Manila Bay Sustainable Development Master Plan

FINAL MASTER PLAN, ACTION PLAN + INVESTMENT REPORT

ANNEX 1

ICZM PLANNING FRAMEWORK

December 2020
PREFACE

Reclamation Project within Manila Bay

In May 2019, during the Science Policy and Information Forum on the Sustainability of Manila Bay at the Philippine International Convention Center (PICC), the Philippine Reclamation Authority (PRA) presented the proposed and approved reclamation projects.

This document

This Integrated Coastal Zone Management (ICZM) Planning Framework is consistent with the overall vision and goal of having a sustainable and resilient Manila Bay. Specifically, this document provides guidance on how to identify, design and assess development projects that are feasible in Manila Bay consistent with the overarching goal of promoting the sustainability and resiliency of Manila Bay.

This document complies with the Terms of Reference of the Formulation of the Manila Bay Sustainable Development Master Plan (MBSDMP) which is distinct from the Reclamation and Development Plan (RDP) that is stipulated under Executive Order 74 (2019).
CONTENTS

1 INTRODUCTION
   ICZM Planning Framework for Manila Bay, 1
   Practical Application, 1

2 BASIS OF MB ICZM PLANNING FRAMEWORK
   Key Principles, 3
   Management Zones within Protected Areas, 3
   Areas for Specific Functions, 4
   Water Circulation and Tidal Movement, 4
   Production Use Zones, 4
   Potential Development Projects within Manila Bay, 5

3 MAJOR ZONES IN MANILA BAY
   Strict Protection Zone (SPZ), 7
   Special Use Zone (SUZ), 9
   Production Use Zone (PUZ), 11
   Land Subsidence, 14

4 PRINCIPLES GOVERNING THE USE OF MANILA BAY ZONES

5 OPERATIONALIZATION OF ICZM PLANNING FRAMEWORK

6 REFERENCE
The Manila Bay Sustainable Development Master Plan (MBSDMP) is a master plan for the development of Manila Bay and its immediate coastal zone together with its larger catchment areas, as the influence sphere. It is intended to guide decision-makers in the assessment and approval of programs, activities, and projects that are consistent with national, regional and local policies, the overall vision for Manila Bay.

ICZM Planning Framework for Manila Bay

The Integrated Coastal Zone Management (ICZM) Planning Framework for Manila Bay is the Overall Guiding Framework of the MBSDMP. It adopts a holistic and integrative approach in addressing the complex social and ecological issues in the Manila Bay Coastal Area. Further it seeks to engage the participation and cooperation of all stakeholders to realize the overall goal of having a “Sustainable and Resilient Manila Bay” by balancing and harmonizing the sectoral objectives (environment, economic, social, cultural and recreational).
Practical Application

The ICZM Planning Framework sets the parameters by which proposed developments under MBSDMP is to be designed and implemented. In support to the AmBisyon Natin 2040: Matatag, Maginhawa, at Panatag na Buhay, the MBSDMP ICZM Planning Framework can also be used as:

- Basis for updating of CLUPs/Zoning ordinances of coastal LGUs in a manner that will harmonize the socioeconomic development goals of the LGUs and Manila Bay;
- Basis for LGUs in determining the best/suitable uses of municipal waters within its jurisdiction;
- Framework to guide in resolving use of areas commonly claimed by two or more LGUs;
- Framework for resolving conflicting uses of Manila Bay;
- Framework for the evaluation of unsolicited land reclamation proposals;
- Framework for identification of areas where building activities may or may not be allowed;
- Basis for implementing measures to mitigate adverse impacts of existing and prospective uses of, and practices/activities in Manila Bay and coastal areas; and
- Guide for the private sector in identifying and developing potential projects.
Key Principles

SUSTAINABILITY
The ICZM Planning Framework is to ensure uninterrupted delivery of Manila Bay ecosystem services.

PRECAUTIONARY
The ICZM Planning Framework is to adopt measures or decisions to guard against uncertain hazards to the Manila Bay ecosystems and its communities.

OPTIMIZATION OF MULTIPLE USES
The ICZM Planning Framework is to ensure optimum balance of ecological and socio-economic goals in the management and development of Manila Bay and ideally of Manila Bay Region.

PARTICIPATORY
The ICZM Planning Framework is developed through engagement of concerned LGUs, NGAs, private sector, and other key stakeholders in making decisions on the use of Manila Bay.

