LOCAL SUSTAINABLE SANITATION PLAN OF ZAMBOANGA CITY (2021-2030)

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Zamboanga City Local Government Unit

Completion date: October 2021

Prepared by: Zamboanga City Local Sustainable Sanitation Plan Team

With technical assistance from: USAID Strengthening Urban Resilience for Growth with Equity (SURGE) Project

FOREWORD

Warmest greetings!

It is with honor and pleasure that I present the Zamboanga City's Local Sustainable Sanitation Plan (2021-2030). On behalf of the City of Zamboanga, I would like to thank and acknowledge the invaluable support and assistance of the following organizations who have devoted their knowledge, time, effort and resources to assist the City in preparing the LSSP: the United States Agency for International Development (USAID) through the Strengthening Urban Resilience for Growth with Equity (SURGE) Project and the Zamboanga City LSSP Team.

Being a highly urbanized city, the provision of universal access to safe drinking water and sanitation facilities is essential for Zamboanga City. Rapid urbanization and population growth in the city resulted to the increase in the demand for safe water and sanitation services and increase in the generation of solid wastes and wastewater. The absence or lack of proper sanitation management can be linked to several health hazards specifically water-borne diseases. Untreated wastewater can also cause contamination of water bodies which are used as water source, food sources via fishing and for recreational activities. Therefore, it is crucial to establish sanitation interventions to improve health conditions, enhance quality of life and to protect the environment and its resources.

The Local Sustainable Sanitation Plan (LSSP) of Zamboanga City was developed based on the "Guidebook for a Local Sustainable Sanitation Strategy" of the Department of Health (DOH). As stated in the DOH issued Administrative Order 2010-0021 entitled "Sustainable Sanitation as National Policy and a National Priority Program of the DOH", the LGUs shall integrate sustainable sanitation in their comprehensive development and investment plans and annual program and budgets.

This LSSP of Zamboanga City is an important milestone in achieving our vision: *"Sustainable access to safely managed water supply and sanitation services and healthy environment for all by 2030."*

That said, I urge all city official and employees, all residents and stakeholders to support the implementation of this Local Sustainable Sanitation Plan. No matter what the city government comes up with now and in the future, it will not succeed without the support and cooperation of the people. We need to work together towards a better and healthier Zamboanga City.

Muchisimas gracias y vaya con Dios!

MAYOR MARIA ISABELLE CLIMACO-SALAZAR
City Mayor
Zamboanga City

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Acronyms

AGE	Acute gastroenteritis
AO	Administrative Order
BHW	Barangay Health Worker
BOD	Biochemical Oxygen Demand
BSWMC	Barangay Solid Waste Management Council
CCA	Climate Change Adaptation
CDRRMO	City Disaster Risk Reduction and Management Office
CEO	City Engineering Office
CHO	City Health Office
CLUP	Comprehensive Land Use Plan
CNC	Certificate of Non-Coverage
CSMC	City Septage Management Council
CWA	Clean Water Act
CWIS	Citywide Inclusive Sanitation
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DOH	Department of Health
DP	Discharge Permit
DPWH	Department of Public Works and Highways
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction Management
ECC	Environmental Compliance Certificate
ECCD	Early Child Care and Development
EHS	Environmental, Health and Safety
EMB	Environmental Management Bureau
EMP	Environmental Management Plan
EO	Executive Order
ESC	Environmental Sanitation Clearance
FGD	Focus Group Discussion
FS	Feasibility Study
GAD	Gender and Development
GES	General Effluent Standards
HCF	Health Care Facility
HCW	Health Care Waste
HUC	Highly Urbanized City
HWID	Hazardous Waste Generator's ID
ICMA	International City/County Management Association
IEC	Information, Education, Communication
IFC	International Finance Corporation
IRR	Implementing Rules and Regulations
KPI	Key Performance Indicators
LBP	Landbank of the Philippines
LCE	Local Chief Executive
LDWQMC	Local Drinking Water Quality Committee
LDWS	Local Drinking Water Surveillance
LGC	Local Government Code
LGU	Local Government Unit
LSSP	Local Sustainable Sanitation Plan

LWUA	Local Water Utilities Administration
M&E	Monitoring and evaluation
MRF	Materials Recovery Facility
NOH	National Objectives for Health
NSSMP	National Sewerage and Septage Management Program
OBO	Office of the Building Official
OCENR	Office of City Local Environment and Natural Resources
OD	Open defecation
PPA	Programs, Projects and Activities
PPP	Public-private partnerships
PSA	Philippine Statistics Authority
PTO	Permit to Operate
PWSSMP	Philippine Water Supply and Sanitation Master Plan
RA	Republic Act
RAP	Resettlement Action Plan
ROW	Right-of-way
SDG	Sustainable Development Goals
SEF	Special Education Fund
SLF	Sanitary Landfill Facility
SMP	Septage Management Program
SP	Sangguniang Panlungsod
SpTP	Septage Treatment Plant
SURGE	Strengthening Urban Resilience for Growth with Equity
SWM	Solid Waste Management
TCLP	Toxic Characteristics Leaching Procedure
THW	Toxic and Hazardous Waste
TWG	Technical Working Group
USAID	United States Agency for International Development
VMGO	Vision, Mission, Goals and Objectives
WASH	Water, Sanitation and Hygiene
WD	Water District
WQG	Water Quality Guideline
WQMA	Water Quality Management Area
WRS	Water Refilling Station
WSP	Water Safety Plan
WSS	Water Supply and Sanitation
ZCWD	Zamboanga City Water District
ZCWSC	Zamboanga City Water Security Council
ZOD	Zero Open Defecation

Definition of Terms

Composting – refers to controlled decomposition of organic matter by microorganisms, mainly bacteria and fungi, into a humus-like product.

Desludging – the process of cleaning or removing the accumulated sludge or septage from a septic tank and transporting it to treatment facilities.

Drainage System – means drainage pipes of a plumbing system taking the wastewater from the plumbing fixtures and delivering it to the sewer or some other outlet.

Effluent – general term for any wastewater, partially or completely treated, or in its natural state, flowing out of a drainage canal, septic tank, building, manufacturing plant, industrial plant, treatment plant, etc.

Excreta – human waste composed of urine and feces.

Local Drinking Water Quality Committee (LDWQMC) – an entity formed at the city or municipal level whose mandate is to monitor the safe quality of drinking-water per Code on Sanitation of the Philippines (P.D. 856)

Materials Recovery Facility (MRF)- refers to a sloid waste transfer stations or sorting stations, drop-off center, composting facility or a recycling facility.

Open Defecation - Disposal of human feces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste.

Philippine Approach to Sustainable Sanitation (PhATSS) – refers to a sanitation program strategy and monitoring framework that local government use to move communities from open defecation status to sustainable sanitation status.

Rainwater Harvesting – is a water conservation strategy involving the collection or storing of water through scientific techniques from the areas where rain falls.

Residual Waste – refers to solid waste that cannot be recycled, reused or composed.

Rural Waterworks and Sanitation Association (RWSA) – a cooperative, non-profit, non-stock association operating a rural water supply and sanitation system by virtue of E.O 577 (1980), E.O. 869 (1983) and E.O. 124 (1987).

Safely Managed Drinking Water - Drinking water from an improved water source which is located on premises, available when needed and free from faecal and priority chemical contamination.

Safely Managed Sanitation Facilities - Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site.

Sanitary Landfill- refers to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environmental impacts arising from the development and operation of the facility.

Sanitary or improved toilet – refers to an approved type of toilet facility used for receiving, safely containing and disposing of human waste. The type of sanitary toilet includes sanitary pit privy, ventilated improved pit, pour flush toilet to a receiving sewer, septic tank or leaching pit and flush toilet to receiving sewer or septic tank.

Sanitation – refers to the hygienic and proper management, collection, disposal/reuse of human excreta (feces and urine) and domestic wastewater to safeguard the health of the individuals and communities.

Septage – the combination of scum, sludge, and liquid that accumulates in the septic tanks.

Septage Management- refers to comprehensive program for managing septic tanks and the procedures for proper desludging, transporting, treating, and disposing of septic tank contents.

Septic tank – a water-tight, multi-chambered receptacle that receives sewage from houses or other buildings and is designed to separate and store the solids and partially digest the organic matter I the sewage.

Sewage – mainly liquid waste containing some solids produced by humans, which typically consists of washing water, feces, urine, laundry wastes and ither materials that flows down drains and toilets from households and other buildings.

Sewer – a pipe or other conduit that carries wastewater from more than on property.

Sewerage System – refers to a system of pipes, pumps, devise and other appurtenant structures for the collection, transportation, and final disposition of wastewater.

Sludge – precipitated solid matter with highly mineralized content produced by domestic wastewater treatment process.

Toilet facility- refers to the structure built of materials of any kind inside or as part of a house or building used by its residents, occupants, visitors, employees, transients or customers as comfort room and lavatory with septic tank built for the purpose.

Unsanitary or unimproved toilet- refers to toilet facility that does not safely contain or dispose human waste.

Waste Diversion – refers to activities which reduce or eliminate the amount of solid waste from waste disposal facilities.

Water District (WD) – a local corporate entity that operates and maintains a water supply system in one or more provincial cities or municipalities. It is classified as a government-owned and controlled corporation, existing under the authority of the Provincial Water Utilities Act of 1973.

Water Safety Plan (WSP) - is a management tool which uses a comprehensive assessment and risk management approach encompassing all steps in water supply from water source (catchment) to consume

Executive Summary

1. The growing economic activities associated with urbanization and population growth in Zamboanga City resulted to the increase in the demand for safe water and sanitation services in the city. Absence or lack of proper and sufficient water supply and sanitation services may affect the health and wellbeing of the pubic as well as the economy of the city. Therefore, it is crucial to ensure the universal access to safe drinking water and sanitation facilities in the city. Sanitation interventions to improve health conditions, enhance the quality of life and to protect the environment and its resources must be established.

2. From May to October 2021, the USAID SURGE Project extended the technical assistance to Zamboanga City for the development of the city's Local Sustainable Sanitation Plan (LSSP) with 10-year planning period from 2021 to 2030. SURGE also worked with the city LGU to assist the local officials in issuing executive order (EO) to form their LSSP Team.

3. The LSSP will serve as the LGU's guide in plotting, financing, and implementing activities that promote safe and sustainable sanitation in the city. The LSSP identified the sanitation strategies, programs, and activities that the LGU must implement to address the city's current and projected sanitation issues and problems, including water source protection, public health, and environment-related issues and concerns. The underlying theme of this plan is the long-term sustainability of water and sanitation programs. These programs must be interrelated and linked with the community development framework and institutional support. The LSSP aims to address the issues systematically and holistically, in such a way that technical, health, cultural, and socio-economic concerns are adequately considered and incorporated in the sanitation plan. The LSSP is based on the principles of equitable solutions, financial and technical viability, and mitigations for climate change adaptation and disaster risk reduction (CCA-DRR).

4. The LSSP was developed considering all the national and local policies issued to improve the sanitation in the country. The LSSP is also consistent to the sanitation targets set in the various national and local sector roadmaps and development plans in the Philippines such as the Philippine Water Supply and Sanitation Master Plan (PWSSMP) 2018-2040, Philippine Development Plan (PDP) 2017-2022, DOH National Objectives for Health (NOH) 2017-2022, and the Philippine Approach to Sustainable Sanitation (PhATSS) 2018-2030.

5. The LSSP was also developed to contain strategies that can be implemented within the ten-year period (2021-2030) to attain the targets of Sustainable Development Goal (SDG) No. 6, particularly Target 6.1 (safe and affordable drinking water), Target 6.2 (end open defecation and provide access to sanitation and hygiene) and Target 6.3 (improve water quality, wastewater treatment and safe recycling and reuse).

6. The development of the LSSP of Zamboanga City followed the prescribed process in the DOH's Guidebook for a Local Sustainable Sanitation Strategy as presented below.

   - **Step 1: Organize the Local Sustainable Sanitation Strategy Team and conduct a consultative dialogue**

     An LSSP team, chaired by the City Mayor, co-chaired by the City Health Office and composed of members from various key offices of the city LGU and other relevant stakeholders, was formed to lead the development of the LSSP. The Executive Order

(EO) to institutionalize the formation of the LSSP Team is still being finalized. The draft EO is attached in **Annex 1.**

- **Step 2: Craft the Vision and Mission for Local Sustainable Sanitation**

  Prior to crafting the vision and mission of the city for local sustainable sanitation, it is important to understand the existing sanitation in the city. A sanitation baseline study was conducted to assess the existing socio-economic, health and sanitation situation in the city and to identify the sanitation gaps, problems and issues. The sanitation baseline report is attached as **Annex 2**.

  The vision and mission statements of Zamboanga City for local sustainable sanitation are presented in the table below.

- **Step 3: Identify Goals and Objectives**

  Guided by the vision and mission, the sanitation goals of the city were formulated and specific objectives to achieve these goals were also determined, as shown in the table below.

- **Step 4: Formulate and Map-out Strategies**

  Strategies are the 'how' or the means of attaining the goals or objectives. They are the general approaches or major course of action that are carried out by the implementers to reach the defined local sanitation goals and objectives.

  Programs, projects and activities (PPAs) were also identified to support the implementation of the strategies. In identifying the PPAs, the principles of equitable solutions, financial and technical viability and resilience to climate/disaster risks were considered. For each PPA, key performance indicators (KPI) were assigned to measure the progress and performance of the city in achieving the targets. The indicative cost, funding source and lead agency were also identified per PPA.

  The development of the LSSP considered five thematic sanitation areas namely water supply, management of on-site sanitation facilities, wastewater, sewage and drainage management, solid waste management and water quality management. The analyses of the existing sanitation conditions, issues and concerns and the identification of the programs, projects and activities were done per thematic area.

- **Step 5: Integrate Sanitation Information into the Components of the LSSP**

  This step involved the actual writing and updating of the LSSP document by integrating the health and sanitation data and information gathered and the outputs of the series of planning workshops conducted from Step 1 to Step 4.

- **Step 6: Endorse the LSSP to LCE and SB**

  This last step in the process is the presentation and endorsement of the LSSP for approval of the Local Chief Executive (LCE) and other LGU officials including, the Sangguniang Panlungsod (SP) council. A resolution adopting the LSSP shall be created to start the implementation of the LSSP. This is to ensure the implementation of the identified PPAs and the allotment of required funding of the PPAs in the budget of the city.

  Adoption by other key stakeholders or lead implementors like the Water Security Council, the local Water District, and DPWH is also needed.

Vision	"Sustainable access to safely managed water supply and sanitation services and healthy environment for all by 2030."
Mission	"Provision of safely managed and sustainable water supply and sanitation services, as well as safer and healthier environment through innovation, stakeholder partnership and collaboration."

Goal	Objectives	Strategies
Goal 1. Establish adequate, inclusive, efficient, climate-resilient, and safely managed WASH facilities and infrastructure including during emergencies	1a. To increase access to safely managed drinking water services to 100% in the city by year 2030. 1b. To increase access to safely managed sanitation services to 100% in the city by year 2030. 1c. To achieve, be certified and maintain ZOD status for all barangays by year 2030 1d. To prevent and eventually eliminate the incidence of WASH-related diseases in the city	**Strategy 1: Provision and/or construction of required WASH infrastructures and facilities** • Establish, construct and/or provide adequate, inclusive, efficient, climate-resilient, and safely managed water supply and sanitation facilities and infrastructure including during emergencies • Integrate sustainability features/considerations in the design, procurement, construction, and operation of WASH facilities and infrastructures and ensure adherence/compliance to applicable regulatory requirements • Establish and enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the implementation of WASH programs, projects and activities (PPAs)
Goal 2. Develop, adopt and enforce policies on WASH, environment and other relevant areas for the protection of the public health	2a. To review, update, and strengthen enforcement of existing local policies on WASH, environmental health protection, and other relevant areas 2b. To develop and enact new policies on WASH, environmental health protection, and other relevant areas based on the identified policy gaps, if any	**Strategy 2: Formulation and/or updating of relevant local WASH policies** • Review and update existing local policies on WASH, environmental health protection, and other relevant areas • Harmonize policies on WASH, environmental health protection, and other relevant areas with other local, inter-LGU, and higher-level policies and plans • Develop new local policies to support the WASH PPAs including the implementation of emergency

Goal	Objectives	Strategies
		response plans for WASH facilities/infrastructures and services.
Goal 3. Promote positive behavioral change and continuing education on WASH in the context of disease prevention, public health and environmental protection	3a. To ensure community participation, including vulnerable groups, in the development and implementation of WASH programs, projects, and activities 3b. To ensure continuing education of the LGU and other stakeholders on WASH and WASH promotion	**Strategy 3: Provision of capacity building and implementation of local sustainable communication and promotion program** • Conduct IECs, advocacy programs, social marketing and capacity building, in partnership with NGOs, academic institutions, and national agencies. • Develop a targeted, community-based approach and culturally appropriate education and marketing campaigns for the stakeholders
Goal 4. Ensure sustainable delivery of adequate, inclusive, efficient, and safely managed WASH services for all even during emergencies	4a. To establish and maintain database for monitoring of WASH facilities/infrastructures and services 4b. To strengthen drinking water quality, sanitation, and environmental health protection surveillance and data monitoring of WASH outcomes	**Strategy 4: Implement monitoring and maintenance program of the WASH facilities** • Gather and collate data on WASH facilities/infrastructures and services • Establish guidelines on the submission of monitoring data of the WASH service providers to LGU • Establish institutional arrangements for the implementation, M&E of the WASH projects to ensure sustainability.

1. Introduction

1.1 Rationale

7. In 2010, the Department of Health (DOH) issued Administrative Order (AO) 2010-0021 entitled "Sustainable Sanitation as National Policy and a National Priority Program of the DOH". This AO aims to achieve zero open defecation (ZOD) status and to attain universal access to safe and adequate sanitary facilities by 2028. The AO states that the local government unit (LGU) shall integrate sustainable sanitation in their comprehensive development and investment plans and annual programs and budgets. The LGU is responsible to carry out sustainable sanitation plan, programs and projects.

8. The DOH then issued the AO 2019-0054, "Guidelines on the Implementation of the Philippine Approach to Sustainable Sanitation (PhATSS)", to provide the implementing guidelines to achieve the national policy on sustainable sanitation (DOH AO 2010-0021) and to achieve the Sustainable Development Goal (SDG) on sanitation. SDG 6 aims to achieve universal access to safely managed water and sanitation particularly Target 6.1 (safe and affordable drinking water), Target 6.2 (end open defecation and provide access to adequate and equitable sanitation and hygiene for all) and Target 6.3 (improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally).

9. Sanitation problems and challenges remain a public health problem despite the issuance of the mentioned AOs. The Annual Poverty Indicators Survey conducted by the Philippine Statistics Authority (PSA) in 2017 reported that only about 27 percent of the households in the country have access to safely managed drinking water services and five percent still use unimproved drinking water services. In terms of access to sanitation facilities, about 74 percent of the households have access to basic sanitation services and six percent practice open defecation[1].

10. Growing economic activities associated with urbanization and population growth in Zamboanga City resulted to the increase in the demand for safe water and sanitation services thus also increased the generation of wastewater in the city. Absence or lack of proper sanitation management may pose health hazards to the public such as water-borne diseases. Untreated wastewater can also cause contamination of water bodies which are used as water source, food sources through fishing and for recreational activities in the city. Therefore, it is crucial to ensure the universal access to safe drinking water and sanitation facilities in the city. Sanitation interventions to improve health conditions, enhance the quality of life and to protect the environment and its resources must be established.

