LDRRM Council, under the leadership of the Mayor for its policy and decision-making process. The operational and functional activities are directed and managed by the LDRRM Office, which uses C3 as its brain center for preparedness, planning, crisis and emergency management supported by the Pasig City Search and Rescue (PCSR) and the Pasig City Fire Brigade (PCFB). All relevant City departments, satellite offices, and institutions are represented in the LDRRM Council, which can also draw on resources from the community and the private sector. Significant decision-making level is delegated at the barangay level, where authority to prepare and respond locally is embedded. Pasig City uses a standard Incident Management System to respond to incident. Five plans are prepared to organize all aspects of DRRM in the city, including preparedness, response, recovery, and risk reduction. These are:

1. Pasig City Disaster Risk Reduction and Management Plan (PCDRRMP) 2010-2013,
2. Pasig City Contingency on Earthquake & Flood Plan of 2016-2021,
3. Search and Rescue Plan,
4. Pasig City Disaster Risk Reduction and Management Plan (PCDRRMP) 2013-2018
5. Command, Communications and Control Back-up Communications Plan, and
6. Major Disaster Response Action Checklist.

5.2. Human and Material Resource

Fire Suppression and Search and Rescue

The BFP-PC takes the lead with the PCFB providing the support technicians, fire trucks and other equipment. BFP-PC has only two fire trucks operating for the entire city. Additional resources would come from the following fire volunteers from the barangays and other organizations:

- Pasig Brotherhood
- Pasig Fire & Rescue Volunteer
- Pasig Central
- Pasig Alliance

¹⁰ More details on these plans are discussed in the Emergency Management component of the Emergency Management System: Review and Upgrade, EMI, June 14, 2012





Pasig City Disaster Risk Reduction and Management Plan

- TEAM Pasig
- Liquefied Petroleum Gas Marketers' Association Volunteers
- Everest Fire Volunteers
- Brgy. Ugong Fire and Rescue
- Brgy. San Antonio Fire & Rescue
- Brgy. Maybunga Fire & Rescue
- Brgy. Kalawaan Fire and Rescue
- Brgy. Rosario Fire Brigade
- Brgy. Pinagbuhatan Fire Brigade
- Brgy. Kapasigan Fire & Rescue
- Brgy. Sumilang Fire Brigade
- Brgy. Palatiw Fire Brigade
- Brgy. Bambang Fire Brigade
- Brgy. Oranbo Fire Brigade
- Brgy. Pineda Fire Brigade
- Brgy. Caniogan Fire Brigade

Currently, the PCSR & PCFB has three teams which have the following vehicles and equipment at their disposal:

- 4 Fire Pumpers
- 3 Ladders
- 1 Snorkel
- 1 Tanker
- 2 Rescue Trucks
- 2 Pick-ups
- 4 6X6 Evacuation Trucks
- 2 Elf trucks (for tents and materials)
- 10 Rubber Boats (2 w/ engine & 8 without)
- 50 Tents (good for 20 families) and another 50 tents (good for 5)
- 4 Buses 50 seater
- 2 coaster (30 seater)
- 2 Hazmat Truck
- 2 Amphibians
- 1 LUF Unmanned Fire Fighting Machine

Emergency Support Functions

The DRRMO has assigned more than 60 institutions and PCG departments into 15 Emergency Support Functions (ESF). The participating institutional representatives signify





their membership on a particular ESF. Emergency managers, responders, planners, decision makers and implementers of these involved institutions are grouped according to a specified ESF based on the function and role of their respective institutions. Each ESF has a specific scope of responsibilities and is comprised of a Lead Agency working with any number of appropriate Support Agencies from different levels of governance and private institutions.

5.3. Facilities: Pasig City Emergency Operations Center (C3)

Pasig City's primary incident management facility or "the primary base" for both day-to-day and emergency operations is the site where the current area of C3 is. The EOC is activated all the time (24/7). On impending disaster, it will be fully operational and the personnel manning the center will be scaled up. The design of the facility is geared towards C3 operations with the following logistics or resources:

- LCD Monitors for Weather, Road, Crime and Floods
- Repeaters for the UHF / VHF Radio
- Networking facilities (dedicated)
- Wireless Network facilities (dedicated)
- PAGASA Telemetry (PAGASA communication link system)
- US Geological Survey earthquake location software
- PABX Telephone System
- Short Messaging System (SMS) Alert System
- Wireless Public Announcement (WPA)
- Emergency back-up power
- Aerial Fiber Optic (dedicated)
- Environment Sensors
- Flood Simulation Tool
- MASE Mobile Applications
- Emergency Cellular Antenna Repeater
- Turbonet GPS monitored Digital Radio System
- Intelligent Traffic System
- HF Radio link to OCD
- Satellite Phones
- Citywide Siren System
- Face Recognition CCTV

It would be best to note that C3/Primary Base has more than 60 LCD monitors with at least 4 screens per monitor and 300 plus cameras within the city.





5.4. Facilities: Rescue Emergency and Disaster (RED) Training Center

The city has recently institutionalized trainings on emergency and disaster management at the newly established RED Training Center located at C. Raymundo Ave., Brgy. Caniogan, Pasig City, which was inaugurated on Sept. 3 2012.

The training center intends to equip the civilian and professional responders with technical, theoretical, medical and leadership skills to strengthen their individual and group capability in support of disaster response.



5.5. Facilities: Incident Command Post

The separate Incident Command Post (ICP) is also the base of the Pasig City Search and Rescue. It is located on higher ground at the PCG Motorpool Compound at C. Raymundo Avenue neighboring the PNP-PC Headquarters. ICP is also activated all the time; with or without emergencies.

Pasig City is taking a proactive stance to establish a primary and an alternative facility with proper logistical resources in order to be able to coordinate and support sustained response and recovery operations. A new building is undergoing construction within the compound that will be the future offices of the PCSR and PCFB. The building will also house the alternative EOC and the Pasig City EM Training Center.

5.6. Communication (Refer to Pasig City Communication Plan for details)

DRRMO's day-to-day communication tools for PCG Departments and the National Government Agencies (NGAs) are: 1) formal office memos, 2) telephones and 3) SMS. DRRMO utilizes similar tools, with the exception of the office memo, to communicate with Private Institutions, Civil Society Organizations (CSOs), and the residents of Pasig City. UHF Radios are also used for communication by C3 personnel and TPMO officers embedded in C3, to other units in the field. The field personnel of Batas Cuidad Enforcement Office (BCEO), Traffic and Parks Management Office (TPMO) and Engineering also have UHF Radios with them. They are in constantly monitoring in an assigned radio frequency.





To date, 3 Wide Area Notification Sirens to be installed in 3 critical spots in the city with 1.5km radius coverage of siren sound and PA capability to be controlled in C3/DRRMO by radio is in bidding phase.

The situation reports (SitReps) are usually sourced from the Engineering, TPMO and BCEO. The field personnel of these institutions will send SitReps to their respective units/head offices. These same personnel will also provide the same information to C3. The damage assessment reports, emanates from the Engineering Department that is assigned to conduct the damage assessments also with PCSR/PCFB, CHO, CSWD and CENRO. A feedback is also provided to DRRMO. Should all communication equipment fail during disasters, runners, messengers and vehicles are used depending on the distance, terrain and condition of the roads. Runners are available to transmit orders and information within the 8 floors of the City Hall. A sufficient number of runners is available by tapping human resources (e.g. janitors) from other Departments if the disaster happens during office hours. Supported by a Communications Van (CARE) on site.

5.7. Response Staging Areas, Camps, and other Facilities

Possible staging areas for responders and equipment are the:

- ✓ Pasig City Motorpool where the PCSR/ICP is located,
- ✓ The City Hall where some vehicles and the Emergency Operations Center is located,
- ✓ Vacant lots within the city, and
- ✓ Near the area of concern where it is safe to place tools and heavy equipment.

The DRRMO, through the EOC at C3, notifies the PCSR to set the staging area. All rescue volunteers will proceed to their designated staging areas or the areas of interest. The staging area remains open and can only be deactivated if there is no more emergency or the situation is heading back to normalcy.

5.8. Back-up Power Generation

The availability of electricity is a concern during disasters. Communications, monitoring and some rescue equipment require sources of power. The PCG has learned its lesson during the Typhoon Ondoy disaster during which they needed to keep their radio repeaters operating and thus they opted to conserve power by limiting the exchanges to only priority communications matters. PCG has established back-up sources or generator sets (GenSet) located in safe areas and higher grounds. C3's wireless infrastructure has a back-up system. The PCSR Incident Command Post at the Pasig City Motorpool has the following generators:

- 10 units of Generator Set 5kVa (Diesel)
- 3 units of Generator Set 4 kVa
- 4 units of Generator Set 7.5kVa (Gasoline)





5.9. Public Health

Procurement of medicines and supplies for the health centers in Pasig City during disasters, such as major floods and earthquakes, is under the authority of the City Health Officer. Medicines and medical supplies are planned for major disasters (e.g., Ondoy) but recognized not to be adequate for a worst case scenario such as what is predicted in the case of a 7.2M earthquake (Refer to HVRA report and to MMEIRS report).

5.10. Public Safety

Through the Police Integrated Patrol System, the Philippine National Police-Pasig City (PNP-PC), conducts the following operations:

- Conduct of police patrol and police presence and visibility;
- Intensified anti-criminality campaign; and
- Other police security operations.

The Three Tiered Defense System Program is the strategic foundation of the PNP's Program of Action against terrorism, utilizing the synergy of partnerships involving people, police, local government leaders and other concerned sectors. The Mayor will take the lead role in activating the Crisis Management Committee while the PNP-PC and departments/offices of PCG will conduct relevant public safety activities. It is important to note that amidst all its multiple roles and responsibilities, the PNP-PC still lacks resources and equipment.

5.11. Responding to Hazardous Materials

Basic training in handling hazardous materials (hazmat) for home owners and community within the Barangay is currently an ongoing activity of PCSR and the Pasig City Fire Brigade (PCFB). The objective of the Program, conducted twice a year, is to impart knowledge on hazmat for the residents to recognize the potential hazard immediately, do what is necessary to protect themselves and provide accurate information when reporting to the C3 call center agents. Trainings on hazardous materials are at the basic level. Higher courses require a set of equipment to use. Without such equipment, it would be useless to conduct specialized or higher level of training.

5.12. Training and Drills

The Command, Communications and Control (C3) unit and the PCSR officers and personnel are recipients of trainings conducted by local and international organizations held either in the locality or other countries. These training courses and themes include the following: 1) Command and Control Center Information System (IC3IS) User's Training, 2) Urban Search and Rescue (USAR), 3) Water Search and Rescue (WASAR), 4) Underwater/Scuba Diving, 5) Shift Water Rescue, 6) Hazardous Materials, and 7) Incident Command System. The





knowledge and skills gained in these training sessions were imparted to other PCG personnel and the community (see Table 9 in page 71).

PCFB & PCSR also conducts the Fire Prevention Training Course for Barangay Officials. This is actually a refresher course for PCSR and PCFB personnel who also have undergone the same training. There is limited number of instructors in the PCSR & PCFB. There are only 2 active squads¹¹ that will train the responders for the 30 barangays of Pasig City. The PCSR proposes to institutionalize a program that would augment the organization during emergencies. Currently, PCSR has a Reaction/Response Team of 30 personnel. They are joined by 30 personnel from the TPMO and 30 from BCEO. The proposed program is to create an Elite Team of Technicians which are sourced or pulled from the barangays. A total force of 210 reserve personnel is targeted in the proposed project.

City drills have been conducted by PCG targeting the Central Business District, barangays and schools. Starting in 2009, Flood Drills have been conducted in the communities every September while Earthquake Drills in the schools and barangays every May to July. Private Institutions are also recipients to quarterly drills, in particular, Fire Drills—that is part of the National Program of the Bureau of Fire Protection (BFP) and supported by the Government of Pasig City. On April 24, 2009 and June 18, 2010, simultaneous drills involving 6-10 buildings and an estimated 20,000 participants, were conducted in the Central Business District, Ortigas Center and on 2015 the city conducted the first ever night drill involving 6 buildings and almost 1,500 responders. The drills were led by PCG, the Ortigas Center Association Incorporated (OCAI), all concerned agencies in the city and selected response teams of other LGUs.

5.13. Warnings and Alerts

Pasig City provides real-time warnings and notifications to the public. The local television stations or the FM and AM radio stations generally broadcast public notifications and warnings. Additional warning systems for Pasig City are:

- **Emergency Outdoor Warning System/Wireless Public Announcement.** Stationary warning tools are in place that can remotely relay the message from DRRMO to strategic locations via siren and Public Address Broadcast. The system is radio controlled and is either solar or battery powered.
- **Mobile Public Announcement/On-Scene Loud Speakers.** These vehicles with mounted loud speakers can go to accessible locations and convey messages or warnings to the persons within in range.
- **SMS Pasig Ka TXT.** To be able to avail the services, C3 encourages the residents to register their names and mobile numbers to the available SMS system. Warnings can easily reach the intended recipient through SMS.
- **Facebook and Twitter Account.** It has been put in place as part of warning system controlled by Information Controller Officer.

¹¹ In a rotation or a shift, there are two active squads (14 individuals) while the members of the third squad takes a rest. This is the set-up for any given time except during disasters where all 3 squads or teams are activated.





- **Mamamayang Aksyon Sa Emergency MASE Mobile Applications.** Mobile Apps given for free by the City to the public using SMART phones as a warning system and information and also for them to send request for assistance.
- **Variable Message Signs.** LED Billboards are located to different areas in the city to provide additional information and warnings.
- **Emergency SMS Blast System.** A device used to txt blast emergency messages to the public within 2 Km radius of the unit.

5.14. Existing Emergency Response Mechanisms

C3 provides information and instructions to the PCSR through its ICP. PCSR then plans and decides on the tasking and assignment of the teams. The team leader then directs the squad¹². Information accumulated from the field is then sent to DRRMO/C3.

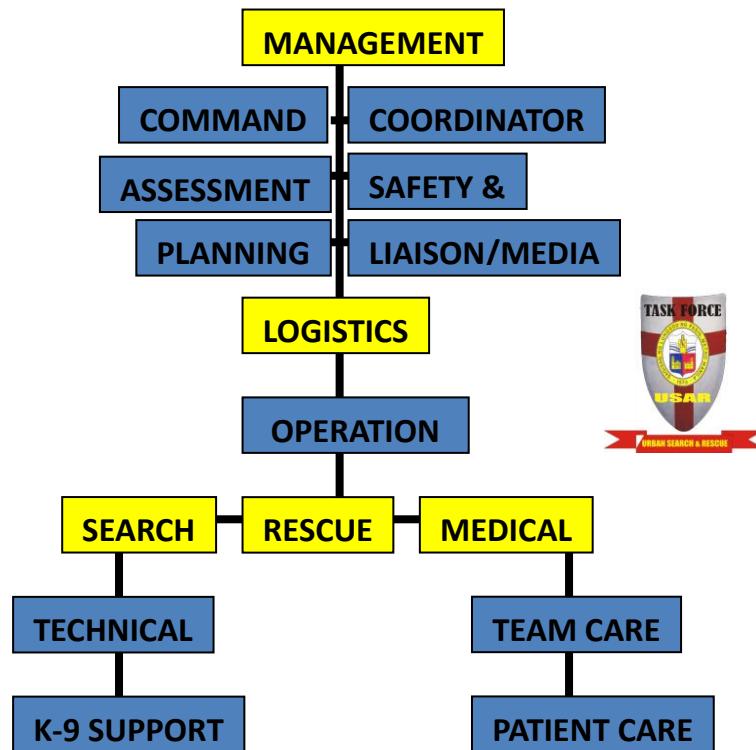


Figure 23. Organizational Chart of Pasig City Task Force USAR

A Joint Information Group (JIG) is activated during disasters. The group, composed of the Office of the Mayor, Public Information Office, DRRMO, City Health Office, City Social Welfare Services, City Environment and Natural

¹² A typical squad is composed of seven persons.





Pasig City Disaster Risk Reduction and Management Plan

Resources Office, and the Pasig offices of the Philippine National Police and Bureau of Fire Protection, manages the flow of information to the public. DRRMO, through C3, validates the notifications, by taking into account new developments before the message or warning can be sent to the responders and general public alike.

When there is an imminent danger of disaster that warrants pre-emptive evacuation, the Task Force Urban Search and Rescue is activated. Figure 23 provides an organizational overview of the components of the Task Force Urban Search and Rescue. The Task Force is composed of PCSR, PCFB, Pasig Emergency Unit (PEU), Health Emergency Medical Services (HEMS), BFP-PC, BCEO Reaction Team and the 30 Barangay Emergency Response Teams (BERT). Task Force Urban Search and Rescue (TFUSAR) will also be activated to conduct USAR in the aftermath of the earthquake, flood or other disaster.

The DRRMO/C3 tracks and accounts for the resources (human and material). The C3 is the coordinator that directs the responding team, coordinates with other agencies, and at times dispatches the TFUSAR. An Emergency Support Function (ESF) system has been formalized in the context of the Pasig City Resilience to Earthquake and Flood Project and is now in place to determine the roles and responsibilities of the various agencies and organizations that intervene in the response to an emergency.

Following an earthquake or flood, a rapid damage assessment and needs analysis is conducted by Engineering, City Social Welfare Services, City Health Office, Pasig City Search and Rescue and Bureau of Fire Protection-Pasig City.

Pasig City has an existing system for disease surveillance during disasters to ensure that health problems are being addressed. The City Health Office can mobilize all health personnel and ensure the availability of all Health Centers to provide curative services and emergency care for encountered diseases.

To augment the manpower for response, the city government formed the Pasig City Disaster Auxiliary Response Team (Pasig City DART). This team is composed of volunteers under the supervision of the city and is not part of the barangay initiated emergency response teams. These volunteers received training from DRRMO.

Pasig City is planning for the following camp management logistical issues during significant disasters. Over time, Pasig City can plan to manage these issues. They are:

- Large volumes of evacuees will exhaust the resources especially during longer stays in the camps;
- Religious restrictions of food for some evacuees;
- Physical fatigue of personnel and social workers due to longer periods of activity and the sheer number of evacuees to accommodate;
- Managing the influx of untrained volunteers becomes a burden on CSWS rather than an asset;
- Reporters and limitations of media during camp operations; and
- Camp workers unable to manage too much food donations resulting in food that is wasted.





6. Pasig City DRRM Plan Elements

6.1. Vision

“Pasig Green City towards a safer, sustainable, gender responsive and more disaster resilient community.”

6.2. Key Sectoral Elements of the Plan

a. Pasig City Risk Atlas and Profile

The HVRA Study report submitted by EMI to Pasig City and The Pasig City Risk Atlas and Profile provides a complete description including graphical presentation of Pasig City's Risks and Vulnerabilities to earthquakes and floods.¹³ Chapter 4 of this document discussed the major findings as well as the relevant data, figures and maps. The key results and recommendations are found in 4.1 up to 4.5 of this document.

b. Legal and Institutional Arrangements on DRRM

Based on the responses of the stakeholders who participated in the LIA Workshop held on September 6, 2010 utilizing the EMI DRRI Tool, the self-assessment rating revealed that:

- There is moderate institutional capability and low level of awareness, understanding, and appreciation on the relevant laws, including their Implementing Rules and Regulations (IRR), framework and corresponding national plans, by the PCG stakeholders. (Update: Last 4 years, the level of awareness has increased due to seminars and workshops conducted)
- There is a low level of institutional coordination and collaboration mechanisms for external/allied partners (Update: Gain Improvements)
- There is a need to further enhance resource mobilization, fund generation and management. (Update: Accomplished)
- There is a lack of clear guidelines from the concerned national government agencies as to the implementation of RA 10121, particularly on the provisions on the creation of DRRMO, utilization of DRRMF and the development of LDRRMP. (Update: A new DRRMO creation was made by ordinance last 2015).

¹³The Hazards, Vulnerability and Risk Assessment Study and the Pasig City Risk Profile and Atlas are separate reports submitted by EMI to Pasig City in VRA





LIA Recommendations

The following corresponding recommendations are presented below for consideration of PCG to address the gaps enumerated in the preceding section. A strong legal foundation and well-established institutional arrangements are essential components of an effective DRRM system; and thus, it should be in place at the outset.

Recommendation 1: Institutionalization of Disaster Risk Reduction and Management within the Pasig City Government through the inclusion of critical offices and agencies in the PCDRRMC and PCDRRMO, and provision of capacity building programs. – **Accomplished (Ordinance made)**

Recommendation 2: Strengthen PCG's coordinative, formal and informal relationships with the external partners, such as the business sector, academe, NGOs, utility companies, and other stakeholders by establishing a multi-sectoral local platform for discussion of DRRM issues and initiatives. – **Accomplished and Continuing Process**

Rationale: One of the essential ingredients for the success of the PCDRRM system is the contribution of the external partners, especially on technical and planning aspects.

Implementation Process: Pursue collaborative atmosphere with allied partners and private sector by creating a system for systematic coordination activities, such as the (a) establishment of a local multi-sectoral platform, (b) execution of memorandum of agreements or any other similar instruments for joint activities or programs on DRRM, and (c) provision of incentives.

When (Timeframe): Immediate (within a year) / Continuing

Who (Concerned Office/s): PCDRRMO

Recommendation 3: Enhance resource mobilization, fund generation and management for DRRM by strengthening partnership with the private sector, neighboring cities, and the international community.

Rationale: Resource mobilization and fund generation and management are fundamental, especially for Pasig, which is getting special attention from funding agencies. This opportunity should be taken advantage of by the city.

Implementation Process: Come up with policies and guidelines on fund utilization to entice potential funding institutions.

When (Timeframe): Immediate / Continuing

Who (Concerned Office/s): PCDRRMC, PCDRRMO, Accounting Office





Recommendation 4: Strengthen PCG's coordinative, formal and informal relationships with the concerned national agencies and other LGUs, especially pertaining on guidelines on fund utilization, DRRMO creation, and DRRM plan preparation. – **Accomplished**

For the full text of the report, please refer to the Legal and Institutional Arrangement Report of the Pasig City Resilience to Earthquakes and Floods Project.

c. Emergency and Management and Disaster Response

Pasig City Government continues to be a leader among Metro Manila Local Government Units (LGU's) in emergency response and preparedness. It is recognized nationally for its accomplishments, having won three **Gawad Kalasag Awards**¹⁴ as one of the best equipped and prepared LGUs in Metro Manila and one of few in the entire country and Best City DRRM Council 3 years consecutively earning the city to receive 2 Hall of Fame Award in 2016.

Pasig City's DRRMO and Command, Communications and Control (C3) houses the Emergency Operations Center (EOC) for both day-to-day and extended emergency operations. The current facility is activated on a 24-hour basis, seven days a week.

EM Recommendations

EMI utilized the EMI Comprehensive Gaps Analysis Tool (CGAT) it developed to facilitate the assessment of the existing emergency management system relative to the provisions of the Emergency Management Accreditation Program (EMAP), an international standard for evaluation of city and state emergency management systems. Key recommendations emanating from the *Pasig City Incident Management System Gaps Analysis* and field investigations are summarized below:

Recommendation 1: Strengthen the Disaster Risk Reduction and Management Office's ability to operate - **Accomplished**

Strengthen and Institutionalize the Disaster Risk Reduction and Management Office by completing the following two actions: a) Hiring three outstanding vacant positions for Administrative and Training, Research and Planning, and Operations and Warning, and b) defining, via City Ordinance, the relationship and flow of command and authority between the Disaster Risk Reduction and Management Office; Command, Control and Communications Office; Pasig City Fire Brigade; and Pasig City Search and Rescue.

¹⁴ The 'Gawad Kalasag' (KAlamidad at Sakuna LAbanan SARILING Galing ang Kaligtasan) is a national awarding mechanism initiated by the National Disaster Risk Reduction and Management Council (NDRRMC) for individuals and institutions (including local governments); in recognition for their initiatives and/or programs on DRR and humanitarian assistance.





Recommendation 2: Complete and Emergency Operations Plan and Adopt and formalize the Emergency Support Function (ESF) System for Pasig City

Adopt and formalize the Emergency Support Function System for Pasig City in order to further define roles and responsibilities during disasters. Adopt the Emergency Support Function Table as an Annex to the *Pasig City Emergency Operations Plan*. The PCDRRMO Emergency Operations Plan must include the ESF concept.

Recommendation 3: Develop and finalize three emergency-related plans

Develop and finalize three additional emergency related plans. These are: a) Continuity of Operations Plan; b) City Mass Casualty Plan; and, c) Disaster Recovery Plan.

Recommendation 4: Further define Pasig City logistical requirements for preparation of evacuation camps and other shelter facilities

Further define Pasig City logistical requirements for preparation of evacuation camps and other shelter facilities based on new information from the *EMI Hazard and Vulnerability Risk Assessment* for Pasig City, which covers earthquake hazards and flood hazards as well as the experience from Typhoon Ondoy.¹⁵

Recommendation 5: Strengthen Pasig City's emergency management capacity by instituting a formal training program

A formal training program is a key to successful emergency management programs. EMAP guidelines emphasize the requirement for a funded, formal, and systematic training program, managed by a focal point. Training for all key stakeholders and responders must be institutionalized at both a generalized level for decision makers and specialized level for responders dealing with life safety. Guidance in terms of priority for training can be taken by looking at the "hotspot" barangays identified in the Hazard, Vulnerability and Risk Study.

Recommendation 6: Additional Emergency Operations Center enhancements.

Accomplished . Continuing Expansion and Upgrades

Carry out additional improvements to the Emergency Operations Center and DRRMO operations with the following actions:

- Add redundant non-electricity based COP display system to the EOC
- Perform non-structural seismic bracing of computer equipment servicing the C3 Emergency Operations Center.
- Enhance security at the Emergency Operations Center by providing a robust Screening Access Control Point with the capability for armed security.

¹⁵ Refer to EMI's Hazard, Vulnerability and Risk Assessment (HVRA) Report of this project filed by EMI on March 14, 2012 for details on evacuation and sheltering requirements





- Carpet the tiled floors to dampen anticipated noise level during crowded and noisy EOC operations.
- Retain the glass wall between the conference room and control room.
- Fully label the monitors with key locations identified and descriptive information for observers located in the conference room.
- Place status boards in the EOC.
- Require all ESF leads and EOC participants to provide their own laptop computers during meetings in the conference room.
- Formalize a Media Room with resources near the EOC.
- Establish Barangay Damage Assessment and Situation Report protocol, adopt ICS forms for situation reports, and complete Barangay Situation Report Training.

d. Information, Education and Communication

Recognizing that DRRM is the responsibility of all, EMI as part of its deliverables under the Pasig City Resilient to Earthquake and Flood Project, developed a set of collaterals or IEC materials that convey messages on risk reduction for earthquake and floods. This particular deliverable intends to increase awareness in a larger scale of audiences from households to the communities. This was effectively done through mass media communications, print media and audio-visual aids, such as video infomercial, poster calendars, banners, brochures and flyers.

Video Infomercial

This 20-minute earthquake awareness and preparedness video infomercial was produced in local language and customized specifically for Pasig City residents. The City Social Works and Development (CSWD) actors were the lead casts in the infomercial. Also, earthquake survivors were interviewed and shared their experiences. The Pasig DRRMO gave survival tips and family earthquake preparedness. The video was distributed in schools and eventually in the household level. Update old Video IEC material for 2017-2022.

Banners

There were around 20 banners (12 pieces 12x12 and 8 12x14 sizes) posted in major thoroughfares of Pasig City for about 3 and a half months. This was done to capture the attention of motorists and other passersby about the city's effort and initiative for making Pasig City resilient against flood and earthquake.

Poster calendars

There were 500 poster calendars distributed within the various departments and offices in Pasig City hall. This type of print media targeted the employees and other working individuals.

Brochures and Flyers

There were 5,000 brochures produced for earthquake preparedness and 2,000 flyers for flood risk were distributed to schools within Pasig. This intends to impart awareness on DRRM among the students and the youth sector.