MULTI-DISCIPLINARY
The ICZM Planning Framework is developed through engagement of experts from various disciplines related to the management and development of Manila Bay.
Management Zones within Protected Areas

The DENR Administrative Order No. 2008-17 (Annex C) amended Section of the DAO No. 25 Series of 1992 and provided criteria in the identification and procedures in the delineation and/or demarcation of management zones within protected areas. The administrative order covers all protected areas under the National Integrated Protected Areas System (NIPAS) except for those protected areas already covered by specific laws. For Manila Bay, the nine (9) categories of management zones in the DAO 25, S. of 1992 were reduced into two (2) classifications, namely: Multiple Use Zones (MUZ) and Strict Protection Zones (SPZ).

**Multiple Use Zones (MUZ)** are areas where settlement, traditional and/or sustainable land-uses, including agriculture, agroforestry, and other income-generating or livelihood activities may be allowed consistent with relevant Protected Area Management Plan. The zone includes, among others, areas of high recreational tourism, educational, or environmental education values, and areas consisting of installation allowed under existing guidelines and of national significance/interest such as facilities/structures for renewable energy, telecommunications, and electric power generation.

**Strict Protection Zones (SPZ)** are areas consisting of natural areas with high biodiversity value, closed to all human activities except for scientific studies and/or ceremonial or non-extractive uses by the indigenous peoples. It may also include habitats of threatened species, or degraded areas that have been designated for restoration and subsequent protection.

Section 8 of the NIPAS Act stipulates a Buffer Zone that states “for each protected area, there shall be established peripheral buffer zones when necessary, in the same manner as Congress establishes the protected area, to protect the same from activities that will directly and indirectly harm it. Such buffer zones shall be included in the individual protected area management plan that shall be prepared for each protected area. The DENR shall exercise its authority over protected areas as provided in this Act on such area and designated as buffer zones.”

In the paper of Shanks et al. (2003), “Propagule Dispersal Distance and the Size and Spacing of Marine Reserves”, it was presented that a reserve of 4 to 6 kilometers in diameter should be large enough to contain dispersing fish and invertebrate larvae and reserves spaced 10 – 20 km apart should be close enough to capture propagules released from adjacent reserves.

Green et al., (2014) in their paper “Designing Marine Reserves for Fisheries Management, Biodiversity Conservation, and Climate Change Adaptation” recommends the replication of protection of each major habitat within at least three (3) widely separated marine reserves to mitigate the loss due to risk of spreading.

Based on the above the buffer zones for critical habitats in Manila Bay shall be delineated as illustrated in Figure 1.

![Figure 1: Buffer Zone used in this document (as described by Shanks et al. (2003) and Green et al. (2014)).](image-url)
Inherent and critical to maintaining the ecosystems of Manila Bay is maintaining its water circulation and tidal movement. This is indicated in the study of Villanoy and Martin (1997) “Modeling the Circulation of Manila Bay: Assessing the Relative Magnitude of Wind and Tide Forcing”.

Water Circulation and Tidal Movement
Areas for Specific Functions

There are areas in Manila Bay that were designated by law for specific purposes. These areas are:

- **Shipping Navigational Lanes** — Being the country’s main hub of trade and sea transport, some areas in the Bay are allocated solely for sea navigation purposes. The Philippine Coast Guard and Philippine Navy are responsible of patrolling the declared navigation lines in the bay.
- **Ports and Harbors** — These areas are solely for docking passenger and cargo ships. There are also the areas where relevant infrastructures are in place. The Philippine Ports Authority have the jurisdiction on these areas and where specific regulations on docking and anchoring procedures are also in place.
- **Naval Bases** — These areas serve as fortresses for the country’s defense. Some areas in the bay are utilized as military bases such as Sangleay Point in Cavite City. The islands of Corregidor, Caballo and El Fraile in the Manila Bay mouth is also regulated by law under the military jurisdiction for its strategic position in country’s national defense.
- **Restricted Areas** — these area areas declared by the Philippine Government as National Defense Zones. Vessels are not allowed to pass closer than 1 mile from the islands except those transiting the Traffic Separation Scheme. Unless authorized by the Armed Forces of the Philippines, vessels are not allowed to stop, anchor or lay in the area. (source: NAMRIA)
- **BFAR Marine Protected Areas** — Protected Areas (PAs) are areas specifically designated for natural resources preservation and protection. These are declared by concerned agencies such as BFAR, wherein specific regulations are in place.