11. The Local Sustainable Sanitation Plan (LSSP) is a planning tool that can be used as a guide for the LGU in achieving their vision and mission, goals, and objectives towards sustainable sanitation. It identifies the sanitation strategies, programs and activities that the LGU must implement to address the city's current sanitation issues and problems. The underlying theme of this plan is the long-term sustainability of water and sanitation programs. These programs must be interrelated and linked with the community development framework and institutional support. The LSSP aims to address the issues systematically and holistically, in

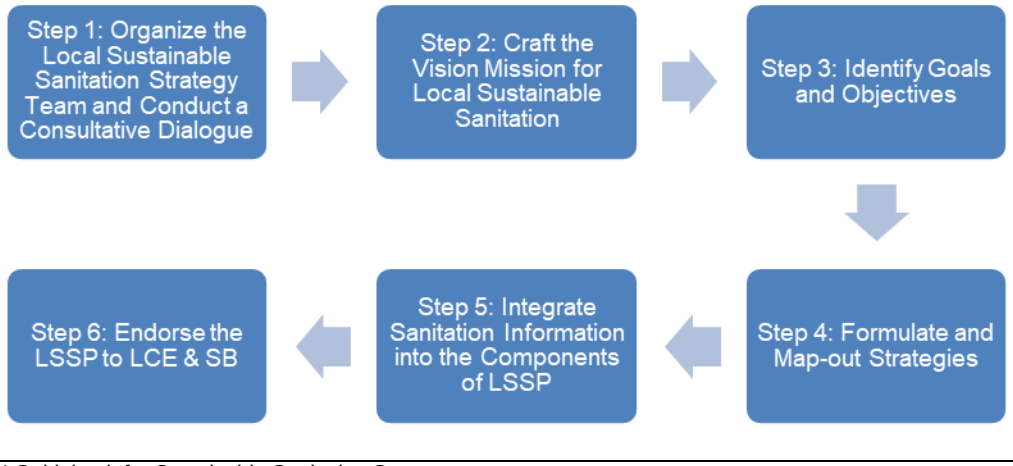
[1] https://psa.gov.ph/content/most-filipino-families-have-access-improved-source-drinking-water-results-2017-annual

such a way that technical, health, cultural, and socio-economic concerns are adequately considered and incorporated in the sanitation plan.

12. The USAID SURGE Project extended the technical assistance to Zamboanga City for the development of the city's LSSP with 10-year planning period from 2021 to 2030. SURGE provided subject matter experts to act as point persons and facilitators in building the technical capacity of Zamboanga City LGU, WD, and relevant stakeholders, as well as in assisting their LSSP Team in the documentation requirements for the preparation of their LSSP. SURGE also worked with the city LGU to assist the local officials in issuing executive order (EO) to form their LSSP Team. The TA was implemented from May to October 2021.

1.2 The LSSP Process

13. The development of the LSSP of Zamboanga City followed the prescribed process of the DOH as shown in the figure below.



Source: DOH Guidebook for Sustainable Sanitation Strategy

Figure 1-1: DOH LSSP Process

Step 1: Organize the Local Sustainable Sanitation Strategy Team and Conduct a Consultative Dialogue

14. An online meeting was conducted on May 28, 2021 with the various key offices of the City LGU and other identified stakeholders to identify the composition of the LSSP team and to define the function of the LSSP Team. The identified LSSP team members of Zamboanga City are shown in **Table 1-1**. The Executive Order (EO) to institutionalize the formation of the LSSP Team is still being finalized. The draft EO is attached in **Annex 1**.

Table 1-1. Zamboanga City LSSP Team Members (based on Draft EO)

TWG	Office
Chairperson	City Mayor
Co-Chairperson	City Health Officer
Members	City Environment and Natural Resources Officer
	City Planning and Development Coordinator
	City Disaster Risk Reduction Management Officer
	City Engineer
	OIC-City Administrator

TWG	Office
	City Social Welfare Development Officer
	City Accountant
	City Budget Officer
	City Agriculture Office
	General Manager Zamboanga City Water District
	Public Information Officer
	City Housing and Land Management Division
	City Health Office
	Chairperson, Committee on Health and Sanitation Sangguniang Panlungsod
	Chairperson, Committee on Natural Resources and Environment Protection Sangguniang Panlunsod
	OIC-Regional Director Department of Health IX
	Regional Director Environmental Management Bureau IX
	Department of Public Works and Highways IX
	Department of Education
	Western Mindanao State University, Academe

Step 2: Craft the Vision and Mission for Local Sustainable Sanitation

15. It is important to understand the existing sanitation in the city when setting the vision, mission, goals and objectives (VMGO) of the LSSP. A sanitation baseline study was conducted to assess the existing socio-economic, health and sanitation situation in the city and to identify the sanitation gaps, problems and issues. The results of the baseline study were presented to the LSSP Team members last August 3, 2020 and a Sanitation Baseline Report was developed and submitted to both the city and the USAID SURGE Project on August 31, 2021.

16. After establishing the existing sanitation conditions and identifying the sanitation issues and concerns of the city, the next step in developing the LSSP is the setting of VMGO for local sustainable sanitation. To facilitate discussion on the VMGO, a SWOT analysis was conducted from the existing sanitation baseline data. An analysis of each of the thematic areas: water, sanitation, wastewater and WASH on Emergencies, was done in terms of technical, financial//economic/financing, institutional (policy, communication, capacity building, environmental) including the mainstreaming of DRR-CCA, which shall serve as the basis of VMGO setting.

17. An online session was held last August 4, 2021 with the LSSP TWG members to formulate the VMGO of the city that is aligned with the national targets and national programs on sustainable sanitation.

18. The following were used as guide questions in setting the vision of the city for the LSSP:

- What is the ideal condition of sanitation for the LGU?
- How would things look if sanitation gaps, issues and challenges were completely and perfectly addressed?

- What is the desired sanitation condition of the LGU?

19. The crafting of the mission considered the following:

- Grounding the vision in practical terms.
- A mission statement describes the direction that the LGU will take to achieve the vision.
- Looking at the big picture of the how to translate the vision into reality.
- Mission statement should inspire people to action.

Step 3: Identify Goals and Objectives

20. Guided by the vision and mission, the sanitation goals of the city were formulated and specific objectives to achieve these goals were also determined. Sanitation goal statements are broader concepts that interpret the vision and mission statement of the city into something that is more time-sensitive and meaningful. These are the long-term results that the city wants to achieve in sanitation that will move closer to its vision and mission.

21. The objectives are the details of the sanitation goals. Objectives were aligned with the sanitation strategies of the city and should be specific, measurable, attainable, realistic, and time-bounded.

Step 4: Formulate Strategies and Map-out Activities

22. Strategies are the 'how' or the means of attaining the goals or objectives. They are the general approaches or major course of action that are carried out by the implementers to reach the defined local sanitation goals and objectives. Programs, projects and activities (PPAs) were also identified to support the implementation of the strategies. In identifying the PPAs, the principles of equitable solutions, financial and technical viability and resilience to climate/disaster risks were considered.

23. Another online session was conducted on August 11, 2021 to identify the relevant programs, projects and activities (PPAs) and the implementation strategies to address the sanitation issues and concerns of the city and to meet the defined local sanitation goals and objectives.

24. An online training was also conducted on August 25, 2021, to present various sanitation strategies to the LSSP TWG to support the local sustainable sanitation planning of Zamboanga City.

Step 5: Integrate Sanitation Information into the components of the LSSP

25. This step involved the actual writing and updating of the LSSP document by integrating the health and sanitation data and information gathered and the outputs of the series of planning workshops conducted from Step 1 to Step 4.

Step 6: Endorse the LSSP

26. This last step in the process is the presentation and endorsement of the LSSP for approval of the Local Chief Executive (LCE) and other LGU officials including, the Sangguniang Panlungsod (SP) council. A resolution adopting the LSSP shall be created to start the implementation of the LSSP.

1.3 LSSP Sanitation Thematic Areas

27. The development of the LSSP considered five thematic sanitation areas, as discussed below. The analyses of the existing sanitation conditions, issues and concerns and the identification of the programs, projects and activities were done per thematic area.

i. **Water supply** – this refers to the supply of safe water for domestic purposes.

To improve the sanitation condition of the city, it is important to ensure the availability and accessibility of safe water supply. Access to an adequate and safe water supply is a vital part of ensuring a safe sanitation service chain within the city.

ii. **On-site sanitation facilities including WASH in Emergencies** – this refers to the access of the households safely managed sanitation systems. Safely managed sanitation systems ensure the separation of human excreta from human contact all throughout the sanitation service chain, from the toilet to safe use or disposal. This includes the sanitary toilet facilities, the containment (i.e., septic tanks), transport, treatment and disposal of the human excreta (i.e., septage management program).

This also includes the availability and provision of WASH (water, sanitation and hygiene) facilities during emergencies, including natural disasters, outbreaks and pandemics. In emergency settings, it is critical that there are available WASH facilities to prevent the spread of diseases and to reduce the health impacts of the disasters.

iii. **Wastewater, sewage and drainage management** – this includes the management of the domestic wastewater generated in the city from the households, institutional and commercial establishments, and the provision and maintenance of the city drainage to reduce the occurrence of flooding in the city.

Disposal of untreated wastewater can cause pollution of the water bodies and contamination of drinking water sources. The users of the receiving water body may also be exposed to harmful microorganisms brought by the untreated wastewater which may lead to infection and diseases.

iv. **Solid waste management (SWM) –** this pertains to the collection and proper disposal of the solid wastes and health care wastes in the city.

The disposal of solid wastes in the water bodies may cause pollution. Improper SWM may also attract disease vectors, which can lead to the spread of infectious diseases. Flooding also occurs in the city due to the clogging of solid wastes in the drainage system.

v. **Water quality management –** this refers to the monitoring and improving the water quality of the water bodies in the city.

The absence of sanitation facilities, improper management and disposal of human excreta, wastewater and solid wastes generated in the city may cause degradation of the water quality of the water bodies.

2. Considerations in the Development of the LSSP

2.1 Legal and Policy Framework for Sanitation

28. Several laws and policies have already been issued to improve the sanitation in the country. The legal framework for the implementation of sanitation programs in the Philippines includes legislative and executive issuances as shown in **Table 2-1** and **Table 2-2**, respectively.

Table 2-1. Legislative Issuances related to Sanitation in the Philippines

Legislative Issuances	Pertinent Provisions
The 1987 Constitution of the Republic of the Philippines	Article II. Declaration of Principles and State Policies. Section 15. The State shall protect and promote the right to health of the people and instill health consciousness among them. Section 16. The State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature. Article X. Local Government. Section 13. Local government units (LGU) may group themselves, consolidate or coordinate their efforts, services, and resources for purposes commonly beneficial to them in accordance with law.
Republic Act (RA) 7160 – Local Government Code (LGC) of 1991	Chapter II. General Powers and Attributes of Local Government Units Section 16. General Welfare. – Within their respective territorial jurisdictions, LGUs shall promote health and safety, enhance the right of the people to a balanced ecology, and preserve the comfort and convenience of their inhabitants. Section 17. Basic Services and Facilities. ● LGUs shall provide basic services and facilities, which include, solid waste disposal system or environmental management system and services or facilities related to general hygiene and sanitation. ● To ensure the active participation of the private sector in local governance, LGUs may, by ordinance, sell, lease, encumber, or otherwise dispose of public economic enterprises owned by them in their proprietary capacity.
Presidential Decree 198: Local Water Districts Law of 1973	Title II. Local Water District Law. Chapter II. Purpose and Formation Section 5. Purpose. – Local water districts (WD) may be formed for the purpose of providing, maintaining and operating wastewater collection, treatment, and disposal facilities. Chapter VII. Powers of District Section 27. Acquisition of Waterworks. – Purchase, construct, or

Legislative Issuances	Pertinent Provisions
	otherwise acquire works, water, water rights, land, rights and privileges useful or necessary to convey, supply, store, collect, treat, dispose of or make other use of water. Section 29. Sewerage. – Require, construct, operate and furnish facilities and services, within or without the district, for the collection, treatment and disposal of sewage, waste, and storm water. Section 32. Protection of Waters of District. – Commence, maintain, intervene in, defend and compromise actions, and proceedings to prevent interference with or deterioration of water quality of the natural flow of any surface, stream or ground water supply which may be used or useful for any purpose of the district or to be a common benefit to the lands or its inhabitants. <u>Chapter IX. Revenues</u> Section 38. Service and Stand-By Charges for Sewers. – Prescribe and collect rates and other charges for sewer services furnished and fix, levy and collect a sewerage and wastewater service stand-by or availability charge in the event sewer service is available and no connection is made. <u>Title III. Local Water Utilities Administration (LWUA) Law. Chapter II. Charter and Purpose</u> Section 48. Charter. – Creation of a national agency to be known as the "Local Water Utilities Administration." Section 49. Purposes. – LWUA shall establish minimum standards and regulations, furnish technical assistance and personnel training programs, monitor and evaluate local water standards, effect system integration, and provide a specialized lending institution.
Republic Act 9275 – Philippine Clean Water Act (CWA) of 2004	<u>Chapter II. Water Quality Management System. Article I. General Provisions.</u> Section 7. National Sewerage and Septage Management Program (NSSMP). ● The Department of Public Works and Highways (DPWH) shall prepare a national program on sewerage and septage management. ● LGUs are directed to appropriate the necessary land, including the required rights-of-way/road access to the land for the construction of the sewage and/or septage treatment facilities, and are authorized to raise funds to subsidize necessary expenses for the operation and maintenance of sewerage treatment or septage facility servicing their area of jurisdiction through local property taxes and enforcement of a service fee system. Section 8. Domestic Sewage Collection, Treatment and Disposal.

Legislative Issuances	Pertinent Provisions
	● The agencies providing water supply and sewerage facilities and/or concessionaires in Metro Manila and other highly urbanized cities (HUCs), in coordination with LGUs, shall connect the existing sewage line found in all subdivisions, condominiums, commercial centers, and other similar establishments, including households, to the available sewerage system subject to service charge/fees. ● In areas not considered as HUCs, the DPWH, in coordination with other concerned agencies, shall employ septage or combined sewerage-septage management system. ● The DOH in coordination with other concerned agencies, shall formulate guidelines and standards for the collection, treatment and disposal of sewage including guidelines for the establishment and operation of centralized sewage treatment system.
Presidential Decree 856 – Code on Sanitation of the Philippines	<u>Chapter II. Water Supply</u> This chapter in the Code on Sanitation prescribes that before water is used, distributed or sold for drinking, it should pass the criteria on standard parameters and values for bacteriological, physical, chemical, biological, and radiological quality set by the Philippine National Standards for Drinking Water (PNSDW). Moreover, for monitoring, the Code on Sanitation requires the local health authority to establish a Water Surveillance Program and create a Local Drinking Water Quality Monitoring Committee (LDWQMC) to oversee the operation of the water systems and the and the quality of the water being produced and distributed by service providers and to monitor the implementation of the provisions of the Implementing Rules and Regulations (IRR).
	<u>Chapter XVII. Sewage Collection and Disposal, Excreta Disposal and Drainage</u> This chapter in the Code on Sanitation sets the guidelines for the provision of individual excreta disposal system and proper disposal of wastewater. Section 74. Provides the requirements in the operation of sewerage works and sewage treatment plants. Section 75. Requires septic tanks in establishments where a public sewerage system is not available and provides the minimum requirements of such. Section 76. Requires septic tank effluent to be treated and to conform to water quality standards before discharging into a stream or body of water.
	<u>Chapter XVIII. Refuse Disposal</u> Section 4 of this chapter sets the minimum standards and requirements for the segregation and storage of refuse/solid

Legislative Issuances	Pertinent Provisions
	waste. It indicates the standard color coding of the waste containers per type of waste. Section 9 of the Chapter 18 sets the specific requirements for the management of biomedical wastes from health care facilities and other similar establishments. Management of these wastes must conform with the standards and guidelines contained in the Health Care Waste Management Manual of the Department of Health (DOH).
	Chapter XX: Pollution of the Environment Section 5 of this chapter lists the sanitary requirements that must be provided by the establishments which include the following: ● Adequate and potable water supply in accordance to Chapter 2 of PD No. 856 and PNSDW 2017 ● Sewage collection and disposal complaint to Chapter 17 of PD No. 856 ● Solid waste management (SWM) in compliance to Chapter 18 of PD No. 856 ● Hand washing facilities with adequate water supply and soap ● Adequate and clean toilet facilities for male and female and disabled workers and clients ● Proper lighting and ventilation.
Republic Act No. 10121- Philippine Disaster Risk Reduction and Management Act of 2010	The DOH, LGUs and national government agencies and other development partners shall ensure that local climate change adaptation (CCA) and disaster risk reduction management (DRRM) plans include WASH in their CCA, disaster prevention, mitigation, response and recovery actions. The DRRM plans shall ensure that evacuation centers have safe water supply and safe, functioning and gender-segregated toilets.
Republic Act No. 9003 – Ecological Solid Waste Management Act of 2000	Section 2 Declaration of Policies (c) Set guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, including composting, recycling, re-use, recovery, green charcoal process, and others, before collection, treatment and disposal in appropriate and environmentally sound SWM facilities in accordance with ecologically sustainable development principles. (d) Ensure the proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of the best environmental practice in ecological waste management excluding incineration. Section 12. City and Municipal SWM Board Each city or municipality shall form a City or Municipal Waste Management Board that shall prepare, submit and implement a plan for the safe and sanitary management of solid waste

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

Table 2-2. Executive Issuances related to Sanitation in the Philippines

Executive Issuances	Pertinent Provisions

DOH Administrative Order No. 2010-0021: Sustainable Sanitation as a National Policy and a National Priority Program of the DOH	● Following their mandates under the LGC, LGUs shall integrate sustainable sanitation in their comprehensive development and investment plans and annual programs and budgets. They shall make specific assignment of responsibilities among the concerned LGU office to carry out sanitation plans, programs and projects.
	● LGUs shall encourage and assist barangays in passing ordinance to address the sanitation problems and needs of the community.
	● By 2022, all LGUs shall have their own local sustainable sanitation plans (LSSPs) and budgets in place under their Province-wide Investment Plan for Health, Municipal-wide Investment Plan for Health or City-wide Investment Plan for Health.
	● As stated in the AO, the national policy on sustainable sanitation shall include references and integration to other sanitation related plans and programs (i.e. solid waste, housing)
	● The National Sustainable Sanitation Plan shall include annual targets for the following:
	  ○ LGUs that have declared sustainable sanitation as priority
	  ○ LGUs that have LSSP
	  ○ Barangays that will be declared Open Defecation Free

Executive Issuances	Pertinent Provisions
	○ Cities with septage management program (SMP), LGUs with LDWQMC; ○ Regions with one major river system designated as WQMA ○ Annual targets for reducing Acute Gastroenteritis and Soil Transmitted Helminthiasis.
DOH Administrative Order (AO) No. 2019-0054: Guidelines on the Implementation of the Philippine Approach to Sustainable Sanitation (PhATSS)	● Provides the implementing guidelines to operationalize the national policy on sustainable sanitation and achieve Sustainable Development Goal (SDG) on sanitation. ● Provides LGUs practical sanitation program strategies to gradually achieve sustainable sanitation. ● Basic sanitation status is the status of the community wherein households, schools, child development centers, and public institutional facilities have their own sanitary toilets that are functional; and communities properly manage animal excreta and properly dispose their solid waste, in addition to maintaining the norm that open defecation is unacceptable. ● Sustainable sanitation status is the status of the community wherein households, private establishments and public institutional facilities have access to safely managed sanitation services; water service providers pro-actively ensure the safety of drinking water; and the community can maintain its basic status and the norm that open defecation is unacceptable. <u>Section VI. Specific Guidelines.</u> ● LGUs shall organize a local coordination body to implement this Order, either through an existing local inter-sectoral body or by establishing a local coordination body to oversee water and sanitation concerns and shall be responsible for planning, budgeting, and monitoring, assessing, and verifying of water and sanitation programs and services, including PhATSS sanitation levels. ● LGUs shall formulate and promulgate local ordinances, executive orders, and/or resolutions to implement the different program components of this Order based on the recommendation of the local coordination body.
DOH AO No. 2014-0027: National Policy on Water Safety Plan (WSP) for All Drinking-Water Service Providers	● This policy requires all drinking-water service providers to develop and implement a water safety plan. <u>Section IX. Roles and Responsibilities</u> J. LGUs shall: ● Advocate and create awareness to the general population and drinking-water service providers on the importance of water safety plan. ● Extend assistance to the operators of community-managed water supply systems in the development and implementation of WSP. ● Establish and make operational the LDWQMC as required by

Executive Issuances	Pertinent Provisions
	the Code of Sanitation of the Philippines. ● Monitor the WSP implementation of drinking-water services through the LDWQMC; and ● Enforce the provisions of the Code on Sanitation and its IRR on water supply and this Order. L. Drinking-water service provider shall ● Comply with the provisions of this Order and the applicable IRR of the Sanitation Code of the Philippines (PD 856).
DOH AO No. 2017-0020 – Philippine National Standards for Drinking Water of 2017	● This AO sets the norms for drinking water quality. The drinking water quality surveillance agencies shall ensure the monitoring of the WSP implementation and its effectiveness in meeting the PNSDW standards. ● As stated in the AO, the LGUs should develop and implement a drinking water quality surveillance and establish an LDWQMC to enforce this Order.
DOH AO No. 2019-0047 – National Standard on the Design, Construction, Operation and Maintenance of Septic Tank Systems	<u>Section VI. Specific Guidelines</u> ● Sets specific and updated standards and criteria for design of septic tanks. These includes basis of septic tank size and volume computation, emphasis on structure stability and watertightness, and need for desludging once every three to five years. ● Sets guidelines on construction and installation. Provides emphasis on location and accessibility of the septic tank, as well as testing to ensure watertightness of the septic tank. ● Specifies provisions on operation and maintenance of septic tanks such as requirement to be desludged every four years. Also indicates materials and substances that are prohibited to be discharged into the septic tank. <u>Section VII. Roles and Responsibilities</u> ● Provides the roles and responsibilities of concerned actors such as the LGU who are instructed to facilitate Information Education and Communication (IEC) campaign on septic tank operation and maintenance to households and pass a local ordinance that would implement and enforce the provisions in the AO including prescribing fines and other penalties for violation. Household and building owners are given the responsibility to ensure that their septic tanks conform to the standards set by the AO and are desludged regularly within the designed cycle period.
DOH AO No. 2017-007 – Guidelines in the Provision of Essential Health Service Packages in Emergencies and Disasters	● One of the essential health service packages that must be provided during emergencies and disasters are WASH facilities. WASH services include hygiene promotion, water supply, excreta disposal, vector control, solid waste management and drainage. ● The LGU shall formulate plans, procedures and protocols to implement this guideline and to provide funds.