IEC Recommendation

Recommendation 1: PCG to reproduce these IEC materials to sustain the awareness campaign and to constantly remind the residents about DRRM. Continue updates and monitor seminars and distribution.

f. GIS, Data Sharing and Management

This section discusses the major findings and proposed recommendations based on the result of the Geographic Information System (GIS) Capacity Needs Assessment (CNA) which was completed by EMI in August 2011. One of the outputs of the CNA was the creation of a roadmap based on the outcome of the investigations and the results of the capacity and needs assessment. This roadmap serves as a strategic guide to develop the existing GIS in Pasig City to a more robust and effective tool in reducing the risk of disasters in the City.¹⁶

GIS has significant role in DRRM especially in the mitigation, preparedness, response and recovery phases. All these phases depend on spatial data (information that can be located on a map) from a variety of sources. In mitigation phase, GIS can be useful in visualizing disaster impacts and as an interface to decision making tools for the development of long-term mitigation and policy strategies. In the **preparedness** phase, GIS can answer useful questions, such as: Where should fire stations be located if a five minute response time is expected? And what quantity of supplies, bed space, and so forth, will be required at each shelter based on the number of expected evacuees? In the **response** phase, GIS can provide detailed information before the first units arrive. For example, during a commercial building fire, it is possible to identify the nearest hydrants, electrical panels, hazardous materials, and floor plan of the building while en route to an emergency. Finally, GIS can play an important role in **relief** and **recovery** efforts. GIS can work in concert with GPS (on the ground) and remote sensing technologies (from space) to locate each damaged facility, identify the type and amount of damage, and begin to establish priorities for action (triage). *The figure below illustrates how GIS constitutes the backbone of Disaster Risk Management by highlighting some of the roles of GIS in all of the four phases of DRM:*

¹⁶For more details refer to Capacity and Needs Assessment of Geographic Information System for DRRM in Pasig City, EMI, September 2011





Pasig City Disaster Risk Reduction and Management Plan

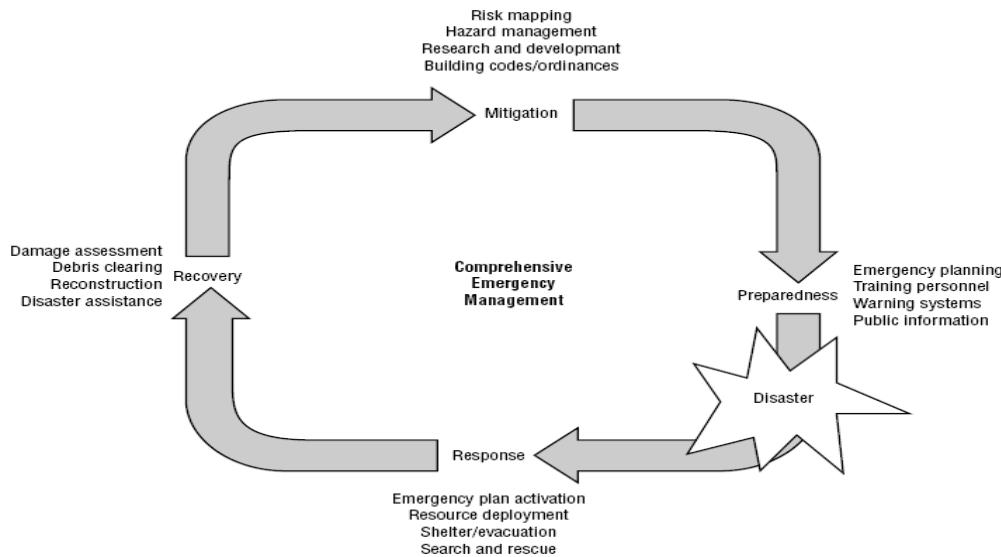


Figure 24: Comprehensive emergency management and a few examples during each phase where GIS plays a role

GIS Key Results

Key Results of the investigation:

- Very few of the personnel are trained in the use of GIS in City Hall.
- Very few of the departments currently have functional GIS software.
- IT infrastructure and hardware is sufficient to support GIS software, however, little attention is currently paid to providing GIS services.
- Data products and maps in City Hall are mostly in non-digital form and departments largely exhibit limited capacity to manage and update their data resources.
- Acquisition and sharing of data in City Hall is based mostly on informal agreements and relationships, and currently no system is in place for inter departmental data sharing and regular back up and maintenance of data.¹⁷
- Facility Security and Back Up
- Enhancement of IT Personnel skills and knowledge

GIS Recommendations

The Pasig GIS-DRRM Road Map developed in the report to address the gaps identified. Eleven (11) recommendations are proposed, which are organized into short-, medium-, and long-term phases along seven (7) main components. Recommendations 1 – 4 will be implemented in the course of this project, while recommendations 5 – 11 are out of the scope of this project but are needed to improve the effectiveness of GIS for DRRM in Pasig City.





Table 5. Summary of GIS Recommendations

Component	Recommendations	Timeline
1. Comprehensive needs and requirements assessment	1. Conduct a GIS capacity and needs assessment for mainstreaming GIS in DRRM of Pasig	Complete, needs validation
	2. Develop a "Road Map" which identifies the main components and a set of key recommendations needed for implementation and maintenance of an effective GIS in Pasig	Complete, needs validation
2. Acquisition and management of data and databases and Security/Back Up	3. Develop a data management plan which specifies the data required, data available, and data to be collected	Short-term
	4. Develop a centralized DRRM database system and back Up	Mid-term
3. Acquisition and management of technological resources	5. Design GIS software acquisition plans and options for Pasig	Short-term
	6. Design GIS hardware acquisition plans and options for Pasig	Mid-term
4. Development and management of human capacity	7. Develop and build human capacity required for GIS mainstreaming in Pasig	Short to Mid-term
5. Development of coordination and institutional processes and protocols	8. Develop data and information sharing protocols that govern the way transactions are undertaken between the departments and with other (external) organizations.	Short-term
	9. Establishment of a city-wide inter-departmental technical coordinating committee (or use of existing Focus Group) to lead the mainstreaming of GIS in Pasig	Short-term
6. Development of products and services – Smart City Programs	10. Develop and/or procure GIS applications, products and services aiming to attain the Smart City status.	Mid-term
7. Continuous updating, monitoring and evaluation	11. Develop and implement monitoring tools, timelines, and evaluation benchmarks for all components of the road map	Continuous

To implement the above recommendations and institutionalize the GIS-DRRM Road Map, the following steps should be followed:

- **Validation** of the GIS-DRRM Road Map proposed in this report by the Project Implementation Team (PIT) and the GIS Focus Group (FG). The practicality of the road map and embedded recommendations should be evaluated against the prevailing social, economic, technological, and institutional environment of Pasig City.





Pasig City Disaster Risk Reduction and Management Plan

- **Institutionalization** of the validated GIS-DRRM Road Map. This requires political approval and support of the Road Map and its implementation by a GIS Technical Coordination Committee (TCC) which should be formally established and provided with authority to coordinate, review and supervise the implementation of the road map.
- **Monitoring** and regular updating of the GIS-DRRM Road Map based on new experiences and knowledge.





g. Land Use Planning and Construction Code and Standards

The review of the current Comprehensive Land Use Plan of Pasig City was undertaken as part of EMI's engagement with PCG. It was done through looking at the different components of the plan to assess how risk parameters are taken into consideration. Recommendations and directions were provided on how the CLUP can be made risk sensitive.¹⁸

To facilitate review and validation of the existing CLUP, a focus group among the different departments of Pasig City were organized to discuss concerns and issues related to its Land Use Plans, Processing Development Permit and Codes and Construction. The focus groups lent significant support to the project by providing data, informing and validating. The following sub-sections discuss the key results and recommendations in making Pasig City's CLUP risk sensitive.

At this point, Pasig City has already a growing recognition of risk-driven land-use planning and risk sensitive *project development cycle*, but needs to develop a framework and process for doing this. Clearly a focus on most exposed population and infrastructure in terms of risk reduction should be made and that the importance of updating safety and construction norms for buildings with special requirements is recognized and new codes are developed for these structures. Particular departments and offices of the City Government are aware of the need to progressively retrofit critical facilities, infrastructure and lifelines for earthquakes, fires and floods; however, this is generally not based on institutional policy or based in terms of the level of hazard and risk information. Still, investment in risk mitigation and resilience by PCG with its stakeholders is needed towards sustainable development of Pasig City.

LUP Key Results (**Accomplished last 2016 and with Ordinance**)

Table 6. Gaps and Strategies for Land Use and Urban Planning

Planning parameter	Gap	Strategies to overcome gap
Legal framework	Before 2010, areas affected by natural hazards were considered for screening out unsafe areas. HLURB guidelines also suggest a screening process to identify suitable sites. But avoidance offers limited options especially for cities and municipalities which are highly urbanized. At this time, there is an explicit legal obligation to consider, hazards, related vulnerabilities and disaster risk management	<ul style="list-style-type: none">• Incorporate DRRMP results in Pasig City to inform planning and land use management decisions (e.g. risk sensitive zoning ordinances).• Land Use management strategies (location based or designed based) useful for reducing risks should be identified and prioritized for Pasig City.

¹⁸ Review of Pasig Comprehensive Land Use Plan, EMI, March 14, 2012





Pasig City Disaster Risk Reduction and Management Plan

Planning parameter	Gap	Strategies to overcome gap
	in preparation of the Pasig City Land Use Plan.	
Technical process of land use planning	<p>Prior to 2010 approval of the DRRM Act, even if the law does not make it mandatory, professional sound practices would have required process of land use planning to be sensitive to disaster reduction.</p> <p>However, such practices have not been fully realized and updating the land use plan of 2002 has not been done.</p> <p>Process is guided by HLURB and there are no clear guidelines on how to use disaster risk assessments in planning process.</p>	<p>In terms preparation of Land Use Plan,</p> <ul style="list-style-type: none"> The Land Use planning & management decisions should be informed by current assessment studies (Pasig City Resilience to Earthquake and Flood Project, MMEIRs and Ondoy studies. Pasig City DRRM Plan.) Guidelines for mainstreaming DRR and climate change adaptation in local land use planning for highly urbanized cities must be prepared with (or by) HLURB to guide the process of integrating HVRA information into land use policy areas and assessing implications to spatial strategies.
For Norms and standards	<p>Norms and standards for land use densities, building heights, floor area ratio, open space use & allocation and connectivity sensitive to risks are not yet available.</p> <p>Similarly there is still need to identify norms for space provision needed for disaster emergencies (e.g. access for fire fighting.)</p>	<p>Pasig City should identify future buildable spaces, their allocation and distribution, and shall include provisions for open spaces, traffic & connectivity, spaces for mitigating structures and early warning, community facilities for rescue and relief, and fire fighting.</p> <p>Pasig City shall continue to review, re-design, protect its remaining natural and man-made buffers to mitigate floods, earthquakes and other hazards.</p> <p>Pasig City shall invest in and maintain critical infrastructure that reduces risk, adjusted to cope with climate change and geohazard risks;</p>
Technical Data	There is lack of guidance on how hazard information and maps should be interpreted for use in Land Use Plans.	<ul style="list-style-type: none"> DRRM Plan HVRA, LUP, EM key findings, Risk Atlas shall be utilized for identifying safe and unsafe areas, and further zoned for future development (with or without restrictions) The hazard maps provided by





Pasig City Disaster Risk Reduction and Management Plan

Planning parameter	Gap	Strategies to overcome gap
		HVRA, MMEIRS, and others and available for Pasig City, should be updated when better data is available mainly in terms of <u>detailed elevation maps and models..</u>
Participatory process	The process of preparing Land Use Plans has not been participatory except for the suggestions and objections invited at the end of the plan making process.	<ul style="list-style-type: none"> Integrate existing programs like Pasig Green City in the CLUP and CDP. HLURB Guidance on land Use Planning Vols. I,II,III and IV can provide a clear process where stakeholders can actively engage and air their concerns, be involved in the decision making process towards Land Use Planning , Revision and Adoption.

Similarly for processing development permitting and construction, certain gaps and strategies to overcome them were identified. Such gap analysis is presented in the table below.

Table 7. Gaps and Strategies for Processing Development Permits

Stages	Gap	Strategies to Overcome Gap
Building Design	<p>The development Control regulations rely upon the National Building Code and the Structural Code of the Philippines.</p> <p>Pasig City relies on the professional competence of licensed engineers performing the design and carrying construction on behalf of the owner for implementation of the building code. Licensed personnel within BO department perform inspections and issue permits and violations. Owners are responsible for corrections. Similar procedure is followed for enforcing environmental laws and regulations.</p> <p>As such, additional requirements are sought by the BO from Building & structure designers, other trades (plumbing, electrical, mechanical) towards the analysis & design to ensure the safety of structures.</p> <p>This makes process of development permission complex and requires several Permitting processes.</p>	<ul style="list-style-type: none"> Building designs shall consider updated flood risk assessment. Building regulation, including CLUP shall be updated using the findings of the HVRA and the corresponding recommendations made in DRRM Plan component studies. Areas of higher hazard can be subjected to more stringent building criteria, particularly for critical facilities Enforce risk-sensitive zoning Train building officials and engineers in hazards, vulnerability and risk assessment and in structural design. License all engineers





Pasig City Disaster Risk Reduction and Management Plan

Stages	Gap	Strategies to Overcome Gap
	Current locational clearance has not benefitted from the HVRA, MMEIRs or Ondoy assessment studies. Hence the zoning needs to be risk sensitive as well.	
During Construction Surveillance of existing buildings	<p>City personnel/ staff inspects the geometry of buildings; but for compliance with approved structural design, quality and strength of materials, etc construction logs and certifications by licensed engineers and architects are relied upon to ensure that specifications are met by contractors.</p> <ul style="list-style-type: none">Independent inspection during construction is carried out by the designers, or field engineers, construction managers assigned by owners, especially for high rise structures. <p>The legal powers and responsibilities of identifying unsafe buildings and that codal provisions are complied with by owners are given to representatives of the Building Official.</p>	<ul style="list-style-type: none">Improved Inspection of building construction, compliance with approved structural drawings and specifications, design parameters, quality and strength of materials is required to reduce riskLong term project to identify critical structures which are structurally vulnerable and ensure necessary mitigating action(s).Adequate training of engineers and building officials is necessary to improve competence in structural engineering.





LUP-CCS Recommendations

Area: Legal Framework

Recommendation 1: The development planning system must be risk sensitive. The involvement and commitment of all Government Levels (i.e. National, Metro Manila, Local) is necessary for risk reduction and mitigation planning and implementation.

Rationale: Mainstreaming of DRR and CCA must be integrated in the entire process from development and land use plans up until the project development cycle (e.g. pre-construction, during construction, and post construction) to ensure that hazards, risks, emergency planning and their management are considered:

How to Implement:

- Incorporate the DRMMP findings in Pasig City disaster risk reduction & management system and especially in the land use/development plan and management.
- The land use zone areas described in Pasig City Land Use plan shall consider risk reduction in the manner land shall be developed and regulated (e.g. zoning, development control regulations, space norms and reservation of land for emergency management and provision). Involvement and commitment of all government offices (ex. HLURB, DILG, MMDA, LLDA) shall be ensured.
- Risk sensitive plans should be followed up by programs, projects and activities implementing risk reduction and emergency management in the project development cycle, which should be monitored and evaluated.

Status: Accomplished 2016

Area: Technical process of land use planning

Recommendation 2: The planning process and plan outputs and implementing tools must be risk sensitive.

Rationale: Pasig City departments and sub-units involvement in the risk reduction process develops ownership of the process. Enforcement of laws and related rules are made easier and advocacies for DRR are better supported.

How to implement:

The Land Use planning & management decisions should be informed by current assessment studies (Pasig City Resilience to Earthquake and Flood Project, MMEIRs and Ondoy studies. Pasig City DRRM Plan. Guidelines for mainstreaming DRR and climate change adaptation in Pasig City land use planning must be prepared with (or by) HLURB to guide the process of





Pasig City Disaster Risk Reduction and Management Plan

integrating HVRA information into land use zone areas and assessing implications to spatial strategies and plans.

Status: Accomplished

Area: For Norms and Standards

Recommendation 3: Current norms to establish building resilience, implementation and enforcement of provisions for rescue and relief should be continued and improved.

Rationale: Different land use zones, especially those occupied for shelter should be safe from hazards. Not permitting any development in areas implicitly prone to disaster has to be applied. Planning norms would have to be established to form a better basis for the development of the physical plan, and that provisions for rescue and relief shall be supported by the land use and physical development sector.

How to Implement:

Risk Sensitive Planning Norms shall be prepared for developing spaces, their allocation and distribution, such as, those concerning provisions of open spaces, spaces for mitigating structures and early warning, community facilities for rescue and relief, and fire fighting, creating natural and man-made buffers, investing in and maintaining resistant infrastructures.

Who: Pasig City Government, MPDO, CPDO, CENRO

When: This should be done within the 10 years. Priority: Medium **ON GOING. Continuous Process**

Area: Technical Data

Recommendation 4: Get national agencies (ex. HLURB, DILG) to support PC DRRM plan and to assist Pasig City translate development and land use plans into urban redevelopment plans using best-updated information.

Rationale: Given the cross cutting nature of disasters, the technical studies are important towards the development of physical plan and those provisions needed for rescue and relief.

How to Implement:

Utilize DRRM Plan HVRA,LUP, EM key findings, Risk Atlas for identifying safe and unsafe areas, and define zones for appropriate development (with or without restrictions) in consideration of the hazards and risks. The hazard maps provided by HVRA, MMEIRS, and others and available for Pasig City, should be updated when better data is available, for example, mainly in terms of detailed elevation maps and models.





Pasig City Disaster Risk Reduction and Management Plan

Who: Pasig City Government, MPDO, CPDO, CENRO

When: This should be done within the next three years especially when the next LUP is formulated. **On going process.**

Area: Participatory Processes

Recommendation 5: In the preparation of the Pasig City Comprehensive Land Use Plan, every effort shall be made to seek participation and support towards the fulfillment of risk reduction and adaptation specially in reducing emergencies and ultimately disasters.

Rationale: Participation and involvement in the risk reduction process develops ownership of the process. Compliance is facilitated, and enforcement of laws and related rules are made easier.

How to Implement:

Implement a clear process where stakeholders can actively engage and air their concerns, be involved in the decision making process towards CLUP Preparation, Revision and Adoption.

Status: Accomplished

Area: Development planning & Implementation process

Recommendation 6: Future development planning & implementation shall be guided by the DRMMP Framework.

Rationale: Risk sensitive land use planning, zoning, development control regulations, construction codes and standards shall be guided by Pasig City DRMMP within the legal mandates of the DRRM act of 2010 and Pasig City ordinance. This shall ensure that the efforts in risk reduction are continued in all development components identified with DRMMP.

How to Implement:

- Review, Modify, Approve and Implement DRMMP and monitor success in reducing risks by assigning components to possible lead institutions (annually).
- Pilot a “risk sensitive” land use planning with the inclusion DRMMP elements.
- Building designs shall always consider updated flood risk assessment and the earthquake impact assessment and the corresponding recommendations made in DRMMP component studies.
- More effective protocol for inspection of buildings, compliance with approved structural design, quality and strength of materials, identifying unsafe and ensuring necessary mitigating action(s) are in place.





h. Training and Competency Building

This component accounts the capacity building component of the Project. It presents the capacity building activities conducted and the modules developed for the PCG. Table 8 enumerates these capacity building activities, implemented mainly through EM training exercises and modules, field exercises on Rapid Visual Screening to determine vulnerability of physical infrastructures, Risk Sensitive Land Use Planning working sessions, DRM Basic Orientations and technical working sessions and hands-on exercises on GIS.

Table 8. Trainings Conducted by EMI for PCG

CAPACITY BUILDING ACTIVITIES	TRAINING OUTPUT	DATE CONDUCTED	TRAIINEES
DRM Basic Orientation	<ul style="list-style-type: none">• Field Investigation Report	Sept. 11, 2011	PCDRRM Council Members; Representatives from PAG-ASA, DAP, OCD-NCR, DILG-NCR and Red Cross
Emergency Management Training Module 1: Introduction to Emergency Management	<ul style="list-style-type: none">• Emergency Support Function (ESF) Table drafted• Table Top Exercise for PC Earthquake• Field Investigation Report	Sept. 13 and 15, 2011	Representatives from PCG department/offices, Manila Water, Red Cross, DepEd and DILG-NCR
Emergency Management Training Module 2: Emergency Operations Center and Plan	<ul style="list-style-type: none">• Table Top Exercise for PC Flooding• Field Investigation Report	Nov. 16 and 17 2011	Representatives from PCG department/offices, PC barangay officials, Manila Water, Red Cross, DepEd and DILG-NCR
Emergency Management Training Module 3: Emergency Operations Plan Formulation	<ul style="list-style-type: none">• Table Top Exercise for PC Earthquake and Flooding• EOP outline formulated• Emergency Support Function (ESF) Table finalized• Field Investigation Report	Apr. 26 - 27, 2012	Representatives from PCG department/offices, PC barangay officials, Manila Water, Red Cross, DepEd and DILG-NCR
Training of Engineers on Rapid Visual Screening (RVS)	<ul style="list-style-type: none">• RVS checklist completed• Photos• Field Investigation Report	Nov. 25, 2011	Representatives from City Engineering Office, Building Official and PCDRRMO
Working Sessions on Risk Sensitive Land Use Planning (RSLUP)	<ul style="list-style-type: none">• Workplan drafted• Field Investigation Report	Jan. 18-19, 2012	Representatives from CPDO, PCDRRMO, CENRO, Engineering office, PHRU, UPAO and Assessor's Office
GIS Technical Working Session and Hands-on Exercises	<ul style="list-style-type: none">• GIS User Manual	Sept. 5, 2012	Representatives from MIS, PCDRRMO, Engineering office, CPDO

In addition to the capacity building activities conducted by EMI, local and international organizations provided trainings and drills for the Pasig Command, Communications and Control (C3) unit and the PCSR/PCFB/PEU/K9 officers and personnel held either locally and in other countries. These training courses include the following: 1) Command and Control Center Information System (IC3IS) User's Training, 2) Urban Search and Rescue (USAR), 3) Water Search and Rescue (WASAR), 4) Underwater/Scuba Diving, 5) Shift Water Rescue, 6) Fire Fighting/Hazardous Materials, and 7) Incident Command System. Table 9 presents a summary of the training courses conducted by PCG.





Pasig City Disaster Risk Reduction and Management Plan

Table 9. Trainings Conducted by PCG

Training Courses	Time Frame	Recipients
Preparedness and Awareness Program and IEC	Feb 2010 to present	1) School (students and teachers) 2) Barangay personnel and residents 3) Home Owners Association members 4) Private Companies
Basic and Advance Rescue Technician Trainings <u>Components:</u> <ul style="list-style-type: none"> • Basic Boat Management/Handling • Flood Rescue Technician and Response Training • Basic and Advance USAR/CCSR • Basic BLS 	Jan 2010 to present	1) City personnel (100 persons) 2) Barangay responders (150 persons)
GAD Program on Free Swimming Lessons for Children <u>Components:</u> <ul style="list-style-type: none"> • Preparedness for floods by providing swimming lessons • GAD issues 	Oct 2010	Children along the riverbanks and flood prone areas
Disaster Readiness Week Program	Sept 20-26, 2010	1) Barangay responders 2) Company responders 3) NGOs 4) Schools
Community-Based DRRM Seminars	Jan 2010 to present	1) 8 Critical Barangays
Be Safe Program <u>Description:</u> School Awareness on Floods and Earthquakes	Jan 2008 to present	1) All private schools (10) 2) All public schools (41)
Barangay Comprehensive Earthquake Preparedness Program <u>Description:</u> Conduct of seminar on earthquake awareness and evacuation/ICS	Apr-May 2011	All 30 Barangays (1,500 participants)
Barangay DRM Training for Barangay Officials	3 days Oct. 20-22	1) Barangay Officials
Rapid Earthquake Disaster Assessment System (REDAS) Training		1) Engineering Department 2) Barangay Officials 3) Assessor's Office 4) Planning Office 5) DRRMO

Training and Capacity Building Recommendations

The findings from the participatory workshops and trainings for each component suggest three (3) key recommendations focused on capacity building activities for PCG personnel and constituents. These key recommendations are summarized below:

Recommendation 1: Develop a DRRM training program for all the personnel of PCG departments with DRR functions. PCDRRM Council who has attended the trainings provided by EMI may facilitate the conduct (re-echo) of the following trainings: DRM Orientation, EM, and basic GIS. DRM Orientation may be cascaded to all employees of PCG. –
Status:**Accomplished and Continued every quarter.**





Rationale: The results of the TNA revealed that majority of the respondents surveyed have not received training on disaster risk management. This point to the need for specifically for all personnel with DRRM functions to undergo training on EM, GIS and DRM Orientation. A city-initiated training on DRM Orientation for all PCG personnel is also recommended.

Implementation Process:

- Develop a DRM training manual consisting modules on DRM Orientation, EM and GIS.
- Create a pool of internal trainers and facilitators who will conduct the said trainings.

Status: **Accomplished and Continuing Program**

Recommendation 2: PCG Departments and allied institutions spearheaded by DRRMO to undergo a training and writeshop on the Formulation of Emergency Operations Plan (EOP) to produce the PCG EOP document in a participatory manner. Status: **Contingency Plan already approved and made into an Ordinance.**

Rationale: At present, the Emergency Operations Plan of Pasig City is under development by the concerned offices/departments. To ensure that a complete and comprehensive EOP will be developed, a writeshop on EOP Formulation must be conducted by a subject matter expert (SME) and participated by the PCDRRM Council.

Implementation Process

- Look for potential resource person to facilitate and moderate the conduct of training and planning writeshop.
- Identify the target participants to ensure that all concerned stakeholders are represented.
- Ensure that the conduct of training is properly documented including the evaluation/assessment for reference and further improvement.

When: This action should be accomplished immediately with HIGH Priority within 3 months

Who: PCG Departments and allied institutions spearheaded by DRRMO

Recommendation 3: Conduct training on EM, GIS and Risk Assessment at the barangay level. Status: **Accomplished.**

Rationale: The trainings on EM, GIS and Risk Assessments were designed for a city-level implementation. Indeed, the success of disaster risk reduction and management initiatives lies on a multi stakeholder's approach. Recognizing the essentials of these trainings in strengthening the competency of the local officials and most especially the people in community, on disaster risk reduction and management, we therefore recommend the conduct of such trainings at the barangay level.





Pasig City Disaster Risk Reduction and Management Plan

Implementation Process:

- Training modules / manuals must be customized and tailored fit to the target audience. Design, Tools and Methodologies should also be taken into account.
- The city-level pool of trainers will conduct the training for the local officials.
- Ensure that the conduct of training is properly documented including the evaluation / assessment for reference and further improvement.

When: This action should be accomplished with MEDIUM priority within months

Who: Spearheaded by PCDRRMO

Outcome of Thematic Areas (2013-2016)

Outcome/Thematic Area: Preparedness					
Output					
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Increase Community Participation	CBDRMM	Accomplished		Monitoring and Evaluation	1. Design Monitoring System 2. Increase DRRM Awareness to Family Unit
Risk Assessment at Local Level	1. Hazard Maps 2. Disaster Risk Vulnerability Assessment 3. Statistical Information	Accomplished		Updating Schedule Focal Person	Set regular review and update, monitored & disseminated by a Focal Person
Early Warning	Warning Systems, Policies Integrated, Centralized Monitoring Center	Accomplished			Maintain and Expand coverage
Capacity	Infrastructure and Scientific Technological, Technical and Institutional Capacities Building	Accomplished			Maintain and Enhance

Emergency Regional Risks	Statistical Information and Data on Regional Disaster Risks	Accomplished			Continue alignment with National Agencies
Use Knowledge, Innovation and Education to build a Culture of Safety and Resilience	1.Information Management and Information Exchange 2. Education and Training 3. Research 4. Public Awareness 5. IEC Campaign	Accomplished			1. Improve Information Dissemination Materials and Schedule 2. Monitoring and Evaluation
Strengthen Disaster Awareness for Effective Emergency Response at all levels	1. Policies 2. Dialogue and Coordination 3. Periodical updating of plans 4. Emergency funds	Accomplished		Periodical Updating	1. Be abreast with International Best Practices
Developed and Implemented Comprehensive National and Local Preparedness Policies, Plans and Systems	Policies, Disaster Plans	Accomplished			1. Feedback Mechanism 2. Benchmarking and Continuous Improvement





Pasig City Disaster Risk Reduction and Management Plan

Outcome/Thematic Area:		Prevention and Mitigation			
		Output			
Activity per sector/office	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Environmental/City Environment and Natural Resources Office <ul style="list-style-type: none"> - From Garbage to Garden, its compost time - Greenheart Recycling - Pasig bus service operation - Enactment of Green Building Ordinance - Greenhouse Gas Management Inventory and Accounting 	<ul style="list-style-type: none"> - Waste reduction, organic fertilizers - Waste reduction - Promote public transportation - Promote Compliance of Building developers with 10,000 GFA - Reduce carbon emission from electricity, waste and fuel 	<ul style="list-style-type: none"> - 550 kilos organic fertilizer - value of production of vegetables 220,000 - 29,000 recycled material - 105,000 passengers - Conduct green building awareness to commercial buildings in Pasig City - Completed entity level GHG for 2014 	<ul style="list-style-type: none"> - On going - On going - Ongoing - Ongoing Community GHG - Ongoing 	<ul style="list-style-type: none"> - Lack of LTFRB and DoTR Support - Lack of capital investment of building developers - Lack of technical personnel 	<ul style="list-style-type: none"> - Advocate for schools, LGU offices, Barangays, HOA - Advocate for schools, LGU offices, Barangays, HOA - Pasig Community Shuttle Service for employee and other stakeholders Promote incentive for compliant green buildings - Develop a GHG management plan

Environmental/Solid Waste Management					
- Waste Collection Monitoring	- 100% area coverage	- 100% area coverage	- On going	- Reporting system, illegal dumping,	- Viber network report





Pasig City Disaster Risk Reduction and Management Plan

<ul style="list-style-type: none"> - Door-to-door solid waste collection - Waste Segregation (BAZERO Program) - Zero waste day - Monitoring of Mechanized MRF (RDF) operation (Pasig LGU/IPM/MMDA/PPP) 	<ul style="list-style-type: none"> - Deliver SW Collection service in inaccessible areas - Full implementation in all HOAs, buildings and condominiums - Implement in all HOAs - Reduction of waste prior to final disposal to Rizal Provincial Sanitary Landfill 	<ul style="list-style-type: none"> - 97% (as per COA-PA 2015) - Condo more or less 90%, HOAS more or less 90%, Buildings more or less 50% - 100% HOA covered - More or less 20% waste prior to final disposal 	<ul style="list-style-type: none"> - On going - On going - On going - On going 	<ul style="list-style-type: none"> - scavengers, early late throwers - For buildings, inconsistent compliance due to frequent replacement of utility personnel - Odor management, equipment breakdown, operation schedule 	<ul style="list-style-type: none"> - QRT (rike) deployment in accessible areas - Enactment of Omnibus ordinance on waste management - Provision of waste bins for stakeholders - Enhance facility and management improvement
Infrastructure/Office of the Building Official					
<ul style="list-style-type: none"> - Inspection of buildings 15 years and older (required certification of structural stability) - Installation of Accelerometer sensors - Evacuation Route signs lead to open space - Minimum distance on the zone of avoidance against ground rupture of at least 5 meters both sides 	<ul style="list-style-type: none"> - ensure the structural stability of the building - installation of accelerometer sensors to new buildings - submission and installation of evacuation plan to all office/commercial /residential buildings and structures - securing of certification from PHIVOLCS 	<ul style="list-style-type: none"> - no problem with regards to commercial and office building when it comes to implementation - compliance of new building - submitted Building Evacuation and Emergency Plan - All structures involved has secured certification from PHILVOLCS 	<ul style="list-style-type: none"> - on going - ongoing - not yet accomplished - ongoing 	<ul style="list-style-type: none"> - old buildings and residential condominiums problem with budget - old buildings failed comply requesting at least 2 years extension - No route signs leads to open spaces 	<ul style="list-style-type: none"> - continue notices and reminder - continue implementation and installation to new buildings - installation of route signage - continuanc e of implementation
Infrastructure/Engineering Flood Control Section					
- construction of drainage system	- in placed effective drainage system	- Accomplished	- on going	- un donated open space and right of	- regular maintenance and