Production Use Zones

Production Use Zone (PUZ) refers to all areas outside the Strict Protection Zones (SPZ) where suitable economic activities may be allowed. The subzones of the PUZ are:

- **Navigation Zone (NZ)** — covers areas designated by law as navigation lanes primarily for water transportation of products (i.e., cargo) and people and related activities, including scientific and ceremonial or religious activities, and are closed to all other human activities including land reclamation and building of structures that will impede the safe movement of all authorized sea vessels.
- **Recreation Zone (RZ)** — covers beaches, beachfronts and adjoining coastal waters primarily designated for sunset watching, swimming, other recreational and ecotourism related activities, scientific and ceremonial or religious activities.
- **Fishery Use Zone (FUZ)** — covers all areas within PUZ but outside NZ and RZ that may be used for fishing, aquaculture, including scientific, religious and other human activities that may not compromise the sustainability and accessibility of areas to fisherfolks.
- **Multiple Use Zone (MUZ)** — covers all areas within PUZ but outside of NZ, RZ and FUZ where land reclamation, building of structures and infrastructures may be allowed following strict implementation of EIA and other related laws and regulations governing such projects. This zone may also be used for other suitable uses described in other PUZ subzones.
Phenomenon in the Area

Land subsidence is the decline of elevation of land surface. It results from gravitational force pushing the land downward as the amount of groundwater level under these grounds decreased or become depleted. (Langridge & Fencl, 2020)

Manila Bay area is threatened by land subsidence. Several studies using historical satellite imageries showed that Manila Bay area, particularly the northeastern portion is sinking. In a study of Rodolfo and Siringan (2006), the mean land subsidence in the Manila Bay coastal area was estimated at 9cm/yr. Other subsidence rates on more specific areas were computed in other studies including 6cm/yr in North Metro Manila and South Bulacan, and 8cm/yr in Caloocan (Eco, 2013). Mean localized subsidence rate in Metro Manila was calculated at 15cm/yr (Raucoules, 2013).

With the combined effects of land subsidence and sea level rise, the already vulnerable population of Metro Manila and surrounding area is expected to be even more vulnerable to natural hazards because of land subsidence. Sinking city means more coastal communities will become more prone to hazards such as flooding and storm surges. As the capital itself is susceptible, major infrastructures and facilities hosting national economic activities will also be prone to these threats.

Potential Developments

The potential developments within Manila Bay can be grouped into three (3):

- **Protection projects** pertain to development works to protect the integrity of existing historical monuments, ports and transport routes, and ecosystems and natural habitats.

- **Restoration projects** pertain to development works to improve the area towards its original intent and purpose.

- **Improvement and upgrading projects** pertain to development works to improve the area towards achieving new objectives that may be beyond or different from the original intent and purpose. Land reclamation projects are included in this project category.

Protection and restoration projects are designed to maintain and/or improve the quality of natural habitats and ecosystems. On the other hand, land reclamation, by its very nature, causes alteration of natural habitats and ecosystems in the bay. Hence, proposed new reclamation projects shall be subject to a robust impact assessment protocols.
The major zones in the MBSDMP ICZM Planning framework were determined considering the following:

- Protection of areas that are critical to the restoration and sustenance of the functions of natural habitats,
- Maintenance of the functions of certain portions of Manila Bay as specified by law,
- Maintenance of the natural water circulation and tidal movement, and
- Provision of spaces for suitable economic, cultural, religious and educational activities.

Some or all the four (4) considerations above are not mutually exclusive and may apply to the same areas in Manila Bay. The areas covered under each of the three (3) major zones are summarized in Table 1.
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Strict Protection</th>
<th>Production Use</th>
<th>Special Use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Sanctuary (ha)</td>
<td>1,371</td>
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<td>-</td>
<td>1,371</td>
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<tr>
<td>BFAR Marine Protected Areas (ha)</td>
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<td>Marine KBAs (ha)</td>
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<td>Mangroves (ha)</td>
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<td>1,091</td>
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<tr>
<td>Coral Reefs (ha)</td>
<td>624</td>
<td>-</td>
<td>-</td>
<td>624</td>
</tr>
<tr>
<td>Mudflats (ha)</td>
<td>2,589</td>
<td>-</td>
<td>-</td>
<td>2,589</td>
</tr>
<tr>
<td>Buffer Zones (ha)</td>
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<td>90,035</td>
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<tr>
<td>Capinpin Port (ha)</td>
<td>-</td>
<td>-</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>Shipping Lanes (km)</td>
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<td>-</td>
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<td>149,712</td>
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<tr>
<td>(Incoming and Outgoing Lanes)</td>
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<td></td>
<td></td>
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<tr>
<td>Naval Bases (ha)</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Manila Port Area (ha)</td>
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<tr>
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<td>73,848</td>
<td>-</td>
<td>73,848</td>
</tr>
</tbody>
</table>
Strict Protection Zones (SPZ)