Executive Issuances	Pertinent Provisions
DILG Memorandum Circular No. 2019-62 – Policy and Guidelines on Sewage Treatment and Sewage Management System	Reiterates the roles of the LGUs in the implementation of sewage treatment and septage management system within their respective territorial jurisdiction. ● Enactment of Sewage Treatment and Septage Management Ordinances ● Ensure that all residential, commercial, industrial institutional, and governmental establishments have proper sewage treatment and septage management system ● Enforce proper septic tank design ● Implement mandatory desludging of all septic tanks at least once every five years; and ● Provide assistance in securing necessary permits, right of way, IEC, and land acquisition to the water utilities in laying down sewer lines. Section 6.5. Barangay officials or the designated member of their respective Barangay Ecological Solid Waste Management Committee (BESWMC) are advised to accompany and give assistance to the water utility or private desludging company in the conduct of desludging activities within their territory. ● Assistance should be in the form of, but not limited to, IEC, house to house census/campaign, opening and closing of septic tank manhole covers, if needed, traffic flow regulation. ● Barangay officials should also set availment rate target to ensure the success of the desludging program. ● Each barangay is required to maintain a registry of household that availed and did not avail of desludging services.
Department of Environment and Natural Resources (DENR) AO No. 2016-08 – Water Quality Guidelines and General Effluent Standards of 2016	● Defines the intended beneficial use of each water body classification. ● Indicates the concentration of physical parameters, inorganics, metals, and organics for each water body classification. ● Enforces effluent standards for discharges to maintain the water quality per water body classification. ● Identifies significant effluent quality parameters per sector/industry category including that for water supply, sewerage, waste management, and remediation.
DENR AO No. 2021-19: Updated Water Quality Guidelines and General Effluent Standards for Selected Parameters	● Updated the WQG and GES for ammonia, boron, copper as dissolved copper, fecal coliform, phosphate as phosphorus and sulfate
DENR AO No. 2001-34: IRR of the Philippine Ecological Solid Waste Management Act of	Rule VI. Creation of Local SWM Boards. Section 4. Creation of a City and Municipal SWM Board Section 5: Membership of the City and Municipal SWM Board Section 6. Creation of a Barangay SWM Committee

Executive Issuances	Pertinent Provisions
2000.	Section 7. Membership of the Barangay SWM Committee Section 8. Encouraging the Setting up of Multi-purpose Environmental Cooperative or Association in LGUs
Department of Interior and Local Government (DILG) Joint Memorandum No.01 Series of 2016 Circular for Water, Sanitation, and Hygiene (WASH) in Early Child Care and Development (ECCD)	● Provide standards and guidelines for the implementation of WASH in ECCD program. ● It seeks to provide clean and sustainable water supply, functional toilets, sanitation and hygiene facilities in all early learning centers, specifically day care centers and child development centers. The LGU in the provincial, municipal and barangay levels are expected to include allocations from their Special Education Fund (SEF) and Gender and Development (GAD) fund, in addition to other local funds to be utilized as: o Support mechanism for the implementation of WASH in ECCD program o Fiscal inputs to organize and support parents' associations to implement the WASH in ECCD Program o Counterpart funds for the continuing professional development on WASH in ECCD of their ECCD public service providers o Provide facilities for the conduct of the WASH in ECCD Program
Department of Agriculture Administrative Order No. 2019-11: Revised Guidelines on the Procedures and Technical Requirements for the issuance of a Certification allowing the safe re-use of wastewater for purposes of irrigation and other agricultural uses.	The DA AO provides the standards and guidelines for the quality, quantity and method of distribution and application of the wastewater for agriculture reuse. It was formulated to ensure the safe reuse of the wastewater therefore, protection of the environment, human, animal and plant health were all considered in the guidelines. If the wastewater will be used for agriculture purposes, a certification must be secured from the designated agency of DA. In addition to the certification, a discharge permit must also be secured from the Environmental Management Bureau (EMB). The approved certificate must be submitted to EMB as part of its application for the discharge permit
Philippine National Standards (PNS) Bureau of Agriculture and Fisheries Standards (BAFS) 291: 2019 Code of practice for the production of organic soil amendments	This Standard applies to organic fertilizers, organic soil conditioners, microbial inoculants, and organic plant supplements. The guidelines put emphasis on minimizing contamination from microbiological, physical, and chemical hazards to ensure safety of workers and limit the possible environmental hazards associated with the production of organic soil amendments.

2.2 Sanitation Targets in the Philippines

29. Various national and local sector roadmaps and development plans were also developed to meet the targets on improving sanitation as shown in **Table 2-3**. These sanitation national targets and roadmaps were considered in developing the LSSP of Zamboanga City.

Table 2-3. Sanitation Targets in the Philippines

Source Document	Sanitation Target
Philippine Water Supply and Sanitation Master Plan (PWSSMP) 2018-2040	By 2022, the following are the targets of the PWSSMP: • 6.6 percent of households with no access to safe water • 58.3 percent of households with access to Level 3 water systems • 100 percent of households have access to improved sanitation facilities • 0 percent of households are practicing open defecation • 97 percent of the households have septic tanks • 69 percent of the households have access to septage collection services • 23 percent of the households have access to sewerage system • 20 percent of the households are connected to a sewerage system By 2030, the following are the targets of the PWSSMP • 0 percent of households with no access to safe water • 77.1 percent of households with access to Level 3 water systems • 100 percent of the households have septic tanks • 100 percent of the households have access to septage collection services • 60 percent of the households have access to sewerage system • 50 percent of the households are connected to a sewerage system
Philippine Development Plan (PDP) 2017-2022	• To increase the percentage of households with access to safe water to 95.16 percent by 2022 • To increase the percentage of households with access to basic sanitation to 97.46 percent by 2022 • To improve domestic wastewater management in WDs and LGUs by increasing treatment facilities • Protect water resources in water-critical areas and in Metro Manila by, among others,

Source Document	Sanitation Target
	expanding sewerage and sanitation infrastructure ● Under the Basic Education Facilities Fund, school buildings will be furnished with complementary sanitation facilities ● Improve the living conditions in congested prisons by providing them with proper sanitation facilities ● To increase the solid waste diversion rate to 80 percent by 2022 ● To increase the number of barangays with access to sanitary landfills to 29.26 percent.
National Objectives for Health (NOH) Philippines 2017-2022	● To increase the percentage of households with access to safely managed drinking water services to 62.5 percent by 2022 ● To increase the percentage of households with access to safely managed sanitation facilities, including a hand-washing facility with soap and water, to 53 percent by 2022.
Philippine Approach to Sustainable Sanitation (PhATSS)	● All (100%) barangays are ZOD-certified by 2025
Philippine Sustainable Sanitation Roadmap 2010-2028	● To attain universal access to safe and adequate sanitary facilities by 2028 ● Superseded by the PWSSMP
National Sewerage and Septage Management Program (NSSMP) 2010-2020	● By 2020, the NSSMP targets for the areas outside Metro Manila are the following: ○ All LGUs have developed septage management systems ○ 17 HUCs have developed sewerage systems ○ About 43.6 million people will have access to septage treatment facilities and about 3.2 million will have access to sewerage treatment facilities ○ Php 26.3 billion has been invested in sanitation improvement projects ○ About 346 million kilograms of biochemical oxygen demand (BOD) per year is diverted from the environment ● Period of implementation superseded by the PWSSMP

2.3 Philippine Water Supply and Sanitation Master Plan (2018-2040)

30. The Philippine Water Supply and Sanitation Master Plan (PWSSMP) 2018-2040 was formulated to set the direction of the Philippines Water Supply and Sanitation (WSS) Sector towards achieving the national targets related to WSS. The vision of the PWSSMP is set on the universal access to WSS services by 2030.

31. The PWSSMP aims to address the WSSP gaps and achieve the national targets through the following:

- delivering infrastructure gaps and sustainable services
- anticipating increase in population
- ensuring climate and disaster resilient structures
- optimizing research and development
- investing on WSS data and data management, and
- addressing the fragmented sector with a viable institutional set-up and financing schemes.

32. Eight key reform agenda (KRA), the soft components of the PWSSMP interventions, were identified to complement the infrastructure component of the PWSSMP and create the enabling environment that the sector needs to achieve the target goals. **Table 2-4** presents the eight KRA of the PWSSMP and the respective focus of each KRA.

Table 2-4: PWSSMP Eight Key Reform Agenda

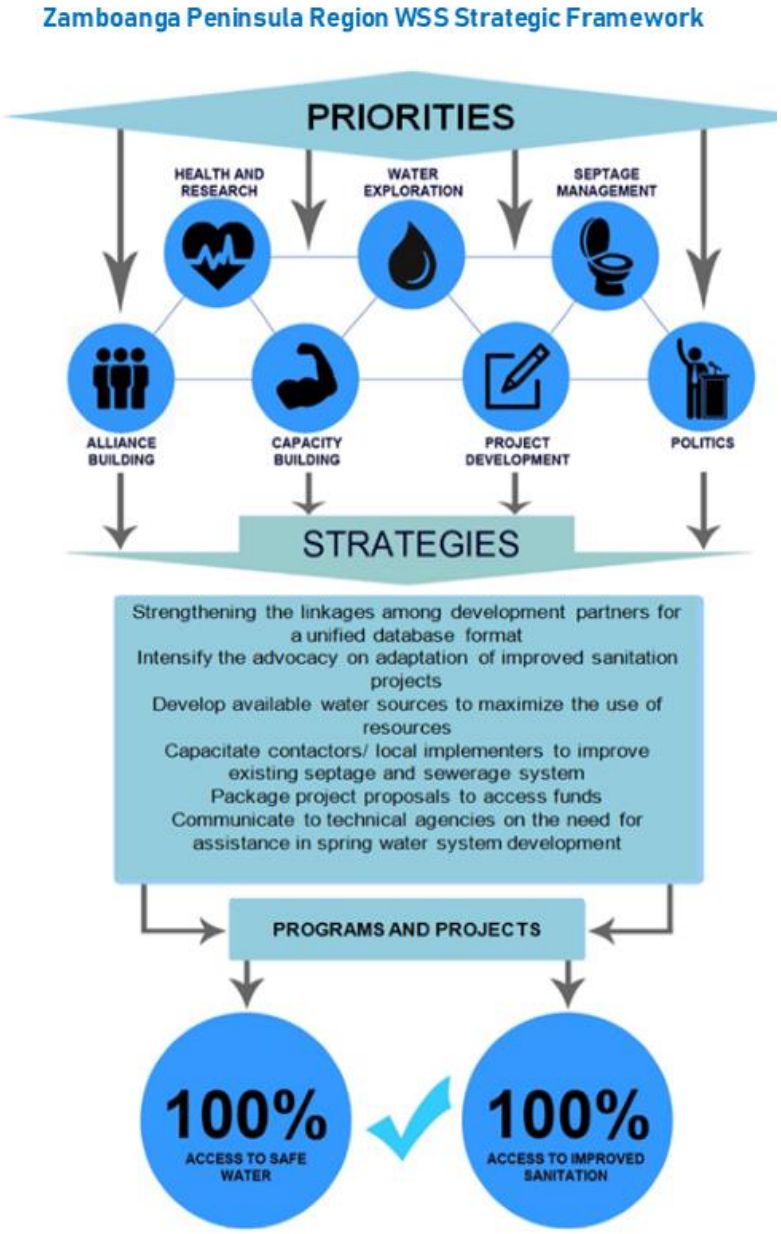
KRA	Focus
KRA 1: Establishing effective WSS sector institutions	Addressing the fragmented WSS sector
KRA 2: Strengthening the regulatory environment	Regulating and managing water resources and WSPS, including water tariffs.
KRA 3: Creating and ensuring effective WSS services	Ensuring appropriate and sustainable operations of WSS service providers
KRA 4: Balancing water supply and demand	Managing and maximizing finite water resources and end-users
KRA 5: Building climate resiliency	Adapting to climate change
KRA 6: Enabling access to funding and financing	Improving availability and acquisition of fund/financing for WSS data
KRA 7: Managing data and information	Ensuring the availability and accessibility of reliable WSS data
KRA 8: Driving research and development	Investing on research and innovations

33. The PWSSMP estimated that about Php 1.07 trillion worth of physical and non-physical investments is required to achieve the targets set by PDP and SDG in 2030. Majority of the required investment is needed from 2020 to 2023 to fund the short-term projects under the priority investment program of LWUA and DILG that were designed to achieve the PDP targets by 2023. Fund sources identified include grants, commercial loans, private/user's equity and development loans.

34. One of the identified strategic interventions to increase the access to improved sanitation in the country is the incorporation of the LSSP into the WSS sector plan, local development plan, annual investment plan and local health plan. The sanitation programs should focus on implementing projects in basic sanitation, zero open defecation, septage management and sewerage systems.

35. Regional WSS master plans for the 17 regions in the country were also developed. The regional WSS master plan sets the regional targets to contribute to the national targets and contains the strategic framework to achieve these targets. The identified strategies and

PPAs in the LSSP must be aligned with the priorities and strategies identified under the Zamboanga Peninsula Region WSS Strategic Framework as shown in **Figure 2-1**.



Source: Philippine Water Supply and Sanitation Master Plan Databook

Figure 2-1. Zamboanga Peninsula WSS Strategic Framework

2.4 Sustainable Development Goals

36. The LSSP was also developed to contain strategies that can be implemented within the ten-year period (2021-2030) to attain the targets of SDG 6, particularly Target 6.1 (safe and affordable drinking water), Target 6.2 (end open defecation and provide access to sanitation and hygiene) and Target 6.3 (improve water quality, wastewater treatment and safe recycling and reuse).

37. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, comprising 17 SDGs and 169 targets. Goal 6 aims to achieve universal access to safely managed water and sanitation by 2030. The targets of Goal 6 are interlinked with all other goals. Sanitation is necessary to achieve other goals including those in relation to poverty, nutrition, education, gender equality, economic growth, reduction in inequalities and sustainable cities[2] as illustrated in **Figure 2-2**.

Source: Solving urban sanitation – sustainability and equitability, World Water, 2020

Figure 2-2. Interlinkages of Sustainable Sanitation to SDGs

38. Unlike the Millennium Development Goals, SDG 6 looks at the entire supply chain rather than the access alone[3]. For instance, SDG Target 6.1 aims to achieve the use of safely managed drinking water services. It considers the type of water source and the accessibility, availability and the quality of the water. The definition of the service ladder for drinking water as defined by SDG 6.1 is shown in **Table 2-5**.

Table 2-5. SDG Ladder for Drinking Water

Drinking water ladder	Definition
Safely Managed	Drinking water from an improved water source which is located on premises, available when needed and free from faecal and priority chemical contamination.

[2] UN-Water, 2016: Water and sanitation interlinkages across the 2030 Agenda for Sustainable Development
[3] Leading factors of success and failure in Asian Development Bank Urban Sanitation Projects, ADB, 2018

Drinking water ladder	Definition
Basic	Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing
Limited	Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing
Unimproved	Drinking water from an unprotected dug well or unprotected spring
Surface Water	Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal

Source: Drinking water | JMP (washdata.org)

39. For SDG 6.2, sanitation systems should address the containment, emptying, conveyance, treatment and end use or disposal of excreta, to achieve safely managed sanitation. **Table 2-6** shows the sanitation ladder of SDG 6.2.

Table 2-6. SDG Sanitation Ladder

Sanitation ladder	Definition
Safely Managed	Use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site
Basic	Use of improved facilities which are not shared with other households
Limited	Use of improved facilities shared between two or more households
Unimproved	Use of improved facilities shared between two or more households
Open Defecation	Disposal of human faeces in fields, forests, bushes, open bodies of water, beaches and other open spaces or with solid waste

Source: Drinking water | JMP (washdata.org)

40. Lastly, SDG 6.3 seeks to improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

2.5 Citywide Inclusive Sanitation (CWIS)[4]

41. The LSSP also considered the CWIS approach. Through this approach, all the members of the city should benefit from adequate and affordable sanitation services thus, the sanitation plan shall cover all areas of the city including low-income households and informal settlers.

42. To completely achieve the health gains from sanitation, the entire community shall have access to sanitation. Without community-level coverage, those using safe sanitation facilities are still at risk from the impacts of the use and practices of unsanitary facilities.

Enabling environment for Sanitation

43. The provision of equitable and sustainable

[4] Solving urban sanitation – sustainability and equitability, World Water, 2020

services requires an integrated approach in addressing the basic services such as water supply, sanitation, wastewater, drainage and solid waste management.

44. **Table 2-7** presents the Manila CWIS principles. These principles provide a framework for action by setting the broad vision for sustainable and inclusive urban sanitation. To implement the CWIS approach, there should be a comprehensive planning methodology, flexible financing mechanisms, capacity building amongst the planners and decision-makers, enabling policies and regulations, and strong advocacy. It requires a radical shift from the conventional approach and needs a strong enabling environment to ensure the operationalization and sustainability of the CWIS principles.

Table 2-7. Manila CWIS Principles

Principle	Definition
Equity	Everyone in an urban area, including communities marginalized by gender, social and economic reasons, benefit from equitable, affordable and safe sanitation services.
Environment and public health	Human waste is safely managed along the entire service chain, starting from containment to reuse and disposal.
Mix of technologies	A variety of sewered and non-sewered sanitation solutions coexist in the same city, depending on contextual appropriateness and resource recovery potential.
Comprehensive planning	Planning is inclusive and holistic with participation from all stakeholders including users and political actors, with short and long-term vision and incremental perspective and is synergistic with other urban development goals.
Monitoring and accountability	Authorities operate with a clear, inclusive mandate, performance targets, monitoring requirements, human and financial resources, and accountability.
Mix of business	Sanitation services are deployed through a range of business models, funding sources, and financial mechanisms to reach all members equitability.

2.6 Principle of Circular Economy

45. The principle of circular economy was also incorporated in the LSSP. With the rapid urbanization and population growth in the city, there is a need to adopt a paradigm change, from linear to circular economy, to ensure the sustainability of water and sanitations services.

46. At present, the water sector's economic model has been linear which follows the "Take-Use-Discharge" strategy wherein the water is withdrawn from the water sources, used by the population, and wastewater is discharged to the environment. This model constraints the availability of water sources and increases the wastes disposed to the environment

47. The concept of circular economy promotes the sustainable management of the water and wastewater. The circular economy aims to minimize or reduce the consumption of fresh water supply by reusing treated wastewater as additional water source. Wastewater can be treated to satisfy the required quality of the potential reuse application. In addition to this, by-

products of the treatment can also be further processed for nutrient recovery which can be used in agriculture. With this, the availability of wastewater treatment plant and the integration of resource recovery facility play an important part in the circular economy.

2.7 Climate Change and Disaster Risk Reduction Considerations

48. Climate change is expected to alter the spatial distribution, timing, and intensity of weather-related events. The anticipated impacts of climate change include (a) more frequent or intense storms that may increase the occurrence and intensity of flooding, (b) reduction in rainfall event which may lead to longer dry seasons and may decrease the flow of water on the surface water and groundwater sources resulting to water scarcity, (c) sea-level rise that may cause salt intrusion in low-lying zones and higher risk of inundation during extreme weather events and (d) increase in temperature.