Pasig City Disaster Risk Reduction and Management Plan

				ways of subdivisions	monitoring of effectiveness
- construction of pumping stations	- 29 pumping stations (target)	- 26 pumping stations accomplished	- 1 on going, 2 proposed		- regular maintenance and monitoring of effectiveness
- construction of revetment wall	- Both side sealed off with revetment wall	- 700 santolan, 2010 pasig river	- Proposed	- affected private properties awaiting the completion of DPWH	- develop as green infrastructure
- construction of detention tanks	- Flood mitigation, water consumption, climate change adaptation	- 1 accomplished	- 1 on going	- lack of public space	- for jogging and bike lane - private commercial building, public school buildings
- construction of linear parks at various creeks	- Increasing green space and green ways	- Accomplished 7,400 linear meter	- proposed	Affected properties private	- for jogging and bike lane
Infrastructure/Structural Section					
- slope protection	- construction of RC wall	- on going	- right of way	- extended/illegal structures	- maintenance and upgrading for adopting of new engineering technology -do-
- Bridges	- construction of bridges	- 6 bridges completed, 1 on going	- reduce congestion of vehicular traffics	- RROW	
- Footing/foundation reinforcement	- retrofitting of existing foundations of public buildings	- Completed	- strengthening the structural integrity of existing bldg. structures	- Aged structures	- Do -
- Buildings	- design criteria used conformed to the structural and building code provisions	- School building/housing projects/hospital, etc (completed)	- constructed	- None -	- Do -
Infrastructure/Pasig Housing					
- Removal and relocation of ISFs on danger areas and waterways (number)	- Cleared waterways particularly	- Relocated no. of ISFs 1,461 remaining of ISFs – 2,827	- Clearing of manggahan floodway	- Proponent DPWH withdrew	- Pasig LGU to handle the clearing





Pasig City Disaster Risk Reduction and Management Plan

of ISFs – 4,288)	manggahan floodway berm areas, relocation of 4,288 ISFs		temporarily stopped no. of ISFs – 2,300	passing the responsibility back to the MMDA citing SC Mandamus	using RA 7279 as legal basis
Policy Supervision and General Monitoring/Office of the Mayor					
- Enactment of Ordinance : EO	- DRRM Ordinance, EO, BDRRM ordinance	- Approval of DRRM ordinance and EO on the DRRM plan	- Accomplished	- Need to be updated and revisited, some barangays have inactive BDRRM	- Re-organization DRRM/ BDRRM membership
➤ Capacity Building Personnel	➤ Organizational Set-up (hiring of personnel)	➤ Hired qualified personnel	➤ On going	➤ human resource dynamics needs constant upgrading of skills	➤ International benchmarking
➤ Capability Building of personnel	➤ Upgrading of skills thru seminars, workshops, conferences	➤ Installation of new systems, procured several equipment and vehicles	➤ On going, scheduling	➤ over-lapping with other seminars	➤ International benchmarking
➤ Procurement of equipment/systems	➤ Acquisition of equipment and system	➤ Improved public awareness and heightened multi-sectoral involvement	➤ On going (budget prioritization)	➤ Availability of new equipment from sources	➤ Customization of vehicles/equipment, ➤ Creation of mechanism for its utilization ➤ Improve inventory/maintenance system ➤ International benchmarking
➤ Public Awareness (paradigm shift)	➤ Fliers, info mechanisms, VMS, social media others	➤ Established rapport with media	➤ completed	➤ Cultural concerns and Filipino Mindset, uncooperative barangay officials	➤ Capacitate PIO
➤ Establishment of media links	➤ Sound and healthy media partnership	➤ partial	➤ On going (not fully utilized) more request from the public, active feedback mechanism	➤ "Envelopment"	





Pasig City Disaster Risk Reduction and Management Plan

- Energy Efficiency and intro to renewable energy	- Low carbon development, pedestrian traffic lights, accident prone areas Conversion of CFL to LED Lights		>On going - On going - ongoing	al journalism"	- Renewable energy for schools, buildings - City Hall, NGO, Schools, Offices
NGO fire and rescue volunteer	- Inclusion of MOA between LGU and NGO - MOA between NGO and National Government	- LGU funded training in Red TC, equipment donated by LGU to the NGO, fund coming from LGU, completed training for the whole CY 2016, force multiplier during disaster and emergency Continuous partnership with BFP and MMDA in responding to disasters and emergency	- Continuous talks about the needs of NGO in response equipment and training, request letter forwarded to DRRM - Still on going	- Some individuals are unable to commit their time due to the duration of training and priorities, some individuals commit but does not complete the respected training - BFP and MMDA follows and operate in a national standard w/c some NGOs are not aware	- Plans of/and making special schedules of training to cater for each individual - Willingness of each party on opening doors and give out advices to NGOs, MMDA establish MMVEC

Outcome/Thematic Area: RESPONSE					
Output					
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Social Service:					
Camp Management	<ul style="list-style-type: none"> • Effective management on Volume of Evacuees • Distribution of Food • Managing untrained Volunteers • Limitation of Media • Volume of Food Donations 	Accomplished Volunteers are with supervisions	With the assistance from different officer Monitoring and follow up Time of delivery of foods Registration of volunteers, training and refresher course Identity of volunteers (uniforms and ID's) Policy in Media Operation inside Evacuation Training on informed trauma	Space required based on National Standards (10sqm per family) Program: provision of Mobile community kitchen to address immediate needs inside evacuation Capability building training	Policy: Memorandum on suppliers and donors Ordinance on the restriction of media in their operation inside evacuation Program: provision of Mobile community kitchen to address immediate needs inside evacuation Capability building training





Pasig City Disaster Risk Reduction and Management Plan

	<ul style="list-style-type: none"> • Stress Management • Relief Distribution 		Assisted by Mayors Office Request and Preparation done in RED	and stress mgt. Restriction in the management of donations (cooked food, expiration date)	
Post Disaster Risk assessment and Intervention	Baik Probisya Program Financial Assistance Cash / Food for work Crisis Intervention Program				Personnel: Additional Worker and Volunteers
					Property: Vehicle Uniform and ID Rechargeable printers and laptop Two way radio PPE's Personal protective equipment
					Pera: Inclusion of logistics and other needs in the PPA's Resources Generation: NGA, NGO and PO's
General Police Duties Security and Search and Rescue Assistance					
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Mobilization of Personnel	Man Power from PNP, BCEO, TPMO and Action Line	Accomplished		Chain of Command	Additional Man Power and Equipment 1. Drumboat 2. Communication 3. Transportation 4. Flare 5. Life vest
Trainings				Conduct Refreshers course	
Evacuation				Ocular Inspection and Conduct of Practical Exercise	
Security				Need to be equip	
Assistance on Search and rescue recovery Operation				Modified Uniform (Reflectorize)	
Traffic Assistance					
Bureau of Fire					
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Response to all fire incidence	Fire emergency Responses				
	Rescue and First aid provision	100% responses to all fire incident	Achieved based on data	Traffic management in fire scenes Crowd Control during fire incidence in depressed areas	Coordinate with PNP and brgy. Officials for assistance during fire incidence for traffic and crowd control
					Continues upgrade of trainings, acquisition of modern fire equipment
General Supplies Office					
Activity	Agency	Accomplishment as	Remarks (If not	Gaps and Issues in	Way forward





Pasig City Disaster Risk Reduction and Management Plan

	Deliverables	of 2016 (new baseline)	accomplished state whether on-going or otherwise)	Implementation	
Logistics in terms of supplies and stock filling	Variuos Supplies and Materials Needed Gas Oil Relief goods Basic Needs Emergency equipment	Delivered and distributed Accomplished Existing MOA on different gas stations with updated balances		Lack of data needed In the case of emergency the Availability of supplies needed Execute MOA between supplier and the LGU to be able to priorities during disaster To allocate enough fund for immediate purchase of needed supplies materials and equipment	Look for more supplies groceries, stores establishment to tap in the event of emergency In the case of emergency the Availability of supplies needed Execute MOA between supplier and the LGU to be able to priorities during disaster To allocate enough fund for immediate purchase of needed supplies materials and equipment

PASIG EMERGENCY UNIT PASIG CITY SEARCH AND RESCUE

Enhancement of Emergency Medical Service Capability	POLICY: Protocol development and updating PROGRAM: DRR Preparedness, lecture and training Improve emergency response: search and rescue and emergency medical service PERSONNEL: Adequate staffing that are qualified and well trained PROPERTY: Upgrading of vehicles and equipment	On going process Continuous lecturing and training Accomplished	Continuous process of enhancing	Compliance and cooperation of the public	Proper coordination for all barangay responders. -Continuous training for local volunteers
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Outcome/Thematic Area: Recovery/Rehabilitation						
Output						
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward	
• Engineering						
Rehabilitation of roads Clearing of roads Drainage repairs	Upgrading of roads Asphalt patching Concrete blocking	Accomplished	On-going		A. Procurement of additional equipment and vehicles	
	Clearing of falling trees/debris	Accomplished	On-going			
	De clogging of drainage Repair of manholes	Accomplished	On-going		B. Provide an insurance for the deployed manpower	





Pasig City Disaster Risk Reduction and Management Plan

Repair of school buildings, day care, health center and other gov't buildings	Retrofitting/repair of affected buildings. (Roofing, windows, walls etc.)	Accomplished	On-going		
Rehabilitation of streetlights	Replacement of busted lights Rewiring of electrical wires	Accomplished	On-going		
• Livelihood					
Relocation of the affected families especially those in danger zones	Relocation site, housing, school, livelihood.	1. Off-city relocation at A. Calauan Laguna Southville 7 – 344units B. Tanay Rizal Southville 10 – 95units Eastville residences – 1661units In-city housing NHA LRB Sta. Lucia - 780units Eusebio Bliss Villages – 360units 2. Awarded sewing machines for livelihood program 3. Provided basic training on hair cutting, massage therapy, cellphone repair, silk screen, dress making, cooking and baking.	On-going	Selling of awarded units	
• Red Cross					
Psychosocial Support	Provides Psychosocial activities and assists the government during the recovery phase	Coordination with the City government and provided assistance to the survivors of fire incident			

Gaps & Issues – Special Concerns (2013-2016)

Solid Waste Management Office (SWMO)

Rationale: Citywide daily collection of solid waste is conducted by our contracted solid waste collection service provider (IPM-CDC) utilizing their trucks equipped with jingle and public address system to signal their arrival in the area of collection. Information campaign on the “Pasig Hotline and Pasig Ka-text Hotline” is widely spread. Suggestions and requests are actually solicited. As the public address states “Para sa karagdagang impormasyon, tumawag sa 643-0000 o mag-text sa Pasig Ka-text 0908-899 3333”

Activity	Agency Deliverables	Accomplishment	Gaps and issues in implementation/frequent request	Way forward
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Pasig City Disaster Risk Reduction and Management Plan

1.Response to Citizen's request, complaints and suggestions	100% request served	<p>a.) Request for solid waste collection</p> <p>b.) Illegal dumping</p> <p>c.) Request for billboard installation</p> <p>d.) Clearing/cleaning of vacant lots and waterways</p> <p>e.) Request for waste collection from Commercial establishment</p> <p>f.) Scavengers/vagrants and illegal vendors</p> <p>g.) Complaint on IPM-CDC operation</p>	<ul style="list-style-type: none"> -Establishment of Viber group (SWMO Monitoring Officer and IPM Monitoring Group linkage) -Geo-fencing and digitalized tagging via installation of GPS on each collection truck (initiated by IPM-CDC) (Program, property and Pera) -Intensify waterways monitoring and deployment of waterways Cleaners (Personnel) -Coordination with Idle land office and City Assessor's Office (Policy) -Strengthen communication with private companies and revive "solid waste management office desk" during payment of taxes (Program and Policy) -Intensify coordination and linkages with other LGU agencies (i.e; Action line, PSWD, Engineering Dept and Office of the City Building Official) (Policy) -Immediate solution is automated odor management -Long term Establish an off-site waste management facility (waste-to-energy) (Program, Policy ,Personnel, Property and Pera)
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Engineering					
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (If not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Street Lights Maintenance	Replacement of busted lights Re-installation of wiring Additional streetlights	3,477 –nos.	On-going	Vandalism Robbery Illegal tapping	Strict monitoring of Barangay and BCEO
Drainage Maintenance	Cleaning and declogging of canal Repair and replacement of canal cover	52,800 L.M	On-going	Disposal of garbage of the residents	Strict monitoring of Barangay and Green Police Upgrading of road
Evacuation Center	Construction of Multi-purpose building (evacuation center)	9 – units	On-going	Location/Area	Additional Multi-Purpose Building





Pasig City Disaster Risk Reduction and Management Plan

RELOCATION ISSUES & CONCERNS:

A. On the Clearing of Manggahan Floodway Channel

A.1. East berm Area (Brgy. Sta. Lucia) - 751 ISFs

1.1 Proponent DPWH's withdrawal

- passing the responsibility to the MMDA, citing the SC Mandamus Order.

1.2 The MMDA has yet to accept the responsibility

1.3 The unfinished 13 LRBs of the NHA (People's Plan)

- 780 ISF's are to be relocated.

1.4 Uncontrolled construction of illegal structures

- on weekends and nighttime

A.2. West Berm Areas (Brgy. Maybunga and Brgy. Rosario) - 1,549 ISFs

2.1 Has yet to have a proponent to do the clearing

- It is scheduled to enforced after the East berm has been cleared

2.2 Uncontrolled construction of illegal structures

- On weekends and during nighttime

2.3. Various associations disseminating wrong info to ISF's that Pres. Duterte will

Not allow the demolition.

2.4. Party List groups assisting the associations not to accept the relocation

A.3. Both Areas

3.1. Limited no. of Action Line demolition crew.

3.2 Requirements of RA 7279 and other National issuances.

Outcome/Thematic Area: CENRO Environment					
Output					
Activity	Agency Deliverables	Accomplishment as of 2016 (new baseline)	Remarks (if not accomplished state whether on-going or otherwise)	Gaps and Issues in Implementation	Way forward
Regular tree care and trimming	Respond to				





Pasig City Disaster Risk Reduction and Management Plan

	1. Barangays/HOAs requests	1,350 trimmed/28 dead trees cut	Accomplished	Lack of equipment / lack of personnel	* additional team created
	2. Regular care trimming	42 trees surgery			* additional equipment, manlift and vehicle
	3. Conduct tree surgery if necessary				* tree protection fee ordinance

Patient Management – Surge

Saturation Avoidance:

PCGH will implement its internal Saturation-Avoidance activities and Surge Protocols with the following criteria:

1. Simultaneous surge of patients or trauma cases (20 or more) in the Emergency Room within one hour.
 2. Increased number of patients in the ER (40 or more) within 4 hours.
 3. Increased number of admissions greater than the licensed bed capacity (more than 200).
 4. Increased percentage of staffing shortage (40 % or more).
 5. The estimated hours before exhaustion of critical hospital supplies (72 hours).

System Saturation:

1. Admitted patients are temporarily placed in the hallways but within the allowed capacity level of the wards to prevent cross-infection and maintain quality of patient care.
2. Referral to nearby hospitals, government or private, mandated with a Memorandum of Agreement under the supervision of the National Capital Regional Office, Department of Health.
3. Creation of a field hospital in vacant lots near the hospital premises.
4. Daily monitoring of the number of cases by the nursing staff with reports to the Hospital Administrator and Medical Director.
5. Review of current system activities and surge level.

Local PNP Gaps and Issues





Pasig City Disaster Risk Reduction and Management Plan

Issues that may be encountered or have been encountered by the PNP during crisis:

1. Training of Key personnel in ICS;
2. Training of SAR Teams for Pasig CPS with equipment;
3. Equipment:
 - a. Utility trucks
 - b. Drone
 - c. Command van
 - d. Mobile detention center
 - e. Response uniform
 - f. Communication

DRRMO

Fire - Additional Fire Boat Stations to be constructed in strategic areas – Gaps:
Due to revetment walls it is difficult to place substations for the boat

- Chemical incidents involving LPGs and other related gases has becoming a problem and needed additional equipment and protection to ensure the responders are safe and can manage the incident;
- High Rise fire is still a major gap at the CBD area;

Rescue - duplication or additional teams with complete equipment is still needed to upgrade and expand to make sure more team can be deployed for multiple incidents;

- Health insurance is needed for both fire and rescue personnel to ensure healthy personnel involved in high risk environment;

Command Center - fiber connectivity is still a major gap since existing technology use aerial fiber which is usually accidentally cut by vehicular accidents or cutting of trees;

- Other means of communications on the road or streets or parks is still a gap for citizens without any means of communications to call the center for an emergency;
- The area of the city is still not fully covered by CCTV and criminals tend to learn these locations and thus migrating their criminal activities to areas without CCTVs;
- Various EWS devices still needed to expand to different barangay areas and schools;
- Expansion of SMART technology is still needed

7. Other Relevant Elements

7.1. Disaster Prevention and Mitigation





Pasig City Disaster Risk Reduction and Management Plan

Under Section 3 of Republic Act 10121, disaster prevention and disaster mitigation are defined as:

Disaster Prevention – the outright avoidance of adverse impacts of hazards and related disasters. It expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance such as construction or dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high-risk zones and seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake

Disaster Mitigation – the lessening or limitation of the adverse impacts of hazards and related disasters. Mitigation measures encompass engineering techniques and hazard-resilient construction as well as improved environmental policies and public awareness

GOAL: Minimize the effects of Hazards and Mitigate its potential effects by reducing the adverse impacts of hazards and related disasters and avoid its adverse impacts. Making disaster risk reduction a priority.

OBJECTIVES

- To activate and mobilize the participation of different barangays for DRR.
- To improve traffic management, reduce vehicular accident and improve air quality; (Low carbon strategy) as part of CCA initiatives.
- To implement Pasig City's solid waste management system.
- Reduce vulnerability and exposure of communities to all hazards.
- Enhance capacities of communities to reduce their own risks and cope with the impacts of all hazards

Local institution and legal framework:

- Supporting the creation and strengthening of local integrated disaster risk reduction mechanisms such as the passing of Ordinance 18 Series of 2010 Creating the Pasig City Disaster Risk Reduction Management Office in accordance with Republic Act 10121
- Integrating risk reduction into the Local Development Plan, Land Use/Zoning and planning, including in poverty reduction strategies
- Adopting or modifying, where necessary, legislation to support disaster risk reduction, including regulations, ordinances and mechanisms that encourage compliance and that promote incentives for undertaking risk reduction and mitigation activities
- Recognizing the importance and specificity of local risk patterns and trends, decentralizing responsibilities and resources for disaster risk reduction to relevant local and barangay authorities





Pasig City Disaster Risk Reduction and Management Plan

- Mainstreaming and integration of DRRM and CCA into national, sectoral, regional and local development policies, plans, programs and budget, especially in RPFPs, PDPFPs, CDPs and CLUPs.

Reduce underlying risk factors, with activities:

1) Natural Resources and Environmental Management

- Encouraging the sustainable use and management of ecosystems, including through better land-use planning and development activities to reduce risk and vulnerabilities
- Implementing integrated environmental and natural resource management approaches that incorporate disaster risk reduction
- Promoting the integration of risk reduction associated with existing climate variability and future climate change

2) Social and Economic Development

- Promoting food security
- Integrating disaster risk reduction planning into the health sector to safeguard hospitals from disaster impacts
- Protecting and strengthening critical public facilities (schools, hospitals, power plants, etc.) to safeguard against disaster impacts
- Strengthening the implementation of social safety net mechanisms & GAD programs
- Incorporating disaster risk reduction into post-disaster recovery and rehabilitation processes
- Minimizing disaster risks and vulnerabilities caused by movement of people
- Promoting diversified income options for populations in high-risk areas to reduce their vulnerability to hazards
- Promoting the development of financial risk-sharing mechanisms such as disaster insurance
- Promoting the establishment of public-private partnerships to better engage the private sector in disaster risk reduction activities
- Developing and promoting alternative and innovative financial instruments for addressing disaster risk

3) Land Use Planning and Other Technical Regulations (See Chapter 6.2 g)

- Incorporating disaster risk assessments into the urban planning and management of disaster-prone human settlements
- Mainstreaming disaster risks into planning procedures for key infrastructure projects, including design criteria, approval and the implementation of the projects
- Developing guidelines and monitoring tools for the reduction of disaster risk in the context of land-use policy and planning
- Incorporating disaster risk assessment into urban development planning
- Encouraging the revision of existing or the development of new building codes, standards, rehabilitation and reconstruction practices

Mainstreaming DRR in Various City Government Plans and Programs:





- Impacts of risks on development programs and projects well recognized in government plans,
- Measures to reduce vulnerability and to increase capacity to cope with disasters integrated in plans, programs and projects, and
- Measures identified to ensure that programs and projects do not contribute to further risks.
- Integration of DRRM and CCA in the different environment-related policies and plans, including for land use, natural resource management

Existing city development plans and programs shall adequately address the recurring negative effects of disasters and sectoral and local plans will integrate DRR.

In order to go on with the adjustments required and further expansion to all levels, programs and projects shall be enhanced in terms of how well disaster risks are reduced and subsequently prioritized to ensure budget allocation. For example, measures to ensure that programs and projects do not contribute to further risks will be put in place and implemented adequately.

Increased disaster resiliency of infrastructure systems

Urban disasters are among the country's growing concerns in DRRM. With the exponential increase of poor people living in highly congested urban communities surrounded by old, unstable and highly vulnerable buildings, attention to how risks can be reduced in infrastructure systems need to be emphasized.

- Conduct of inventory, vulnerability and risk assessments of critical facilities
- Develop guidelines on the redesign, retrofitting or operational modifications of infrastructure
- Integration of DRRM and CCA in the building code
- Advocacy for the implementation of the building code and use of green technology

Community Centered, End-to-End monitoring, forecasting and early warning systems EWS are established and/or improved and maintained.

As defined under Republic Act 10121, EWS is the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

A Community-centered EWS consist of 4 elements:

- The knowledge of the risks;
- Monitoring, analysis and forecasting of the hazards;
- Communication or dissemination of alerts and warnings;
- and local capabilities to respond to the warnings received.





End-to-End Early Warning System emphasizes that all steps from hazard detection, monitoring, alarm & notification to community response are incorporated in the EWS.

To achieve such objectives, the city shall do the following:

- Develop and institutionalize EWS information sharing and communication systems between LGUs, communities and national government
- Develop criteria for accreditation and/or standardized EWS
- Procure equipment and establish EWS facilities
- Develop community-based and local early warning systems for various hazards

7.2. Disaster Preparedness

Under Section 3 of Republic Act 10121, disaster preparedness is defined as

Disaster Preparedness -- the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or conditions. Preparedness action is carried out within the context of DRRM and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery. Preparedness is based on a sound analysis of DRR and good linkages with early warning systems and includes such activities as contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information and associated training and field exercises. These must be supported by formal, institutional, legal and budgetary capacities.

This priority area provides for the key strategic actions that give importance to activities and programs revolving around community awareness and understanding; contingency planning; conduct of local drills and the development of a city disaster response plan and/or emergency operations plan. Likewise, in preparing our communities and governments for possible disasters, predetermined needs based on information available are crucial. Risk-related information coming from the prevention and mitigation aspect are necessary in order for the preparedness activities to be responsive to the needs of the people and situation on the ground. Also, the policies, budget and institutional mechanisms established under the P&M aspect will be further enhanced through capacity building activities, development of coordination mechanisms and the like. Through these, coordination, complementation and interoperability of work in DRRM operations and essential services will be ensured.

It should be noted that the activities under this priority area are not linear but they are cyclical and anticipate improvements over time. Behavioral change created by the preparedness aspect is eventually measured by how well people responded to the disasters. At the frontlines of preparedness are the local government units and communities. Overall, the bottom line is, having more prepared citizenry and governments. (**NDRRM Plan**)





GOAL: Building a culture of Safety and Resilience by strengthening the capacities of all stakeholders and improving risk information and early warning system enabling communities to be aware, to respond, to cope and recover from the adverse impacts of a disaster or an emergency.

OBJECTIVES:

- To provide relocation sites for informal settlers.
- Increase the level of awareness of the community to the threats and impacts of all hazards, risks and vulnerabilities
- To provide better communication system for DRRM
- Develop and implement comprehensive national and local disaster preparedness policies, plans and systems
- To provide Disaster Training Center.
- To ensure continuous operation in case of power and systems failure.
- To provide better monitoring system for DRRM.
- To develop gender-responsive disaster preparedness program in the grassroots level and To capacitate the residents and homeowners in initiating and sustaining their own disaster risk reduction and management program to help reduce the impact of hazards in their community
- To capacitate and sustain high level of skills and efficiency of city responders
- To increase level of awareness of the community to various hazards & disasters and equip the community with the necessary skills to cope with the negative impacts of a disaster
- To protect and support the disaster workers
- Increase the capacity of institutions
- Strengthen partnership among all key players and stakeholders

Activities to achieve the objectives:

Increase Community Participation

Systematically involving community in disaster risk reduction (Promoting and Implementing Community Based Disaster Risk Reduction Management), including in the process of decision-making for issues, hazard mapping, planning, implementation, monitoring and evaluation, through the creation of networking, including volunteer network, strategic human resource management, and by making legal regulations and defining responsibilities and delegation of authority.

Risk Assessment at Local Level (See Chapter 4.1 and 4.4)

- Improving, developing, updating and widely disseminating risk hazard maps and related information to decision-makers and the general public





Pasig City Disaster Risk Reduction and Management Plan

- Developing and Upgrading systems of indicators of disaster risk and vulnerability at local scales that will enable decision-makers to assess the impact of disasters
- Recording, analyzing, summarizing and disseminating statistical information on disaster occurrence, impacts and losses

Early Warning

- Developing early warning systems that are people-centered, in particular systems whose warnings are timely and understandable to those at risk and quick access and dissemination
- Establishing a Centralized Monitoring Center, periodically reviewing and maintaining information systems as part of early warning systems
- Establishing institutional capacities to ensure that early warning systems are well integrated into governmental policy and decision-making processes
- Strengthening of coordination and cooperation among all relevant sectors and actors in the early warning chain in order to achieve fully effective early warning systems including direct link to concerned agencies such as PAG-ASA and PHILVOCS
- Creating and strengthening effective early warning systems in all critical areas

Capacity (See Chapter 5)

- Supporting the development and sustainability of the infrastructure and scientific, technological, technical and institutional capacities needed to research, observe, analyze, map and forecast natural and related hazards, vulnerabilities and disaster impacts
- Supporting the development and improvement of relevant databases and the promotion of full and open exchange and dissemination of data for assessment, monitoring and early warning purposes
- Supporting the improvement of scientific and technical methods and capacities for risk assessment, monitoring and early warning, through research, partnerships, training and technical capacity building
- Establishing and strengthening the capacity to record, analyze, summarize, disseminate, and exchange statistical information and data

Emergency Regional Risks

- Compiling and standardizing statistical information and data on regional disaster risks, impacts and losses
- Cooperating regionally and internationally to assess and monitor regional and trans-boundary hazards
- Researching, analyzing and reporting long-term changes and emerging issues that might increase vulnerabilities and risks or the capacity of authorities and communities to respond to disasters

Use knowledge, innovation and education to build a culture of safety and resilience at all level, with activities:





1) Information Management and Information Exchange

- Providing easily understandable information on disaster risks and protection options, especially to residents in high-risk areas
- Strengthening networks among disaster experts, managers and planners across sectors and between regions, and creating or strengthening procedures for using available expertise in developing local risk reduction plans
- Promoting and improving dialogue and cooperation among scientific communities and practitioners working on disaster risk reduction
- Strengthening the use and implementation of updated information, information and technology for disaster risk reduction purposes
- In the medium-term, developing directories, inventories, and information exchange systems at the barangay, local, national and international levels
- Institutions dealing with urban development should provide information to the public on disaster reduction options prior to constructions, land purchase or land sale
- Updating and widely disseminating international standard terminology related to disaster risk reduction

2) Education and Training (See page 71)

- Promoting the inclusion of disaster risk reduction knowledge in relevant sections of school curricula
- Promoting the implementation of local risk assessment and disaster preparedness programs in schools and institutions of higher education
- Promoting the implementation of programs and activities in schools for learning how to minimize the effects of hazards
- Developing training and learning programs in disaster risk reduction targeted at specific sectors (development planners, emergency managers, local government officials, etc.)
- Promoting community-based training initiatives to enhance local capacities to mitigate and cope with disasters (thru CBDRM programs)and integrating DRR to GAD & Climate Change Initiative programs
- Ensuring equal access to appropriate training and educational opportunities for women and vulnerable constituencies

3) Research

- Developing improved methods for predictive multi-risk assessments and socio economic cost–benefit analysis of risk reduction actions
- Strengthening the technical and scientific capacity to develop and apply methodologies, studies and models to assess vulnerabilities to and the impact of geological, weather, water and climate-related hazards





4) Public Awareness

- Promoting the engagement of the media to stimulate a culture of disaster resilience and strong community involvement

5) Information, Education and Communication (IEC) Campaign

A comprehensive local DRR IEC program developed and implemented (See Chapter 6, page 59). There are advocacy campaigns such as “Kayang Kaya kung Sama Sama” and BE SAFE (School Awareness on Fire/Flood and Earthquake).

Dissemination of IEC materials and awareness raising of communities and organizations is essential to ensure support, participation and cooperation for reduce disaster risk. Different forms of media need to be more effectively used in communicating to issue warning and to educate people. Forms such as stickers, tarpaulin info boards, posters, flyers and handbooks (Emergency handbook) and other materials that can enhance awareness to all kinds of stakeholders.

Various technology shall also be used to disseminate IEC materials thru the internet, wireless technology and SMS blasting and various activities and programs that attracts various stakeholders. A Disaster Rescue Training Center shall be program to ensure sustainability on IEC programs of the City.