This zone covers all remaining natural habitats critical for biodiversity conservation and sustainable fish stock biomass production; and areas that are identified for restoration and/or augmentation of existing natural habitats, that are closed to all human activities except for scientific and ceremonial or non-extractive uses by the indigenous peoples.

Habitats of threatened species, or degraded areas that have been designated for restoration and subsequent protection are included in this zone. These areas include fish sanctuaries, mangroves, coral reefs, mudflats, locally managed protected areas, marine key biodiversity areas, and a buffer zone of about 3-kilometer radius from the perimeter of the complex area to approximate the 4 to 6-kilometer buffer described by Shanks et al. (2003) to optimize the protection of habitats where the majority of dispersing fish and invertebrate larvae are predicted to settle.
Special Use Zones

These are portions of the Manila Bay with specific functions that are specified and protected by law. Human activities in this zone is also defined and limited by law. Areas in this zone include the shipping navigational lanes, ports and harbors, naval bases, restricted areas, and protected areas.

The shipping navigational lanes are areas designated by law as navigation lanes primarily for water transportation of products and people and related activities, including scientific and ceremonial or religious activities including land reclamation and building of structures that will impede the safe movement of all authorized sea vessels. All necessart measures to minimize if not totally avoid adverse impacts on natural habitats and ecosystems in Manila Bay shall be implemented in this zone.
Production Use Zones

This zone is primarily intended for economic purposes, including recreation purposes. Economic activities in the areas covered in this zone may be allowed provided that all necessary measures are implemented to minimize if not totally avoid adverse impacts on all natural habitats and ecosystems, and in all other areas in the PUZ and SUZ within the bay.

All proposed PAPs and unsolicited development projects proposals in this zone shall be subjected to rigorous, participatory and fully transparent programmatic environmental impact assessment. The combined impacts of said proposed projects in this zone shall be assessed within the context of the impacts of all ongoing projects elsewhere in the bay.
The use of all the zones shall take into consideration the following:

- The rate of land subsidence plus sea level rise,
- Strength of storm surge due to extreme tropical cyclones,
- The natural water dynamics and water circulation in the bay, and
- Coastal soil erosion
Land Subsidence

With the rate of land subsidence plus sea level rise at the north of Manila Bay, any flood protection measure or development project initiated now are likely to become dysfunctional within the next decades. With the rate of population growth and expansion in these areas, addressing the concerns of communities on being exposed to flooding has become more complicated and difficult to manage.

Based on the results of rapid assessment of the conditions of the coastal areas, the disappearance of the original coastline, unabated land subsidence and sea level rise, the need to draw a new coastline that will serve as the ‘Coastal Line of Defense’ (CLD) was deemed necessary. The CLD will be the basis for distinguishing:

- areas that can be developed and protected (based on cost-benefit analysis), and
- areas that are too costly to improve and protect in the long run—thus retreat is inevitable to ensure the long-term security of people exposed to flooding, and to avoid loss of investments in development and flood protection that are likely to be inundated in the future.

With this line, measures and developments above and below the CLD can be designed and implemented more appropriately and suited to the conditions onsite.
Storm Surge

Tropical cyclones regularly passing through the Manila Bay is likely to enhance storm surge in the future. In the past, 4 to 6-meter storm surges in Manila Bay were recorded.

All cities within the Metro Manila are highly vulnerable to storm surges, according to the vulnerability assessment of ERDB in 2018. Provinces outside Metro Manila such as Bulacan and Pampanga are also highly susceptible to storm surge, while it is moderate to low vulnerable in Bataan and Cavite areas.