49. Climate change may worsen the risks that the current climate poses for sanitation, create new risks, heighten uncertainties, and can increase inequality in sanitation access. The impacts of climate change in the water supply include damage to infrastructure from flooding, loss of water sources due to declining rainfall and changes in the water quality of water sources and within the distribution of water. While for sanitation, the impacts include damage and loss of services from floods and reduced carrying capacity of waters receiving wastewater.

50. The potential consequences of climate change for the sustainability of water and sanitation services intersect with other causes such as mechanical failure, poor siting or construction, and underlying institutional, financial and social factors. With this, the development of the LSSP took into consideration the effects of climate change to the water and sanitation services and included adaptation measures to ensure the sustainability and resilience of water and sanitation infrastructures to climate change.

3. Sanitation Profile of the City

51. A sanitation baseline study was conducted in Zamboanga City to determine the existing conditions of the water supply, sanitation and hygiene, solid waste management (SWM), water quality management and to identify sanitation-related hazards that may affect the city. This section presents the highlights of the existing sanitation profile of the city. The sanitation baseline report is attached in **Annex 2**.

52. **Table 3-1** shows the summary of the status of the water supply, sanitation and hygiene, SWM and water quality management in Zamboanga City as compared to the national targets set in Philippine Development Plan (PDP) 2017-2022, DOH National Objectives for Health (NOH) 2017-2022, Philippine Approach to Sustainable Sanitation (PhATSS) 2018-2030, Philippine Water Supply and Sanitation Master Plan (PWSSMP) 2018-2040 and the 2030 UN Sustainable Development Goals (SDG) to determine the status of the city towards meeting these targets.

Table 3-1. Summary of Sanitation Baseline in Zamboanga City

Component	Indicator	Baseline	National Target	
			Value	Reference
Water Supply	Percent households with access to improved water supply	90.7% (2020)	95.16% (2022)	PDP 2017-2022
	Percent households with access to Level III systems	61.1% (2020)	77.1% (2030)	PWSSMP 2018-2040
	Percent household with access to safely managed drinking water services	No data	62.5% (2022)	NOH 2017-2022
			100% (2030)	SDG 6.1
Management of on-site sanitation facilities (toilets, septic tanks, septage management)	Percent households with access to improved sanitation facilities	81.3% (2020)	100% (2022)	PWSSMP 2018-2040
	Percent households with septic tanks (on-site system)	81.3% (2020)	97% (2022) 100% (2030)	PWSSMP 2018-2040
	Percent households practicing open defecation	No data	0% (2022)	PWSSMP 2018-2040
	Percentage of households with access to septage collection services	No data	69% (2022) 100% (2030)	PWSSMP 2018-2040
	Percent household with access to safely managed sanitation facilities, including a hand-washing facility with soap	No data	53% (2022)	NOH 2017-2022
			100% (2030)	SDG 6.2

Component	Indicator	Baseline	National Target	
			Value	Reference
	and water			
	Percent barangay certified ZOD	0 %	100% (2025)	PhATSS 2018-2030
Wastewater, sewage and drainage management	Percent of households connected to sewerage system	0.4% (2020)	20% (2022) 50% (2030)	PWSSMP 2018-2040
Solid Waste Management	Percent solid waste diversion rate	23.40% (2019)	80% (2022)	PDP 2017-2022
	Percent barangays with access to sanitary landfill	41% (2020)	29.26% (2022)	PDP 2017-2022
	Percent of municipal solid waste collected and managed in controlled facilities out of total municipal wastes generated	65% (2019)	100% (2030)	SDG 11.6
Water Quality Management	Percent recreational waters improving	Two WQMAs in the city	>80% (2022)	PDP 2017-2022

3.1 Demography

53. Zamboanga City is a first class highly urbanized city (HUC). It has a total land area of 145,327.02 hectares.

54. According to the census conducted by the Philippine Statistics Authority (PSA) in 2020, Zamboanga City had population of 977,234 which is about 25 percent of the total population in Zamboanga Peninsula. From 2015 to 2020, the city exhibited an average population growth rate of 2.68 percent which is higher than the average national and regional growth rate of 1.63 percent and 1.39 percent, respectively. Furthermore, the average population density of the city was computed to be 691 persons per square kilometer of land for the same period.

55. There are a total of 98 barangays in the city, 58 of which are urban barangays while the remaining 40 are rural barangays. There are also nine island barangays in the city namely barangays Tigtabon, Santa Barbara, Pangapuyan, Landang Laum, Landang Gua, Busay, Pasilmanta, Manalipa and Tumalutab. The projected population in the city per barangay is presented in **Table 3-2.**

Table 3-2. Projected Population in Zamboanga City per Barangay

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
Urban						
1	Arena Blanco	13,671	2,688	4.7	15,927	17,915
2	Ayala	26,658	5,390	4.1	28,526	32,086

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
3	Baliwasan	17,932	6,553	3.7	31,683	35,637
4	Boalan	11,541	1,892	4.6	11,002	12,375
5	Bolong	8,068	1,544	4.2	8,173	9,193
6	Buenavista	8,154	1,444	4.5	8,205	9,229
7	Bunguiao	7,952	1,810	4	9,219	10,370
8	Cabaluay	8,849	1,557	4.1	8,034	9,037
9	Cabatangan	17,812	3,088	4.4	17,308	19,468
10	Calarian	33,563	6,764	4.3	36,562	41,125
11	Camino Nuevo	7,421	1,736	4.4	9,791	11,013
12	Campo Islam	11,730	3,303	3.8	16,258	17,862
13	Canelar	10,512	2,380	4.7	14,043	15,796
14	Cawit	10,244	1,836	5	11,702	13,162
15	Culianan	10,851	1,799	4.6	10,524	11,837
16	Curuan	11,954	2,081	4.2	11,128	12,517
17	Divisoria	13,172	2,053	4.5	11,662	13,118
18	Guiwan	13,231	3,207	4.4	18,095	20,353
19	Kasanyangan	28,819	2,641	5.3	17,857	20,085
20	La Paz	8,724	1,652	4.6	9,561	10,754
21	Labuan	16,095	2,524	4.5	14,495	16,304
22	Licomo	5,888	1,177	4.5	6,727	7,566
23	Limpapa	6,060	1,264	4.6	7,315	8,228
24	Lunzuran	13,232	2,238	4.4	12,564	14,133
25	Maasin	9,267	1,995	4.5	11,333	12,748
26	Malagutay	8,265	1,598	4.2	8,422	9,473
27	Mampang	31,975	7,436	4.6	43,411	48,828
28	Manicahan	11,999	2,129	4.7	12,754	14,346
29	Mariki	6,310	258	6.9	2,246	2,526
30	Mercedes	22,321	3,211	4.6	18,625	20,949
31	Pasonanca	27,215	6,216	4.4	34,633	38,955
32	Patalon	11,127	1,791	4.5	10,283	11,567
33	Putik	22,271	4,451	4.4	24,900	28,007
34	Recodo	23,254	4,126	4.2	22,008	24,754
35	Rio Hondo	8,827	638	5.2	4,208	4,733
36	San Jose Cawa-Cawa	4,292	1,240	4.5	7,810	8,785
37	San Jose Gusu	16,260	3,984	4.2	21,158	23,798
38	San Roque	28,829	5,905	4.7	35,285	39,688
39	Sangali	26,758	4,754	4.4	26,273	29,552
40	Sinunuc	22,918	3,714	4.4	20,884	23,491
41	Sta. Barbara	6,711	794	5.8	6,025	6,777
42	Sta. Catalina	16,644	3,694	4.7	21,880	24,611
43	Sta. Maria	24,133	5,889	4.3	31,863	35,840
44	Sto. Niño	3,888	1,058	3.8	5,224	5,876
45	Talisayan	11,428	1,482	4.5	10,400	11,698
46	Talon-Talon	37,350	7,724	4.5	44,175	49,688

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
47	Taluksangay	9,437	1,769	5.8	12,952	14,568
48	Tetuan	29,621	7,351	4	37,683	42,386
49	Tigtabon	5,365	1,156	4.6	6,695	7,531
50	Tugbungan	26,538	5,589	4.3	30,158	33,922
51	Tulungatung	11,741	1,944	4.8	11,698	13,158
52	Tumaga	33,399	6,833	4.5	38,998	43,865
53	Vitali	10,716	2,237	4.2	11,900	13,385
54	Zambowood	12,870	2,431	4.2	12,862	14,467
55	Zone I	4,806	553	4.2	5202	5852
56	Zone II	1,802	489	4.1	2711	3050
57	Zone III	1,146	350	4.2	1922	2162
58	Zone IV	1,174	295	4.3	1656	1863
Sub-Total		**852,790**	**167,705**	**4.4**	**944,598**	**1,062,062**
Rural						
1	Baluno	3,865	711	4.4	3,992	4,490
2	Busay	2,290	825	4.1	4,250	4,780
3	Cacao	1,311	318	4.2	1,704	1,917
4	Calabasa	2,936	775	4.2	4,076	4,585
5	Capisan	1,488	308	4.6	1,781	2,004
6	Dita	2,028	491	4.2	2,638	2,967
7	Dulian (UB)	2,569	658	3.9	3,252	3,657
8	Dulian (UP)	1,489	309	4.3	1,676	1,886
9	Guisao	2,583	812	4.2	4,299	4,836
10	Lamisahan	2,764	581	3.9	2,896	3,257
11	Landang Gua	3,154	628	4.8	3,787	4,259
12	Landang Laum	3,095	940	5.1	6,032	6,785
13	Lanzones	3,689	848	3.9	4,159	4,678
14	Lapakan	1,868	322	4.3	1,743	1,961
15	Latuan	2,615	668	3.7	3,109	3,496
16	Limaong	4,766	892	4.5	5,061	5,692
17	Lubigan	3,249	687	4.3	3,726	4,191
18	Lumayang	1,999	320	4.6	1,861	2,093
19	Lumbangan	4,461	763	4.2	4,093	4,604
20	Manalipa	2,588	462	4.6	2,711	3,050
21	Mangusu	5,608	1,014	4.7	6,051	6,807
22	Muti	3,420	631	4.7	3,774	4,245
23	Pamucutan	4,404	941	4.3	5,135	5,776
24	Pangapuyan	767	133	4.4	746	840
25	Panubigan	982	336	4.8	2,037	2,291
26	Pasilmanta	3,138	515	4.1	2,685	3,020
27	Pasobolong	5,624	925	4.1	4,755	5,348
28	Quiniput	4,015	826	4	4,212	4,737
29	Salaan	3,623	913	4.4	5,153	5,796
30	Sibulao	4,167	980	4.3	5,369	6,040
31	Sinubong	3,601	745	6.3	5,932	6,673

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
32	Tagasilay	3,998	698	4.3	3,759	4,228
33	Taguiti	1,328	324	4.5	1,847	2,078
34	Talabaan	5,907	1,174	4.5	6,756	7,599
35	Tictapul	3,527	796	4.8	4,829	5,432
36	Tigbalabag	2,109	460	3.9	2,281	2,566
37	Tolosa	3,859	673	4.1	3,508	3,946
38	Tumalutab	3,436	548	4.4	3,058	3,440
39	Tumitus	2,731	656	4.6	3,828	4,306
40	Victoria	3,393	659	4.3	3,545	3,987
Sub-Total		**124,444**	**26,265**	**4.4**	**146,106**	**164,343**
TOTAL		**977,234**	**193,970**	**4.4**	**1,090,704**	**1,226,405**
Sources: PSA 2020, POPCEN 2015; CDP of Zamboanga City 2016-2021						

3.2 City Health Profile

56. The CHO is the primary health agency of the City Government of Zamboanga. The DOH-licensed health care facilities in the city consist of 14 hospitals (6 government and 8 private), 17 birthing homes, 13 institution-based clinical laboratories (2 government and 11 private) and five (5) private free-standing facilities. There are also 99 barangay health centers in the city.

57. For the past five years, acute gastroenteritis (AGE) and diarrhea were recorded as the leading sanitation-related causes of morbidity in the city. AGE was also recorded to be one of the leading sanitation-related causes of mortality in city in 2018 and 2019. These can be attributed to the lack of access to sanitary facilities in the city and due to poor sanitation practices (see **Table 3-3** and **Table 3-4**).

58. A rotavirus outbreak happened in the city in 2016. Rotavirus spreads from fecal-oral contact which usually happens because of poor hand-washing practices or from consuming contaminated food or water. To stop the spread of the rotavirus, the CHO strengthened its WASH IEC programs on proper hygiene practices and the importance of the use of sanitary toilet facilities. The CHO also disinfected the groundwater sources of the households and strictly monitored the quality of the drinking water from the service providers.

Table 3-3: Top 10 Leading Causes of Morbidity in Zamboanga City, 2016-2020

Rank	2016		2017		2018		2019		2020	
1	Acute Respiratory Infection	34,881	Acute Respiratory Infection	65,544	Acute Respiratory Infection	80,473	Acute Respiratory Infection	57,706	Animal Bite	10,691
2	Animal Bite	6,073	Fever	9,993	Systemic Viral Illness	12,640	Animal bites	10,329	Acute Respiratory Infection	8,024
3	Fever	5,947	Animal Bite	6,945	Animal Bite	9,041	Systemic Viral Illness	9,691	Wounds/Injuries	4,178
4	Wounds	4,949	Hypertension	5,590	Hypertension	9,021	Dengue	7,315	Systemic Viral Illness	1,864
5	Hypertension	3,232	Wounds	5,468	Skin Diseases	6,932	Trauma	6,852	Hypertension	1,603
6	Acute Gastroenteritis*	3,015	Skin Diseases	4,230	Trauma	6,190	Hypertension	4,881	Acute Gastroenteritis*	1,398
7	Skin Diseases	2,135	Acute Gastroenteritis	2,154	Acute Gastroenteritis*	6,085	Acute Gastroenteritis*	3,717	Skin Diseases	1,221
8	Urinary Tract Infection	1,521	Diarrhea*	1,865	Tuberculosis (all forms)	3,181	Tuberculosis (all forms)	3,414	Tooth ache	1,113
9	Injuries	1,386	Injuries	1 683	Urinary Tract Infection	2 121	Skin Diseases	3 081	Urinary Tract Infection	586
10	Diarrhea*	1,217	Headache	1 455	Dental caries	1 852	Type 2 Hypersensitivity Reaction	1 350	Headache	558

Source: CHO 2020
*Can be due to poor sanitation access and practices

Table 3-4: Top 10 Leading Causes of Mortality in Zamboanga City, CY 2016-2020

Rank	2016		2017		2018		2019		2020	
1	Diseases of the Heart	730	Diseases of the Heart	1180	Diseases of the Heart	1015	Diseases of the Heart	1555	Diseases of the Heart	1610
2	Pneumonia	453	Pneumonia	640	Pneumonia	529	Diseases of the Vascular System	638	Diseases of the Vascular System	499
3	Malignant Neoplasms	373	Diseases of the Vascular System	561	Diseases of the Vascular System	397	Pneumonia	525	Cancer (All Types)	492
4	Diseases of the Vascular System	367	Malignant Neoplasms	465	Cancer (All Types)	232	Cancer (All Types)	495	Pneumonia	419
5	Tuberculosis (All forms)	128	Tuberculosis (All forms)	148	Tuberculosis (All forms)	128	Renal Disease	296	Hypertension and its complications	219
6	Chronic Obstructive Pulmonary Disease	86	Diabetes Mellitus	134	Diabetes and its complications	107	Tuberculosis (All forms)	245	Tuberculosis (All forms)	202
7	Diabetes Mellitus	85	Chronic Obstructive Pulmonary Disease	99	Trauma	78	Trauma	186	Renal Disease	182
8	Vehicular Accident	56	Hypertension and its Complications	89	Chronic Obstructive Pulmonary Disease	60	Diabetes and its complications	132	COVID-19 confirmed	174
9	Diabetic Nephropathy	53	Asthma	76	Undetermined cause of death	57	Chronic Obstructive Pulmonary Disease	122	Diabetes and its complications	133
10	Aspiration Pneumonia	51	End Stage Renal Disease	71	Acute Gastroenteritis*	54	Acute Gastroenteritis*	79	Chronic Obstructive Pulmonary Disease	84

Source: CHO 2020
*Can be due to sanitation access and practices

3.3 Water Supply

3.3.1 Household access to Improved Water Supply

60. In 2020, about 90.7 percent of the households have access to improved water supply. In terms of water service level, about 61.1 percent of the households are connected to Level 3 water supply system, 18.9 percent have access to Level 2 water supply system and 10.7 percent have Level 1 water supply system.

61. Based on the accomplished validation of CHO on the access of improved water supply in 2019, there were 30 barangays that do not have access to Level 3 water supply system.

3.3.2 Water Supply Service Provider

62. Zamboanga City Water District (ZCWD) is the main water service provider in the city. At present, it serves 61 out of the 98 barangays in the city.

63. There are also rural/barangay waterworks and sanitation association and communal water supply systems established in the city that provide water supply to the barangays that are not covered by ZCWD. In addition to this, there were 378 water refilling stations (WRS) in the city in 2020. Water from these is used by the households for drinking.

3.3.3 Water Sources

64. The common water sources of the water service providers in the city include surface water, d deep well and spring. There are also households that use open shallow well or unprotected spring as their water source.

Zamboanga City Water District

65. The Tumaga River supplies about 60 percent of the water requirement in the city. Water from this river is treated in the three water treatment plants of ZCWD using conventional water treatment process. This supplies water to the 14 barangays in the city.

66. In addition to the treatment plants, ZCWD also operates six water systems in the city wherein the water is sourced from springs. ZCWD taps the Dumalon Creek to feed water in the Dumalon Water System, seven spring sources supply the Tolosa Water System and one spring source each for Lamisahan, Lumayang and Vitali water systems. The spring sources of ZCWD had average production of 117,552 cubic meters per month in 2020. Water from these sources is chlorinated prior to distribution.

67. ZCWD has a total of 24 deep wells located within the city. However, only 13 are being operated, three were already decommissioned and eight are on stand-by. These deepwells supply water to barangays Boalan, Divisoria, Pasobolong, Putik and Zambowood. In 2020, the average production of the deepwells was 434,476 cubic meters per month. Chlorination is also done in the water from these sources before distribution to the customers.

68. Lastly, ZCWD also entered an agreement with the PrimeWater Infrastructure Corp for a bulk water supply to serve 24 barangays in the city.

Other water service providers

69. The water sources of the other water service providers in the city include developed spring and deep wells.

70. The WRS source their water from their own deep wells. However, some WRS operate their deep well without securing the permit to operate from the Department of Health (DOH).

3.3.4 Current Programs, Projects and Activities

71. The following are the on-going projects of ZCWD regarding water supply

- Service expansion under the Salintubig Project
- On-going construction of the Ranchio Frio Water System in Brgy. Vitali
- On-going construction of Sumidero Water System in Brgy. Bunguiao
- On-going construction of Cahumban Water System
- On-going construction of water system as part of the Z3R Buld Back Better rehabilitation project

72. On the other hand, the following are the existing activities of the CHO regarding water supply.

- IEC distribution on water supply, sanitation and environmental health
- Site survey of deep well sources
- Regular water sampling (WRS, ice plants and food processing plants, restaurants, water services providers)
- Water supply disinfection
- Monitoring of household's water supply
- Regular monitoring of WRS and water service providers
- Created LDWQMC to monitor the quality management of water supply in the city

3.4 On-site Sanitation Facilities including WASH in Emergencies

3.4.1 Household access to Sanitary Toilet Facilities

73. There were about 81.3 percent households in the city that have sanitary toilet facilities in 2020. The remaining 18.7 percent were either sharing toilet facilities with other households or were open defecating. At present, the CHO does not have available data on the number of households that practice open defecation (OD).

3.4.2 Zero Open Defecation (ZOD) Status

74. As of 2020, there were no barangays in the city that were certified or declared to have zero open defecation. The CHO does not yet have a monitoring program for OD.

75. The ZOD program of the city is implemented through the conduct of WASH IECs in the communities.

3.4.3 Septage Management Program (SMP)

76. The City Ordinance No. 2009-153, establishing a SMP in Zamboanga City, was signed and approved on July 8, 2009. However, despite the issuance of the said ordinance, the city is

not yet implementing a city-wide formal SMP and desludging of septic tanks is not commonly practiced in the city.