Strengthen disaster preparedness for effective emergency response at all levels, with activities: (See Chapter 6, page 57)

- Strengthening policy, technical and institutional capacities in barangay and local disaster management, including those related to technology, training, and human and material / equipment resources
- Supporting dialog, information exchange and coordination among institutions dealing with early warning, disaster risk reduction, emergency response, development and other relevant agencies
- Strengthening and when necessary developing coordinated regional approaches and creating or upgrading regional policies, operational mechanisms, plans and communication systems in the event of cross-border disasters
- Preparing or reviewing and periodically updating disaster preparedness, response and contingency plans and policies at all levels
- Promoting the establishment of emergency funds to support response, recovery and preparedness measures
- Developing specific mechanisms to engage the active participation and ownership of relevant stakeholders
- Purchasing modern rescue equipment, tools, systems and vehicles to improve response
- Construction of Fire & Rescue sub Stations in strategic areas to ensure quick response in 5 minutes or less





Developed and implemented comprehensive national and local preparedness policies, plans and systems

The actions and responses of communities and governments during disasters depend on the amount of preparedness activities they do before the disaster happens. The development and implementation of comprehensive and coordinated preparedness policies, plans and systems spell out the difference between reduced and increased risks. When the capacity of institutions is increased, response operations will become more efficient, effective, and timely (**NDRRM Plan**).

Target activities

- Develop and/or enhance and simulate scenario-based preparedness and response plans
- Develop and/or enhance ICS coordination and communication systems
- Develop and/or enhance a manual of operations for Disaster Operations Centers
- Develop and/or enhance guidelines for emergency response teams
- Develop and/or enhance agreed protocols for information gathering and reporting
- Develop and/or enhance common and integrated response assessment tools and mechanisms
- Conduct inventory of resources for disaster operations and response

7.3. Disaster Response

Republic Act 10121 defines Response as:

Disaster Response – the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Disaster response is predominantly focused on immediate and short-term needs and is sometimes called “disaster relief.”

This aspect will likewise include Early Recovery which means, under IRR Rule 2 Section 1:

Early Recovery -- multidimensional process of recovery that begins in a humanitarian setting. It is guided by development principles that seek to build on humanitarian programmes and catalyze sustainable development opportunities. It aims to generate self-sustaining, nationally-owned, resilient processes for post-crisis recovery. It encompasses the restoration of basic services, livelihoods, governance, security and rule of law, environment and social dimensions, including reintegration of displaced populations.

This priority area under the NDRRMP and PCDRRMP provides for key actions that gives importance to activities during the actual disaster response operations from needs assessment to search and rescue to relief operations to early recovery activities. The activities identified below will either be done before the actual response operations or





Pasig City Disaster Risk Reduction and Management Plan

during. For those activities which need to be completed prior actual response operations, they will be linked to the activities earlier identified in the preparedness aspect. Overall, the success and realization of this aspect rely heavily on the completion of the activities under both the prevention and mitigation and preparedness aspects (**NDRRM Plan**).

GOAL: Strengthening preparedness for response by continuous provisions of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

OBJECTIVES:

- Able to address medical needs and hospitalization of affected and injured victims and management of the dead.
- To be able to provide prompt and quick response.
- To Pre Position Disaster Responders and Support Management in impending Typhoon and Pre evacuation
- To decrease the number of preventable deaths and injuries
- To provide basic subsistence needs of affected population
- To immediately restore basic social services

To achieve these objectives, the PCDRRMP identified the following outcomes:

Well-established disaster response and relief operations

Key to effective disaster response operations is the recognition of the importance of a seamless flow of information especially during calamities. This will ensure that reliable, accurate data are collected and shared in a timely manner in order to contribute to effective disaster response operations (**NDRRM Plan**).

Target activities

- Activation of the Incident Command Systems (ICS) and C3 at local levels
- Issuances of public advisories in accordance with protocols developed
- Establishment of coordination systems for effective and efficient relief and response operations
- Activation of relief distribution points/centers
- Modernization & Redundancy Communications Plan & System

The PCDRRMO shall formulate standard operating procedures and Emergency Operations Plan (SOPs and EOPs) on effective responses will make interventions meaningful and resource spending cost effective. Such SOPs shall be based from NDRRMCs guidelines and International standards. Holding of dialogues and exchanging information to strengthen coordination between disaster practitioners and development workers will be scheduled. The approach includes utilizing volunteerism and participation in order to make disaster response more effective.





Adequate and prompt assessment of needs and damages

Adequate and prompt assessment of damage and needs during and after a disaster is called for. Accordingly, this includes a time frame (i.e., 24-48 hrs.) for damage and needs analysis (DANA) to be considered as “rapid.” In order to gather data, interviews, ocular inspection and creation of reports are among the key activities. In order to promptly produce and submit DANA Report, a DANA Team must be pre-created during normal times (under preparedness) and activated during disasters. The effectiveness of disaster response operations lie on the efficient and prompt information collection, consolidation, analysis, and use (**NDRRM Plan**).

Target activities

- Activation of assessment teams at all levels
- Conduct assessment using the latest DANA tool and use of the information by the appropriate DRRM council
- Use of technology (e.g. smart phone e-tool) in assessment
- ***Procedures to Exchange Relevant Information during Hazard Events and Disasters, and to Undertake Post-event Reviews.*** During disaster or hazard events, important information is exchanged among the key stakeholders on response and relief. The Pasig C3 operates and maintains the PCDRRMO Operations Center, a 24/7 facility with well trained staff equipped with wireless technology, computer aided dispatch system, GIS, GPS, equipment, stable systems, and sound procedures. The PCDRRMO's Pasig C3 is activated into a 24/7 Emergency Operations Center (EOC) accepting all types of emergency calls including non-emergency calls. All PCDRRMC member-agencies with disaster response mandate are required to send focal persons to the facility during major disasters to speed up coordination and information management. The facility is linked with local, barangay and national responders to speed up response and to cope up with the given scenario.

The Pasig C3 needs a rapid disaster assessment and coordination system, with a reliable telecommunication infrastructure from the usual telephone lines, PABX, radio communication (VHF-UHF), wireless radio, IP communications, satellite phone, SMS, internet and Digital type communications. It will aim to develop feedback mechanism between barangays and the city.

The telecommunication infrastructure of the Pasig C3 and its information management system shall be constantly reviewed and updated as new lessons are learned with every disaster. PCDRRMC thru PCDRRMO shall formulate a standard data gathering methods among the members to ensure quality and synchronized procedures.

Integrated and coordinated Search, Rescue and Retrieval (SRR) capacity

Management of the dead and missing may be one of the most difficult aspects under disaster response. It has deep and long-lasting impact to victims, survivors, families, and





Pasig City Disaster Risk Reduction and Management Plan

communities. Accordingly, the care of the dead and missing must never be overlooked in disaster planning. There must be integrated and coordinated services for the dead and missing to ensure that the dead maintain its dignity and the missing found. (**NDRRM Plan**)

Target activities

- Develop and implement systems for SRR with concerned agencies and Barangay Responders
- Creation of Disaster Victim Identification (DVI) teams;
- Identification of Cold Storage for Temporary holding of the dead
- Identification of area for Mass Grave

Safe and timely Evacuation of affected communities & Temporary Shelters with Basic Social Services provided to affected families

The decision to evacuate an area must be done promptly. Timing is essential to an orderly, safe, and effective evacuation. Authorities must ensure that no person gets stranded; all those who want/need evacuation must be attended to. Though timing is essential, it is not only the factor that contributes to successful evacuation operations. The availability of logistics is also a key consideration; the scale of disaster itself (e.g., inclement weather) is also important. Accordingly, there must be regular coordination with relevant agencies to ensure seamless activation of evacuation system/procedures (**NDRRM Plan**).

Target activities

- Activate an evacuation system and/or set of procedures
- Identification of standard-based relief shelters and sites
- Provision of tents and other temporary shelter facilities
- Development and implementation of a set of minimum standards on temporary shelters
- Establishment of child-friendly spaces and other learning areas in the evacuation centers
- Provision of spaces for people's livestock, poultry and pets in the Ecs
- Conduct of livelihood-oriented activities for internally displaced persons
- Conduct of medical consultation and nutritional assessment
- Assessment of water quality and conduct of quick damage repairs and road clearing operations
- Determination of existing and available hospital services
- Immediate restoration of lifelines
- Purchase of Mobile Water Treatment units
- Formulate and Implement Pre Mobilization Plans and Procedures for Pre Positioning and Preparations for impending Typhoons

7.4. Rehabilitation and Recovery

Under Section 3 of Republic Act 10121, rehabilitation and recovery are defined as





Rehabilitation – measures that ensure the ability of affected communities and/or areas to restore their normal level of functioning by rebuilding livelihood and damaged infrastructure and increasing the communities' organizational capacity

IRR Rule 2 Section 1

(ee) *Post Disaster Recovery* – the restoration and improvement where appropriate, of facilities, livelihood and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors, in accordance with the principles of "build back better"

The Rehabilitation and Recovery aspect of DRRM cover areas like employment and livelihoods, infrastructure and lifeline facilities, housing and resettlement, among others. These are recovery efforts done when people are already outside of the evacuation centers (**NDRRM Plan**).

GOAL: Achieve fast and resilient restoration actions, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors and a stronger organizational capacities of communities.

OBJECTIVES:

- To provide an adequate access of documents for various stakeholders.
- To be able Emergency Personnel to provide prompt and quick response with protection and support
- To restore people's means of livelihood and continuity of economic activities and business
- To restore shelter and other buildings/installation
- To reconstruct infrastructure and other public utilities;
- To assist in the physical and psychological rehabilitation of persons who suffered from the effects of disaster

DRR Integrated into Post-disaster Recovery and Rehabilitation Process.

The cluster or ESF approach will be used and followed by the PCDRRMC which can provide a forum for all stakeholders' concerns (for example, education) to be proactive in terms of all phases of DRM. Regular Cluster or ESF (Emergency Support Function) meetings shall be made to increase the prospects for DRR integration in the disaster cycle, including rehabilitation and recovery.

The use of cluster or ESF approach aims to enhance coordinative capacities and preparedness for post-disaster and recovery which shall be active to engaged not only during and after disasters.

Financial Reserves and Contingency Mechanisms - Establishment of Emergency Funds and Early Recovery Programs





Proposed capital expenditure for pre-disaster operation, priority is given to emergency relief operations, and repair, rehabilitation and reconstruction of public infrastructure and lifelines damaged by disasters.

On Funds. Submission of programming and reports relating to the LDRRMF by the PCDRRMO through the PCDRRMC and the Local Development Council to the Sanggunian Panlunsod (sec. 12.c.7) and to COA. Monitoring of release, utilization, accounting and auditing of the LDRRMF in accordance with the guidelines and procedures provided by the NDRRMC (Sec. 6.i).

The DRRM Fund will be used for DRRM and will be used to implement the PCDRRM Plan. Thirty percent (30%) of the fund shall be set aside as Quick Response Fund (QRF) for relief and recovery programs (Sec. 21 par 1; Sec.22 a & c) Unexpended PCDRRM Fund goes to a trust fund which will be used solely for DRRM activities of the PCDRRMC within the next five (5) years.

Creation of a task force to prepare, document and submit the Pasig City Comprehensive Disaster Recovery Plan which will cover government employees and various stakeholders.

Enroll all personnel involved in disaster program in a life or health insurance policy and all other equipment related to DRR in a non-life policy as part of early recovery programs for emergency workers.

Immediately after a disaster the following activities shall be taken and handled by various clusters or ESFs:

- Conduct of post-DANA
- Develop and implement a system for early recovery, to include specific activities addressing the needs identified
- Develop partnership mechanisms with utility providers and key stakeholders
- Design and implement temporary livelihood and/or income generating activities (i.e., cash/ food for work; micro and small enterprise recovery)
- Create programs to ensure people affected by a disaster be able to return back to normal and more secure

DRR and climate change resilient infrastructure constructed/reconstructed and Human Settlements

This is about the development of disaster-resilient housing designs and introduction of improved and modernized building systems and programs. It also includes, among others, the identification of safe and secure relocation sites for people displaced by natural and human-induced disaster of those living in hazardous areas.





Pasig City Disaster Risk Reduction and Management Plan

Long term recovery ensures that the rehabilitation or reconstruction of infrastructures is disaster and climate-proof.

Target activities

- Undertake the necessary rehabilitation or repair of damaged infrastructure
- Implement the building code and promote green technology
- Conduct monitoring and/or tracking of approval of infrastructure projects and permits
- Design and construct disaster resilient housing
- Identify and provide suitable relocation sites for affected population
- Conduct trainings for social preparation of host communities and those who will be relocated to reduce conflict
- Submit proposals and copies of Pasig Recovery Plans to international financing institutions like JICA, ADB, AUSAID, KOICA, USAID in building disaster preventive infrastructures and programs like desilting of Pasig-Marikina river and other waterways
- Legislation of an ordinance penalizing non-compliance to Building Code for Strict implementation of approved engineering design for the construction of disaster resilient housing and other infrastructures





8. Plan Implementation, Monitoring and Evaluation

Pasig City DRRM Plan shall serve as a guideline for early prevention of disasters. The implementation of the Plan will be done in synergy with the long and medium-term city development plans. This effort calls for serious, concerted and consistent commitment of all relevant stakeholders.

a. Indicators

Megacity Indicator System for Pasig

The Megacity Indicator System intends to present the rationale, structure, and evaluation of the direct impacts of floods and earthquakes on the population and built environment of Pasig by employing a number of physical risk indicators based on the hazard, vulnerability and risk analysis (HVRA) study conducted by EMI for Pasig.¹⁹ For a holistic view of risk, additional indicators pertaining to the vulnerabilities and coping capacities in Pasig were also considered. This report also discusses and presents the results for the thirty (30) barangays in Pasig.

UDRI Key Results

Urban Disaster Risk Index (UDRI)

UDRI is the combination of the aggravating coefficient (F) and Physical Risk (R_F) which are computed based on the expression below:

$$UDRI = \sum_{i=1}^n R_{F_i} \times (1 + F_i)$$

*The Aggregating coefficient or F is the weighted aggregation of the impact indicators such as Population Density, Vulnerable Population, Social Disparity, Crime Rate, Infant Mortality Rate, Hospital Beds, Health Human Resources, Public Space and Development Level. While the Physical Risk (R_F) is the additive aggregation of the earthquake risk indicators and flood risk indicators.

Using the above formula, the barangays were ranked according to the most exposed to earthquake (left) and flood (right) risks as shown in the figure below. The direct impact of floods and earthquakes are shown in red bar, while the impact factor is shown in green. **The barangays with the highest UDRI score for both earthquakes and floods are Manggahan, Rosario, Santolan, Maybunga, Sta. Lucia and Dela Paz.**

¹⁹ Draft Urban Disaster Risk Indicators, EMI, August 2012





Pasig City Disaster Risk Reduction and Management Plan

Giving earthquake and flood events equal importance (respective weights of 0.5 each) a combined direct risk ranking is obtained which is shown in Figure 26.

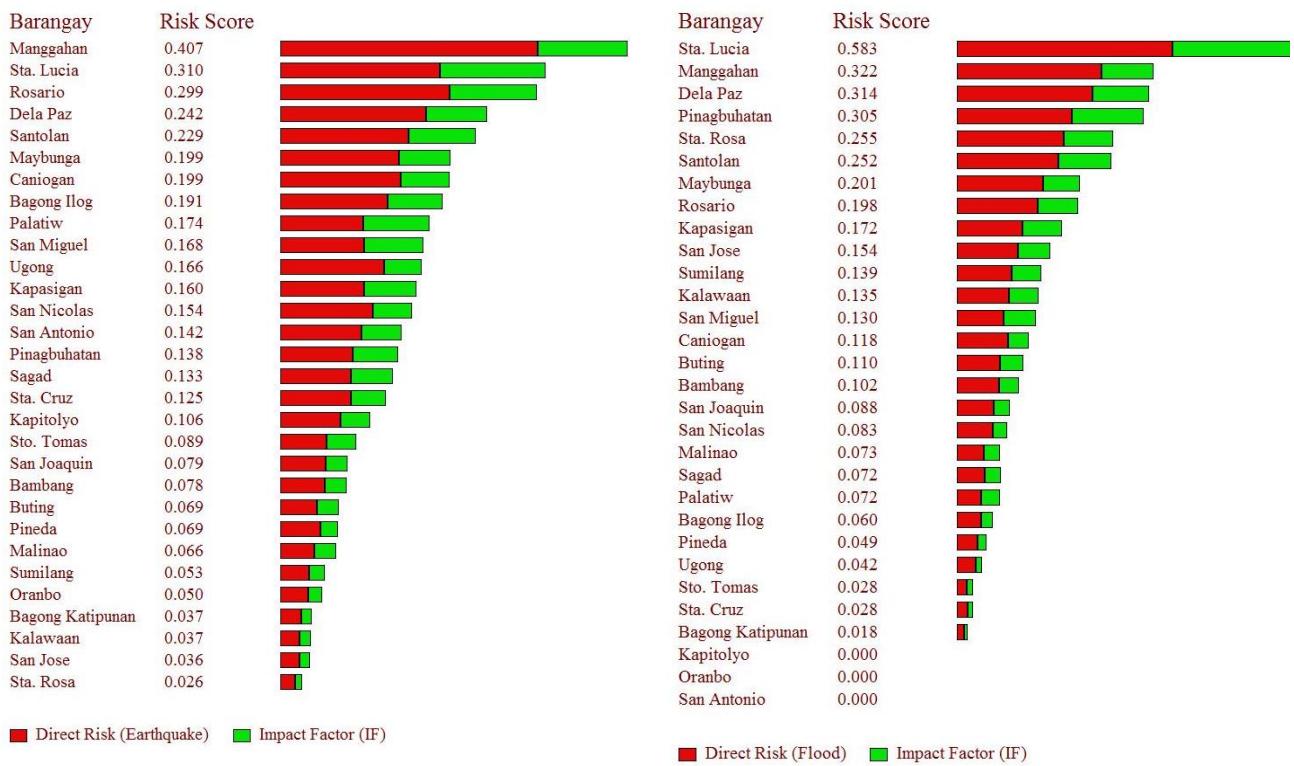


Figure 25. UDRI ranking for Barangays in Pasig with respect to earthquake impact scenario (left) and flood susceptibility (right)





Pasig City Disaster Risk Reduction and Management Plan

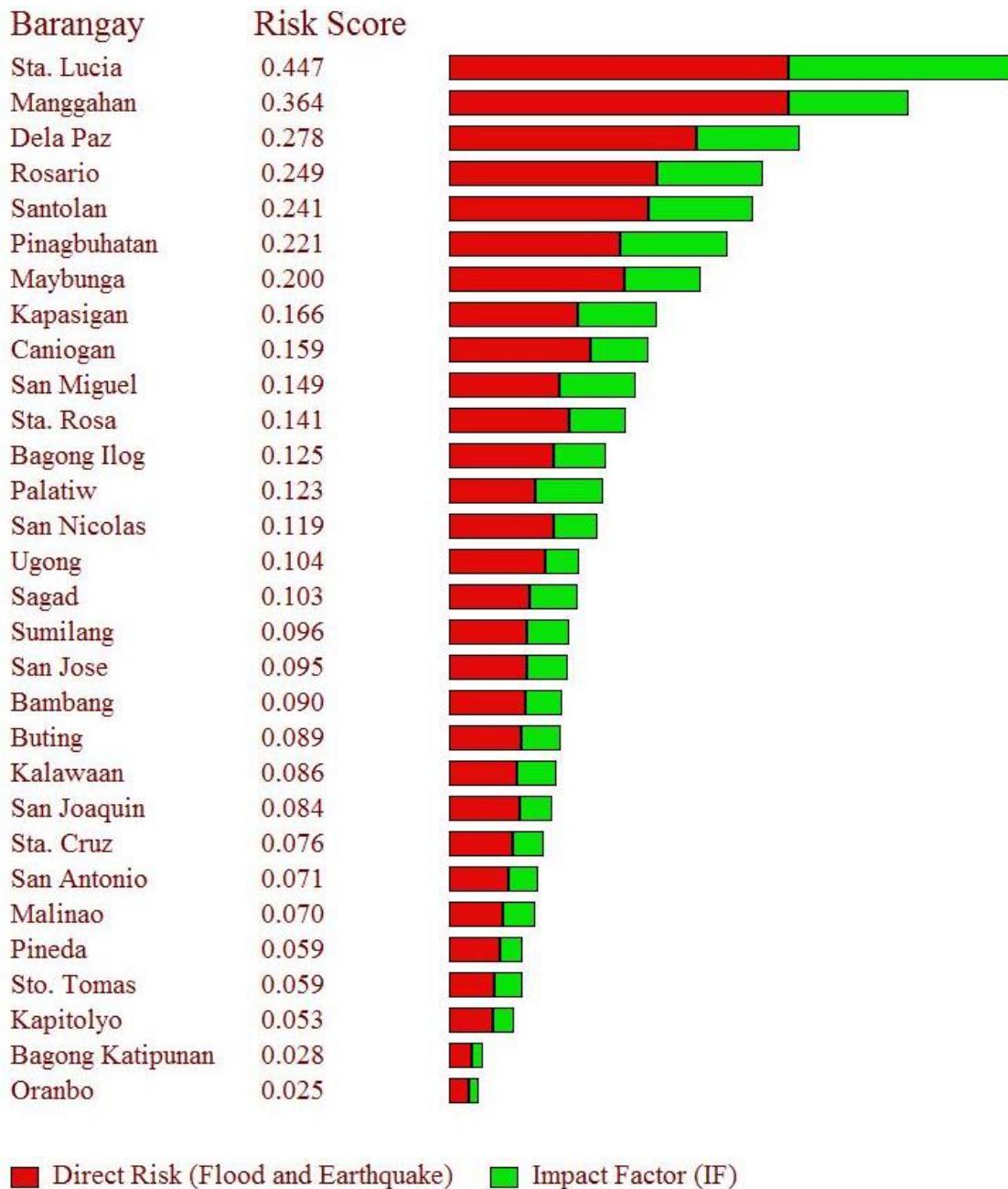


Figure 26. Combined (earthquake and flood) UDRI rankings for all Barangays in Pasig. Physical Risk (Red) and Impact Factor (Green)

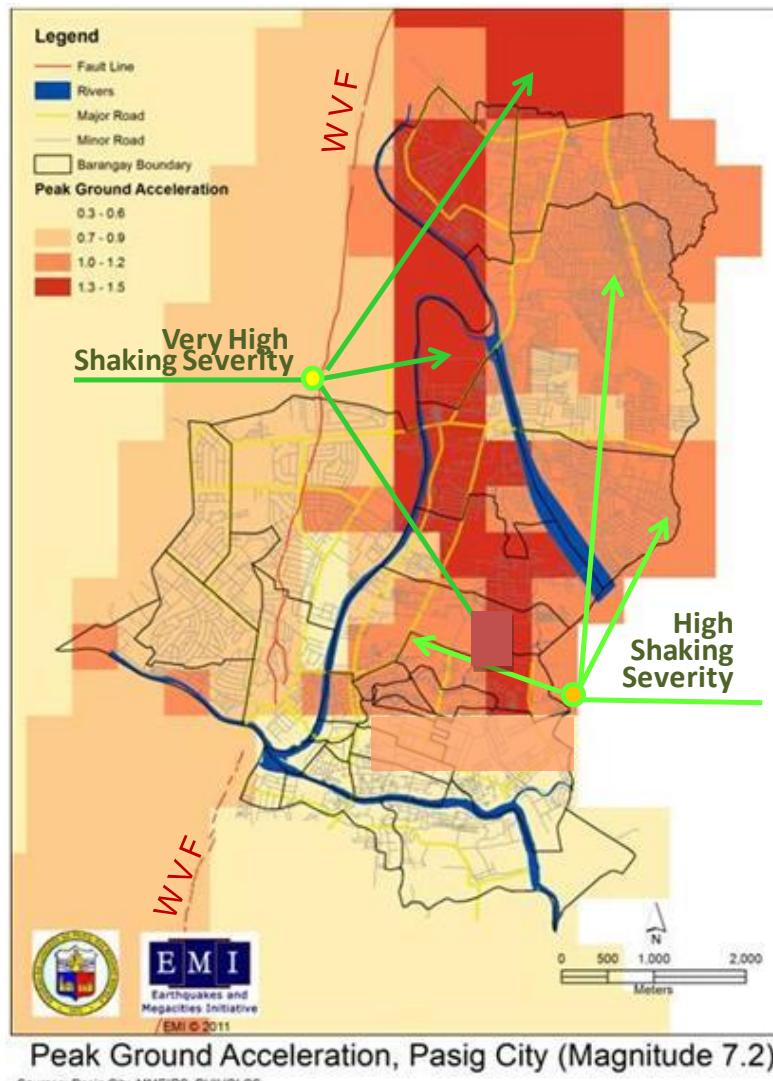
Physical Risk Index

The Physical Risk Index for earthquakes was developed based on the *M7.2 earthquake on the West Valley Fault (MMEIRS Model 8)*. Experts believe that the West Valley Fault (WVF) has built up significant strain since the last earthquake more than 350 years ago to enter into an active state and generate another strong earthquake soon in the future. The West Valley Fault could also trigger an earthquake of smaller magnitude than 7.2 – probably more likely than M7.2, but the M7.2 is considered a worst case scenario and is the scenario that causes the most damage and losses for Pasig which is used here for developing the earthquake risk indicators (Figure 26).





Pasig City Disaster Risk Reduction and Management Plan



Sources: Pasig City, MMEIRS, PHIVOLCS

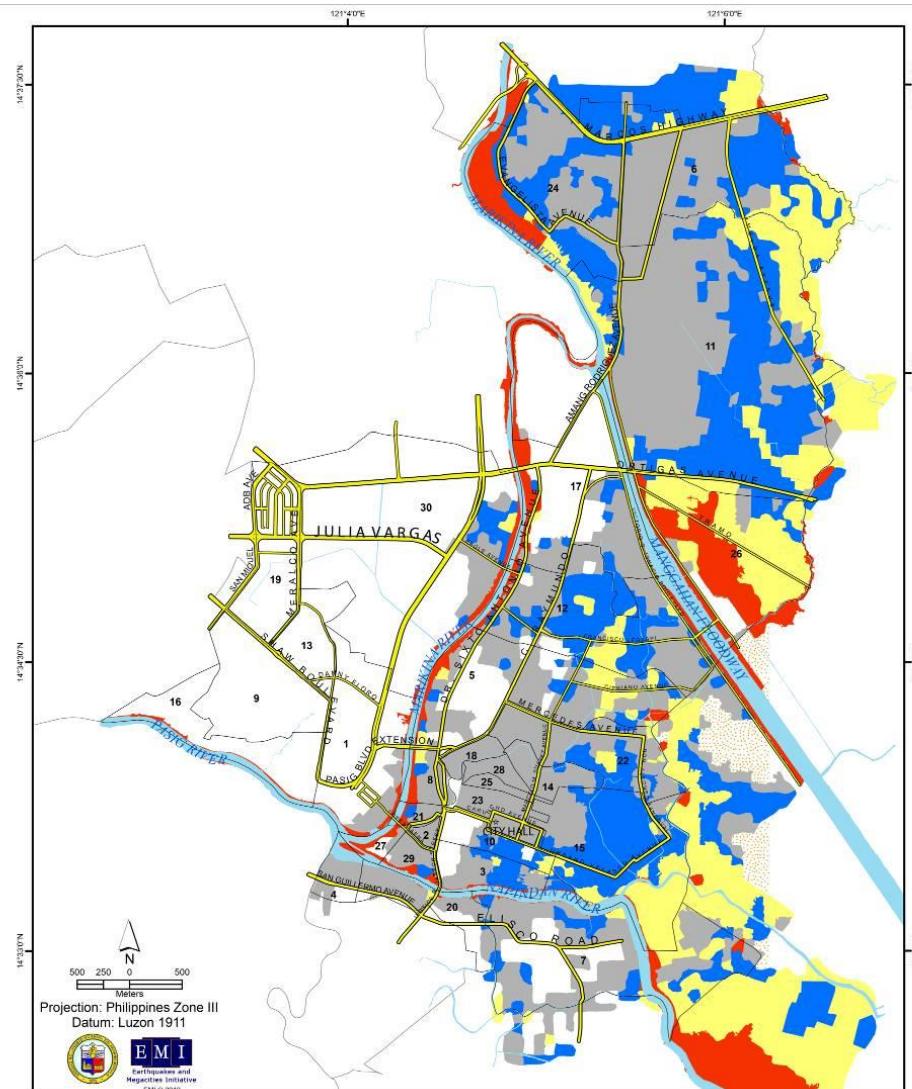
Figure 27. Shaking Severity Distribution in Pasig (represented in terms of peak ground acceleration or PGA)
(source: MMEIRS Study)

The Physical Risk Index for floods was based on the EMI flood susceptibility map of Pasig which draws heavily on the observations of the 2009 Ondoy flood and the 100-year and 200-year flood hazard scenarios from the Master Plan for Flood Management in Metro Manila and Surrounding Areas from the World Bank, courtesy of DPWH shown in Figure Figure 28 (see EMI report for details of study).





Pasig City Disaster Risk Reduction and Management Plan



Flood Susceptibility

based on Observed Ondoy Flood Situation and Master Plan for Flood Management in Metro Manila and Surrounding Areas (2012)



Figure 28. Flood Susceptibility Map in Pasig (represented in terms of very low to high flood susceptibility based on repeat of 2009 Ondoy floods and the flood hazard scenarios from the Master Plan for Flood Management in Metro Manila and Surrounding Areas from the World Bank, courtesy of DPWH.

For the ranking of Barangays in Pasig based on the direct impact of the earthquake and flood, four (4) key indicators representing the impact of each of the respective hazards on population, roads, critical facilities and high loss potential facilities in Pasig were selected. As the impact on population is highly correlated with the impact on buildings, this indicator was left out in order not to duplicate its effect. Following the UDRI Framework and approach, contributing factors were normalized using the transformation functions to obtain the rankings of direct impact of earthquakes (Figure 29) and floods (Figure 30).





Pasig City Disaster Risk Reduction and Management Plan

The top five Barangays in terms of earthquake impact : Manggahan, Rosario, Maybunga, Sta. Lucia, Dela Paz and Santolan,. Four of these Barangays – Sta. Lucia, Manggahan, Dela Paz and Santolan - also are ranked as the top five in terms of Flood impact.