Strong events of storm surge can damage structures in its paths along coastal areas. Destructive surges along the Manila Bay coastline should be taken into consideration when designing future PAPs and development plans.
Coastal Soil Erosion, Water Circulation and Tidal Movement

Coastal erosion is a natural process wherein the rate of material being deposited away from the coast is higher than the amount of materials deposited into it. Transport of materials such as sediments, rocks and sands are highly affected by water dynamics. In the case of Manila Bay, the characteristics double gyre, or the two seemingly rotating wave actions of the bay is responsible for the transport of materials around the bay area. However, even if erosion is a natural process, several anthropogenic factors such as climate change and altered bathymetry of the coasts may hasten the rate of this natural process.

Manila Bay coast being a host to countless households, industries and infrastructures, is highly vulnerable to the threats of coastal erosion (ERDB, 2018). Structures that are present in the coasts are threatened by the heightened coastal erosion due to stronger surges caused by stronger typhoons. Similarly, the denuded state of natural habitats, heavy water flows from outfalls such as of Pasig and Pampanga River system also causes erosion of the riverine and coastal areas.

Coastal erosion along with the alteration of the natural circulation and tidal movement in the bay must be taken into consideration in deciding on future PAPs and development plans in the Manila Bay Area. Strategic planning to lessen the vulnerability of the coast may be considered.

Legend:
- Water Circulation
- Erosion (Coastal Index of Vulnerability)
  - High (≥61%)
  - Moderate (≤60%)
Guiding Principles on Developments within Manila Bay
| 1 | “Pangalagaan at panumbalikin ang ating ecosystem.” | Protect and Restore Existing Ecosystem. Protection and restoration projects in any zones, when necessary, shall be implemented. |
| 2 | “Pangalagaan ang kanlungan ng mga isda at buhay ilang.” | Protect Habitat of Fishes, Migratory Birds, and Large Marine Mammals. No development projects that may cause alteration or permanent loss of mangrove, intertidal mudflats, coral reefs, marine protected areas, fish sanctuary, and marine key biodiversity areas, including shallow water surrounding marine complex areas (combination of mangrove, intertidal mudflats, coral reefs, marine protected areas, fish sanctuary, and/or marine key biodiversity areas) is not allowed in this Zone. |
| 3 | “Panatilihin ang tanging gamit ng tukoy na lugar ayon sa batas.” | Sustain Use of Areas Defined by Law or by Tradition. Development projects for purposes consistent with the intent and use defined by law may be allowed within Zone 2. |
| 4 | “Panatilihin ang likas na galaw ng tubig.” | Maintain Water Circulation and Tidal Movement. Any development in any zone shall not significantly impede or alter water circulation and tidal movement that will have significant impact on the sustainability of Manila Bay’s critical habitat and stability of the coastal areas. |
| 5 | “Tiyakin ang ibayo at maingat na gamit ng ating likas yaman.” | Optimize the use of available resources for greater benefits. Any development project within Zone 3 may be allowed. This includes potential change of economic activities in favor of better economic and financial outcomes. |
Once legitimized, the ICZM framework for Manila Bay area shall become the overarching framework for the monitoring and evaluation of impacts of all ongoing PAPs, and for the appraisal of the sustainability of all proposed PAPs in the pipeline along with all prospective proposed PAPs for implementation within the Manila Bay area.

The assessment of all PAPs related to mangroves, key biodiversity areas, corals and mudflats in Strict Protection Zone, shall be under the responsibility of DENR BMB and EMB. For all PAPs related to fishery, fish sanctuaries and marine protected areas, the assessment shall be the responsibility of DA-BFAR.

In Special Use Zone, the assessment of PAPs related to navigation lanes, seaports, etc. shall be the responsibility of PPA, MARINA and PCG.

For PAPs related to fishery in the Production Use Zone (PUZ), the assessment shall be the responsibility of DA-BFAR. All other PAPs in the PUZ shall be assessed by DENR-EMB. In all zones, the assessment of impacts of all ongoing, and suitability of all proposed PAPs shall be spearheaded by the concerned NGAs in close collaboration with concerned LGUs.


Implementing Rules and Regulation of Executive Order No. 146


Green et al. (2014) “Designing Marine Reserves for Fisheries Management, Biodiversity Conservation, and Climate Change Adaptation”

Villanoy and Martin (1997) "Modeling the Circulation of Manila Bay: Assessing the Relative Magnitude of Wind and Tide Forcing"
Annex 1 are maps overlaying the proposed reclamation projects at various stages of approval/implementation (provided by PRA) to the various MB ICZM PF Zones.