77. The city LGU and ZCWD entered an agreement for the implementation of the SMP in the city. ZCWD, in partnership with the city LGU, will take the lead in the implementation of the SMP in the city which includes the desludging of the septic tanks, operation and maintenance of the septage treatment plants and collection of the septage fee from its customers. There are two combined septage-sewage treatment plants being constructed in the city.

78. The existing septage management ordinance of the city is being reviewed and updated to reflect the recent developments regarding the SMP in the city. Guidelines for the desludging services of ZCWD non-customers must also be developed.

79. There are three registered private desludgers in the city that provide desludging services to the households, commercial and institutional establishment upon request. Two of the private desludgers in the city operate their own septage treatment plant (SpTP). The third private desludger transports the collected septage to one of the SpTPs for proper treatment and disposal. **Table 3-5** presents the details of the registered private desludgers in the city.

Table 3-5: Registered Private Desludgers in Zamboanga City

Private Desludger	Barangays Served	No. of VTU trucks	Frequency of desludging	SpTP Location and Capacity	Desludging fee
Christine Haresco Wastewater Treatment Services	Labuan to Curuan and all barangays in between	1 unit x 3700 L 1 unit x 4200 L	2 to 3 trips per day	50 m^3/day Brgy. Sinubong	Php 3,500.00 within 10 km radius. Additional Php 500.00 for every km thereafter
Veterans Builders Ents.	All 98 barangays	4 units x 4500 L 1 unit x 17,000 L 1 unit x 19000 L	3 trips per day	Brgy. Pamucutan Brgy. Cabaluay	Php 4,000.00-4,500.00 Additional payment depends on the distance
K-Gees Services				Trucking services only. MOA with Christine Haresco	

80. As stated in the existing septage management ordinance of the city, the City Septage Management Council shall implement an accreditation system and operational guidelines for the private desludgers in the city however, there is no system yet in place. Nevertheless, the city allows the operation of the private delsudgers as long as all the necessary regulatory

requirements of the national and local agencies are secured. The CHO conducts quarterly monitoring of the compliance of the private desludgers. The following must be presented during the inspection; valid DENR wastewater discharge permit, valid sanitary permit, health cards of workers and logbook of activities.

3.4.4 WASH in Emergencies

81. The city has three designated evacuation centers. These are in barangays Cabatangan, Curuan and Vitali. Also, 75 out of the 98 barangays designated schools and covered courts as their temporary evacuation centers during emergency situations.

82. The existing WASH facilities in these evacuation centers are not enough to cater the needs of the population during emergencies. With this, the CHO and CDRRMO provides additional temporary WASH facilities during emergencies to ensure that all affected individuals have access to proper WASH facilities.

3.4.5 Current Programs, Projects and Activities

83. The following are the activities of the City LGU regarding on-site sanitation facilities including WASH in emergencies.

- Together with the barangay officials, provides technical assistance to households for the construction of toilet facilities.
- Conduct orientation on personal hygiene to elementary and daycare students
- Distribution of hygiene kits to students to schools and daycare centers
- Monitoring of households' sanitation facilities
- Provision of hygiene and medical kits during emergency situations
- Assessment and provision of temporary WASH facilities at evacuation centers during emergencies (i.e., portalets)
- On-going review of existing city septage management ordinance

84. The following are the current activities of ZCWD:

- On-going construction of combined septage-sewage treatment facilities in Magay and Vale Vista
- Conducts IEC on WASH as part of its Community Relations and External Affairs activities
- On-going pre-feasibility study for the proposed septage management program in Zamboanga City

3.5 Wastewater, Sewage and Drainage Management

3.5.1 Sewerage System

85. The existing sewerage system in Zamboanga City was constructed from 1933 to 1939 under the United States Colonial Government. It is a separate system wherein the sewer lines are directly connected to the households to collect sewage only. However, the collected sewage from the households is directly discharged to the coastal water without proper treatment. The operation and maintenance of the sewerage system is done by ZCWD.

86. The existing sewer lines is only within the Central Business District of the city which covers barangays Zone I, Zone II, Zone III and Zone IV. As of 2020, there were 895 households that are connected to the sewer lines, all of which are ZCWD customers.

87. The sewage collected from the households is conveyed to the two pumping stations of ZCWD. Sewage from barangays Zone III and Zone IV are transported to the east pumping station. From the east pumping station, the sewage is pumped to the west pumping station. The west pumping station also receives the sewage collected from barangays Zone I and Zone II. The west pump station then pumps the collected sewage to the outfall in the coastal water, located near the Zamboanga Port. About 2,300 cubic meters per day of sewage is collected from the households and discharged to the coastal water.

88. The ZCWD proposes to rehabilitate and expand the sewer lines in the CBD. At present, the ZCWD applied for a loan to ADB to rehabilitate the existing sewer lines and expand to about 1.8 kilometers. The ZCWD also plans to further expand the sewer lines to additional 6.84 kilometers.

89. With the proposed expansion of the sewered areas, the capacities of the existing pumping stations in the city must be increased and/or additional pumping stations should be installed to accommodate the additional sewage that will be collected.

3.5.2 City Drainage

90. The existing drainage system is only available within the 15-km radius from the city proper. Rural barangays do not have proper drainage system which cause flooding during heavy rainfall. The city does not yet have a local drainage master plan.

3.5.3 Current Programs, Projects and Activities

91. A sewerage system is being constructed in barangays Rio Hondo and Mariki. A sewage treatment plant is being constructed in Brgy. Rio Hondo to treat the sewage that will be collected. It will serve about 2,500 households and will have capacity of 1,500 cubic meters per day. The project is funded by the Local Water Utilities Administration (LWUA) as part of the Zamboanga City Roadmap to Recover and Reconstruction (Z3R) Plan.

92. A combined septage and sewage treatment plant is also being constructed to serve Vale Vista Subdivision in Brgy. Kasanyangan. The project will serve about 3,920 households with capacity of 2,500 cubic meters per day.

93. A combined septage and sewage treatment plant in Magay will also be constructed by ZCWD. It will serve barangays Zone 1 to IV, Santa Catalina, Camino Nuevo, Canelar, Santo Nino and San Jose Cawa-Cawa. The treatment facility will have a capacity of 4,000 cubic meters per day. Bidding for the construction of this treatment facility is still on-going.

94. The DPWH Region IX has developed a master plan for the drainage and flood control in the urban core and central areas in Zamboanga City. For the past years, the DPWH Regional Office had also implemented several projects to rehabilitate the existing drainage system and construct new drainage facilities in the city.

3.6 Solid Waste Management

95. The City Government through OCENR and the barangay units share the responsibility in collecting the solid wastes from the households. The shared collection services scheme collects from 40 barangays with an average of 235 tons per day from all sources. This corresponds to an estimated collection efficiency of the city at 65 percent. About 75% of the wastes collected are from residential, 5% are commercial waste, 8% are market wastes and 11.5% are recyclables.

96. The estimated current waste generate rate of the city is 0.45 kg/capita/day. Based on the waste audit conducted by OCENR, about 42 percent of the total wastes generated in the city are biodegradable.

97. Currently, the City Government operates five material recovery facilities (MRF) located in Bagsakan Center (Sta. Cruz Market), Main Public Market (Magay), City Abattoir (San Roque), Lumbangan Controlled Disposal Facility, and Sanitary Landfill Facility-MRF (Salaan). The existing facilities accommodates an average of 28 tons per day of biodegradable waste or approximately 30 percent of the total biodegradable wastes disposed daily.

98. In 2019, the waste diversion rate in Zamboanga City is at 23.40 percent and is targeted to increase to 40 percent by the end of 2030.

99. An existing 10.6-hectare Sanitary Landfill Facility (SLF) in Barangay Salaan is owned and operated by the City Government of Zamboanga. Based on the design, the SLF will have a total of six cells. Each cell has a minimum lifespan of three years that can accommodate 292,000 cubic meters of wastes based on the estimated average disposal rate of 200 tons per day. At present, two disposal cells are already operating. Cell No. 1 is being operated since March 2015. An additional cell, Cell No. 2, has been constructed and operational since 2019 to cater the city's final disposal for the next three years.

100. The city constructed a medical waste treatment facility in Brgy. Salaan however, it is not yet being operated. It will have an annual treatment capacity of 9.5 metric tons of medical wastes or about 150 kilograms per hour. The facility will be operated and maintained by the City Health Office.

3.6.1 Current Programs, Projects, and Initiatives

101. OCENR is coordinating with inter-agencies through barangay forum, focus group discussions (FGDs), print-out advocacies, engagement with social media, and information and education campaign (IEC). The primary objective of the IEC is to inform the public about the behavioral change towards ecological SWM practice of waste reduction at the community, households, and schools.

102. Furthermore, the City Government offices conduct orientation and action planning workshops together with the public and private organizations on source reduction and segregation, reuse and recycling.

103. The City Government and the concerned academic institutions developed an environmental education module with the following theme:

- Environmental and health effects of improper waste management
- E's of Empowerment- Environmental organization, Education, Engineering, Equity, Enforcement, and Entrepreneurship
- Related laws and regulations

- 3 R's of Waste Management (Reduce, Reuse, and Recycle) and Composting
- Establishment of Barangay Ecological Solid Waste Management Programs/Committees and Action Planning

104. The existing 10-Year SWMP of the city has a planning period of 2020 to 2030. The implementation of the SWMP in the city is already on-going. The following are the projects in the SWMP that were already accomplished or currently being implemented.

- Constructed Cell No. 2 in the sanitary landfill
- Constructed the medical waste treatment facility
- On-going construction of additional transfer stations and city MRFs
- Continuous IEC campaign and promotional programs on proper waste segregation, source reduction and recycling

3.7 Water Quality Management

105. There are two designated water quality management areas (WQMA) that covered the city, as shown in the table below. The EMB Region IX developed the 10-year WQMA action plan for both WQMAs and were already adopted by the respective governing boards of the WQMAs.

106. The River Basin Control Office of DENR also funded the formulation of the Climate Change-Responsive Integrated River Basin Management and Development Master Plans for the eight clustered river basins in the city which consists of the Ayala, Bolong, Curuan, Manicahan, Tumaga and Vitali-Taguite rivers.

107. In terms of water quality monitoring, EMB Region IX monitors 13 sampling stations for Tumaga River and six sampling stations for Ayala River. EMB Region IX also monitors several rivers in Zamboanga City such as Mercedes River, Saaz River and Patalon River. These rivers are considered as the priority rivers in the whole region.

Table 3-6: Designated WQMA in Zamboanga City

WQMA	Legal Basis	Cities/Municipalities Covered
Tumaga River WQMA	DAO No. 2013-01	Zamboanga City (Barangays Pasonanca, Sta. Maria, Tumaga, Guiwan, Tetuan, Tugbungan, Lumayang, Lumbangan, Lunzuran, Putik, Divisoria, Salaan, Culianan, Mercedes, Pasobolong, Boalan, Zambowood, Talon-Talon, Mampang)
Ayala River WQMA	DAO No. 2016-15	Zamboanga City (Barangays Baluno, La Paz, Cawit, Tulungatung, Recodo, Ayala)

4. Sanitation Problems and Issues

108. The key issues identified in the city in terms of the sanitation thematic areas are summarized in the table below. These are further discussed in the next subsections.

Table 4-1. Summary of Identified Sanitation Problems and Issues

Component	Identified Issues
Water Supply	a. About 30 barangays in the city do not have access to Level 3 water system. - Remote areas are still utilizing level 1 water source as drinking water. - Some barangays do not have available water service provider (source of water is commonly open well) - Barangays Muti, Taluksangay and Talabaan use communal water system as water source which are not maintained to ensure delivery of safe water. b. Some areas are experiencing low water pressure c. In 2016 and 2019, ZCWD experienced low water production/supply due to drought that resulted to the implementation of water rationing and/or intermittent water supply to its customers. d. Some residents have inadequate knowledge on alternative strategies and procedure/s in provision of safe drinking water. e. Some WRS are still utilizing deep well source without Permit to Operate issued by DOH IX f. Lack of monitoring of households located at far flung barangays with doubtful sources g. City Health Office has no capacity to test or conduct water analysis as required in SDG 6.1 h. The requirement of DOH-approved water safety plans (WSPs) is not enforced for all water service providers. There is also no local policy requiring the implementation of WSP by the drinking water service providers. i. The city does not have an established local drinking water quality surveillance program. j. Existing water sources and water supply infrastructure in the city are susceptible to landslide and flooding. k. The city needs to strengthen its IEC on water conservation practices and safe water handling practices
Management of on-site sanitation facilities (toilets, septic tanks, septage management)	a. Poor sanitation practices are still observed in the city. There are households that share their toilet facilities to other households, use insanitary toilet facilities or practice open defecation. - The houses-on-stilts, informal settlers and indigenous people in barangays Mariki, Rio Hondo, Sta. Barbara, Sta. Catalina, Kasanyangan, Talon-talon and Zone IV have low access to sanitary toilet facilities - Some indigenous communities have difficulty in adapting proper sanitation practices. - Households in the island barangays also have low access to sanitary toilet facilities - Sanitation facilities provided in houses-on-stilts had been detached

Component	Identified Issues
	b. The city does not have monitoring system for the households that practice open defecation. There is also no procedure or guidelines for ZOD barangay certification and monitoring in place. c. Weak implementation of sanitation policies and no existing city ordinance on WASH d. The existing septage management ordinance of the city must be reviewed and updated to reflect the recent developments on the implementation of the SMP in the city. e. There are septic tanks that are not compliant to the prescribed standard design of DOH and the households cannot afford to retrofit their septic tanks. f. Formal septage management program (SMP) is not yet being implemented in the city. g. There is a need to strengthen the IEC programs on proper sanitation and hygiene practices h. The city LGU must raise the awareness of the households regarding the city ordinance on sanitation and the proposed SMP of the city. i. City LGU representatives/leaders/community lack on training and awareness on WASH for j. Lack of training and awareness advocacy on WASH for COVID-19 and emerging diseases for health care facilities (HCFs) (health workers/ sanitary inspectors) k. Inadequate financing and resources to establish WASH facilities. l. Weak coordination and implementation of WASH programs and policies. m. Lack of potable water supply infrastructure in evacuation centers n. Inadequate WASH facilities in schools that serve as evacuation centers o. The city does not have local policy for the provision of WASH facilities during emergencies p. Existing sanitation facilities in the city are susceptible to landslide and flooding.
Wastewater, Sewage and Drainage Management	a. Disposal of untreated wastewater in the environment - Sewer lines are only limited to city proper, and no treatment is provided to the collected wastewater b. Lack on policy regarding sewerage system c. The drainage is reportedly undersized and are usually clogged with solid wastes which causes flooding in the area. d. Absence of drainage system outside city proper especially in rural barangays e. No maintenance of drainage systems and outfalls f. No drainage master plan g. Sewerage and drainage infrastructures in the city are susceptible to landslide and flooding.
Solid Waste Management	a. There are barangays unserved by the city and barangay waste collection. b. Limited waste reduction and segregation practice in the city - Not all barangays have functional MRFs and composting facility - Inadequate programs to improve diversion rate - Lack of local market for recyclables and reusable waste - Lacks information and awareness on effective solid waste

Component	Identified Issues
	management - Lack of infrastructure to support the resource recovery initiatives c. Barangay Solid Waste Management Councils (BSWMCs) of the city are inactive. d. Absence of proper on-site treatment and disposal of health care waste (HCW) in HCFs e. Lack of training and capacity building on proper HCW management in the HCFs. f. Location of the City MRFs, SLF and medical waste treatment facility are susceptible to landslide and flooding.
Water Quality Management	a. Lack of information and awareness advocacy of relevant stakeholders in water quality management in the community and commercial establishments. b. Presence of informal settlers near bodies of water directly discharging untreated sewage.

4.1 Household Level

a. Open defecation and Insanitary Toilet Facilities

109. The city does not monitor the number of households that practice open defecation. However, in 2020, about 18.77 percent of the households in the city did not have sanitary toilet facilities. These were either sharing toilet facilities with other households or were open defecating. Barangays that have low access (less than 10 percent) to sanitary toilet facilities include the island barangays Landang Gua, Tigtabon, Manalipa and Pangapuyan, and urban barangay Mariki where houses on stilts and informal settlers were mostly observed.

110. The houses on stilts in barangays Mariki, Rio Hondo, Arena Blanco, Sta. Catalina and other coastal barangays were funded by the National Housing Authority. Sanitation facilities with septic tanks were also provided per household. It is the responsibility of the households to manage their own sanitation facilities. However, during the inspection of CHO, the sanitation facilities installed in the houses on stilts were already detached thus, the households resort to open defecation or sharing of toilet facilities, and the wastes are directly discharged to the coastal water. Also, it was observed that some of the households converted the space allotted for the sanitary toilet facility into a living space.

111. There are also differences on the preferences towards the use of sanitation facilities and the handling of excreta between the diverse cultures in the city. Cultural norms and social habits may impair people from using hygienic and sanitary toilet facilities. Therefore, it is important to consider social and cultural beliefs and traditional practices in developing sanitation interventions in the city.

112. Prior to starting an intervention, it is vital to assess and understand the cultural practices, systems and beliefs, leadership structures, and other existing drivers of change within the various cultures in the city. This process should help to identify any opportunities or issues specific to that cultural setting that could be drawn on to facilitate or trigger behavior change. Each group has different socio-cultural factors that must be identified and be used to produce culturally appropriate responses to encourage the group to abandon open defecation.

b. Onsite treatment system

113. The Office of the Building Official (OBO) requires a properly designed septic tank when securing building permits for new residential, commercial, institutional or industrial establishments. The OBO and CHO reviews and evaluates the building plans submitted as part of the application for building permit. They also monitor and validate the compliance of the constructed septic tanks in the city.

114. As stated in City Ordinance No. 2009-152, the ordinance establishing the SMP of the city, all residential establishments shall have an approved excreta disposal system for treatment of domestic sewage. The ordinance requires that all water users that are discharging below 40 cubic meters of sewage per day shall have at least two-closed chamber septic tank; 41 to 500 cubic meters of sewage per day shall have at least three-closed chamber septic tank and 501 to 1,000 cubic meters shall have at least five-closed chamber with pond. All establishments that generate more than 1,000 cubic meters shall have its own wastewater treatment facility or shall have an existing contract of service with any duly accredited wastewater treatment facility.

115. However, despite these local policies, the city still has low access to sanitary toilet facilities with properly designed septic tanks. In 2020 about 81.3 percent of the households have septic tanks but not all are compliant to the standards. Based on the sanitation survey conducted, about 57 percent of the households have septic tanks with only one chamber and about 35 percent have septic tanks that are not water-tight or bottomless. This may contaminate the water from the nearby deep wells or shallow wells.

116. There is a need to retrofit the septic tanks of the households to be compliant to the design requirement of the DOH. It shall be noted that as stated in the DOH AO No. 2019-0047 “National Standard on the Design, Construction, Operation and Maintenance of Septic Tanks Systems”, a septic tank should have a minimum of two chambers and must be watertight.

117. Desludging of septic tanks is not commonly practiced in the city. The sanitation survey revealed that about 74 percent of the households have septic tanks that were never desludged. This shows the lack of knowledge or awareness of the households on the proper maintenance or operation of the septic tanks. As required by the DOH, desludging of septic tanks must be done every four years. Also, this is because the city does not yet have a formal city wide SMP implemented. There are available private desludgers in the city however, their services are only upon request.

c. Demand for sanitary toilet facilities

118. The households are responsible for constructing their own sanitary toilet facilities and septic tanks. Based on the sanitation survey, majority of households that do not have sanitary toilet facilities were willing to install one. They are also keen to construct their own septic tanks. However, despite the willingness of the households, there are barriers that hamper them from having their own toilet facilities which include their financial ability, status of tenure, unavailability of space within their home, terrain and soil conditions of the available land, or lack of access to water supply.

119. The city LGU must provide technical assistance to the households and provide alternative options to reduce the footprint and cost requirement of the sanitary toilet facilities. For the

households that lack land ownership, the city LGU may consider introducing portable toilet facilities.

d. Awareness for importance of toilet facilities

120. The problem on sanitation is related to the practices and behavior of the households. Residents lack knowledge about proper hygiene behavior and sanitary practices and are used to certain ways of living which are difficult to change. The prevailing conditions, culture and practices of the residents play a significant role in developing technical options for water and sanitation. Behavior change among the stakeholders is essential for the sanitation interventions to be successful in improving the public health.

121. The households recognize the health risks associated to poor sanitation. Based on the survey, the households answered that the reasons why having a toilet facility is important include to have clean and safe environment and to protect the health of the family members. Also, according to the households, the impacts of poor sanitation systems and practices include groundwater contamination, foul odor of drainage system and increase in water-borne diseases. Furthermore, the households answered that septic tanks should be installed to avoid excreta from contaminating the ground water.