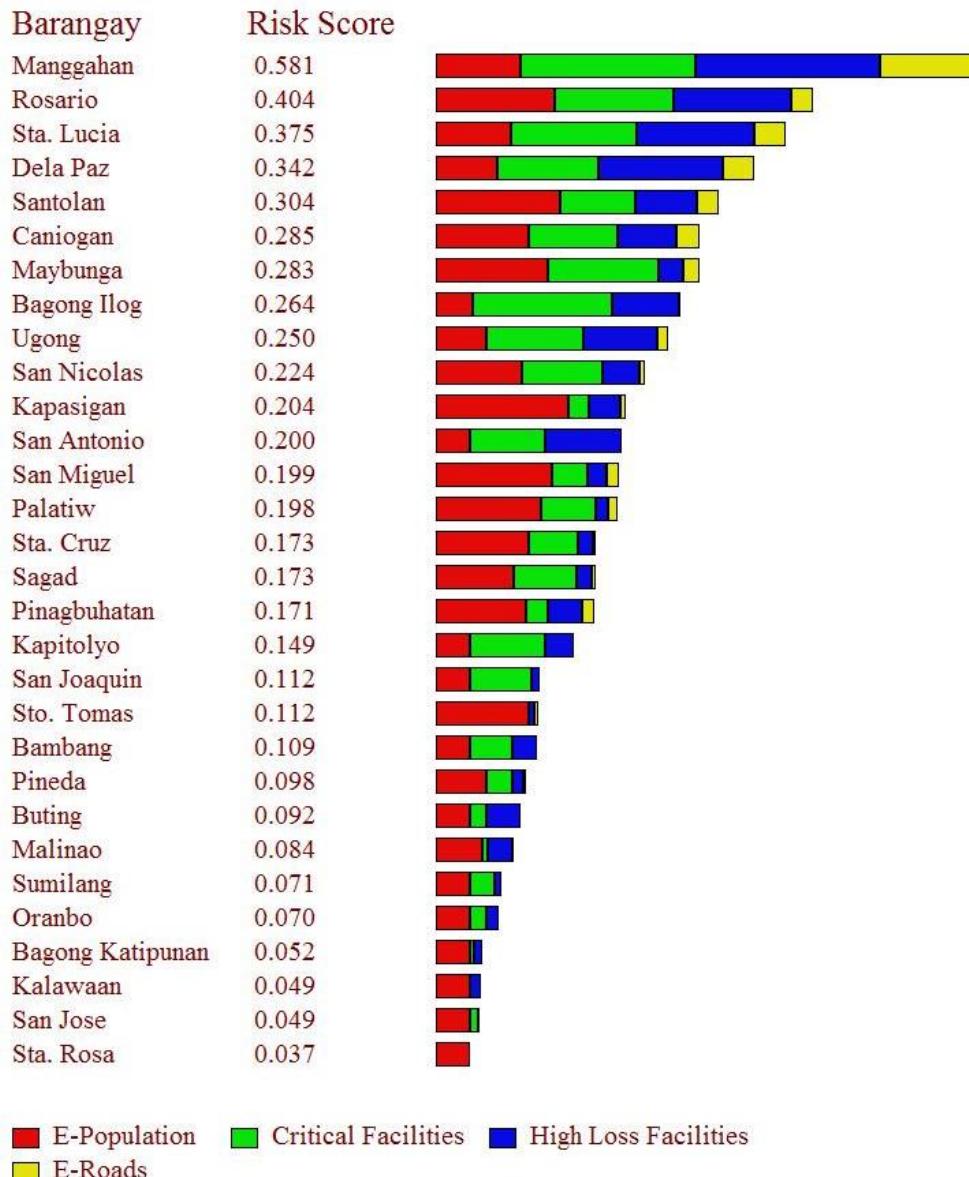


Figure 29.Ranking of Barangays in Pasig based on Earthquake Impact.





Pasig City Disaster Risk Reduction and Management Plan

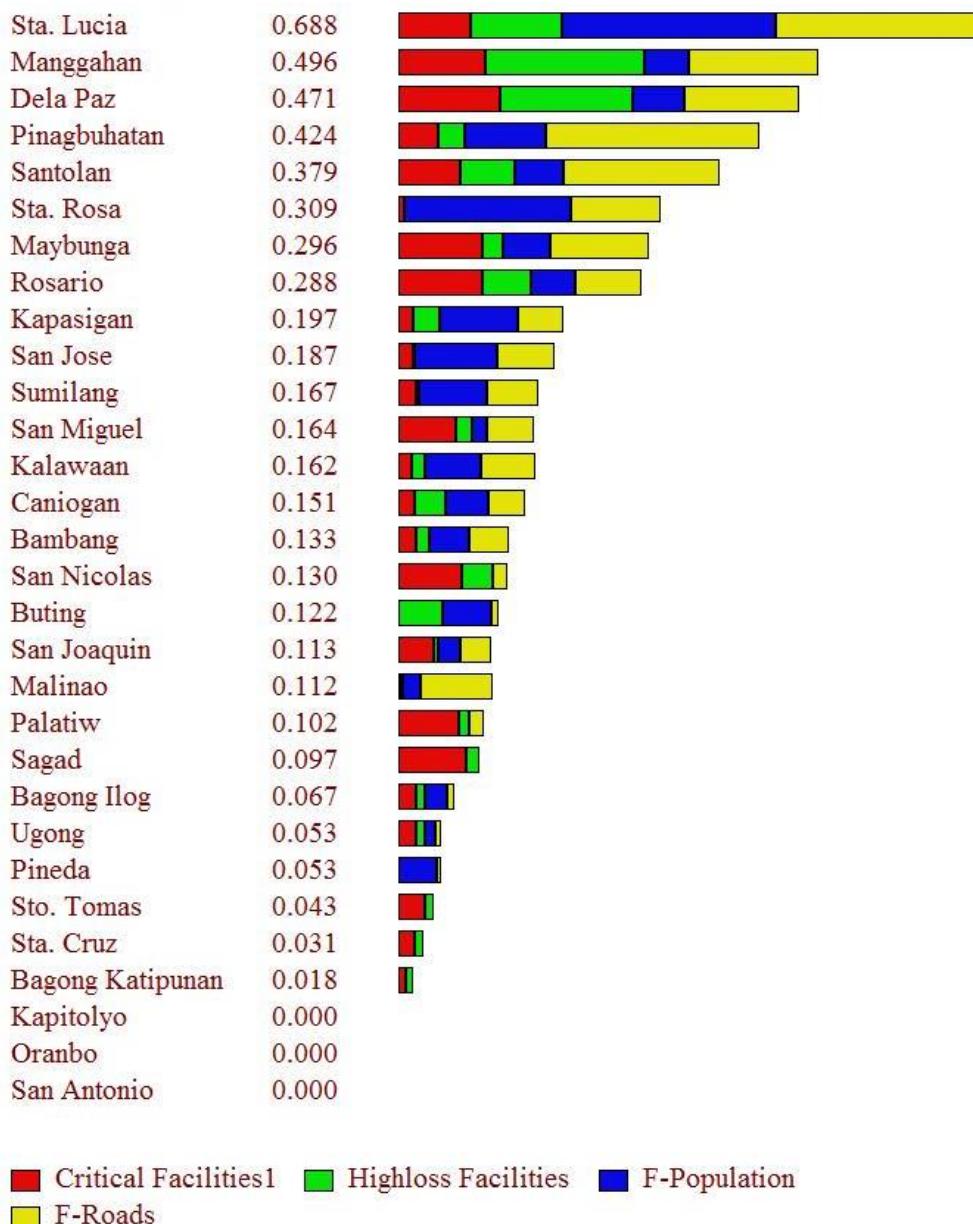


Figure 30. Ranking of Barangays in Pasig based on Flood Impact

The composite index for critical facilities and high loss potential facilities is obtained through a number of sub-indicators belonging to each category. For both floods and earthquakes, the facilities that were considered to be critical are the following: hospitals, clinics, health centers, police stations, fire stations, gas stations and power stations. The impact to a number of facilities, such as schools, markets, malls and churches was also considered to obtain the composite index for impact on high loss facilities in Pasig for earthquakes and floods. The ranking of all Barangays with respect to these two composite indexes is shown in Figure 31 and Figure 32.





Pasig City Disaster Risk Reduction and Management Plan

Critical Facilities – Earthquake Impact

Manggahan	0.701
Bagong Ilog	0.544
Maybunga	0.501
Rosario	0.456
Sta. Lucia	0.448
Ugong	0.442
Dela Paz	0.437
San Nicolas	0.369
Caniogan	0.367
San Antonio	0.361
Kapitolyo	0.281
Santolan	0.257
Palatiw	0.256
Sagad	0.237
San Joaquin	0.219
Bambang	0.219
Sta. Cruz	0.156
Pinagbuhanan	0.111
Pineda	0.092
Sumilang	0.090
Kapasigan	0.084
San Miguel	0.066
San Jose	0.052
Buting	0.040
Oranbo	0.040
Malinao	0.008
Bagong Katipunan	0.006
Kalawaan	0.000
Sta. Rosa	0.000
Sto. Tomas	0.000

█ E-Hospitals1 █ E-Police █ E-Fire
█ E-Power █ E-Health Centers █ E-Clinics
█ E-Gas Stations

High Loss Potential Facilities – Earthquake Impact

Manggahan	0.750
Dela Paz	0.508
Rosario	0.479
Sta. Lucia	0.478
San Antonio	0.315
Ugong	0.303
Bagong Ilog	0.274
Santolan	0.251
Caniogan	0.240
San Nicolas	0.149
Pinagbuhanan	0.139
Buting	0.138
Kapasigan	0.130
Kapitolyo	0.121
Maybunga	0.102
Bambang	0.100
Malinao	0.100
San Miguel	0.082
Sagad	0.065
Sta. Cruz	0.063
Oranbo	0.055
Palatiw	0.055
Pineda	0.047
Kalawaan	0.045
Bagong Katipunan	0.037
San Joaquin	0.037
Sumilang	0.029
Sto. Tomas	0.027
San Jose	0.010
Sta. Rosa	0.000

█ E-Schools █ E-Markets █ E-Malls
█ E-Churches

Manggahan	0.701
Bagong Ilog	0.544
Maybunga	0.501
Rosario	0.456
Sta. Lucia	0.448
Ugong	0.442
Dela Paz	0.437
San Nicolas	0.369
Caniogan	0.367
San Antonio	0.361
Kapitolyo	0.281
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Kapasigan	0.084
San Miguel	0.066
San Jose	0.052
Buting	0.040
Oranbo	0.040
Malinao	0.008
Bagong Katipunan	0.006
Kalawaan	0.000
Sta. Rosa	0.000
Sto. Tomas	0.000

█ E-Hospitals1 █ E-Police █ E-Fire
█ E-Power █ E-Health Centers █ E-Clinics
█ E-Gas Stations

Manggahan	0.750
Dela Paz	0.508
Rosario	0.479
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San Joaquin	0.037
Sumilang	0.029
Sto. Tomas	0.027
San Jose	0.010
Sta. Rosa	0.000

█ E-Schools █ E-Markets █ E-Malls
█ E-Churches

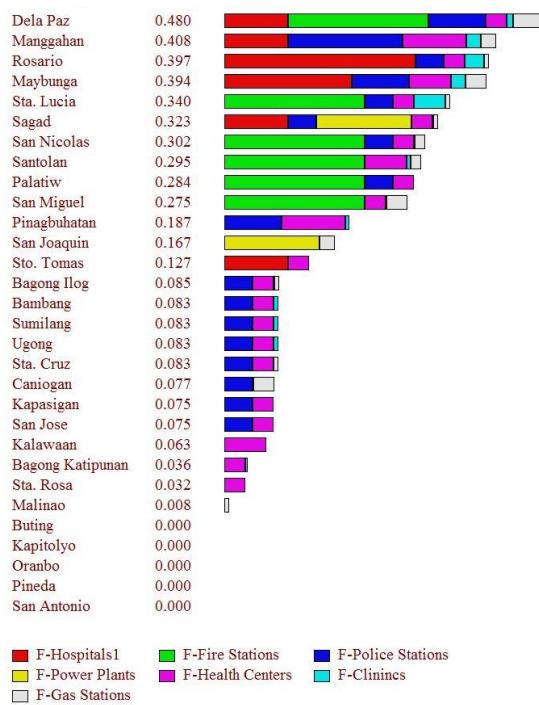
Figure 31. Ranking of Earthquake Impact on Critical Facilities (Left) and High Loss Potential Facilities (Right)





Pasig City Disaster Risk Reduction and Management Plan

Critical Facilities – Flood Impact



High Loss Potential Facilities – Flood Impact

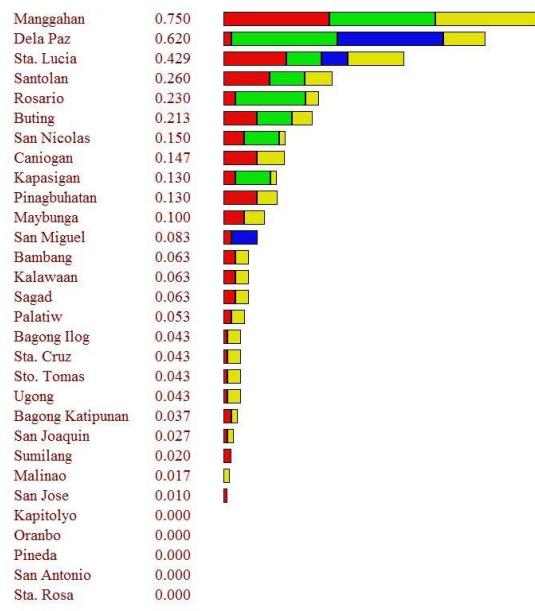
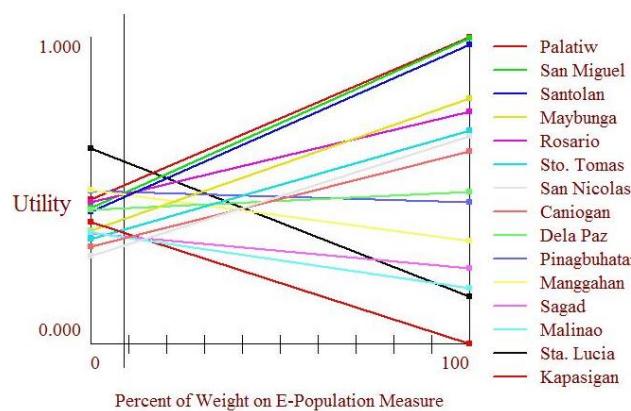


Figure 32. Ranking of Flood Impact on Critical Facilities (Left) and High Loss Potential Facilities (Right)

It should be noted that the elicitation of weights is a subjective process. The ranking obtained can change depending on the assignment of weights to each indicator or sub-indicator. The corollary is that Barngays with a steep downward slope (e.g., Sta. Lucia and Kapasigan for earthquakes and San Nicolas, Sto Thomas and Palatiw for floods) will obtain lower risk rankings if all the weight is shifted only to the ‘Population Affected’ indicators as in these Barangays the population is minimally affected for the respective hazard types.

Critical Facilities – Flood Impact



High Loss Potential Facilities – Flood Impact

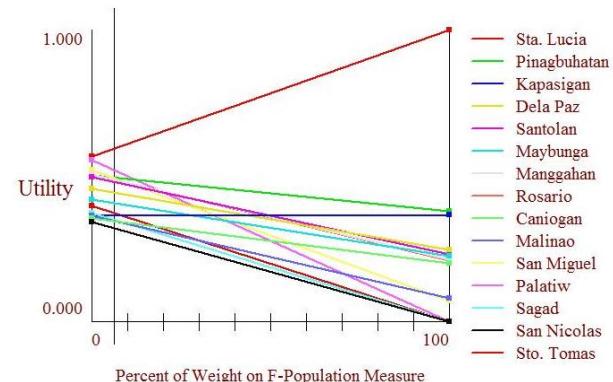


Figure 33. Sensitivity Graph showing changes in rankings of Barngays based on different weight assignment to the “Population Affected” indicator for earthquakes (left) and flood (right) hazard.



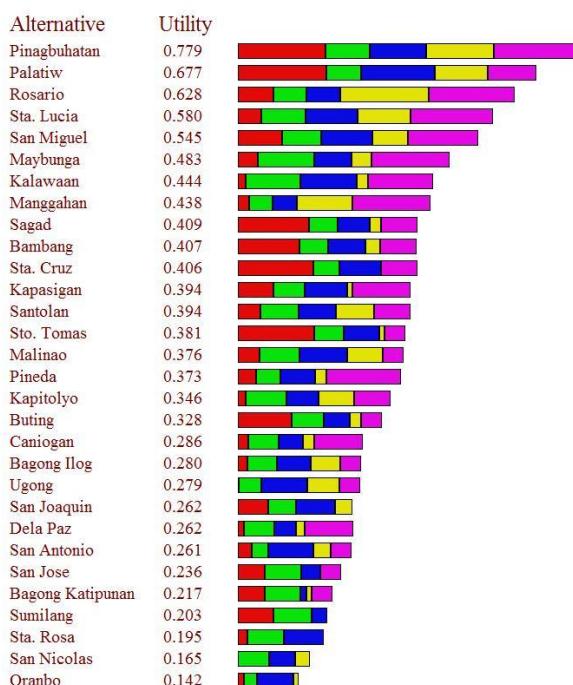


Pasig City Disaster Risk Reduction and Management Plan

Impact Factors

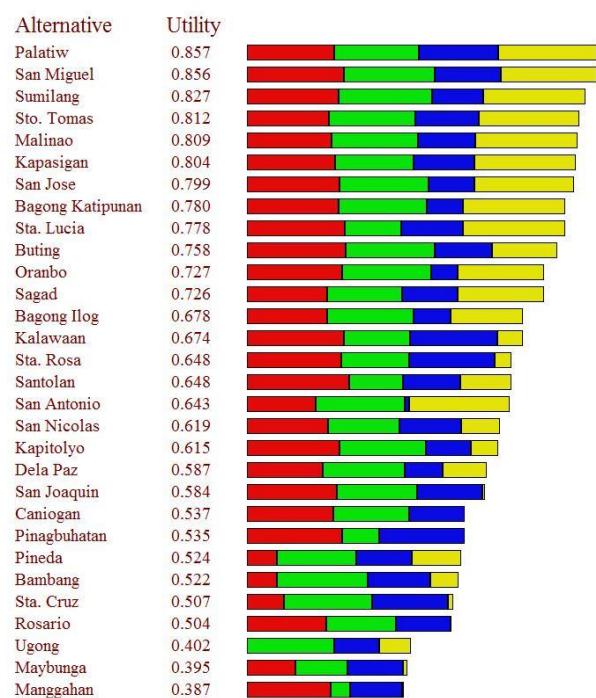
The rankings of the social fragility indicator group and coping capacity indicator group are plotted in Figure 29. In order to add the social fragility and coping capacity score together, an inverse relationship is used for coping capacity such that the Barangays with the lowest coping capacity receive the lowest score. It can be seen in Figure 34 that the top two Barangays with the lowest coping capacity – Palatiw and San Miguel – also show up in the top for indicators with the highest social fragility. It can also be seen that different indicators contribute in different measures to the overall ranking as determined by their weight and value. Needless to say, the selection of importance weights influences directly the overall results. The implementation of the indicators in the workshop will need to validate the ‘borrowed’ weight assignments in this initial implementation to obtain the final ranking results from a consensus weight assigned by the stakeholders.

Ranking for Social Fragility Goal



■ Population Density ■ Vulnerable Population ■ Social Disparity
■ Crime Index ■ Infant Mortality Rate

Ranking for Coping Capacity Goal



■ Hospital Beds ■ Health Human Resources ■ Development Level
■ Rescue Area (sqm)

Figure 34. Ranking of the Social Fragility Index (Left) and (lack of) Coping capacity Index (Right)

Population Density (FS1)

Population density is considered to be an important proxy measure in aggravating the impact of physical damage. This indicator is estimated as the ratio of the 2007 population of Pasig (Source National Statistics Office Census Data) and the land area of each. The overall impact and social losses in a community tend to be a culmination of various interrelated physical and social factors rather than being a linear function of damage alone. Using population density as one of the main indicators for social fragility introduces a proxy for the aggravation of indirect impacts of damage which are larger in denser and more crowded

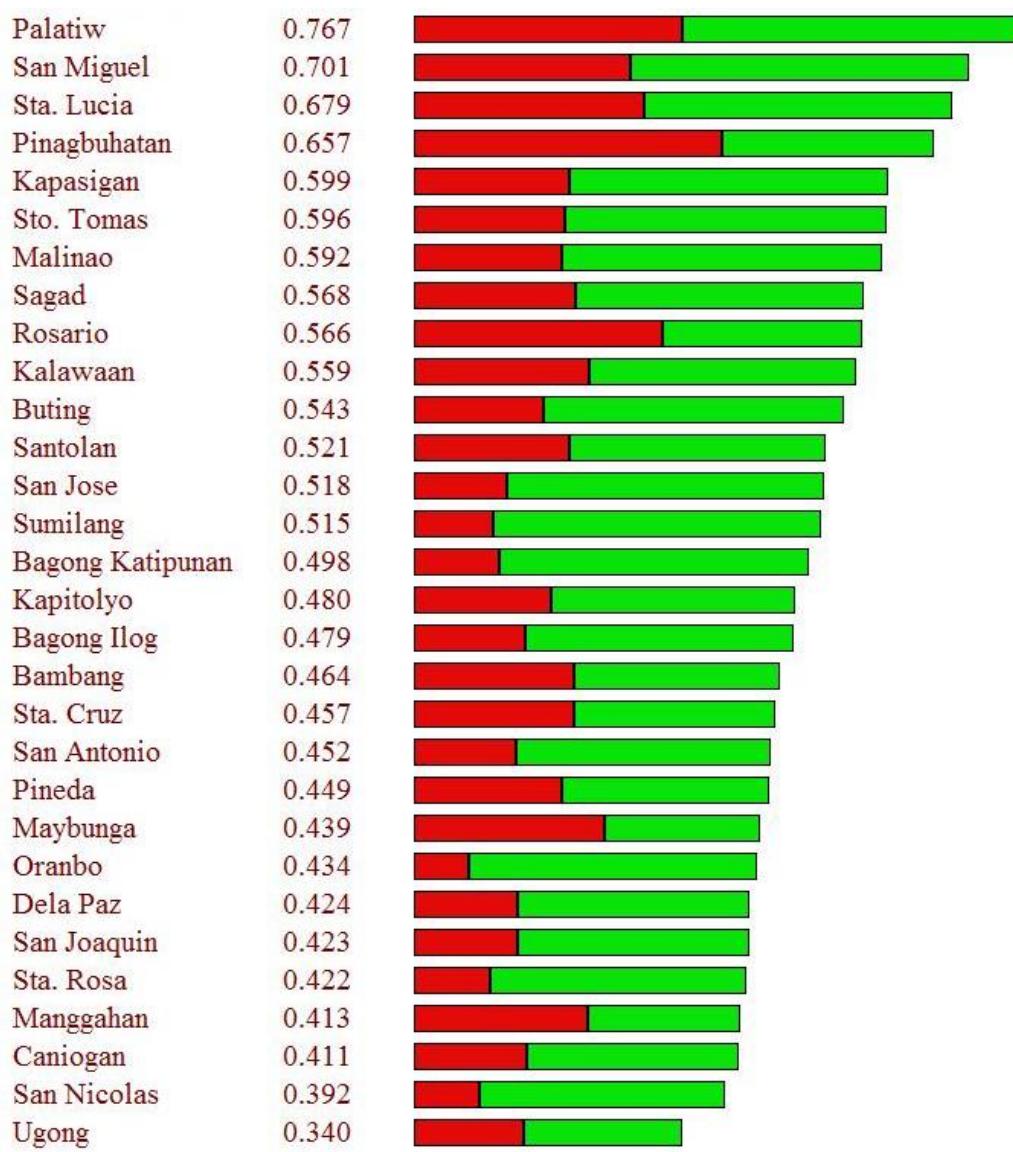




Pasig City Disaster Risk Reduction and Management Plan

population centers. Barangays with a greater population density also tend to have a higher social fragility index and in some cases also correspond to greater impact from earthquakes and floods. Thus, population density is expected to aggravate the direct damages and as an indicator of social fragility it will have a strong influence on the total risk in Barangays such as Pingabuhutan and Palatiw.

Total Risk (UDRI)



■ Social Fragility ■ Coping Capacity

Figure 35. Ranking of Impact Factor for all Pasig Barangays





Vulnerable Population (FS2)

This indicator considers the contribution of three vulnerable groups in determining the vulnerable population score: children (age 0 – 6) elderly (age 65 and over) and slum dwellers. Children and elderly are population groups which are exposed to greater health risks following events. They are also differentially impacted due to lack of mobility, higher hospitalization rates for elderly and greater susceptibility to post traumatic stress disorder in children. The data for these indicators comes from the 2007 Census from the National Statistics Office. The indicator representing slum dwellers comes from the City Assessors Building Survey which includes data on the number of structures classified as “Informal Settlements”. The ranking of Barangays with respect to vulnerable population groups is shown in Figure 16.

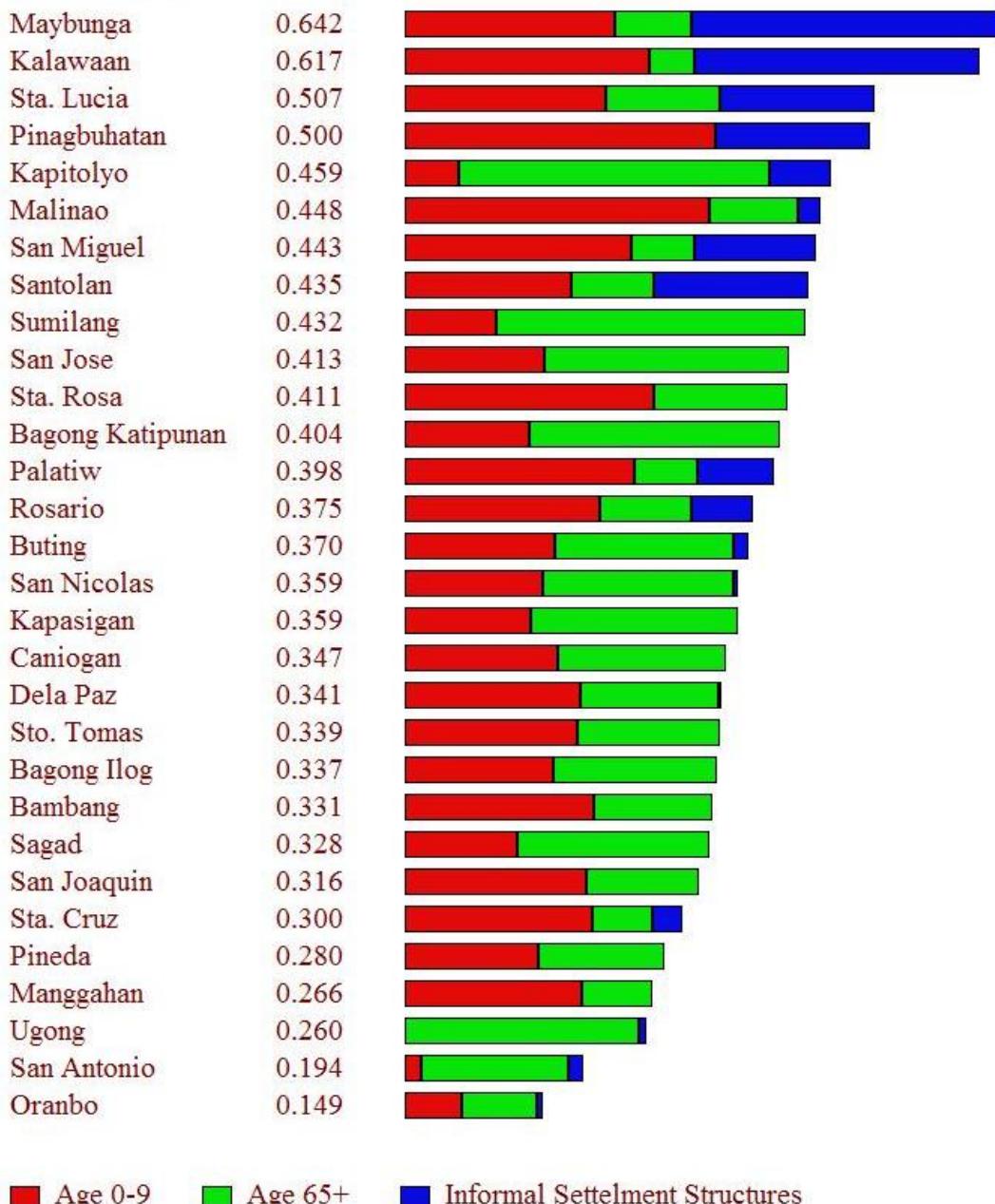
Social Disparity Index (FS3)

The social disparity indicator is comprised of the following three sub-indicators which constructed from the 2007 Census data (National Statistics Office); see Appendix 2 for full description of these three sub-indicators: *Education Disparity Index* - the disparity with respect to low education population groups (no schooling and only elementary schooling) were analyzed to identify the more vulnerable Barangays with respect to the education criteria; *Homeownership Disparity Index* - the disparity with respect to population groups renting homes (with and without owner consent) were analyzed to identify the more vulnerable Barangays with respect to the homeownership criteria; and *Employment Disparity Index* - the disparity with respect to population groups classified as unskilled laborers and were analyzed to identify the more vulnerable Barangays with respect to the education criteria.





Pasig City Disaster Risk Reduction and Management Plan



■ Age 0-9 ■ Age 65+ ■ Informal Settlement Structures

Figure 36. Ranking of Barangays with respect to 'Vulnerable Population' composite index

Crime Index (FS4)

Crime and 'fear of crime' among poor people can be seen in connection to other insecurities which they may experience as a result of various social, economic and demographic processes which makes a community vulnerable. In addition fear of crime in neighborhoods influences people's behavior in evacuation and seeking public shelter. Crime incidents within Pasig city reported for the seven "Index Crimes" - theft, robbery, carnapping, physical injury, rape, murder and homicide - were obtained from the Peace and Order Situation





Pasig City Disaster Risk Reduction and Management Plan

Report²⁰ for the the 3rd Quarter of 2011 and used here as the Crime Index for each Barangay.

Infant Mortality Rate (FS5)

Infant Mortality Rate (IMR) is an important indicator of health for whole populations, reflecting the intuition that structural factors affecting the health of entire populations have an impact on the mortality rate of infants. Studies have also found a strong (generally) linear association between more comprehensive measures of population health such as the disability adjusted life expectancy (DALE) and IMR (e.g., Reidpath and Allodey, 2003). Poor health in population after a disaster, can also lead to the exaggeration of baseline diseases and increased transmission of communicable infectious diseases. There is also growing evidence that chronic disease and disability create a great burden during and in the aftermath of disaster.