122. However, there are still households who practice open defecation thus, the city LGU must continue and strengthen its information and education campaigns to the households on the importance of sanitary toilet facilities.

e. Affordability and access to financing of the households

123. The main challenge for the households in constructing their own sanitary toilet facility is the costs. Based on the survey conducted, more than half of the households have an average monthly income of below Php 10,000. Of the households surveyed, less than four percent are paying a monthly house rent which can go as high as Php 8,000. They are also paying monthly cost for water which ranges from Php 500 to Php 3,000. Based on 2018 report of PSA, a family of five needed at least Php 10,481 per month to meet both basic food and non-food needs. In 2018, the PSA reported that the city has poverty incidence of 6.6 percent and subsidence incidence of 0.6 percent.

124. With the limited income, daily expenditures and inability to save, it is difficult for the households to spend a significant part of their budget on sanitation. In addition to this, the households also have poor access to financing. There are very limited financial options for the households to get loans or financial assistance for the construction of the sanitary toilet facilities.

125. The city LGU may partner with financial institutions such as microfinance institutions or institutions that offer blended financing to help the households have access to subsidies or loans. The city LGU must work with the financial institutions to develop an acceptable payment scheme for the households. In this way, the households will be more eager to install their own toilet facilities.

f. Water Demand Management and Wastewater Minimization and Re-use Awareness and Practices

126. With the increasing population in the city and the robust commercial and tourism activities, more water is used thus, more wastewater is also generated. There is a need to raise awareness and to promote different water conservation practices and efficient use of water to the households.

127. Wastewater minimization and re-use in the city are not being practiced. The city LGU may explore the possible reuse of treated effluent for irrigation and other non-potable water uses.

4.2 Community Level

a. Sharing of Toilet Facilities

128. Sharing of toilet facilities is a common practice of low-income families and informal settlers. Based on the survey conducted, about 17 percent of the households were sharing households with other households. Sharing of toilet facilities is unhygienic and may increase the health risks of the users especially if poorly maintained.

b. Informal settlements

129. There are informal settlements in the coastal areas of the city. These are located in barangays Mariki, Rio Hondo, Sta. Barbara, Sta. Catalina, Kasanyangan, Talon-talon and Zone IV. For the past years, the city government of Zamboanga City is working with the national government to provide relocation areas and housing projects for these informal settlers. There are thirteen government-owned and managed resettlement areas available in the city for the informal settlers.

130. These informal settlers/families do not have access to sanitation facilities. Since access is not available, they recourse to open defecation or the use of insanitary toilet facilities wherein human wastes end up to the waterbodies. This behavior poses high risks to the health of the families and creates an unclean, unsafe and unsanitary living environment.

4.3 LGU Level

a. Septage management program in the city

131. At present, the city is not implementing a formal SMP. However, there are three registered private desludgers in the city that provide sanitation services to the households, commercial and institutional establishment upon request. Two of the private desludgers in the city operate their own septage treatment facility. The third private desludger transports the collected septage to one of the SpTPs for proper treatment and disposal.

132. In desludging of the septic tanks, it is important to consider the existing condition of the septic tank. Based on the assessment done to the septic tanks during the survey, it was observed that about 24 percent of the septic tanks do not have proper manholes and about 16 percent are not accessible.

133. The households will have to pay a septage fee once the SMP of the city is implemented. This means additional expenses for them. The survey revealed that 60 percent of the

households are willing to avail of the desludging services and about 40 percent do not want to avail of the desludging services mainly because of the cost of the services. However, some of the households especially those from rural barangays said that they are willing to avail but cannot afford to pay the corresponding desludging fee.

134. For the desludging cost, majority of the households are willing to pay less than Php 1,000 per desludging service. In terms of payment, most of the households preferred to have a monthly installment payment scheme and were willing to pay Php 60 per month.

b. Sewerage system in the city

135. The city has an existing sewerage system however, it is limited within the central business district of the city. Collected sewage from the households are discharged directly to the coastal water without treatment. The existing sewerage system is already antiquated and must be rehabilitated. The ZCWD proposes to rehabilitate and expand the sewer lines in the CBD. At present, the ZCWD applied for a loan to ADB to rehabilitate the existing sewer lines and expand to about 1.8 kilometers. The ZCWD also plans to further expand the sewer lines to additional 6.84 kilometers.

136. Sewerage system is an essential component in any urban, developed, highly populated areas as septage management only partially addresses domestic sanitation issues. It is known that septage management alone is merely an intermediate response to address the long-standing issues on sanitation. The resulting effluent of septic tanks are partially treated sewage that when left unregulated, may cause a gradual build-up of fecal contamination in receiving water bodies. Presence of sewerage systems yield the most environmentally beneficial effects; however, it is largely capital-intensive and thus making it an afterthought unless carefully planned.

137. Due to budgetary constraints, the city may consider prioritizing the provision of sewerage system in urban barangays since these are typically the most densely populated areas and it is expected that essential infrastructures are already laid-out such as road networks for sewer pipe routing, and drainage system.

138. Decentralized wastewater treatment facilities can also be installed in the barangays that will not be covered by the proposed sewerage system of the city. However, this may be challenging to implement due to lack of available land, resistance from the households and the availability and limited technical capacity of manpower to operate the treatment plant.

139. The city also requires the subdivisions to construct and operate their own sewage treatment plant however, it is not being strictly implemented. The city may promote the pond system to be constructed inside the subdivision to enhance the quality of the wastewater before discharging. This pond system can be a lagoon or a constructed wetland. This system is simple and requires limited manpower.

c. Program on wastewater and biosolid reuse

140. At present, there are no programs on wastewater and biosolid reuse in the city. The city may consider reusing the treated effluent of the treatment plants as alternative water sources for non-potable applications to reduce the use of fresh water supply. The treated effluent can be applied as irrigation or landscaping, cleaning of streets and drainage systems and other non-potable uses.

141. On the other hand, the treated biosolids can be reused as soil conditioner or fertilizer. The city may explore the possibilities of partnering with the local farmers to promote the reuse of the treated effluent and biosolids. Also, may also consider co-composting the biosolids with municipal waste. Another option is to use the biosolids as landfill cover.

142. However, the city must ensure that the reuse of wastewater and biosolids should comply to the guidelines and requirements of DENR, DOH and DA to ensure the protection of the environment and public.

143. The city must also promote the reuse of treated wastewater to the industries and commercial establishments that are operating their own sewage treatment plants. Information and education campaign to these establishments must be initiated by the LGU.

d. Siting of sanitation facilities

144. In siting the treatment facilities, one of the factors that should be considered is the susceptibility of the proposed site to geohazards, among others. The design of the structures should consider the possible effects of the geohazards in the operation of the treatment plants.

145. There are four climate-related hazards identified in the city namely, flooding, rain-induced landslides, drought and tsunami. Based on the hazard assessment conducted to the existing and proposed sanitation facilities in the city, most of the facilities are susceptible to landslide, flooding and tsunami.

146. Other factors that should be considered in selecting the location of the treatment facilities include accessibility, area capacity, space availability, zoning, availability of utilities (e.g., power and water), proximity to water sources and the classification of the receiving water body.

e. Awareness of the stakeholders to sanitation project

147. As stated in the Septage Management Program City Ordinance of Zamboanga City, the City Septage Management Council (CSMC) shall plan and implement an information and education program on the city's septage management system and on wastewater management.

148. Based on the survey conducted, about 13.6 percent of the households were not aware of the city ordinance on sanitation. This was observed mostly in barangays Baliwasan, Campo Islam, Dulilan, Mampang, San Jose Gusu and Victoria. Furthermore, about 35.4 percent do not know or never heard about the proposed SMP of the city. These households were mostly from the rural barangays.

149. The city LGU must work together with the barangay leaders to develop a targeted, community-based approach and conduct education and marketing campaigns for the stakeholders regarding the sanitation projects. It is important that the stakeholders understand the importance of the sewerage system and SMP in protecting the environment and public health. This is to get acceptance from the stakeholders and for them to avail the services willingly. The public must also be consulted in all stages of the project cycle, from planning until the actual operation.

f. Provision of access to safe water

150. Contamination of water sources is a health risk to the city, especially to the households who rely to groundwater sources for water supply. Water sources can be contaminated due to open defecation and the discharge of untreated wastewater to the waterways. Flooding from nearby rivers can also worsen the risks as it can bring polluted water in direct contact with the people or may contaminate the water supply.

151. Therefore, the city LGU shall ensure that the households have access to piped water supply and discourage the use of doubtful water sources. The city has been implementing several water supply projects together with the ZCWD and DPWH Region IX to increase the access of the households to safe water.

152. The city is also vulnerable to drought which reduces the availability of water supply from surface water and groundwater resources in the city. In 2016 and 2019, ZCWD experienced low water production/supply that resulted to the implementation of water rationing and/or intermittent water supply to its customers.

153. The city LGU together with the ZCWD shall also plan on alternative water sources, especially in the island barangays, to always ensure the availability of water supply.

154. The city must also advocate and promote the installation of rainwater harvesting facilities to institutional, commercial and industrial establishments as alternative water source for non-potable uses of water.

g. Monitoring of Drinking Water Quality

155. From 2016 to 2020, AGE is one of the top leading causes of morbidity in Zamboanga City and also one of the top leading causes of mortality in 2018 and 2019. Therefore, city LGU shall regularly monitor the quality of the water sources of the households and the water supplied by the water service providers in the city to ensure that it is safe and complies to the Philippine National Standards for Drinking Water (PNSDW) 2017.

156. The city already created its Local Drinking Water Quality Monitoring Committee (LDWQMC) however, a drinking water quality surveillance program is not yet established.

157. The CHO is regularly collecting water samples from all the drinking water service providers in the city to validate its compliance to the standards. However, the analysis of the water samples collected is limited only to the presence or absence of E. coli. The city does not yet have a laboratory that can analyze the water samples based on the PNSDW mandatory parameters.

158. Also, as required by the Department of Health (DOH), all the drinking water suppliers in the city should develop and implement their own DOH-approved water safety plan (WSP). However, this is not yet being implemented in the city.

h. Solid waste and drainage management

159. Flooding is caused by the city's lack of proper drainage system and improper maintenance of the existing drainage system. The drainage system is limited only to the city proper and were reported to be undersized. Rural barangays do not have drainage system experience flooding during heavy rain, especially those located near the rivers.

160. Also, solid wastes were observed to be blocking the drainage. This also contributes to the flooding during heavy rains. With this, the city must strengthen the implementation of its solid waste management program.

i. Hygiene and sanitation program

161. While the city LGU recognizes the importance of having sanitary toilet facilities, the limited budget and competing public priorities make sanitation not the top priority of the LGU. However, the LGU are still working on to support the poorest households that have limited financial resources, especially the informal settlers.

162. The access to sanitary toilet facilities must not only be limited to the households. It is also important to provide proper WASH facilities to public places and institutions such as schools and health care facilities. Safe sanitation in healthcare facilities is an essential component of quality of care and infection prevention and control strategies, especially for preventing exposure of health service users and staff to infection. Improved sanitation conditions in schools also affect child health and well-being.

163. WASH facilities during emergency situations including natural disasters, outbreaks and pandemic should also be readily available. Special attention should be paid to sanitation during these situations. In emergency settings, it is critical that there are available WASH facilities to prevent the spread of diseases and to reduce the health impacts of the disasters. The proper disposal of wastewater and solid wastes during emergencies must be provided.

164. With the presence of open defecation in the city, there is a need to intensify the campaign on the importance of having sanitary toilet facilities. The targeted campaign should not only feature the health and hygiene issues but must also aim to change the behavior of the households with regards to sanitation.

165. Also, targeted IEC on proper hand washing must be conducted in schools. Handwashing with soap after using the toilet should be promoted and supported by the availability of soap and water close to sanitation facilities.

j. Capacity development

166. Capacity building shall be provided to those involved in the implementation of the LSSP to develop and/or enhance their skills and knowledge. Service providers should receive training in business as well as technical skills to promote efficiency, minimize costs and, ultimately, improve sustainability of the projects.

k. Ordinance and policies in place

167. Local policies and regulations must be enacted and implemented to institutionalize, promote and ensure the sustainability of the sanitation projects. The policies shall set the procedures, rules and allocation mechanisms that will serve as basis for the implementation of the projects. Existing local policies must be reviewed and updated to integrate the new plans. The city must ensure that health considerations are firmly embedded in sanitation policies and that sanitation is embedded in relevant health policies.

168. The septage ordinance of the city must be revised to update the amount of the septage fee to be collected, improve implementing mechanisms and arrangement, and to include the guidelines for the desludging of non-ZCWD customers. Provisions on the reuse of biosolids

and treated effluent from the septage treatment plant can also be incorporated in the ordinance.

169. The city does not yet have an ordinance for the operation of the sewerage system.

170. The city recently created the Zamboanga City Water Security Council (ZCWSC) through the Executive Order No. BC-661-2021. The ZCWSC shall collaborate with other concerned government agencies and other stakeholders to craft the Zamboanga City Water Security Master Plan which shall include the following thematic areas.

- Water recharge area restoration, protection and management (watershed area protection)
- Water resources protection, development, and management (source development, water supply systems)
- Renewable water resources (i.e., rainwater harvesting, surface runoff)
- Water conservation and efficiency
- Wastewater and sewage treatment and re-use
- Septage management
- Point and non-point water pollution
- Water remediation and rehabilitation
- Water supply and sanitations services in emergencies

I. Institutional Arrangements

171. Coordination and collaboration between different sectors and stakeholders are important to ensure the successful implementation of the sanitation programs. Institutional arrangements for the implementation, monitoring and evaluation (M&E) of the sanitation projects must be defined and established.

172. ZCWD, in partnership with the LGU, will take the lead in the implementation of the SMP and sewerage system in the city. ZCWD shall form new units within its existing organization that will be responsible for managing and delivering the septage management services within its service area. The ZCWD or the city LGU may also tap the services of the private desludgers. The private desludgers must be accredited by the City Septage Management Board (CSMB).

173. The city should establish and enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the implementation of the sanitation projects.

174. The city must also explore different financing and management options for the implementation of the sanitation projects.

5. Potential Impacts of Identified Sanitation Problems

175. Access to safely managed water, safely managed sanitation and proper hygiene practices are essential to achieve the health, social and economic goals of the city. The potential impacts of the identified sanitation problems are discussed in the succeeding subsections.

5.1 Health Impacts

176. The primary purpose of the use of sanitary toilet facilities from a public health perspective is to eliminate the possibility of human contact to human excreta (faeces and urine) and excreta-related pathogen transmission. The lack of safe sanitation system leads to infection and diseases such as diarrheal diseases, neglected tropical diseases and vector-borne diseases. The potential health impacts of the use of unsanitary toilet facilities are summarized in **Table 5-1.**

Table 5-1. Health Impacts of Unsafe Sanitation[5]

Direct impact (infections)	Conditions caused by preceding infection	Broader well-being
Faecal-oral infections • Diarrheas (incl. cholera) • Dysenteries • Poliomyelitis • Typhoid **Helminth infections** • Ascariasis • Trichiniasis • Hookworm infection • Cysticercosis (Taenia solium/infection) • Schistosomiasis • Foodborne trematodes **Insect vector diseases** • Lymphatic filariasis • West Nile Fever • Trachoma	**Stunting/growth faltering** (related to repeated diarrhea, helminth infections, environmental enteric dysfunction) **Consequences of stunting** (obstructed labor, low birthweight) **Impaired cognitive function** (infect brain, muscle, or other tissue, and are a major cause of adult onset seizures) **Pneumonia** (related to repeated diarrhea in undernourished children) **Anemia** (related to hookworm infections)	**Immediate** • Anxiety from shame and embarrassment due open defecation and shared sanitation • Adverse birth outcomes due to healthcare facilities with inadequate sanitation **Long-term** • School absenteeism • Poverty • Decreased economic productivity • Anti-microbial resistance

5.2 Environmental Impacts

177. Open defecation, discharge of untreated wastewater and disposal of solid wastes to the water bodies may cause pollution of groundwater sources and surface water contamination

[5] Guidelines on Sanitation and Health (WHO, 2018)

in the city. Domestic wastewater is high in fecal coliform, biochemical oxygen demand (BOD), total suspended solids, ammonia, nitrogen, phosphate and surfactants.

178. Most households have septic tanks to pre-treat their wastewater before discharging to the environment. However, effluent from the septic tank is not compliant with the required standards thus, may also affect the ambient quality of the receiving water body. There are also septic tanks that are 'bottomless' or those without concrete flooring which cause seepage of wastewater to the ground and may contaminate the groundwater sources.

5.3 Impacts on Economic Development

179. Poor water and sanitation services may also affect the economic development of the city. The major economic activities in the city include fisheries and tourism. Poor sanitation and discharge of untreated wastewater significantly contribute to water pollution, thus reducing the production of fishes in the sea.

180. With the influx of tourists in the city, water demand increases, and more wastewater and solid wastes are generated. Poor liquid and solid waste management practices, combined with inadequate water supply, may contribute to the degradation of the surrounding environment of the city. These practices make the surroundings unclean, unattractive, and unsafe for swimming, thus making the tourism unsustainable. Also, if visiting tourists are dissatisfied with the water and sanitation services of the city, there is a possibility that they will not return and may also discourage other tourists to visit.

5.4 Socio-economic Impacts

181. Poor sanitation including poor hygiene causes health problems and premature deaths to the households. These impacts are expected to cause financial losses to people who must pay for health services, who pay more to access clean water supplies, or who may lose income due to reduced or lost productivity because of poor health.

182. Decrease in tourism activities may also affect the local community since tourism generates employment and income in the city. Many businesses in the city such as hotels and restaurants will also be greatly affected by the decrease of the tourist arrival.

6. Sustainable Sanitation Strategy

6.1 Vision and Mission Statement

183. The Vision-Mission Statements developed by the LSSP Team during the VMGO city workshop are presented in **Table 6-1**. These statements were drawn consistent with the current City's Vision-Mission presented in the comprehensive land use plan (CLUP).

Table 6-1: Vision and Mission Statement of Zamboanga City on WASH

Vision Statement
"Sustainable access to safely managed water supply and sanitation services and healthy environment for all by 2030."
Mission Statement
"Provision of safely managed and sustainable water supply and sanitation services, as well as safer and healthier environment through innovation, stakeholder partnership and collaboration."

6.2 Statement of Goals and Objectives

184. Guided by the vision and mission, the sanitation goals of the city were formulated and specific objectives to achieve these goals were also determined and are shown in **Table 6-2**.

6.3 Implementation Strategies

185. Strategies are the 'how' or the means of attaining the goals or objectives. They are the general approaches or major course of action that are carried out by the implementers to reach the defined local sanitation goals and objectives. Based on the assessment and analysis conducted on the strengths, weaknesses, opportunities and threats (SWOT) of the existing sanitation in the city, different alternative strategies were identified by the LSSP Team. The strategies that will be pursued to achieve the sanitation goals and objectives of the city are shown in **Table 6-2**. These are further discussed in the next sub-sections.