Hospital Beds (FC1)

Health centers offer only outpatient procedures to its barangay constituents so there are no hospital beds available in the barangay health centers. When the patient's condition requires inpatient treatments, they are referred or transferred to the nearest hospital in the area. Data on both public and private hospitals beds were compiled for different Barangays in Pasig. In those Barangays where hospitals are not present a travel cost matrix was computed based on the proximity of the closest hospital to the centroid of each Barangay. An adjusted indicator representing hospital beds for each Barangay using the travel cost matrix was then obtained.

Health Human Resources (FC2)

The health human resources indicator is based on healthcare personnel, such as number of doctors and nurses for each Barangay. These indicators are given 'default' weights shown in Table 6 and have to be validated at the implementation workshop.. Barangay health workers refer to Barangay volunteers who work at health centers in their Barangays but are not part of its regular staff. However, they receive regular allowances from the Barangay for their work. Staff members only include doctors, nurses, midwives, dentists, dental aides, nutritionists, medical technologists, sanitary engineers and sanitary inspectors.

Rescue Area (FC3)

Rescue area is a proxy for the City's shelter placement capacity and is based on the sleeping shelter space that can be provided in various public facilities available in Pasig, such as public and private schools, sport complexes and covered courts, multi-purpose halls, churches and Barangay halls. The floor area (in square meters) for all public shelter facilities were obtained from Pasig City Hall. The location of these areas was superimposed on the

²⁰ PSSupt. Jessie L. Cardona, MPA, Acting Chief of Police at the Pasig City Police Station presented during the Barangay DRRM Planning Workshop in Subic on October 20-21 2011





flood susceptibility and earthquake impact map and the effective rescue area was adjusted based on the different levels of risk the facility was exposed to (i.e., if a particular facility is located in areas of earthquake or flood risk, its storage capacity was reduced in proportion to the level of risk it was exposed to).

Development Level (FC4)

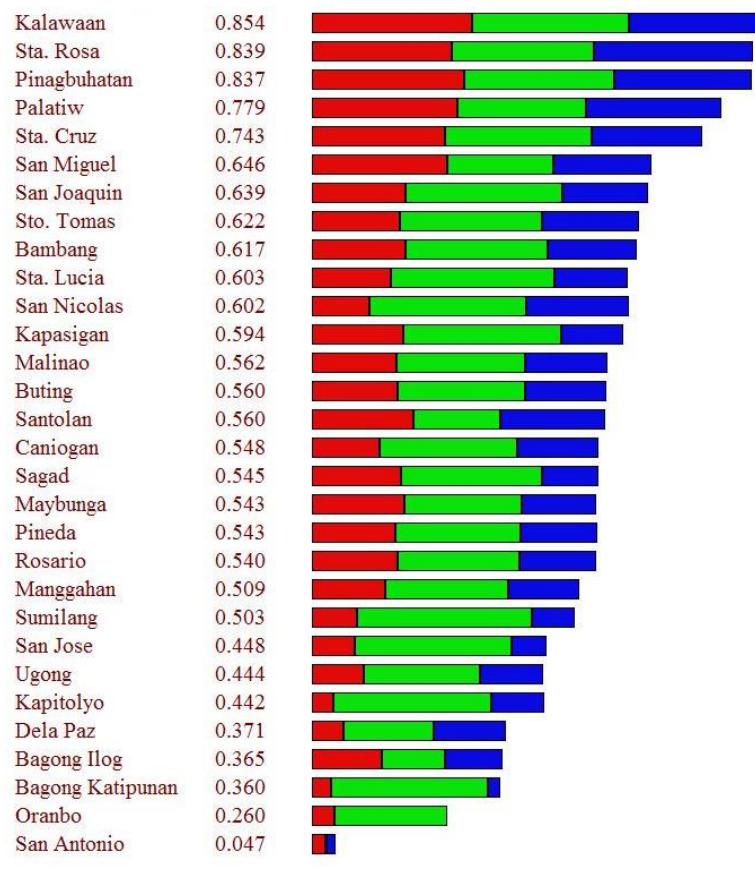
The Development Level indicator is composed of three sub-indicators which represent the different levels of human development based on the UNDP Human Development Index (HDI) methodology in the different Barangays of Pasig. The Development Level indicator ranking for all Barangays in Pasig is shown in Figure 37 using the ‘default’ weights:

- *Education Level:* Using the NSO 2007 Census, the make-up of population groups with respect to different education levels (from no schooling to post graduate) was analyzed and an education score was computed for each Barangay.
- *Income Level:* Using the NSO 2007 Census, the classification in different types of employment for each Barangay were used to compute a score which serves as a proxy for income level as this data was not directly available.
- *Highly Developed Built-area:* Land use type, year of construction, and height (low-rise, mid-rise, high-rise, super high-rise) were used to derive a ‘highly developed built area’ score for each Barangay.





Pasig City Disaster Risk Reduction and Management Plan



■ Education Proxy ■ Building Development Proxy ■ Income Proxy

Figure 37. Ranking of Pasig Barangays with Respect to Development Level Score





b. Implementation Plan

Moving forward, a validation workshop among the key representatives of Pasig and the respective Focus Groups is recommended to introduce and cascade the concept of indicators and evaluate the UDRI application in Pasig. Through this process, the PIT will attempt to demonstrate to the larger focus group of stakeholders how the UDRI can be used by stakeholders. Each of the indicators used in the UDRI will be discussed with the stakeholders. Further, the participants in this workshop will be asked to apply the analytical hierarchical process (AHP) to understand the relative importance of one indicator to the other, understand the weighting methodology and to arrive at a final consensus weighting for the indicators. The implementation of the UDRI with the stakeholders should provide insights into the gaps and capacities within different areas of the city and the potential of using an instrument to discover key policy and action areas where performance needs improvements. The goal of this process is for the stakeholders to take ownership of the indicator model and use the results for periodic evaluations of the city's risk and for institutionalizing disaster risk reduction in Istanbul.

The Logical Decisions for Windows (LDW) application will be used in the implementation of the UDRI in workshop with stakeholders as an interactive and dynamic tool which will allow the stakeholders to display the indicators and their weights using various output and visualizations formats. To facilitate the weighting assignment process, the LDW tool will allow the stakeholders to change and manipulate the existing weights and interactively investigate the changes upon the total ranking outcome. The software also supports performing sensitivity analyses, which can be used to interactively demonstrate variability of the results to different indicators. It also enables an evaluation of the stability of the methodology to variability of the input data. The advantage of using such a tool is that it integrates the models is that during a periodic evaluation, other indicators that may have previously not been available or simply overlooked can be integrated into the framework to obtain a new evaluation of risk and Disaster Risk Management (DRM) practices in Pasig. Below are some important observations from experience with past implementation of the UDRI which *should be noted*:

- It was observed that some participants had difficulty in understanding the concept of indicators. Some individuals resisted the idea of indices.
- Pair wise comparison was found relatively easy by the participants, nevertheless when the AHP forms were analyzed, they showed important inconsistencies, and incomplete forms.
- The participants were requested to fill out individual forms; it seems that a work group with the assistance of a facilitator could make the process easier.
- Most participants found the forms easy to use; however and understanding of the context of the indicators and what they measure was essential to a correct evaluation of the weights
- The forms take time to be filled out; it is desired that the survey is done in steps or stages so that the participants don't lose concentration.
- The participants were able to identify alternate indicators or variables for physical risk and aggravating factors; however it is important for the stakeholders to





understand the data limitations which are faced in arriving at the current descriptors, as well as the design of the indicators which is made consistent across different cities.

c. Implementation Process

In order to ensure a smoother process of application of the methodology in an urban environment, it is recommended that the PIT look into the following recommendations prior to initiating the implementation process in Pasig:

- The PIT will identify and put together a “Focus Group” (FG) constituted by a selected group of key city stakeholders who will test, monitor, and validate the results of UDRI.
- The PIT will identify and put together a “Core Group” (CG) composed of technical persons trained in the use of the LDW tool, application of the methodology and its key elements, such as how to estimate weights for the different descriptors and to develop transformation functions.
- Questionnaires for determining UDRI weights should be sent to a larger FG for evaluation prior to the workshop.
- The optimum number of members of the FG will be decided by the CG; in any case it should have at least three members and a maximum of 10 so that the group is easier to handle.
- The CG will review and suggest changes to improve the translation/localization of the technical documents on the methodology and adopt local terminology whenever possible, to facilitate its comprehension.

It is recommended that the workshop is staged in a one day sessions; one half-day for each of the physical risk and impact factor indicator sets.





d. Monitoring and Evaluation

OCD Disaster Risk Reduction Monitoring & Evaluation System

The monitoring and evaluation matrices for disaster prevention and mitigation, response, preparedness and mitigation, as well as rehabilitation and recovery were the workshop output of the PCDRRMC members in the 5-day workshop which was facilitated by the OCD.





Pasig City Disaster Risk Reduction and Management Plan

Activity	Agency Deliverables/Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022
Understanding Disaster Risk <ul style="list-style-type: none">• Production• Publication• Conduct of• strengthening DR Gov. to manage Disaster Risk	<ul style="list-style-type: none">• Fliers, Info books• Conferences, SeminarsWorkshop on First Aid Rescue (HOA's, TODA's, School, Businesses)• Simulation Exercises (City Wide)• Equipment, vehicles• Hiring of experts• List of Hazard prone areas• Ordinances EO		<ul style="list-style-type: none">• Procurement of drones• Inventory of vehicles and equipment	<ul style="list-style-type: none">• Holding of SIMULEX (Citywide)• Procurement of emergency boat construction of new Command Center at Oranbo• Customization of vehicles and equipment for DRRM• Tagging and retrofitting of Govt. owned	<ul style="list-style-type: none">• Procurement of emergency chopper LIFESAVER ON AIR.• Construction of new Command Center.• Installation of water sprinkling	<ul style="list-style-type: none">• Hazard hunting densely populated areas	<ul style="list-style-type: none">• Hazard hunting densely populated areas.	<ul style="list-style-type: none">• Hazard hunting in densely populated areas





Pasig City Disaster Risk Reduction and Management Plan

• Investing in DRR for resilience • Enhancing	• E blotter system			buildings. • Ordinance on waste management for Brgy. Mandatory compliance. • Ordinance declaration of areas as non-habitable / non buildable. • Seminars for Traffic Enforcers on Basic and advance Traffic Management • Procurement of mobile police van w/ detention center with direct access to National system (NBI, LTO, PDEA etc.)	system.			
	• CCTV			• Installation of E blotter system, installation of community Disaster Box in hazardous areas. • Installation of additional	• Installation of additional (CCTV)	• Installation of additional (CCTV)	• Installation of additional (CCTV)	





Pasig City Disaster Risk Reduction and Management Plan

Disaster Preparedness for effective response and to “Build Back Better” in recovery, rehab and reconstruction.	<ul style="list-style-type: none">• PA systems			<ul style="list-style-type: none">• Installation of additional CCTV in identified hazard prone areas (creeks, waterways, densely population area).	<ul style="list-style-type: none">(CCTV) in identified hazardous areas.• Maintenance of existing CTV• Installation of PA system	in identified hazardous areas.	identified hazardous areas.	in identified hazardous areas.
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Pasig City Disaster Risk Reduction and Management Plan

Activity	Agency	2016 Baseline	2017	2018	2019	2020	2021	2022
Emergency response	Pasig City search and Rescue Pasig City Fire Brigade	Accomplished	Proposal for water safety and survival course training	Earthquake Preparedness training Distribution of flyers/IEC materials (Homeowners)	Proposal earthquake Preparedness Training Government facilities	Proposal for Earthquake preparedness Collage PLP/RTU	Refresher course for TASK FORCE Flood rescue Training	Proposal Training for NGO/BRGY/DART Urban search and rescue
Program for training and development		Accomplished	Batang Emergency response Training (Light rescue Training) School	Proposal training for NGO/BRGY/DART Flood Rescue Training	Proposal Flood Preparedness Training/distribution of flyers/IEC materials Homeowners association	Proposal to create TASK FORCE to support for response	Proposal for Joint Exercise simulation for flood response	Proposal for joint exercise simulation for earthquake response
Upgrades of equipment and stations		Accomplished	Earthquake Preparedness training (Homeowners)	Batang Emergency Response Training Water Safety School	Proposal refresher course Urban search and rescue DRRMO Local Responder	Proposal Training for Flood rescue preparedness		





Pasig City Disaster Risk Reduction and Management Plan

Activity	Agency	2016 baseline	2017	2018	2019
Activation / Implementation of MOA	Pasig DRRM and Pasig NGO	On going	Completion/ Submission and Approval of MOA Accreditation of NGO	Volunteer to Career Program Basic ICS training Communications Equipment	Basic Life Support Training - Issuance of Trauma bag and Basic Medical Equipment





Pasig City Disaster Risk Reduction and Management Plan

		2nd	Insurance for all NGO members (registered pasig voters)	Training - USAR - Firefighting	Development of Task Force - Issuance of Uniform - Recognition of Members
		3rd	Continuation of proposed training / program and development -Basic Life Support - Executive Course ICS	- RopeTech 2	Executive Course ICS - officers of each brigade
		4th	RopeTech 1 CVERT	Swiftwater Training	RopeTech 1
			Issuance of Requested Equipment and PPE - Firefighting Equipment and PPE - Hand Tools and	Issuance of Requested Equipment and PPE - Life jacket - Helmet - PPE	Issuance of Requested Equipment - Firehoses - Firefighting





Pasig City Disaster Risk Reduction and Management Plan

			Accessories - Uniform - Fire hose	- Throwbag and Accessories - Wetsuit and Booties	PPE - Tools and Accessories - Uniform - Rope Rescue Basic Equipment
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Activity	Agency Deliverables / Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022
1. Relocation of informal settler families (ISFs) on waterways / danger areas	<ul style="list-style-type: none"> Waterways and danger areas cleared of ISFs Converted to Linear Parks / buffer zones <p>• Manggahan Floodway E / B – 751 W / B – 1,549 Others – 527 Total = 2,827</p>			1. Enactment of ordinance declaring Manggahan Floodway Berm Areas & Waterway Easements as Non – Habitable / Non-Buildable areas. 2. Enactment of an Ordinance that will Penalize Returning Relocate's &	1. Clearing of Manggahan Floodway West berm area (1,549) ISFs Budget requirement : Bus rental – 542,000 Truck rental – 2,910,00 Groceries – 774,500	1. Other remaining uncleared water - ways (527 ISFs) Budget requirement : Bus rental – 192,500 Truck rental – 990,00 Groceries – 316,200	1. Continuous greening of cleared areas. 2. Deployment of guards to secure and protect the recovered areas. 3. Continuous visits and provisions	1. Continuous greening of cleared areas. 2. Deployment of guards to secure and protect developed / cleared areas.





Pasig City Disaster Risk Reduction and Management Plan

				<p>Those found to have Abandoned or Sold Units Awarded to Them.</p> <p>3. Installation of CCTVs on cleared / recovered areas</p> <p>4. Hiring of demolition crew</p> <p>5. Acquisition of equipment / tools for demolition</p> <p>6. Clearing of Manggahan Floodway East berm area (751) ISF's)</p> <p>Budget requirement :</p> <p>Bus rental – 262,500</p> <p>Truck rental – 1,410,000</p> <p>Groceries – 375,500</p> <p>Hot meals – 450,600</p> <p>Meals of support Groups – 216,000</p> <p>Consultations meals – 112,000</p> <p>Total = P2,826, 600.00</p>	<p>Hot meals – 929,400</p> <p>Meals of support Groups – 324,000</p> <p>Consultations meals – 224,000</p> <p>Total = P5,704,400.00</p>	<p>Hot meals – 395,250</p> <p>Meals of support Groups – 135,000</p> <p>Consultations meals – 112,000</p> <p>Total = P2,140,950.00</p>	<p>of basic services to relocated families.</p>	<p>3. Continuous visits and provisions of basic services to relocated families.</p>
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Pasig City Disaster Risk Reduction and Management Plan

Activity	Agency Deliverables / Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022
Understanding Disaster Risk	Fliers, Info books							
Production / Publication								
conduct of	Conferences, seminars, workshops and First Aid Rescue (HOA's, TODA's, School, Businesses)							
	Simulation exercises (City Wide)			Holding of Simulex (City Wide)				
Strenghtening Government to manage Disaster Risk	* Equipments, vehicles		Procurement of Drones	* Procurement of emergency boat life saver on water.	* Procurement of emergency chopper life saver on Air	* Hazard hunting in densely populated	* Hazard hunting in densely populated	* Hazard hunting in densely populated areas.





Pasig City Disaster Risk Reduction and Management Plan

* Hiring of experts		* Inventory of vehicles and equipment	* Construction of new Command Center at Oranbo	* Construction of new Command Center	areas.	areas.	
			* Customization of vehicles and equipment for DRRM				
* List of hazard prone areas			* Tagging and retrofitting of Government owned buildings	* Installation og water sprinkling system			
* Ordinances Executive Order			* Ordinance on waste management for Barangay mandatory compliance				
			* Ordinance on declaration of areas as non - habitable / non buildable				
			* Seminars for Traffic enforcers on Basic and advance Traffic Management				





Pasig City Disaster Risk Reduction and Management Plan

Investing in DRR for Resilience	E Blotter system			Procurement of mobile Police Van with detention Center with direct access to National system (NBI, LTO, PDEA, etc.	Installation of E blotter system			
				Installation of community Disaster Box in hazardous areas				
	CCTV			Installation of additional CCTV in identified hazardous prone areas (creeks, waterways, densely population areas)	Installation of additional CCTV in identified hazardous prone areas (creeks, waterways, densely population areas)	Installation of additional CCTV in identified hazardous prone areas (creeks, waterways, densely population areas)	Installation of additional CCTV in identified hazardous prone areas (creeks, waterways, densely population areas)	
				Maintenance of existing CCTV	Maintenance of existing CCTV	Maintenance of existing CCTV	Maintenance of existing CCTV	





Pasig City Disaster Risk Reduction and Management Plan

	PA System			Installation of PA system in the entire City	Installation of PA system	Installation of PA system	Installation of PA system	Installation of PA system
Achieving DISASTER Preparedness for effective response and to "Build Back Better" in recovery, rehab and reconstruction.	Evacuation Center			* Identifying / scouting of possible area for a permanent evacuation center to house 1,000 pax.	Construction of Pasig City Evacuation Center (also processing area for eventual relocation)	Construction of Pasig City evacuation center and processing area.		
				* Employment of emergency workers for clearing, reconstruction and rehab of area.				
				* Establishment of a repository of emergency or defect of supplier, construction materials.				





Pasig City Disaster Risk Reduction and Management Plan

Activity	Agency Deliverables/Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021
1. Engineering							
Drainage and Road improvement							
Flood Control			P103,000,000.00				
	Construction of Drainage System	20,389.30 LM		Continuous			
	Construction of Pumping Stations	26 units		Continuous			
	Construction of Revetment Wall	2,710 lm		Continuous			
	Construction of Linear Park	7,410 lm.		Continuous			
	Construction of concrete Creek Bed of various Creeks			Continuous			
	Declogging and repair	52,800 Lin.m		Continuous			
Road Networks			P270,000,000.00				
	-Asphalt Overlay -Concreting of Roads	5,183.66 sqm 2,426.5 LM		Continuous concreting and improvement Construction of new roads Updating of			





Pasig City Disaster Risk Reduction and Management Plan

				Assets Inventory			
Installation and Rehabilitation of Streetlights	New installation, repair and replacement of streetlights	3477 repaired and replaced 3449 newly installed Solar and LED	On-going	Upgrading of lights to Solar and LED			
Evacuation Centers	Construction of Multi-Purpose Buildings	9 Units		Additional Construction of Multi-Purpose Bldgs.			
Repair and Maintenance	Retrofitting of aged Bldgs.	2 Bldgs.		Continuous rehabilitation/retr ofitting			
Issuance of Building Permits	Issuance of Notice of Violation (Illegal Construction) Requiring the applicants with regards to Soil Testing (3 storey & above) Requiring all applicants near the fault line to			Require Soil Testing for all construction that was included within liquefaction area identified in hazard map Propose an			





Pasig City Disaster Risk Reduction and Management Plan

	secure a certification from PHIVOLCS			Ordinance declaring non-buildable within the fault buffer zone Requiring all existing Govt. Buildings to secure Building Permit Implement BP 220 for economic and socialized housing Ensuring the safety and protection of all on-going construction Implementation of new structural code of the Phils. 2015 Implement Digital archiving of all documents			
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Pasig City Disaster Risk Reduction and Management Plan

				Purchasing of STAAD Software Propose an Ordinance penalizing Barangay with regards to constructing any structures identified in danger/hazard area			
1. FSIC print	<ul style="list-style-type: none">1. FSIC<ul style="list-style-type: none">-Information campaign semi-annually-training to respond during fire (timba brigade)-Fire Drills-orienting residents to remove all obstructing vehicles during emergency	<ul style="list-style-type: none">-Semi annual (March and December) Upon request<ul style="list-style-type: none">- upon request-Upon request of the Barangay		<ul style="list-style-type: none">-Road widening to depressed areas-Annual Fire drills on Fire Prone areas and highly congested areasInstallation of Fire Hydrant (Fully secured)No parking and obstruction on			





Pasig City Disaster Risk Reduction and Management Plan

				Access Roads Requiring all Govt. Buildings to secure Fire Certificate			
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Activity	Agency Deliverables/Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022
CHO 1) Management of the Dead.	Policy Statement: The city guarantees respect for the dignity of the deceased and their families in accordance with their cultural and religious beliefs.	None	Policy crafted and adopted	Review	review	review	review	review
	Provision of Cadaver Bags	10 bags	Purchase 600 3M	200 P1.2M	200 P1.2M	200 P1.2M	200 P1.2M	200 P1.2M
	Provision of site for temporary (mass) burial	None	Lot identified for purchase	20M	20M	20M	20M	20M
	Increase # of funeral homes with MOA.	2	Increase MOA with operating funeral homes in the city.	1	1	1	1	1
CHO 2) Observance and compliance to	Decrease congestion at ER by 20% and maximum utilization of hospital beds and resources.	5 mass casualty incident	Train dispatch and emergency responders on site on categorization of	100K	100K	100K	100K	100K





Pasig City Disaster Risk Reduction and Management Plan

the ER Saturation Avoidance and surge protocol			medical emergencies; research and data collection. Procurement of communication equipment.	500K	500K	500K	500K	500K	500K
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Outcome/Thematic Area: PREPAREDNESS									
Output:									
Activity	Agency Deliverables/Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022	
SWMO 1. Strict implementation of household waste segregation.	90% household practicing proper segregation.	Not available during workshop	Implementation initiated	N/A	N/A	N/A	N/A	N/A	
2. Additional service providers to fully cover collection efforts in hard reachable areas.	At least 1 service provider identified and contracted	None	1 CONTRACT SIGNED	200M	200M	200M	200M	200M	
3. More responsive collection scheme	New schedule to address community life style.	None	Scheme designed No funds required.	N/A	N/A	N/A	N/A	N/A	
4. Expansion of the Green hearts program to the	Households practicing green heart program	None	Plan formulated	2M	2M	2M	2M	2M	





Pasig City Disaster Risk Reduction and Management Plan

households with incentives.								
5. Strict implementation of the Plastic Ordinance.	Decrease use of plastic packaging.	None	None	N/A	N/A	N/A	N/A	N/A
6. Engage citizens to support poor collection , HOA	MOA forged with HOA for effective waste disposal and collection.	None						

Outcome/Thematic Area: PREPAREDNESS								
Output:								
Activity	Agency Deliverables/Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022
7. Removal of water Lilies from waterways every month or quarter.	Water lilies removal schedule identified.	Not available during workshop.	Quarterly clean up conducted	4 clean up				
8. Support livelihood by encouraging idle residents to purchase	Organize community haulers.	Not available during workshop	5 pilot barangays identified	100 pedicabs				





Pasig City Disaster Risk Reduction and Management Plan

pedicabs or support communities who will help haul/collect garbage in dense communities such as pinagbuhatan.								
9. Identify collection sites, provide large bins to restaurants (as requested) in Kapitolyo area. to prevent scavengers from rummaging through collections sites	Sites identified and provided with dump vessels	Not available during workshop	Purchased at least 10 dump vessels	10 units				
10. Purchase land for MRF of city as proposed.	Land purchase.	Not available during workshop	Lot/s identified	P	P	P	P	P





Pasig City Disaster Risk Reduction and Management Plan

MIS OFFICE	2017		2018		2019		2020	2021	2022
COMPUTERIZATION, DATA GENERATION, PROTECTION & WAREHOUSING	ACTIVITY	DELIVERABLE	ACTIVITY	DELIVERABLE	ACTIVITY	DELIVERABLE			
	Operational Administrative & REVENUE SYSTEMS (OARS) IMPLEMENTATION	Full System Migration and Integration of Modules	UNDERGROUND FIBER OPTICS PROJECT COMPLETION	MISO CITY- WIDE AREA NETWORK	DRP SITE SUBSCRIPTION	BACK UP ON A GLOBAL CLOUD	EVALUATION< RETOOLING<ENHANCEMENT		
	DATA STORAGE & RETRIEVAL	Remeasured FILE SIZE with AMPLE STORAGE MEDIA		PRIVATE/LGU CLOUD	BUILD LGU- OWNED DRP SITE	OFF-SITE, PROVINCIAL DATA CENTER			
	DIGITAL ARCHIVING	ARCHIVAL DATA CENTER (CITY HALL)	UPGRADE OF DATA CENTERS to DRP-CALIBER SITES	ANNEXES with AUX POWER and LARGE DATA STORAGE CAPACITY					
				INCREASED FAULT TOLERANCE					





Pasig City Disaster Risk Reduction and Management Plan

Activity	Agency Deliverables / Commitments	2016 Baseline	2017 TARGETS (include budget and source if possible)	2018	2019	2020	2021	2022
I. Personnel for Environment protection strengthen Admin Office of CENRO Hiring of Technical Personnel 1. Environmental Planner (2) 2. Project Development Officer (3) 3. Community Organizers (4) 4. Legal Officer (1) 5. Architect (1) 6. Architect (1)0 7. Transport Plans specialist (2) 8. Environmental Inspectors (4) 9. One Team for Bantay Puno			1. Environmental Planner (1) 2. Project Development Officer (1) 3. Legal Office 4. Transport Planner (1) 5. Inspectors one team (2)	1. Environmental Planner (1) 2. Project Development Officer (1) 3. Legal Office 4. Transport Planner (1) 5. Inspectors one team (2)	1. Community Organizer (1) 2. Project Development Officer (2) 3. Community Organizer (1) 4. Architect (1) 5. Transport Planner (1) 6. Environmental Inspector			





Pasig City Disaster Risk Reduction and Management Plan

				tor (2)					
II.	Policy								
Review of existing									
<ul style="list-style-type: none">Environmental policies – capacity building trainingImplementation of Green Building code –Formulation and updating of the Local Climate Change Action Plan (LCAP)									
III.	PROGRAMS								
SPECIAL CONCERN / PRIORITIES									
A. Tree care and Trimming									
1. Trimming of trees purchase and specialized									
a. Equipment									
	Responded to requests from community	1,350 trees trimmed	CENRO DRRMO 5 million 2 million	10 Million 2	10 Million 2 Million	10 Million 2 Million	20 Million 4 Million	20 Million 4 Million	20 Million 4 Million





Pasig City Disaster Risk Reduction and Management Plan

b. Personnel				Million				
B. Wastewater and water conservation 1. Installation of rainwater harvesting 2. Wastewater – sewer systems	- Installed rainwater in LGU offices / Schools - Clean up	5 million / DRRMO 20 Million	10 Local buildings 41 schools	30 million 20 million	20 million Bokashi balls treatment	20 million	25 million 20 million	25 million
C. River and waterways / creeks 1. Water quality management 2. Deployment of Technical personnel for creek (1-2 personnel) Community Organizer 5 creek cleaners Review of location of CCTV cameras in creek / 3. Promoting landscaping / green landscaping trees along Riverbanks and green infrastructure along Riverbanks - 17 creeks - 4 major rivers 4. Installation of Bike lanes /	- Elevate water quality to class C			20 million	20 million			





Pasig City Disaster Risk Reduction and Management Plan

Bikeways for river / creeks								
5. Installation of solar wind powered streetlights along creeks and riverbanks								
- 17 creeks								
- 3 major rivers								
6. River ferry / installation train / tram								
7. Electric vehicles along Pasig or Marikina River								
- Pedestrian bridges								
- Along Pasig / Marikina river								
8. SIPAG								
- Water lily								
Livelihood								
- Handicraft								
- Fertilizers								
9. Protected Bike lanes along the identified areas.								
10. Mainstream / advocate bike / bike paths in the real estate / commercial developments								
11. Pasig Green Bike share								





Pasig City Disaster Risk Reduction and Management Plan

program for CBD and Poblacion areas 12. Planting of trees that will attract birds								
Environmental/City Environment and Natural Resources Office - From Garbage to Garden, its compost time - Greenheart Recycling	- Waste reduction , organic fertilizers - Waste	- 550 kilos organic fertilizer - value of production of vegetables 220,000 - 29,000 recycled	- On going - On going - On going	-	- Advocate for schools, LGU offices, Barangays, HOA - Advocate for schools,			





Pasig City Disaster Risk Reduction and Management Plan

- Pasig bus service operation	reduction	material	- Ongoing	- Lack of LTFR B and DoT R Support	LGU offices, Barangays, HOA			
- Renewable energy / energy efficiency	- Promote public transportation	- 105,000 passengers	- Ongoing ing Community GHG	- Lack of capital investment of building developers	- Pasig Community Shuttle Service for employee and other stakeholders			
- Implementation of Green Building Ordinance	- Implement pilot sites such as schools local govt. offices	- Conduct green building awareness to commercial buildings in Pasig City						
- Greenhouse Gas Management Inventory and Accounting								
- Quality management and monitoring	- Promote Compliance of Building developer s with	- Complete			Promote incentive			





Pasig City Disaster Risk Reduction and Management Plan

	10,000 GFA - Reduce carbon emission from electricity, waste and fuel	entity level GHG for 2014		- Lack of technical personnel	for compliant green buildings - Develop a GHG management plan			
IV. Properties and Equipments 1. Manlift with truck 1 set 2. Hybrid solar assisted thermal aircon for - Rizal High - Gym - 96 Day Care Centers 3. Solar powered / wind								





Pasig City Disaster Risk Reduction and Management Plan

powered lights

4. Waste energy equipment / machineries
5. Clean vehicles / bus service / hybrid solar powered Jeepneys
6. Bus depot with equipment / machineries for shuttle service
7. Hybrid solar boat for multi purpose





Pasig City Disaster Risk Reduction and Management Plan

Activity SWMO	Agency Deliverables/ Commitments	2016 Baseline	2017 TARGETS	2018	2019	2020	2021	2022
<ul style="list-style-type: none">-Establishment of Viber group (SWMO Monitoring Officer and IPM Monitoring Group linkage) (Personnel/Policy)-Geo-fencing and digitalized tagging via installation of GPS on each waste collection truck (initiated by IPM-CDC)-Procurement of applicable state-of-the-art waste bins to be installed in selected critical/priority areas (Property and Pera)-Intensify waterways and		<ul style="list-style-type: none">-Selected personnel only-Initiated in smaller areas-On-going research	<ul style="list-style-type: none">To be completed before the 3rd Quarter of 2017To be completed before the last Quarter of 2017	<ul style="list-style-type: none">-Widen coverage-30 Additional	<ul style="list-style-type: none">-Update system-50 Additional Bins			





Pasig City Disaster Risk Reduction and Management Plan

deployment of waterways Cleaners (Personnel) -Coordination with Idle land office and City Assessor's Office to inform owners of vacant lot to utilize it as Community Urban Garden or provide fencing or enclosures (Policy) -Strengthen linkages and partnership with private companies and institutionalize "solid waste management office desk" during payment of taxes (Program and Policy) -Intensify coordination and linkages with other LGU agencies (i.e; Action line, PSWD, Engineering Dept and Office of the City	-Hiring of additional personnel - Dissemination of communication letters	study Existing 14 Personnel	-To procure initial samples for actual use Additional 16 Personnel hired - Establishment of Social media accounts and other communication means	bins Additional 15 Personnel Widen coverage	Additional 10 Personnel			
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Pasig City Disaster Risk Reduction and Management Plan

Building Official) (Policy) via Viber or social media		-Initial meetings initiated with the Business Sector	- Establishment of Social media accounts and SWMO desk re-established	Widen coverage				
-Establishment of an off-site waste management facility (waste-to-energy) (Program, Policy ,Personnel, Property and Pera)								
-Enactment of an Omnibus Solid Waste Management Ordinance of Pasig City(Policy)								
-Widen coverage of waste segregation program		-Created and established social media accounts		Widen coverage				
-Establishment of complete data base for all programs and activities			-Connect linkages with LGU agencies					





Pasig City Disaster Risk Reduction and Management Plan

		<ul style="list-style-type: none">-On-going site selection-Feasibility study-Draft prepared-Hiring of additional Waste Evaluators to	<ul style="list-style-type: none">-Actual visit in local LGUs/foreign country with Best Practice on waste management-32 Existing Waste Evaluators-Additional 33 Waste	<ul style="list-style-type: none">- Preparatory works including community acceptance-Review implementation				





Pasig City Disaster Risk Reduction and Management Plan

		-Incomplete data base	Evaluators -Purchase of new computers and necessary softwares completed	Citywide implementation of Waste Segregation -Review and updating of data base				
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Pasig City Disaster Risk Reduction and Management Plan

Activity C3	Agency	2016 Baseline	2017	2018	2019	2020	2021	2022
DRRMO – SMART Technology								
Data warehouse and systems backup	DRRMO/C3	Accomplished	Proposal for offsite systems / data backup and secured data facility protection (remote C3 in Oranbo / revolving /RED office)	Data warehouse and analytics – Big data hosting and interconnection with other agencies (e-Blotter / police blacklists, LTO read only Access, etc.)	Remote indexing of data resources for analysis (creation of Open Data Directory) shared accessed by interconnecting offices/dept. and other business establishments			





Pasig City Disaster Risk Reduction and Management Plan

Social Media / citizen reporting / Text messaging system	DRRMO/C3	Accomplished	MAsE reloaded to include voice call and video reporting, supporting emergency button (police and Fire/Rescue)	MAsE Big data integration with citizen accessibility thru FB / Google account .Open Data Directory link adhering to medical emergencies and other emergencies	Proposal for virtual Emergency alarm button link thru MaSe within CBD offices to enable one touch alarm call to remote c3 office in Oranbo thru internet	Centralized virtual Emergency calling (linking all remote command centers) with business establishments and other offices.		
Early warning System, communication and security	DRRMO /C3	Accomplished	P.A System and Siren in every public school and disaster prone Barangays, emergency phones on busy public areas. Additional fixed HD CCTV on intersections with Traffic lights	Police vehicle / service Utility vehicles with remote read-only data access to government database / Open directory (LTO,e-Blotter, C3 etc.) thru internet	Proposal for LED digital signage within CBD area to replace tarpaulin / metal signage			
Smartcity development	DRRMO/C3	Accomplished	Modification of smartpasigcity.ph domain to reflect new	Linking of 3d City model map with basemap. Identification of				





Pasig City Disaster Risk Reduction and Management Plan

			dashboard to reflect centralize POI and IoT. Plotting of new 3d City Model Map	Zone Maps and land use maps.				
City Volunteers Directory	DRRMO/C3	Accomplished	Modifications in expanding and integrating the profile data of the Volunteers Directory for various Categories					
ITC Trainings Software & Hardware	DRRMO/C3/MS	Accomplished	To expand the training program for IT personnel and hire additional IT personnel to help maintain the System.					
Command Centers	DRRMO/C3	Accomplished	Expand and Create duplicate EOC / C3 capability in the Oranbo area to cater the CBD. Including direct emergency					





Pasig City Disaster Risk Reduction and Management Plan

			connections to CBD establishments for easy comms.					
E-SMART Vehicles	DRRMO/C3 PNP, TPMO, BCEO	On going study	Provide E Smart Vehicles which can connect access to LTO, C3 and PNP blotter					
E Blotter Stations	C3/PNP Pasig	Accomplished	Expand the functions of the 3 PCP on access on E Blotter					
ITS Traffic System	C3/DRRMO/TP MO	On going	Upon completion of the 1 st phase. Provide updated Traffic Study in order to recommend necessary adjustments to the traffic program and projects like additional Traffic lights in some areas. Installation of Non Contact Violation					





Pasig City Disaster Risk Reduction and Management Plan

			cameras/system.					
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PREVENTION AND MITIGATION

GOAL: Minimize the effects of Hazards and Mitigate its potential effects by reducing the adverse impacts of hazards and related disasters and avoid its adverse impacts. Making disaster risk reduction a priority.

IMPACT:

Table 10. Monitoring and Evaluation

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
To activate and mobilize the participation of different barangays for DRR.	Well-trained, knowledgeable and capacitated barangays	Formulate, disseminate and issuance of a duly approved MO by the City Mayor in reference to RA 10121.	RA 10121	Barangay implementation	no. of barangays, no. of MO issued	30 BRGYS.	CENRO, BAO, DRRMO, GAD, DILG	Personal reporting, Participation to Galing pasig and Disaster Readiness Week	quarterly	DRRMO, BAO
		Full implementation of the BDRRMP .	RA 10121	Barangay implementation	no. of barangays, no. of MO issued	30 BRGYS.	CENRO, BAO, DRRMO, GAD, DILG	Personal reporting, Participation to Galing Pasig and Disaster Readiness Week	quarterly	DRRMO, BAO
		Continuous and	Modules	900 participants	no. of trainings conducted,	30 participants from 30 Brgys., 24	DRRMO, GAD, BAO, CENRO	Attendance, Pre training	Monthly	DRRMC





Pasig City Disaster Risk Reduction and Management Plan

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
	sustainable DRRM Training.					trainings, 50% male, 50% female		Exam, Post Training Drills,		
	Provide technical, financial and logistic assistance to barangays if necessary.	30 Barangays	30 barangays, utilization of their own BDRRMF	No. of brgys. Assisted	30 barangays	Brgy. Budget	BDRRMP	Quarterly	DRRMO/DRRM C	
To improve traffic management , reduce vehicular accident and improve air quality.(Low carbon strategy)	Improved traffic. Air quality and reduced vehicular accidents.	Installation of a centralized and intelligent traffic management system to complement the existing CCTV system	TTPI transport study (conducted UP)	the device will improve traffic, reduce pollution and vehicular accidents	no. of installed ITS	27 strategic sites	TPMO, CENRO, C3	Reporting of violators from TPMO, Air quality test by CENRO, Health survey, PNP Traffic division data	weekly	C3
To implement Pasig City's solid waste management system.	Segregation outsource in every household and business establishments .	Intensify the no segregation, no collection policies. - Advocacy, enforcement by green	Result of Waste Characterization study of SWM/CENRO	140,000 households and 20,000 business establishments will comply	no. of household and business establishment	35% household and business establishment	SWMO, CENRO	Interview, inspection, monitoring , secondary data	weekly	SWMO





Pasig City Disaster Risk Reduction and Management Plan

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
	police, issuance of OVR/Penalty,									





PREPAREDNESS

GOAL: Building a culture of Safety and Resilience by strengthening the capacities of all stakeholders and improving risk information and early warning system enabling communities to be aware, to respond, to cope and recover from the adverse impacts of a disaster or an emergency.

IMPACT:

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
To provide relocation sites for informal settlers.	Relocated informal settlers.	Purchase lots to be used as relocation sites for informal settlers	4,500 families based on UPAO/PHRU records	Identified the remaining informal settlers for relocation.	no. of families relocated	4,500 families	UPAO/PHRU, BAO, PAL	survey, actual inspection, actual demolition	Monthly	UPAO
To provide better communication system and quick response to disaster.	Better communication system and quick response to disaster.	Purchase of better communication system, DRR vehicles (fire truck, rescue vehicles, chemical truck, man lift)	HVRA study	well equipped and sufficient for the needs of the responders.	No. of equipment, vehicles, facilities purchased/installled.	100% purchased/installled	C3,PCSR,PCFB, ENGINEERING, CHO,PCGH	inventory of equipment, actual inspection, auditing	Quarterly	GSO - Asset Division
To provide Disaster Training Center..	Institutionalized fully equipped Disaster Training	Rescue Emergency Disaster Training Center (RED) : Office Equipment	HVRA study	well equipped and sufficient for the needs of the responders.	No. of equipment, vehicles, facilities purchased/installled	100% purchased/installled	C3,PCSR,PCFB, ENGINEERING, CHO,PCGH	inventory of equipment, actual inspection, auditing	Quarterly	DRRMO





Pasig City Disaster Risk Reduction and Management Plan

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
	Center.	and Furniture's C3 Satellite Station PCs, printers, servers, license, Monitors Back Up Radio Repeater and Base Systems Internal CCTV and Wireless Connections, Quarters equipment and furniture's, cooking and gym, Training Equipment			led.					
To ensure continuous operation in case of power and systems failure.	Effective and efficient delivery of services to the public.	Upgrade facilities at C3 including purchase of redundancy (back-up) hardware	HVRA study	well equipped and sufficient for the needs of the responders.	No. of equipment, vehicles, facilities purchased/install ed.	100% purchased/install ed	C3,PCSR,PCFB, ENGINEERING, CHO,PCGH	inventory of equipment, actual inspection, auditing	Quarterly	GSO - Asset Division
To provide better monitoring system and uninterrupted operations.	Better monitoring system and uninterrupted operations.	Purchase of emergency backup power for CCTV and Wireless Antenna and Backhaul	HVRA study	well equipped and sufficient for the needs of the responders.	No. of equipment, vehicles, facilities purchased/install ed.	100% purchased/install ed	C3,PCSR,PCFB, ENGINEERING, CHO,PCGH	inventory of equipment, actual inspection, auditing	Quarterly	DRRMO





Pasig City Disaster Risk Reduction and Management Plan

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
	Radios									
To provide better monitoring system and uninterrupted operations for DRRM.	Better monitoring system and uninterrupted operations.	Purchase of Wide Area Notification System	HVRA study	well equipped and sufficient for the needs of the responders.	No. of equipment, vehicles, facilities purchased/install ed.	100% purchased/install ed	C3,PCSR,PCFB, ENGINEERING, CHO,PCGH	inventory of equipment, actual inspection, auditing	Quarterly	PASIG C3
To develop gender-responsive disaster preparedness program in the grassroots level and To capacitate the resident and homeowners in initiating and sustaining their own disaster risk reduction and management program to help reduce the impact of hazards in	An organized community disaster volunteers group that will ensure continuity of activities that promote:	Community DRR-Gender Responsive/CCA Seminars & Trainings and 2. CERT	based on the community organized group such as HOA's, PWD, Elderly, Youth, Sectoral, Business Sector, NGO's	Empowered, capacitated, enabled for effective response.	no. of trainings, no. of participants, no. of organized groups	600 Core group (GAD), 2000 advocates (CHO) 1,000 leaders (DSWD) 700 green police (CENRO), 300 responders/volunteers (DRRMO)	DSWD, GAD, CHO, DRRMO, BAO,	reporting and monitoring, attendance of targeted participants	Monthly - DRRMC	DRRMO





Pasig City Disaster Risk Reduction and Management Plan

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
their community.										
To capacitate and sustain high level of skills and efficiency of city responders	High level of City responder Proficiency and Services	Various SAR and Fire Training	based on the community organized group such as HOA's, PWD, Elderly, Youth, Business Sector, NGO's.	Empowered, capacitated, enabled for effective response.	no. of trainings, no. of participants, no. of organized groups	600 Core group (GAD), 2000 advocates (CHO) 1,000 leaders (DSWD) 700 green police (CENRO), 300 responders/volunteers (DRRMO)	DSWD, GAD, CHO, DRRMO, BAO,	reporting and monitoring, attendance of targeted participants	Monthly - DRRMC	DRRMO
To increase level of awareness of the community to various hazards & disasters	resilient and ready communities and individuals	Multi Hazard Preparedness Activities	based on the community organized group such as HOA's, PWD, Elderly, Youth, Business Sector, NGO's	Empowered, capacitated, enabled for effective response.	no. of trainings, no. of participants, no. of organized groups	600 Core group (GAD), 2000 advocates (CHO) 1,000 leaders (DSWD) 700 green police (CENRO), 300 responders/volunteers (DRRMO)	DSWD, GAD, CHO, DRRMO, BAO,	reporting and monitoring, attendance of targeted participants	Monthly - DRRMC	DRRMO





Pasig City Disaster Risk Reduction and Management Plan

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
To protect and support the disaster workers	fast recovery of city disaster workers	Premiums and Accident Health Insurance for Accredited Volunteers	List of accredited NGO volunteers	One master insurance policy for accredited volunteers.	no. of insured accredited volunteers	200 volunteers	C3, PCSR, PCFB	master list of submitted list of accredited volunteers	Annual - DRRMC	DRRMO





RESPONSE

GOAL: Strengthening preparedness for response by continuous provisions of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

IMPACT:

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
Able to address medical needs and hospitalization of affected and injured victims.	To supplement the existing hospital facilities in case of major disaster/catastrophe	Purchase the necessary field hospital tents which will be put up in case of emergency	MMEIR study, number of projected injured individuals	Treatment and provide the medical needs of those injured.	no. of treated patients	11,000 projected disaster victims	CHO, PCGH , DSWD data	Patient's medical record.	Daily	CHO/PCGH
To be able to provide prompt and quick response.	5 minute standard response time.	Installation of additional emergency response sub-stations	MMEIRS study, responders time travel	Prepositioned additional sub stations.	no. of sub stations	3 sub stations	PC3, PCSR, PCFB	incident report, time of response arrival	Weekly	DRRMO
To Pre Position Disaster Responders and Support Management in impending	zero casualties	Preventive Response Mobilization on Typhoons & Floods	Past situation report records	Efficient and quick response.	no. of assisted victims	High risk barangays (7 identified barangays)	DRRMO, Engineering Dept.	Historical data, EMI study	As the need arise	DRRMO





RECOVERY AND REHABILITATION

EXPECTED OUTPUT		PROGRAMS	BASELINE	ASSUMPTION	OBJECTIVELY VERIFIABLE INDICATORS	TARGETS FOR INDICATORS WITH GAD INDICATORS	INFORMATION SYSTEM			
OBJECTIVE	OUTCOME						Data Source to Assess Performance	Collection Methods	Frequency & Audience of the Report Presentation	Lead Person to gather Info.
To minimize the effect of flooding in low lying areas	upgraded drainage and canal system	Upgrading & construction of drainage and canals flood mitigation.	Flood Control data	Lessen flooded areas	no. of drainage and canals upgraded and constructed	High risk barangays (7 identified barangays)	ENGINEERING (FLOOD CONTROL OFFICE)	Actual inspection report, survey	Daily	ENGINEERING DEPT.
To rehab emergency response vehicles and equipment	Repaired disaster equipment and vehicles.	Rehabilitation and repairing of disaster response Vehicles and equipment	Serviceable and repaired response vehicles and equipment.	No. of rehabilitated and repaired disaster response vehicles.	2 water tankers, 2 fire and rescue pick up,	PCFB, PCSR, CITY PARKS	Inspection report from GSO	Quarterly - GSO	Annually	DRRMO





Pasig City Disaster Risk Reduction and Management Plan

Disaster Risk Resiliency Indicators

The Disaster Risk Resiliency Indicators (DRRI) developed by EMI can also be used as a tool for monitoring and evaluation (M&E). The DRRI is a set of ten (10) indicators that establishes initial benchmarks to measure to what extent risk reduction approaches have been mainstreamed in the organizational, functional, operational and development systems and processes of local governments. The indicators capture the potential for achieving disaster resilience in particular sectors, based on pre-defined benchmarks and performance targets. Anchored on EMI's concept and approach to DRR mainstreaming and aligned with the five (5) elements of the Hyogo Framework for Action and the Ten Essentials for Making Cities Resilient, the DRRI is divided among 5 key areas: (1) Legal and Institutional Processes and Policies; (2) Public Awareness and Capacity Building; (3) Critical Services and Infrastructure Resiliency; (4) Emergency Preparedness, Response, and Recovery Planning; and (5) Development Planning, Regulation, and Risk Mitigation.

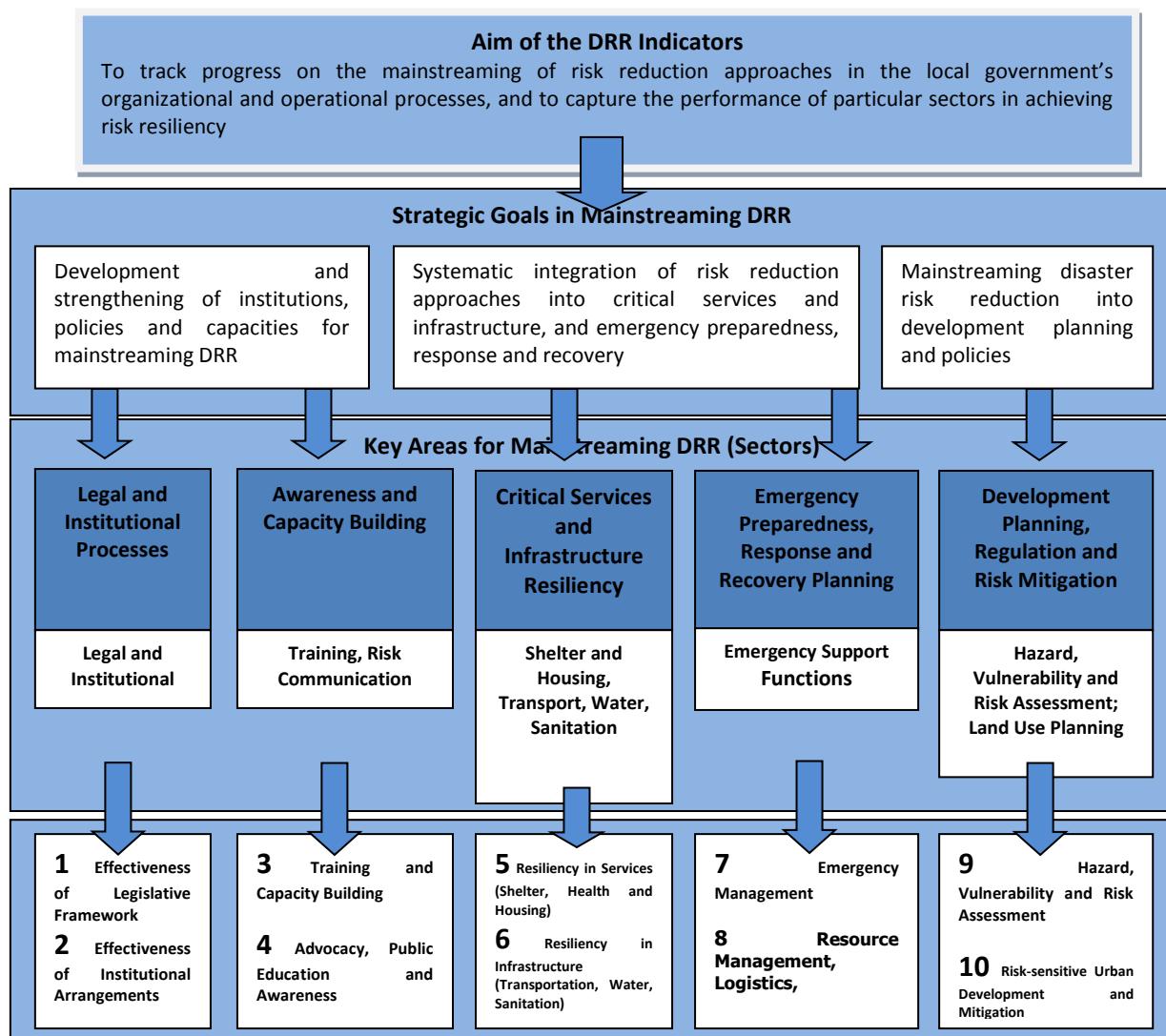


Figure 39. Disaster Risk Resiliency Indicator





Pasig City Disaster Risk Reduction and Management Plan

The rationale for applying the DRRI indicators is illustrated in the figure above. The main aim of the indicators is to track progress on the mainstreaming of risk reduction approaches in a local government's systems and processes. That primary mainstreaming goal is further divided into three strategic goals. Each of the goals corresponds to one or more key areas affecting a local government's disaster resilience. Finally, two indicators corresponding to each of the five key areas of mainstreaming are identified, the descriptors for which provide a measure of the performance of the local government in mainstreaming disaster risk reduction in a particular key area.





Pasig City Disaster Risk Reduction and Management Plan

The DRRI allocates a 1-5 ranking for each of the ten (10) indicators that fall under the five (5) main areas of mainstreaming, using five Performance Target Levels of attainment. Each indicator has specific descriptors for its corresponding attainment levels, as well as guide questions that can be used to provide specific details to support the assigned ranking.

The DRRI was applied to the Pasig City Resiliency to Earthquakes and Floods Project at the start of the project to establish an initial benchmark in terms of the level by risk resiliency parameters are mainstreamed into its governance systems and processes. As can be seen in Table 11. DRRI Results, PCG's overall ranking is **3.6** which can be translated as having a moderate level of attainment in terms of DRR mainstreaming. This shows that PCG has a consistent engagement and commitment to DRR by the institutions; however, the policies and systems have not yet been fully established.²¹ Results of the initial assessment exercise, however, may not have been accurate since there was limited representation and input from key members of the Pasig City DRRM Council.

Table 11. DRRI Results

DRR Indicators	Ave. Scores	Ave. Score for Key Area
Legal and Institutional Processes		
Indicator 1. Effectiveness of Legislative Framework	3.5	3.5
Indicator 2. Effectiveness of Institutional Arrangements	3.5	
Awareness and Capacity Building		
Indicator 3. Training and Capacity Building	3.5	
Indicator 4. Advocacy, Communication, Education and Public Awareness	3.5	3.5
Critical Services and Infrastructure Resiliency		
Indicator 5. Resiliency of Critical Services	3.6	
Indicator 6. Resiliency of Infrastructure	3.6	
Emergency Management and Response Planning		
Indicator 7. Emergency Management	4.0	
Indicator 8. Resource Management, Logistics and Contingency Planning	3.6	3.8
Development Planning, Regulation and Risk Mitigation		
Indicator 9. Hazard, Vulnerability and Risk Assessment	3.6	
Indicator 10. Risk-Sensitive Urban (and Rural) Development and Mitigation	3.3	3.4
AVERAGE SCORE	3.6	3.6

²¹ The DRRI result is based on the questionnaires collected from 11 out of 17 PCDRRMC members namely PCDRRMO, Engineering, PNP, City Fire, DILG, Philippine Red Cross, Knights of Columbus, Pasig Lions, City Health, City Veterinarian and Liga ng mga Barangay. The answers were validated among the PCDRRMC members and external partners present in the workshop on September 6, 2010.





Pasig City Disaster Risk Reduction and Management Plan

As a next step, Pasig City may revisit the results of the initial DRRI assessment by conducting another round of assessment with the key members of the Pasig DRRM Council. This will provide a more accurate benchmark in determining what areas need further attention and investments and help Pasig City focus its resources in building resiliency to disasters.





9. References

Cardona, O.D. (2004). The need for rethinking the concepts of vulnerability and risk from a holistic perspective: a necessary review and criticism for effective risk management. In: Bankoff

Carreno, L., Cardona, O., Barbat, A., (2005). Urban Seismic Risk Evaluation: A Holistic Approach, Natural Hazards, Volume 40, Number 1, p. 137-172.

Davis, C., (2011). Water Systems Framework Report, EMI

Earthquakes and Megacities Initiative (EMI), Emergency Management System: Review and Upgrade, June 14, 2012.

Earthquakes and Megacities Initiative (EMI), GIS Capacity Needs Assessment for DRRM, September 2011.

Earthquakes and Megacities Initiative (EMI), Hazard, Vulnerability and Risk Assessment Report, March 14, 2012.

Earthquakes and Megacities Initiative (EMI), Review of Pasig Comprehensive Land Use Plan, June 14, 2012.

Earthquakes and Megacities Initiative. *Land Use and Urban Planning Component: Disaster Risk Reduction and Management Master Plan*. Pasig City Resilience to Earthquakes and Floods Project. March 2011.

Earthquakes and Megacities Initiative. Organizational Mapping Tool. Legal and Institutional Arrangements Component. *To setup disaster risk management office within the Aqaba Special Economic Zone Authority and provide competency training Project*. 2011.

Earthquakes and Megacities Initiative. *Pasig City Emergency Management System: Review and Upgrade Report*. Pasig City Resilience to Earthquakes and Floods Project. June 2012.

EMI (2009), Final Report: Amman disaster risk management master plan: support to building national capacities for earthquake risk reduction in Amman. A project undertaken under contract no. 00051485 awarded by UNDP-Jordan. 130p.

Fernandez, J., Mattingly, S., Bendimerad, F., Cardona, O., (2006). Application of Indicators in Urban and Megacities Disaster Risk Management, A Case Study of Metro Manila, EMI Topical Report TR-07-01, September 2006, 30 p. Report for this application is available from the EMI website (http://emi-megacities.org/upload/3cd_2007_MISReport_TR0701.pdf)

G, Frerks G, Hilhorst D. (eds.) Mapping vulnerability: disasters, development and people, London, Earthscan Publishers.





Pasig City Disaster Risk Reduction and Management Plan

Khazai, B., Wenzel, F., Kilic, O., Basmaci, A., Konukcu, B., Mentese, E. Y., Sungay, B. (2009).

Megacity Indicator Systems (MIS) for Disaster Risk Management in Istanbul, International Conference on Megacities: Risk, Vulnerability and Sustainable Development, September 7-9, 2009, Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany.

Minutes of the PCDRRMO Meetings, May 2011

Pasig City DRRM Plan 2010-2013

Pasig City, Ordinance No. 18 (September 30, 2010), creating the Pasig City Disaster Risk Reduction and Management Office (PCDRRMO)

Sinha R., Goyal, A., Shinde R. M., Mahendra, M., (2010). Seismic Risk Assessment of Pasig, by, IIT Reference Number: DRD/CE/RS-15/2009-2010, Final Version, October 2010.