Table 6-2: Sanitation Goals, Objectives and Strategies of Zamboanga City

Goal	Objectives	Strategies
Goal 1. Establish adequate, inclusive, efficient, climate-resilient, and safely managed WASH facilities and infrastructure including during emergencies	1a. To increase access to safely managed drinking water services to 100% in the city by year 2030. 1b. To increase access to safely managed sanitation services to 100% in the city by year 2030. 1c. To achieve, be certified and maintain ZOD status for all barangays by year 2030 1d. To prevent and eventually eliminate the incidence of WASH-related diseases in the city	**Strategy 1: Provision and/or construction of required WASH infrastructures and facilities** • Establish, construct and/or provide adequate, inclusive, efficient, climate-resilient, and safely managed water supply and sanitation facilities and infrastructure including during emergencies • Integrate sustainability features/considerations in the design, procurement, construction, and operation of WASH facilities and infrastructures and ensure adherence/compliance to applicable regulatory requirements • Establish and enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the implementation of WASH programs, projects and activities (PPAs)
Goal 2. Develop, adopt and enforce policies on WASH, environment and other relevant areas for the protection of the public health	2a. To review, update, and strengthen enforcement of existing local policies on WASH, environmental health protection, and other relevant areas 2b. To develop and enact new policies on WASH, environmental health protection, and other relevant areas based on the identified policy gaps, if any	**Strategy 2: Formulation and/or updating of relevant local WASH policies** • Review and update existing local policies on WASH, environmental health protection, and other relevant areas • Harmonize policies on WASH, environmental health protection, and other relevant areas with other local, inter-LGU, and higher-level policies and plans • Develop new local policies to support the WASH PPAs including the implementation of emergency response plans for WASH facilities/infrastructures and services

Goal	Objectives	Strategies
Goal 3. Promote positive behavioral change and continuing education on WASH in the context of disease prevention, public health and environmental protection	3a. To ensure community participation, including vulnerable groups, in the development and implementation of WASH programs, projects, and activities 3b. To ensure continuing education of the LGU and other stakeholders on WASH and WASH promotion	**Strategy 3: Provision of capacity building and implementation of local sustainable communication and promotion program** • Conduct IECs, advocacy programs, social marketing and capacity building, in partnership with NGOs, academic institutions, and national agencies. • Develop a targeted, community-based approach and culturally appropriate education and marketing campaigns for the stakeholders
Goal 4. Ensure sustainable delivery of adequate, inclusive, efficient, and safely managed WASH services for all even during emergencies	4a. To establish and maintain database for monitoring of WASH facilities/infrastructures and services 4b. To strengthen drinking water quality, sanitation, and environmental health protection surveillance and data monitoring of WASH outcomes	**Strategy 4: Implement monitoring and maintenance program of the WASH facilities** • Gather and collate data on WASH facilities/infrastructures and services • Establish guidelines on the submission of monitoring data of the WASH service providers to LGU • Establish institutional arrangements for the implementation, M&E of the WASH projects to ensure sustainability.

6.4 Programs, Projects and Activities (PPAs) and Targets

186. Programs, projects and activities (PPAs) were identified to support the implementation of the mentioned sanitation strategies. **Table 6-3** lists the identified PPAs per sanitation intervention area. For each PPA, key performance indicators (KPI) were assigned to measure the progress and performance of the city in achieving the targets. The indicative cost, funding source and lead agency were also identified per PPA.

187. The identified sanitation projects and policies must be integrated in the objectives of the Zamboanga City Water Security Master Plan that will also be developed.

Table 6-3: Identified Programs, Projects and Activities

Goal 1:	Establish adequate, inclusive, efficient, climate-resilient, and safely managed WASH facilities and infrastructure including during em
Objectives:	1a. To increase access to safely managed drinking water services to 100% in the city by year 2030 1b. To increase access to safely managed sanitation services to 100% in the city by year 2030 1c. To achieve, be certified and maintain ZOD status for all barangays by year 2030 1d. To prevent and eventually eliminate the incidence of WASH-related diseases in the city
Strategy	**Provision and/or construction of required WASH infrastructures and facilities** • Establish, construct and/or provide adequate, inclusive, efficient, climate-resilient, and safely managed water supply and sanitati • Integrate sustainability features/considerations in the design, procurement, construction, and operation of WASH facilities and in regulatory requirements • Establish and enhance collaboration and partnerships with the private sector, donors, national government, academic institutions activities

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	Baseline	TARGETS & TIMEFRAME			ESTIMAT	
				SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT-TERM (2021-2023)	M
Water Supply	Source development, service expansion, facility rehabilitation to increase the Level 3 Water supply in the city	Percent household with safely managed drinking water services	No data	70%	80%	100%	3.0 B	
	Installation of rainwater harvesting facility in public institutions	Percent public institutions with rainwater harvesting facilities	No data		100%			
	Develop alternative water sources in island barangays	Percent island barangays with alternative water sources	No data	50%	100%		10M	
Management of on-site sanitation facilities (toilet, septic tank and	Assist the households in the construction of improved sanitation facilities	Percent ZOD certified Barangay	0%			100%		
		Percent household with sanitary toilet facilities	81.3% (2020)			100%		

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	Baseline	TARGETS & TIMEFRAME			ESTIMAT	
				SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT-TERM (2021-2023)	M
	Construct WASH facilities in designated evacuation centers and other Disaster Risk Reduction (DRR)-related facilities in barangays	Percent evacuation centers with WASH facility	No data	50%	75%	100%	50M	
	Implementation of Septage Management Program (SMP) in the city including Resource Recovery Program	Percent household septic tanks desludged	-					
		Number of commercial and institutional establishments desludged	-					
		Volume of septage properly treated (m^3/day)	-		292	292		
		Volume of reused treated effluent (m^3/day)	-					
		Volume of reused biosolids (m^3/day)	-					
Wastewater, Sewage and Drainage Management	Implementation of Sewerage System in Mariki including Resource Recovery Program	Number of households connected	-		3,939			
		Volume of wastewater safely treated (m^3/day)	-		1,500			
		Volume of reused treated effluent (m^3/day)	-					
		Volume of reused biosolids (m^3/day)	-					
	Implementation of Sewerage System in Vale Vista Subdivision including Resource	Number of households connected	-		2,500			
		Volume of wastewater safely treated (m^3/day)	-		2,000			

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	Baseline	TARGETS & TIMEFRAME			ESTIMAT	
				SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT-TERM (2021-2023)	M
Solid Waste Management	Operation of City Medical Waste Treatment Facility	Volume of health care wastes (HCWs) treated (MT/year)	-	9.5	9.5	9.5	27.8 M	
	Construction of dedicated disposal cell for treated HCW in the SLF	Number of disposal cell for treated HCW	-	1	1	**1**		

Goal 2:	Develop, adopt and enforce policies on WASH, environment and other relevant areas for the protection of the public health
Objectives:	2a. To review, update, and strengthen enforcement of existing local policies on WASH, environmental health protection, and other 2b. To develop and enact new policies on WASH, environmental health protection, and other relevant areas based on the identifie
Strategy	**Formulation and/or updating of relevant local policies** • Review and update existing local policies on WASH, environmental health protection, and other relevant areas • Harmonize policies on WASH, environmental health protection, and other relevant areas with other local, inter-LGU, and highe • Develop new local policies to support the WASH programs, projects and activities including the implementation of emergency r

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	TARGETS & TIMEFRAME			
			SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SH TI (2 2
Water Supply	Review, updating of existing and/or development of new local policies on water supply development and protection such as: ● Update City EO No. BC 396-2019 ● Resolution to support the development and implementation of the City Water Security Master Plan ● Local ordinance requiring all drinking water service providers to have water safety plans (WSP) ● Local ordinance requiring all WRS to secure permit to operate (PTO) from DOH Region IX ● EO on Implementation of Local Drinking Water Quality Surveillance ● Policy on prioritizing provision of water to waterless barangays ● Local policy to regulate groundwater extraction ● Local policy to monitor groundwater source	Number of ordinances reviewed, passed, and updated	8			0
Management of on-site sanitation	Review, updating, and amendment of existing and/or development of new local policies on excreta disposal (toilet and septic tank) including					

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	TARGETS & TIMEFRAME			
			SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SH TI (2 20
	● Local ordinance to comply to DOH AO 2017-007 Guidelines in the Provision of the Essential Health Service Packages in Emergencies and Disasters ● Local policy mainstreaming WASH and DRR-CCA at the barangay level					
Wastewater, Sewage and Drainage Management	Review, updating of existing and/or development of new local policies such as ● Local ordinance for the sewerage system ● IRR for the sewerage system ● Local policy on the rehabilitation and provision of proper drainage system in the city and formulation of drainage master plan	Number of ordinances reviewed, passed, and updated	3			0
Solid Waste Management	Review, updating, and amendment of existing and/or development of new local policies such as • City ordinance to include treated HCWs from city managed HCFs in the collection services of the city • Resolution for the construction of dedicated disposal cell for HCW in the SLF	Number of ordinances reviewed, passed, and updated	2			0
Water Quality Management	Review, updating of existing and/or development of new local policies on water quality management: ● Local policies and guidelines on water quality management at barangay level ● Local policy on operationalization of Tumaga River water quality management area (WQMA) Action Plan ● Local policy on operationalization of Ayala River WQMA Action Plan	Number of ordinances reviewed, passed, and updated	3			0

Goal 3	Promote positive behavioral change and continuing education on WASH in the context of disease prevention, public health and en
Objectives:	3a. To ensure community participation, including vulnerable groups, in the development and implementation of WASH programs, p 3b. To ensure continuing education of the LGU and other stakeholders on WASH and WASH Promotion
Strategy	**Provision of capacity building and implementation of local sustainable communication and promotion program** • Conduct IECs, advocacy programs, social marketing and capacity building, in partnership with NGOs, academic institutions, an • Develop a targeted, community-based approach, culturally appropriate education and marketing campaigns for the stakeholder

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	TARGETS & TIMEFRAME			ESTIMATED COS	
			SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT-TERM (2021-2023)	MEDI TER (2024-
Water Supply	Provide orientation/training/capacity building on the following: • Development and implementation of WSPs	Number of training/orientation/ capacity building conducted	4	3	3	0.4 M	0.3
	• Implementation of water demand management including water auditing		2	2	2	0.2 M	0.2
	• Local drinking water quality surveillance program		2	2	2	0.2 M	0.2
	• Proper procedure for water sampling		4	3	3	0.4 M	0.3
	• Rainwater harvesting program		2	2	2	0.2 M	0.2
	• Water testing procedures		4	3	3	0.4 M	0.3
	Conduct advocacy/social marketing/IEC Program on: • Water conservation, safe water storage, handling, and use including during	Number barangays where IEC	98	98	98	3M	3M

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	TARGETS & TIMEFRAME			ESTIMATED COS	
			SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT-TERM (2021-2023)	MEDI TER (2024-
	• Proper design of septic tanks		2	2	2	0.2M	0.2
	• Provision of WASH facilities during emergencies		2	2	2	0.2M	0.2
	• Septage treatment process		1	1	1	0.1M	0.1
	• Bio-solids reuse and disposal		1	1	1	0.1M	0.1
	• Development and implementation of sanitation safety plan		1	1	1	0.1M	0.1
	Conduct advocacy/social marketing/IEC Program on: • Zero open defecation (ZOD)	Number barangays where IEC programs/social marketing implemented	98	98	98	3M	3M
	• Low-cost and water efficient sanitary toilet facilities		98	98	98	3M	3M
	• Installation of properly designed septic tanks		98	98	98	3M	3M
	• Proper and sanitary behavior and use of sanitation facilities		98	98	98	3M	3M
	• WASH during emergencies (natural disasters, pandemic)		98	98	98	3M	3M
	• Septage management program		98	98	98	3M	3M

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	TARGETS & TIMEFRAME			ESTIMATED COS	
			SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT-TERM (2021-2023)	MEDI TER (2024-
	• Proper wastewater management	marketing implemented	98	98	98	3M	3M
	• Safe reuse of sanitation residuals (treated effluent, biosolids)		98	98	98	3M	3M
Solid Waste Management	Provide orientation/training/capacity building on the following: • Proper health care waste management according to DOH manual	Number of training/orientation/ capacity building conducted	2	2	2	0,2M	0,2
	• Proper management of toxic and hazardous waste (THW)		2	2	2	0,2M	0,2
	• Proper use and maintenance of MRFs		2	2	2	0,2M	0,2
	• Composting techniques		2	2	2	0,2M	0,2
	Conduct social marketing/IEC activities on: • Proper waste segregation to households and recycling of wastes	Number barangays where IEC programs/social marketing implemented	98	98	98	3M	3M
	• Composting of yard waste, kitchen waste/ food scraps		98	98	98	3M	3M
Water Quality Management	Conduct IEC Program on: • Importance of watershed	Number barangays where IEC programs/social	98	98	98	3M	3M

Goal 4:	Ensure sustainable delivery of adequate, inclusive, efficient, and safely managed WASH services for all even during emergencies
Objectives:	4a. To establish database for existing WASH facilities/infrastructures and services 4b. To strengthen drinking water quality, sanitation, and environmental health protection surveillance and data monitoring of WASH
Strategy	**Implement monitoring and maintenance program of the WASH facilities** • Gather and collate data on WASH facilities/infrastructures and services • Establish guidelines on the submission of monitoring data of the WASH service providers to LGU • Establish institutional arrangements for the implementation, monitoring and evaluation of the WASH projects to ensure sustainab

INTERVENTION AREA	PROGRAMS, PROJECTS, ACTIVITIES	KEY PERFORMANCE INDICATORS (KPI)	TARGETS & TIMEFRAME			E
			SHORT-TERM (2021-2023)	MEDIUM-TERM (2024-2026)	LONG-TERM (2027-2030)	SHORT TERM (2021-20
Water Supply	Implement local drinking water quality surveillance program	Percent drinking water providers monitored and audited				
	Establish city-owned DOH-accredited water laboratory in the city for analysis of PNSDW-mandatory parameters.	Number of operating DOH-accredited laboratory		1	1	
Management of on-site sanitation facilities (toilet, septic tank and septage management) including WASH in Emergencies	Implement ZOD monitoring program	Percent ZOD-certified barangays			100%	
	Develop market-based systems for reuse products including pricing options	Number of developed system				
Solid Waste Management	Review and update the 10-year Solid Waste Management Plan (SWMP)	Number of updated SWMP	1	1	1	0.1M
Water Quality Management	Coordination with EMB Region IX for water quality monitoring and improvement of Tumaga River WQMA and Ayala River WQMA	Number of water quality monitoring activities conducted				
	Implement City Action Plan for	Number of activities				

6.4.1 Strategy 1: Provision and/or construction of required infrastructures and facilities

188. This strategy focuses on the construction or provision of required infrastructures to increase the access of the city to safely managed drinking water services, safely managed sanitation facilities, proper hygiene, proper wastewater management, proper solid waste management, and water quality management.

A. Water Supply

a. Source development, service expansion and facility rehabilitation for water supply

189. The following are the planned and proposed water supply projects of ZCWD and DPWH Region IX to increase the access on safely managed drinking water supply of the households in Zamboanga City.

190. The ZCWD should also develop and implement an action plan to manage and reduce the non-revenue water in their water supply system.

Table 6-4: ZCWD Planned and Proposed Water Supply Projects

Project	Status	Target year of Implementation	Barangays to be served	Estimated Project Cost
Design, supply, installation, testing and commissioning of filtration system for existing Dumalon Water System	Still in progress for some detailed engineering adjustments	2024	Existing service area of Dumalon Water system (West Coast barangays)	333.09M
Design, supply, installation and construction 20 MLD complete water treatment facility	For funding source	2022	Existing service area at Central to East coast area Benefit the existing 26,000 households for pressure and supply improvement distribution	
Construction of 40MLD Riverbed Filtration System	For feasibility study (FS)	2022-2023	Lanzones Guisao Cacao Tolosa Culianan	

Project	Status	Target year of Implementation	Barangays to be served	Estimated Project Cost
			Pasobolong Mercedes	
Proposed Bog Lake Water System 20MLD WTP	For FS	2022-2023	West Coast Barangays up to the Central Business District 24,000 households' beneficiaries	785.93M
Proposed Cahumban Water System	On-going implementation	2021	East Coast Barangays up to the Central Business District 1,867 households' beneficiaries	76.04M
Construction of 50MLD East Coast transmission and distribution Pipeline	For FS	2025	Labuan Limpapa Patalon	779.82M
Proposed water source development at Sitio Latap, Barangay Limpapa	With concept design and costing	2024	Bunguiao Sangali Bolong	120.31M
Proposed Bunguiao Water System	On-going implementation (DPWH)	To date	Vitali Mangusu Tictapul	58.84M
Construction of Rancho Frio Water System	On-going implementation (DPWH)	To date	Upper Cabatangan	8.66M
Proposed water system project at Dulian-Cabatangan	On-going implementation (DPWH)	For turnover, 2021	55 locations of feederline expansion of different barangays	7.71M
Proposed feederline expansion projects	For funding	2022		20M

Project	Status	Target year of Implementation	Barangays to be served	Estimated Project Cost
Proposed construction of high dam in Tumaga River Intake	On-going implementation of feasibility studies		Entire service area of ZCWD and additional areas	30 billion as per USAID Pre-FS

Source: ZCWD

Table 6-5: DPWH Region IX Planned Projects on Water Supply

Project	Status
Construction of Water Supply Level III, Brgy. Manicahan, Zamboanga City	(Under GAA 2021, On-Going)
Construction of Water Supply and Distribution System at ELUM Air Station, Hill 900, La Paz, Zamboanga City	(Under Regional Budget Proposal for 2022, Proposed)

Source: DPWH Region IX

191. The City LGU should ensure that all the barangays in the city have access to Level 3 water supply systems. For the barangays that are not within the service areas of ZCWD, the city may assist the barangay LGUs in constructing and operating a community-managed water supply system.

b. Develop alternative water sources in island barangays

192. Since the households in the island barangays of the city are not within the service area of ZCWD, the city LGU should provide technical assistance to the households to develop safe alternative water supply system.

c. Installation of rainwater harvesting facilities in public facilities

193. As an alternative water source, rainwater harvesting facilities will be constructed in public schools, healthcare facilities and other public places in the city. It is an effective option, particularly in areas where other water sources are unreliable or are simply not available. As stated in City Ordinance No. 524, an initial budget of Php 10 million pesos is appropriated to ensure the immediate installation of the rainwater collectors by the city for its own structures.

194. The city must also advocate the installation of rainwater harvesting facilities in commercial, institutional and industrial establishments to be used as additional water source and reduce the requirement for fresh water supply.

B. Management of On-site Sanitation Facilities including WASH in Emergencies

a. Assist the households in the construction of sanitary toilet facilities and provision of WASH facilities in houses on stilts and island barangays

195. The city LGU may partner with private sectors, donors and other NGOs to provide financial assistance to the poorest households in the city that do not have their own toilet facilities, especially those who are living in the houses on stilts and island barangays. This is to help

decrease the practice of open defecation and to achieve ZOD status to all the barangays. However, the city must ensure that the household has access to water supply, has available land area where the sanitation facility will be constructed and has the willingness to construct the sanitation facility including a septic tank.

196. The city may also link the households with microfinance institutions or other credit sources that can provide loan assistance for the construction/improvement of toilets and septic tanks. Low-cost, water-efficient and culturally accepted sanitary toilet facilities shall also be introduced to the households.

197. The CHO must also expand their sanitation monitoring data to include the number of households that are open defecating, number of households that have insanitary toilet facilities and number of households that are sharing toilet facilities.

198. As part of the planning stage of this PPA, the CHO should identify the location of the houses on stilts and the number of households that do not have safely managed WASH facilities.

199. It is also vital to assess and understand the cultural practices, systems and beliefs, leadership structures, and other existing drivers of change within the various cultures in the city. This process can help to identify any opportunities or issues specific to that cultural setting that could be drawn on to facilitate or trigger behavior change. Each group has different socio-cultural factors that must be identified and be used to produce culturally appropriate responses to encourage the group to abandon open defecation.

b. Implementation of Septage Management Program (SMP)

200. The SMP in Zamboanga City will be implemented and operated by ZCWD, in partnership with the city LGU. Three septage treatment plants (SpTP) will be constructed in the city to cover all the inland barangays.

201. At present, the combined septage-sewage treatment plant in Vale Vista is being constructed as shown in the table below. Another combined septage-sewage treatment plant in Magay is yet to be constructed. Lastly, a pre-FS, also under the USAID SURGE Project, was conducted for the SpTP in Cabatangan.

Table 6-6: Proposed Septage Treatment Plants in Zamboanga City

SpTP	Barangays to be served	Septage Design Capacity (m^3/day)	Status	Target operating year	Funding
SpTP in Magay	All inland barangays	15	For bidding	2025	NSSMP (LGU), Landbank loan (ZCWD)
SpTP in Vale Vista	All inland barangays	15	On-going construction	2024	LWUA
SpTP in Cabatangan	All inland barangays	260	Pre-FS conducted	To be determined	To be determined

c. Improvement of WASH facilities in Primary Health Facilities

202. The provision of basic WASH services is important to ensure that quality care is provided in the health care facilities, and that the risk of the spread of infection, both within the facility and in surrounding communities, is reduced or prevented. Emerging and growing threats from antimicrobial-resistant infections, infectious disease outbreaks, and pandemics (e.g., COVID-19) may be significantly reduced by reliable WASH services.

d. Provision of WASH facilities in Evacuation Centers

203. The provision of adequate WASH facilities must be included in the disaster preparedness planning of the city. The city must provide enough safe water supply, sanitary toilet facilities, hand washing facilities and proper management of domestic wastewater and solid wastes in the designated evacuation and/or isolation centers. These are essential components of quick and effective responses during emergencies (including natural disasters, outbreaks, and pandemics) and helps bring emergencies under control when they occur.