Annexes

Annex A: Twenty-Six (26) functions of the LDRRMO as Specified by RA10121

1. Design, program, and coordinate disaster risk reduction and management activities consistent with the National Council's standards and guidelines;
2. Facilitate and support risk assessments and contingency planning activities at the local level;
3. Consolidate local disaster risk information which includes natural hazards, vulnerabilities, and climate change risks, and maintain a local risk map;
4. Organize and conduct training, orientation, and knowledge management activities on disaster risk reduction and management at the local level;
5. Operate a multi-hazard early warning system, linked to disaster risk reduction to provide accurate and timely advice to national or local emergency response organizations and to the general public, through diverse mass media, particularly radio, landline communications, and technologies for communication within rural communities;
6. Formulate and implement a comprehensive and integrated LDRRMP in accordance with the national, regional and provincial framework, and policies on disaster risk reduction in close coordination with the local development councils (LDCs);
7. Prepare and submit to the local sanggunian through the LDRRMC and the LDC the annual LDRRM Office Plan and budget, the proposed programming of the LDRRM Fund, other dedicated disaster risk reduction and management resources, and other regular funding source/s and budgetary support of the LDRRMO/BDRRMC;
8. Conduct continuous disaster monitoring and mobilize instrumentalities and entities of the LGUs, Civil Society Organizations (CSOs), private groups and organized volunteers, to utilize their facilities and resources for the protection and preservation of life and properties during emergencies in accordance with existing policies and procedures;
9. Identify, assess and manage the hazards vulnerabilities and risks that may occur in their locality;
10. Disseminate information and raise public awareness about those hazards, vulnerabilities and risks, their nature, effects, early warning signs and counter-measures;
11. Identify and implement cost-effective risk reduction measures/strategies;
12. Maintain a database of human resource, equipment, directories, and location of critical infrastructures and their capacities such as hospitals and evacuation centers;
13. Develop, strengthen and operationalize mechanisms for partnership or networking with the private sector, CSOs, and volunteer groups;
14. Take all necessary steps on a continuing basis to maintain, provide, or arrange the provision of, or to otherwise make available, suitably-trained and competent personnel for effective civil defense and disaster risk reduction and management in its area;
15. Recommend through the LDRRMC the enactment of local ordinances consistent with the requirements of this Act;
16. Implement policies, approved plans and programs of the LDRRMC consistent with the policies and guidelines laid down in this Act;
17. Establish a Provincial/City/Municipal/Barangay Disaster Risk Reduction and Management Operations Center;





Pasig City Disaster Risk Reduction and Management Plan

18. Prepare and submit, through the LDRRMC and the LDC, the report on the utilization of the LDRRMF and other dedicated disaster risk reduction and management resources to the local Commission on Audit (COA), copy furnished the regional director of the OCD and the Local Government Operations Officer of the DILG; and
19. Serve as the secretariat and executive arm of the LDRRMC;
20. Coordinate other disaster risk reduction and management activities;
21. Establish linkage/ network with other LGUs for disaster risk reduction and emergency response purposes;
22. Recommend through the LDRRMC the enactment of local ordinances consistent with the requirements of this Act;
23. Implement policies, approved plans and programs of the LDRRMC consistent with the policies and guidelines laid down in this Act;
24. Establish a Provincial/City/Municipal/Barangay Disaster Risk Reduction and Management Operations Center;
25. Prepare and submit, through the LDRRMC and the LDC, the report on the utilization of the LDRRMF and other dedicated disaster risk reduction and management resources to the local Commission on Audit (COA), copy furnished the regional director of the OCD and the Local Government Operations Officer of the DILG; and
26. Act on other matters that may be authorized by the LDRRMC





Annex B: Key Activities Conducted in the Development of the Pasig City Resilience to Earthquakes and Floods Project

Date	Key Activities
Jul 26-29, 2011	Geographic Information System (GIS) data gathering and Key Informant Interview (KII) with Pasig City Government (PCG) departments concerned.
Aug 3, 2011	First Field Investigation (FI) , spearheaded by Dr. Bijan Khazai, GIS-ICT Expert, for the GIS Validation Workshop to validate the results of the KIIs.
Aug 5, 2011	Advisory Committee meeting with external partners, namely PHIVOLCS, PAGASA, OCD, NAMRIA, MMDA and Manila Water, to give an orientation about the project and their roles in it.
Sep 6, 2011	Second Field Investigation for the Legal and Institutional Arrangements (LIA) Validation and Network Analysis Workshop, led by Atty. Violeta Seva and Prof. Rolando Talampas, LIA Practice leader and Institutional Arrangements Specialist, respectively; to validate the Disaster Risk Resiliency Indicators tool and Network Analysis survey results among the respondents, members of the Pasig City Disaster Risk Reduction and Management Council (PCDRRMC).
Sep 5-9, 2011	Emergency Management (EM) Training Needs Assessment (TNA) Survey for PCDRRMC and PIT members.
Sep 13 & 15, 2011	Third Field Investigation for a 2-day Training Workshop on EM Module 1, led by Mr. Jim Buika, EM Expert.
Sep 14, 2011	KII by Mr. Jim Buika with Mr. Ritche Van Angeles, PCDDRMO Chief, for initial EM systems evaluation and Emergency Operations Center ocular visit. Initial coordination meeting between EMI and OCD-UNDP team.
Sep 15, 2011	PIT meeting for the creation of Focus Groups (FGs).
Oct 20, 2011	Data gathering for city's GIS database development and orientation on hazard mapping at the Pasig City Barangay Disaster Risk Reduction and Management Planning Workshop
Nov 9, 2011	Second Advisory Committee Meeting with NAMRIA, PAGASA, Meralco, Manila Water and MMDA to present project progress and seek assistance in acquiring other risk data from their respective offices





Pasig City Disaster Risk Reduction and Management Plan

Date	Key Activities
Nov 10, 2011	LUP-CCSGIS-HVRA Focus group meetings to present the status/project update and request assistance needed in acquiring barangay risk data
Nov 16-17, 2011	Fourth Field Investigation Training Workshop on EM Module 2, led by Mr. Troy Kindred, EM Expert.
Nov 23, 2011	CLUP review meeting with Pasig City officials: Arch. Luisa Soriano, Planning Department, Arch. Raul Silva, Building Official's Office and Engr. Nicolas Cruz, Engineering
Nov 25, 2011	Fifth Field Investigation for the Training of Engineers on Rapid Visual Screening spearheaded by Dr. Fouad M. Bendimerad, DRM Expert and Dr. Renan Tanhueco, LUP Expert
Nov 29, 2011	Casting of actors in cooperation with City Social Works and Development (CSWD) for the Video infomercial
Dec 1-4, 2011	Infomercial videoshoot for the scenes including interview of earthquake survivors
Dec 5-12, 2011	Printing of IEC materials
Dec 14, 2011	Sixth Field Investigation was the completion of the IEC materials on earthquakes and floods, namely brochures, poster/calendar, banners and video infomercial.
Dec 15, 2011	Submission by EMI of Information, Education and Communication materials to the Office of the Mayor, Barangay Affairs Office and Pasig DRRMO.
Jan 16, 2012	Seventh Field Investigation for the Risk-Sensitive Land Use Planning Workshop spearheaded by EMI Urban Development Planning Expert Dr. Renan Tanhueco, LUP expert
Feb 6, 2012	Acquired the LiDAR derived dataset from NAMRIA for use in the development of the Hazards, Vulnerability and Risk Assessment (HVRA) Report, GIS database and City Risk Atlas.
Dec 15 - Mar 15,	Eight Field Investigation was intended for the review, finalization,





Pasig City Disaster Risk Reduction and Management Plan

Date	Key Activities
2012	packaging, and printing of the HVRA and CLUP Review Report
April 26-27, 2012	Ninth Field Investigation for the Training Workshop on EM Module 3 led by Mr. Troy Kindred, EM expert
May 21, 2012	Tenth Field Investigation was the Validation of Earthquake Findings with PHIVOLCS and Flood Findings with City Engineers, EFCOS-MMDA and DPWH Flood Control Office
Aug. 4, 2012	Eleventh Field Investigation was the Stakeholder's Orientation on Earthquake Findings
	The Twelfth and last Field Investigation was the Validation of the Updated Pasig DRRMP. After the submission of the Draft PCDRRM Plan 2013-2018, the PCDRRMC will review and validate the key results and recommendations contained in the plan.





Annex C: Various emergencies and incidents related to DRR-CCA since 2008 to 2016

Car Accident without injuries
Car Accident with injuries
Public Scandal
Medical Emergency
PNP Checkpoint
Request Field Personnel
Street Fighting
Illegal Parking
Drinking in Public
Fire
Flooded area
Illegal Gambling
Electrical Fire
Obstruction
Illegal Vendor
Towing
Man Creating Trouble
Mentally Ill Person
Police Assistance
Fallen Tree
Fall Victims
Request Rescue
Stalled Vehicle
Operation
Robbery
Unconscious
Fallen Low hanging wire
Rubbish Fire
Street Children
Hit and Run
Heavy Traffic

MOST COMMON INCIDENTS
For the last 8 years since 2008
Rank according to frequency

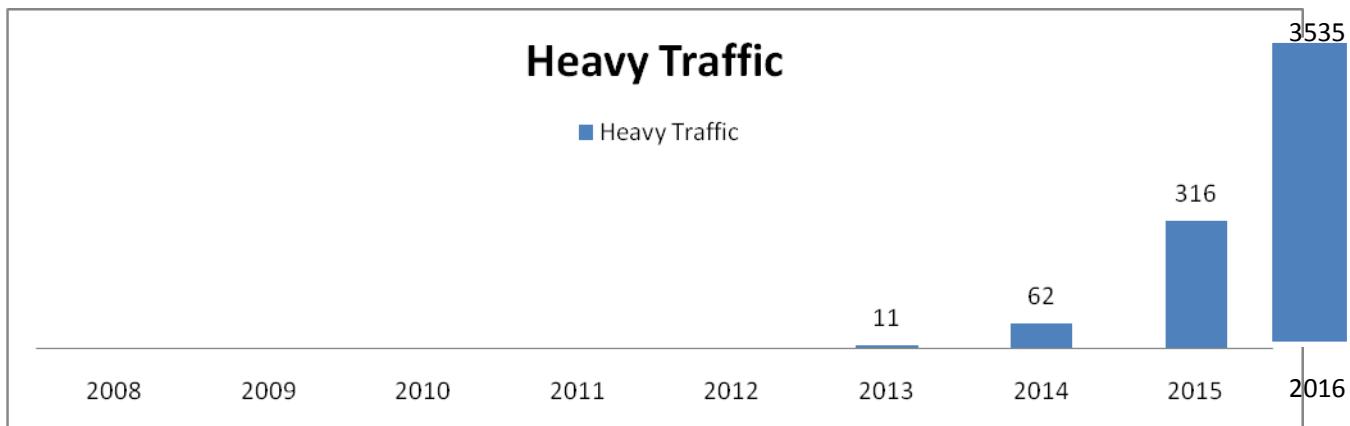




Pasig City Disaster Risk Reduction and Management Plan

2016

No .	Barangay	No. of Times Reported
1	Ugong	469
2	Bagong Ilog	417
3	San Antonio	372
4	Rosario	325
5	Oranbo	244
6	Maybunga	216
7	San Miguel	176
8	Kapasigan	128
9	Sagad	124
10	Pinagbuhatan	109
11	Pineda	109
12	Caniogan	106
13	San Joaquin	105
14	Kapitolyo	91



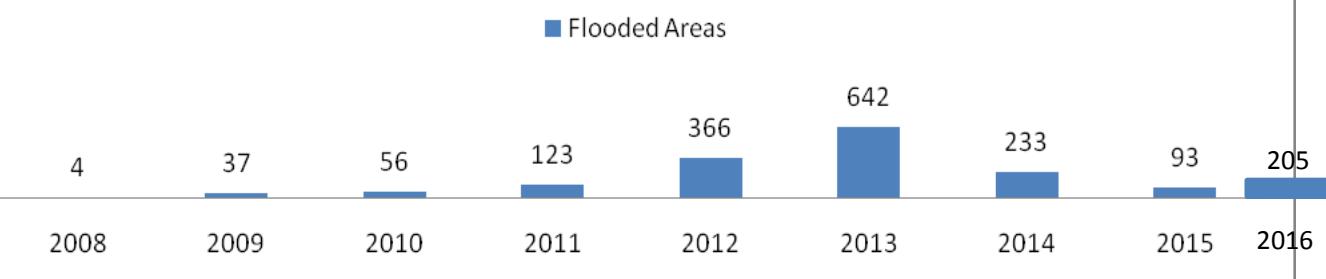


Pasig City Disaster Risk Reduction and Management Plan

2016

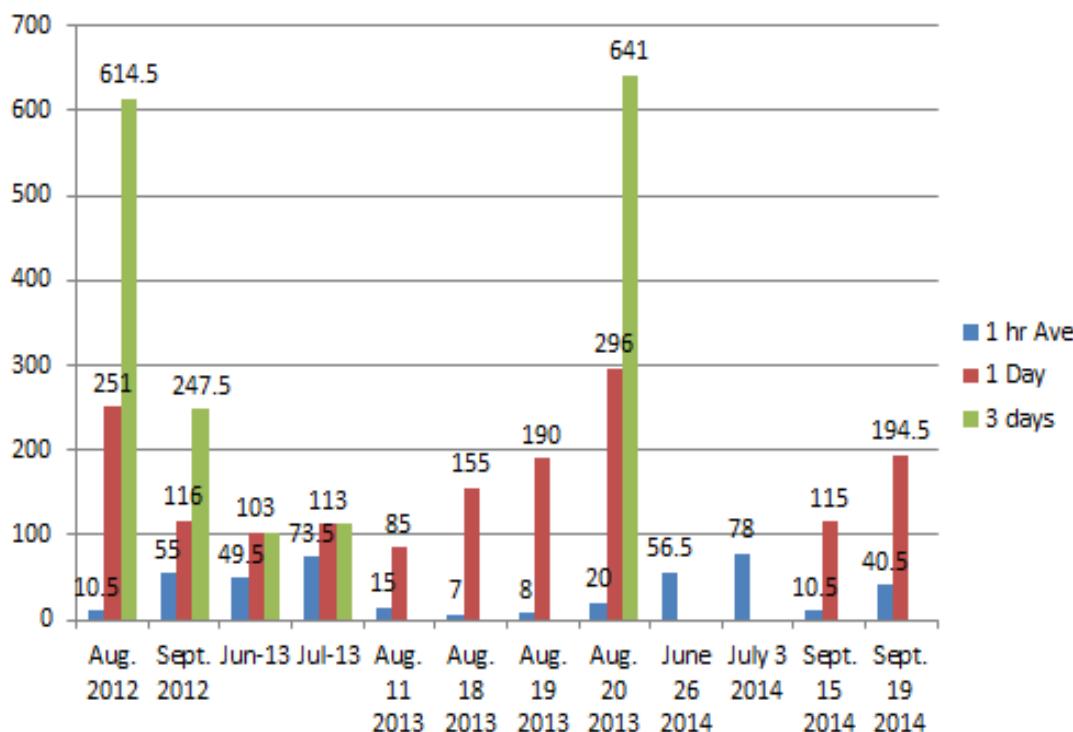
No .	Barangay	Total Flooded Areas
1	Pinagbuhanan	53
2	Caniogan	33
3	Manggahan	30
4	Maybunga	19
5	Sta. Lucia	16
6	San Miguel	10
7	Bagong Ilog	7
8	Palatiw	7
9	Rosario	5
10	San Joaquin	5
11	Santolan	4
12	Sto. Tomas	4
13	Sagad	2
14	Sta. Cruz	2

Summary of Flooded Areas



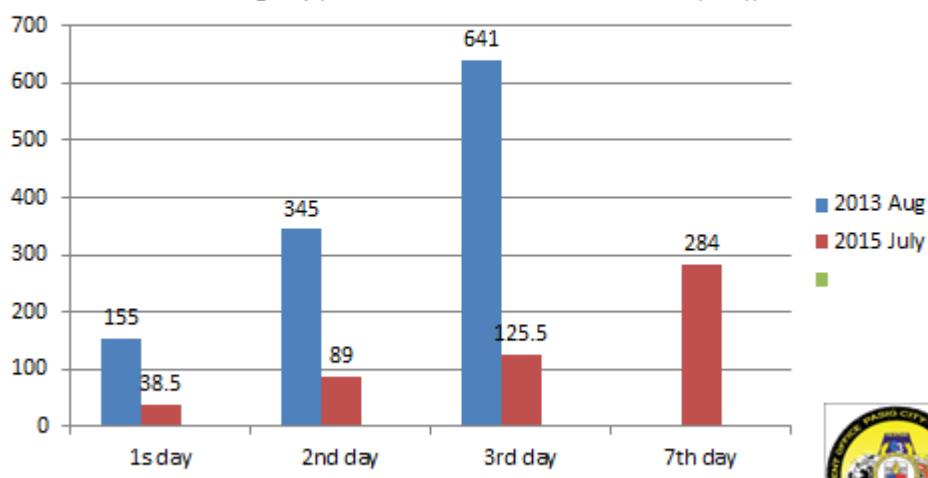


PROFILING OF DATA



HABAGAT COMPARISON 2013 and 2015

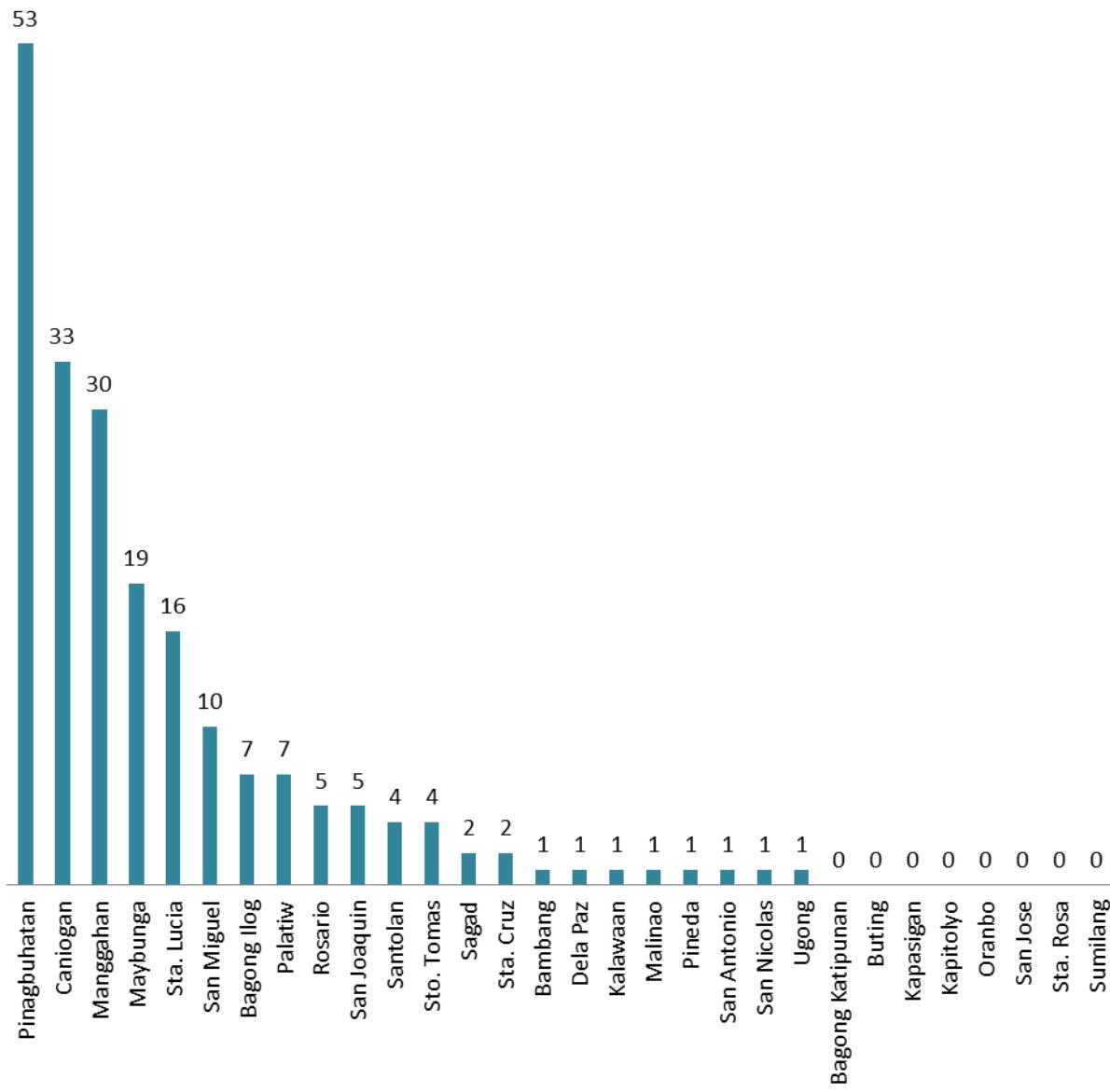
in Pasig City (Based from RainFall Data Records (mm))





2016 SUMMARY DATA

Graphical Presentation of Flooded Areas per Barangay



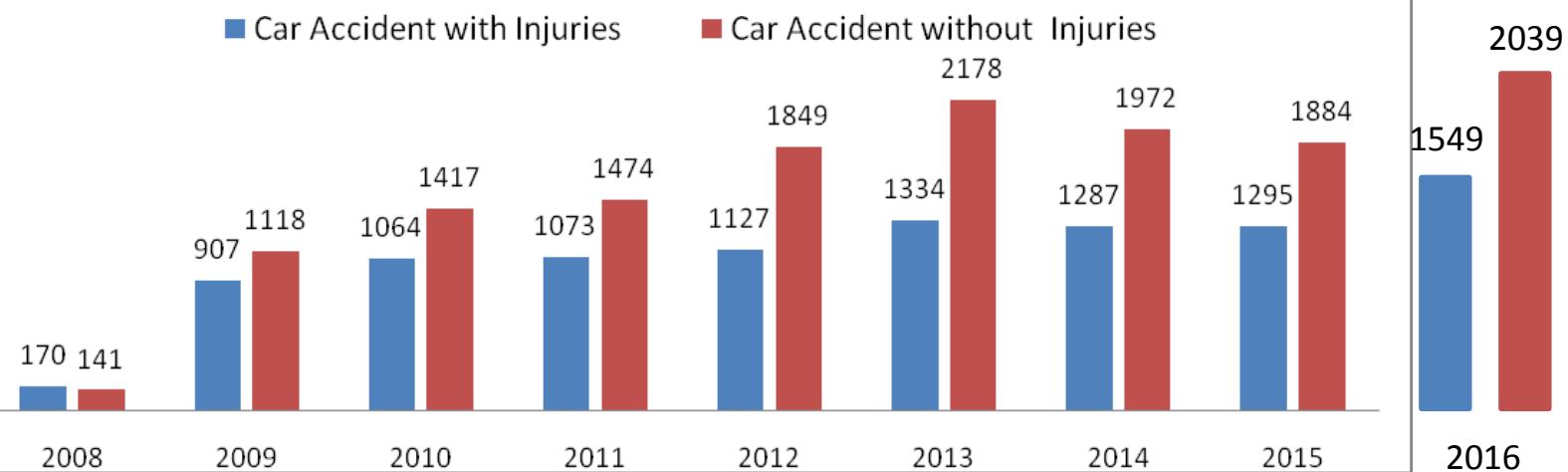


Pasig City Disaster Risk Reduction and Management Plan

2016

No .	Barangay	Total Car Accident with injuries	Total Car Accident without injuries	Total Accident
1	Ugong	224	396	620
2	Bagong Ilog	119	170	289
3	Rosario	133	162	295
4	Pinagbuhanan	135	81	216
5	San Antonio	52	132	184
6	San Miguel	123	58	181
7	Sta. Lucia	76	125	201
8	Maybunga	100	91	191
9	Kapitolyo	51	145	196
10	Manggahan	85	83	168
11	Santolan	51	107	158
12	Dela Paz	42	83	125
13	Caniogan	69	46	115
14	Pineda	30	55	85
15	Oranbo	23	54	77

Summary of Car Accident

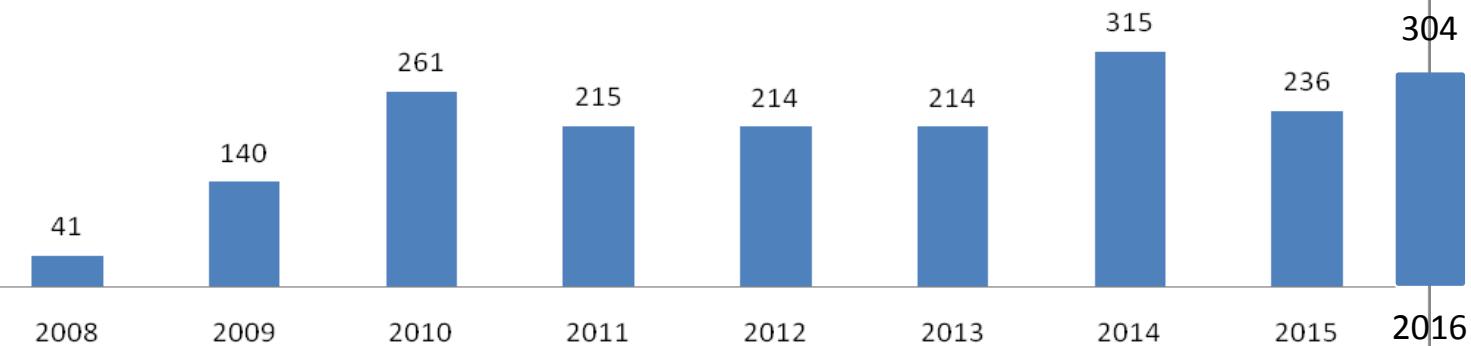




2016

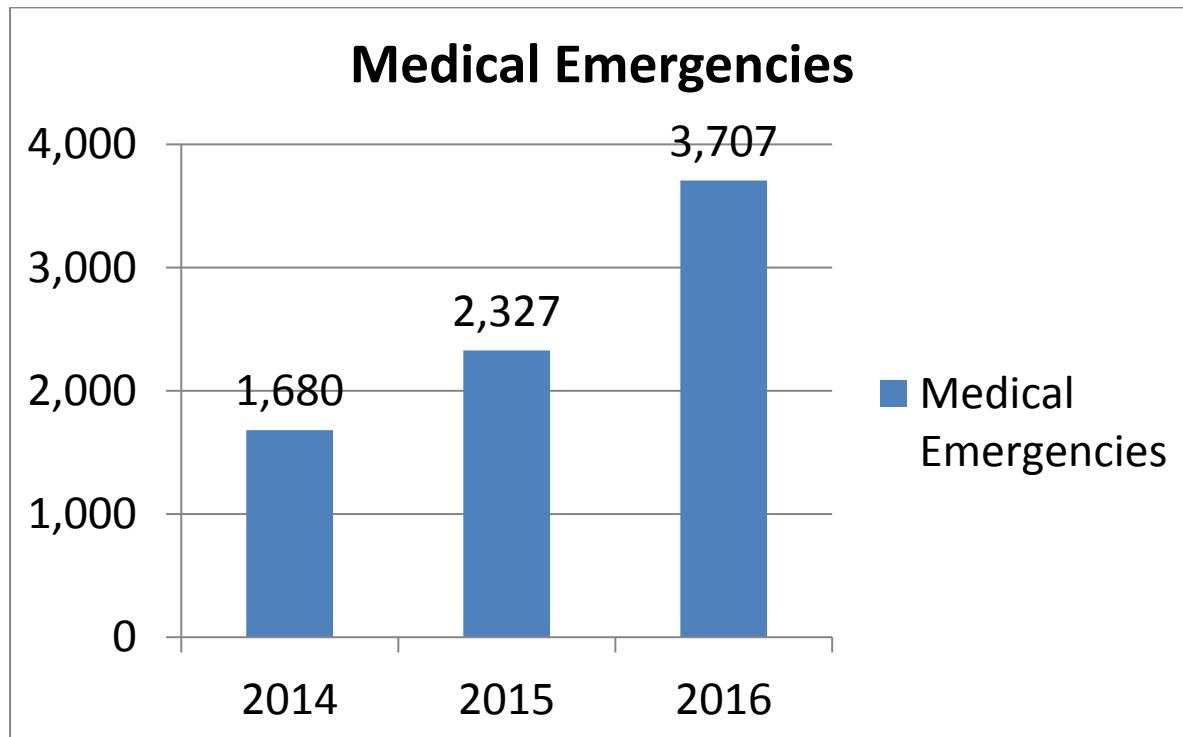
Summary of Fire Incident

■ Fire Incident



No.	Barangay	Total Fire Incident
1	Pinagbuhanan	51
2	Rosario	25
3	San Nicolas	23
4	Manggahan	22
5	Maybunga	20
6	Palatiw	19
7	Santolan	17
8	Sta. Lucia	16
9	San Miguel	15
10	Bagong Ilog	12
11	Kalawaan	10
12	San Joaquin	9
13	Dela Paz	8
14	Caniogan	8
15	Sto. Tomas	7
16	Pineda	7
17	Kapitolyo	6
18	Bambang	5
19	Malinao	5
20	Ugong	4
21	Buting	3
22	San Antonio	3
23	Sagad	3
24	Kapasigan	2
25	San Jose	2
26	Sta. Rosa	1
27	Sta. Cruz	1





2016

Incident Type	Grand Total
Medical Emergency	703
Chest Pain (MHT)	557
Fall Victim	321
Unconscious (MHT)	273
DIZZINESS/NAUSEA	265
Bed ridden	199
Stroke	181
Delivering a Baby	173
Hypertension	161
Vomiting	144
Heart Problems	108
Abdominal Pain	100
Diabetic Problem (MHT)	86
Injured / Fractured Person	73





Pasig City Disaster Risk Reduction and Management Plan

TOP 5 Request and Complaints			
YEAR 2014			
No.	Request/Complaints	Department/Agency Concerned	Total No. of Request
1	Busted Streetlights	Electrical Maintenance Office	510
2	Uncollected Garbages	IPM	167
3	Manhole Cover	Drainage Maintenance Office	89
4	Declogging of Drainage	Drainage Maintenance Office	82
5	Trimming/Cutting of Trees	CENRO	66
	Stray Dogs and Animals	City Veterinarian Office	66

TOP 5 Request and Complaints			
YEAR 2015			
No.	Request/Complaints	Department/Agency Concerned	Total No. of Request
1	Busted Streetlights	Electrical Maintenance Office	696
2	Declogging of Drainage	Drainage Maintenance Office	118
3	Uncollected Garbages	IPM	112
4	Stray Dogs and Animals	City Veterinarian Office	105
5	Trimming/Cutting of Trees	CENRO	96

TOP 5 Request and Complaints			
YEAR 2016			
No.	Request/Complaints	Department/Agency Concerned	Total No. of Request
1	Busted Streetlights	Electrical Maintenance Office	800
2	Uncollected Garbages	IPM	294
3	Declogging of Drainage	Drainage Maintenance Office	149
4	Manhole Cover	Drainage Maintenance Office	134
5	Stray Dogs and Animals	City Veterinarian Office	108
	Trimming and Cutting of Trees	CENRO	108

OVER-ALL TOP REQUEST AND COMPLAINTS						
YEAR		2014	2015	2016	Grand Total	
No.	Request/Complaints	Department/Agency Concerned	Total No. of Request	Total No. of Request	Total No. of Request	
1	Busted Streetlights	Electrical Maintenance Office	510	696	800	2006
2	Uncollected Garbages	IPM	167	112	294	573
3	Declogging of Drainage	Drainage Maintenance Office	82	118	149	349
4	Manhole Cover	Drainage Maintenance Office	89	84	134	307
5	Stray Dogs and Animals	City Veterinarian Office	66	105	108	279
6	Trimming and Cutting of Trees	CENRO	66	96	108	270





Pasig City Disaster Risk Reduction and Management Plan



**Marco Polo Hotel Ortigas March 8 -10, 2017
Pasig City DRRM Council**





Pasig City Disaster Risk Reduction and Management Plan