204. The sanitary toilet facilities must be gender separated, accessible, well lighted and adequate in number. The needs of the people with disabilities, children, women's privacy, safety and menstrual hygiene needs must also be taken into consideration. The sanitation facilities shall also have properly designed septic tanks to contain the sewage that will be generated. Proper treatment and disposal of the sewage must also be provided.

C. Wastewater, Sewage and Drainage Management

a. Implementation of Sewerage System in CBD

205. The ZCWD and the ZC LGU entered an agreement to construct a combined sewage and SpTP in Barangay Zone 1. The facility will be designed to treat up to 6,000 cubic meters per day of sewage that will be collected from existing sewer lines. The city LGU availed the NSSMP subsidy while the ZCWD availed of a loan from Landbank to fund the project. About 50% of the NSSMP grant was already downloaded by the ZC LGU through the DPWH region IX Office while the other half will be given upon completion of the project.

206. Expansion of the sewer lines within the CBD is also being proposed. The ZCWD applied for an ADB loan to expand the sewer lines to 1.8 kilometers to serve additional 20 establishments within the CBD. Another 6.8 kilometers of sewer line expansion is being proposed by ZCWD that will benefit about 200 households.

207. This sewerage system will serve barangays Zone I to IV, Camino Nuevo, Tetuan, Santa Catalina and Santa Barbara.

b. Implementation of Sewerage System in Vale Vista Subdivision

208. Under the Z3R project, a separate sewerage system is being constructed in Vale Vista Subdivision. The sewerage system includes the installation of sewer lines and construction of a combined septage-sewage treatment plant in Brgy. Kasanyangan. The treatment plant will treat the sewage that will be collected from the 3,929 households. It will have a capacity of 2,000 cubic meters of sewage per day. The project is funded by LWUA.

209. Based on the TOR, a recycled water system will be provided in the STP to enable the reuse of the treated effluent for landscaping, equipment washing and toilet flushing. A dedicated pipe network for the reuse will also be provided.

c. Implementation of Sewerage System in Barangay Mariki

210. Also under the Z3R project, a sewage treatment plant is being constructed in Brgy. Rio Hondo to treat the sewage from Brgy. Rio Hondo and Mariki. It has a design capacity of 1,500 cubic meter per day, Sewer lines are being constructed in the barangays that will serve 2,500 households. The project is also funded by LWUA.

211. A recycling facility will also be provided in the STP.

d. Rehabilitation and/or construction of drainage system

212. The inadequate drainage system contributes to the flooding in the city. The city must rehabilitate the existing drainage system of the city and increase the sizes of the drainage mains and laterals. The capacity of the rivers and waterways must also be improved to mitigate the flooding in some areas. Regular maintenance of the drainage system must also be observed to ensure there are no solid wastes clogging.

213. A drainage master plan of the city must also be prepared and developed.

Table 6-7: Planned Projects of DPWH Region IX on Drainage

Project Name	Scope of Works	Implementor
Construction of Drainage System, Barangay Sangali, Zamboanga City	Construction of Drainage Structure	DPWH Zamboanga City District Engineering Office (ZCDEO)
Construction of Drainage System, Barangay Sta. Catalina, Zamboanga City	Construction of Drainage Structure	DPWH ZCDEO
Construction of Drainage System, Barangay Tugbungan, Zamboanga City	Construction of Drainage Structure	DPWH ZCDEO

D. Solid Waste Management

a. Operation of City Medical Waste Treatment Facility

214. A medical waste treatment facility was constructed in Brgy. Salaan. It will have an annual treatment capacity of 9.5 metric tons of medical wastes or about 150 kilograms per hour. The facility will be operated and maintained by the City Health Office (CHO).

215. The medical waste treatment facility will cater to all medical wastes generated by CHO, Crispino Paragas Memorial Hospital, health centers, rural health units, city government owned lying-in clinics and city government operated COVID-19 quarantine and isolation centers. Collection and treatment of medical wastes from private hospitals, clinics and laboratories shall be subjected for further study.

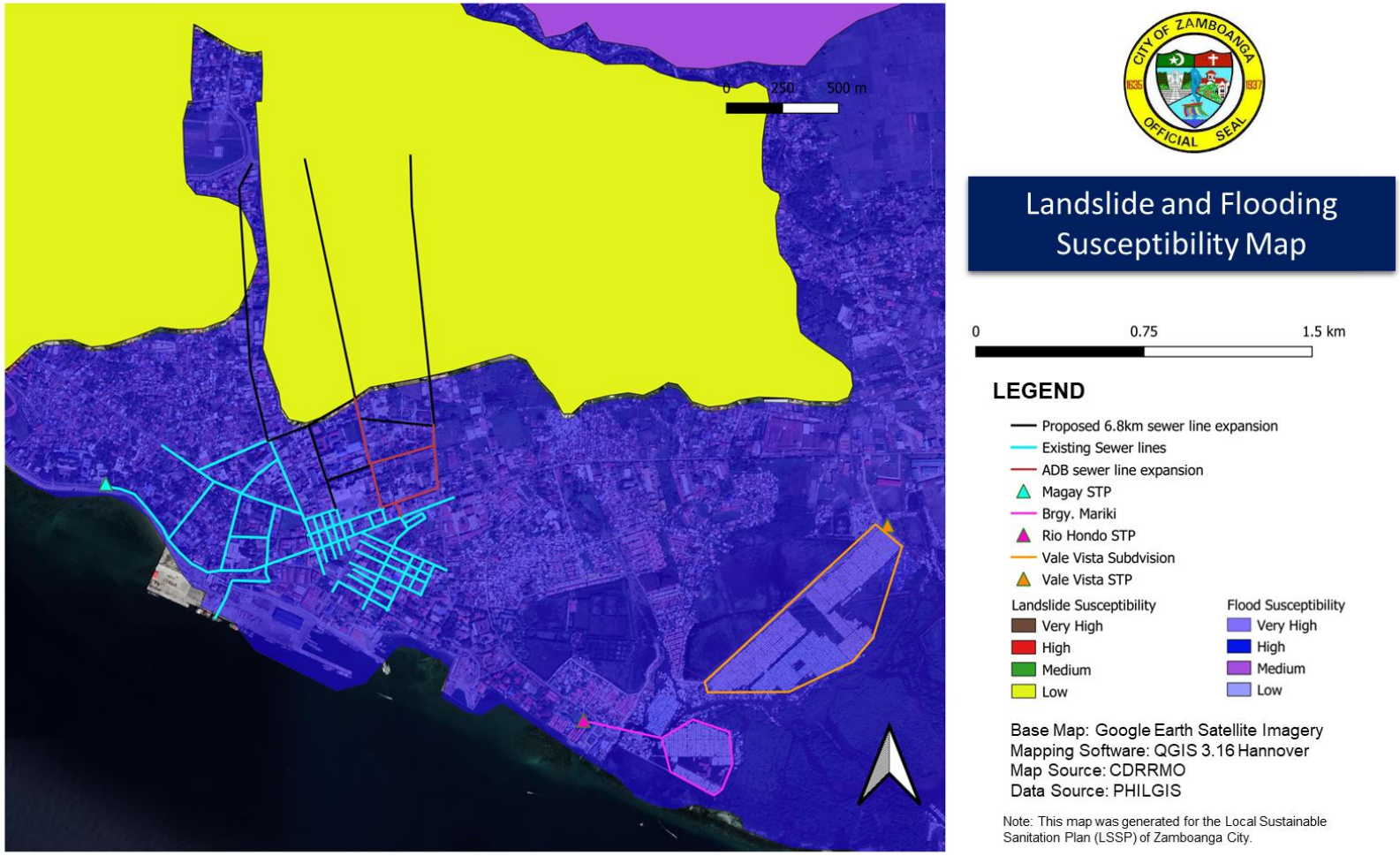


Figure 6-1: Proposed Sewerage Systems in Zamboanga City

6.4.2 Strategy 2: Formulation and/or updating of relevant policies

216. The following are the identified relevant local policies per thematic area that must be formulated and enacted in addition to the existing policies of the city. There are also existing local policies that must be updated.

217. The city shall review and update, amend if needed, its existing septage management ordinance to align with the recent DOH issuances regarding sanitation such as the DOH AO No. 2019-0047 for the design and construction of septic tanks and the revised implementing rules and regulations (RIRR) of the Chapter 17: Sewage Collection and Disposal, Excreta Disposal and Drainage of the Code on Sanitation of the Philippines. The implementing rules and regulations (IRR) for the implementation of the SMP in city must also be updated to include the services for ZCWD non-customers and to update the desludging fee.

218. The city must also create a local policy on sewage collection and disposal following the RIRR of Chapter 17. An implementing rules and regulations (IRR) must also be developed for the implementation of the sewerage system in the city. The IRR must include guidelines and procedures on how to operationalize the sewerage projects in the city including institutional arrangements.

Table 6-8. Identified local policies for formulation/updating

Thematic Area	Local policies for formulation or updating
Water Supply	● Updating of City Executive Ordinance No. BC 396-2019: Creation of LDWQMC ● IRR for the monitoring and evaluation of rainwater harvesting facilities ● Local ordinance requiring all drinking water service providers to have WSP ● Local ordinance requiring all WRS to secure PTO from DOH Region IX ● EO on Implementation of Local Drinking Water Quality Surveillance Program ● Policy on prioritizing provision of water to waterless barangays ● Local policy to regulate groundwater extraction ● Local policy to monitor groundwater source
Management of On-site Sanitation Facilities including WASH in Emergencies	● Updating of CO 2009-152: Septage Management System in Zamboanga ● Update IRR for the implementation of SMP, including adoption of reuse programs ● EO for the creation of WASH Committee ● Local ordinance for the adaption of PhATSS ● Local ordinance to end open defecation and creation of ZOD verification and certification team ● Local policy on the implementation of LSSP ● Local ordinance to comply to DOH AO 2017-007 Guidelines in the Provision of the Essential Health Service Packages in Emergencies and Disasters ● Local policy mainstreaming WASH and DRR-CCA at the

Thematic Area	Local policies for formulation or updating
	barangay level
Wastewater, Sewage and Drainage Management	● Local ordinance for the sewerage system ● IRR for the sewerage system ● Local policy on the rehabilitation and provision of proper drainage system in the city and developing a drainage master plan
Solid Waste Management	• City ordinance to include treated HCWs from city managed HCFs in the collection services of the city • Resolution for the construction of dedicated disposal cell for HCW in the SLF
Water Quality Management	• Local policies and guidelines on water quality management at barangay level • Local policy on operationalization of Tumaga River water quality management area (WQMA) Action Plan • Local policy on operationalization of Ayala River WQMA Action Plan

6.4.3 Strategy 3: Provision of Capacity Building

219. **Table 6-9** shows the list of identified capacity building and the corresponding target participants. The city may also consider hiring external consultants or experts to provide guidance on the proper planning and implementation of the sanitation projects.

220. The city may consider partnering with the NGOs, private sectors, academe institutions and national government agencies such as the DOH, LWUA and DPWH for the capacity building.

Table 6-9. List of Capacity Building

Topic	Target Participants
Water Supply	
Creation and operationalization of local drinking water surveillance program	City LGU, LDWQMC
Development and implementation of WSP	City LGU, Water Service Providers, DOH, ZCWD
Rainwater harvesting program	City LGU, ZCWSC
Proper procedure for water sampling	Sanitary inspectors
Water testing procedures	City LGU
Non-revenue water management and reduction	ZCWD, Water Service Providers
Water demand management including water auditing	ZCWD, Water Service Providers, City LGU
Orientation, updating and M&E of the City Water Security Master Plan	City LGU, Water Service Providers, DOH, ZCWD, ZCWSC
On-site Sanitation Facilities including WASH in emergencies	
Philippine approach to Sustainable Sanitation (PhATSS)	Barangay LGU
Low-cost and water efficient sanitary toilet	City LGU, Barangay LGU

Topic	Target Participants
designs	
Proper design of septic tanks	City LGU, Barangay LGU
Provision of WASH during emergencies	Barangay LGU, City LGU
Septage treatment process	City LGU, CSMC, ZCWD
Bio-solids and treated effluent re-use and disposal	City LGU, CSMC, ZCWD, ZCWSC
Development and implementation of sanitation safety plan	City LGU, CSMC, ZCWD
Wastewater, Sewage and Drainage Management	
Sewage treatment alternatives including low-cost options	City LGU, CSMC
Safe reuse of sanitation residuals (treated effluent, biosolids)	City LGU, ZCWD, CSMC
Drainage and sewerage maintenance	City LGU, ZCWD, CSMC
Development of drainage master plan	City LGU, DPWH, ZCWD
Solid Waste Management	
Proper health care waste management	City LGU, HCFs
Proper management of THW	City LGU
Proper use and maintenance of MRFs	Barangay LGU
Composting techniques	Barangay LGU

6.4.4 Strategy 3: Implementation of Local Sustainable Sanitation Communication and Promotion Program

221. Behavior change among the stakeholders is essential for the sanitation interventions to be successful in improving the public health. Advocacy and communications of the LSSP are critical to ensure that the implementation is sustainable and effective. A local sustainable promotion program must be developed and realized to properly promote and communicate the LSSP to all key stakeholders. The objective of this is to increase awareness and educate all communities that will benefit or be affected by the programs and projects indicated in the LSSP and to inculcate proper sanitation as a necessity for all individuals.

222. A robust sanitation behavior change strategy must be implemented to the stakeholders to ensure that the sanitation interventions are effective in improving public health. Improving communications and building cooperative agreements among the key stakeholders will ensure that sanitation programs and projects will be fulfilled with full support from the community.

223. There are six approaches that can be used to achieve this are (i) information, education and communication approach, (ii) behavior change communication (iii) social marketing, (iv) training, (v) advocacy and (vi) mobilization. Frequently, a combination of these approaches is used to successfully achieve sanitation and hygiene behavior change among the public. This can be done through the following methods.

a. Individual Methods – home visits, personal letters, focus interviews
b. Group Methods – meetings, study tours, group workshops, FGD
c. Multi-Media – newspaper publication, radio broadcast, web posting, social media posts
d. Printed Information Materials – flyers, pamphlets, tarpaulins, posters, newspapers
e. Audio Visual Presentations – videos, films

224. Any material that will be used in the promotion and communication of the sanitation plan must be in the language that can be easily understood by the community, preferably in the local language and dialect, and in a manner that is informative, cohesive and complete.

225. Sanitation behavior change is not a singular and one-off event, but rather an ongoing process. The communication and promotion activities should be regarded as a continuous or sustained effort that must level up overtime. The activities must be designed and funded, from the onset, in a way that regular monitoring and adaptation is possible to ensure that the objectives of the activities are met. Pre-testing materials and activities and developing M&E systems are also needed.

226. In designing the communication and promotion activities, the city must also consider the cultural differences in the city. The city should coordinate with the cultural leaders before engaging with the indigenous people groups.

227. **Table 6-10** lists the advocacy, communication and promotion activities for Zamboanga City**.**

Table 6-10. Identified Communication and Promotion Activities

Activity	Target/Objective	Partners	Target Audience	Materials
Water Supply				
Social marketing and advocacy on rainwater harvesting	For the commercial and institutional establishments to install rainwater harvesting facilities	• City government • DILG • DepEd • DOH • ZCWD • ZCWSC	• Commercial establishments • Schools • Hospitals • Institutional establishments	• FGD • Printed materials • Social media
IEC on safe water practices	For the public to observe water conservation, safe water storage, handling and usage	• City government • DepEd • DOH • ZCWD • ZCWSC	• Commercial establishments • Schools • Hospitals • Households with Level 1 and Level 2 water systems	• FGD • Printed materials • Audio Visual Presentations • Social media
IEC on safely managed drinking water supply	To promote the importance of safely managed drinking water supply	• City government • DepEd • ZCWD	• Commercial establishments • Schools • Hospitals • Households with Level 1 and Level 2 water systems	• FGD • Printed materials • Audio Visual Presentations • Social media •
Promotion of water demand management principles and practices	To promote water conservation practices, efficient and equitable use of water and alternative sources of water	• City government • LWUA • ZCWSC • ZCWD • EMB	• Households • Water service providers • Commercial establishments • Institutional establishments • Industries	• FGD • Printed materials • Audio Visual Presentations • Social media
On-site Sanitation Facilities including WASH in emergencies				
IEC on ZOD	For the households to abandon open defecation and adopt safe sanitation facilities	• CHO • Barangay health workers (BHW) • DepEd	• Informal settlers • Houses on stilts • Riverside dwellers • Households without	• FGD • Multimedia • Printed materials • Audio Visual

Activity	Target/Objective	Partners	Target Audience	Materials
		• DOH • Cultural leaders	toilets • School children • Indigenous people	Presentations
Social marketing on low-cost and water-efficient sanitary toilet facilities	For the households to abandon open defecation and adopt safe sanitation facilities	• CHO • BHW • DOH • Cultural leaders	• Informal settlers • Houses on stilts • Riverside dwellers • Households without toilets • Indigenous people	• FGD • Multimedia • Printed materials • Audio Visual Presentations • Social media
IEC on proper use of WASH facilities	To increase awareness on the proper use and importance of WASH facilities	• CHO • BHW • DepEd • DOH • Cultural leaders • ZCWSC	• Informal settlers • Houses on stilts • Riverside dwellers • Households without toilets • Indigenous people	• Printed materials • Audio Visual Presentations • Social media
IEC on WASH in emergencies	To promote the importance of WASH facilities during emergencies	• CHO • DOH • DILG • ZCWSC	• Barangay LGUs • Households	• FGD • Printed materials • Audio Visual Presentations • Social media
Social marketing of SMP	For the public to avail the desludging services and regularly desludge their septic tanks	• City government • Barangay LGU • DILG • DepEd • DOH • ZCWD • ZCWSC	• Households • Commercial establishments	• Printed materials • Audio Visual Presentations • Social media
Advocacy for ZOD	For the households to abandon open defecation	• City government • Cultural leaders	• Informal settlers • Houses on stilts • Riverside dwellers • Households without toilets • Indigenous people	• FGD • Printed materials • Audio Visual Presentations • Social media
Advocacy for SMP	• To encourage the public	• City government	• Households	• Printed materials

Activity	Target/Objective	Partners	Target Audience	Materials
	to avail the desludging services • To increase the willingness of the households to pay for the sanitation services	• ZCWD • ZCWSC	• Commercial establishments	• Audio Visual Presentations • Social media
Wastewater, Sewage and Drainage Management				
Social marketing of sewerage system	For the public to connect to the sewerage system	• City Government • Barangay LGU • DILG • DepEd • DOH • ZCWD • ZCWSC	• Households • Commercial establishments	• Printed materials • Audio Visual Presentations • Social media
IEC on wastewater management	To promote and advocate the importance of healthy environment and good hygiene	• City Government • Barangay LGU • DILG • DepEd • DOH • ZCWD • ZCWSC	• Households • Commercial establishments	• Printed materials • Audio Visual Presentations • Social media
Advocacy for sewerage system	• To encourage the public to connect to the sewerage system • To increase the willingness of the households to pay for the sanitation services	• City government • ZCWSC	• Households • Commercial establishments	• Printed materials • Audio Visual Presentations • Social media
Advocacy for the safe reuse of treated effluent and biosolids	• To encourage the private sectors to reuse treated effluent and biosolids • To increase awareness	• City government • ZCWD • ZCWSC	• Households • Commercial/Industrial establishments	• Printed materials • Audio Visual Presentations • Social media

Activity	Target/Objective	Partners	Target Audience	Materials
	of the public on the benefits of the safe reuse of treated effluent and biosolids			
Solid Waste Management				
IEC on proper solid waste management	For the public to practice proper waste segregation, recycling and disposal	• City Government • Barangay LGU • DILG • DepEd • DOH	• Households • Commercial establishments • School	• FGD • Printed materials • Social media
IEC on composting of yard waste, kitchen waste/food scraps	For the public to practice backyard composting	• City Government • Barangay LGU • DILG • DepEd • DOH	• Households • Commercial establishments • School •	• FGD • Printed materials • Social media
Water Quality Management				
IEC on the importance of watershed	To raise awareness to the public on the importance of the watershed	• City Government • Barangay LGU • DILG • DepEd • DOH • ZCWD	• Households • Commercial establishments • School	• FGD • Printed materials • Social media
IEC on water-borne diseases	To educate the public on water-borne diseases	• City Government • Barangay LGU • DILG • DepEd • DOH • ZCWSC	• Households • Commercial establishments • School	• FGD • Printed materials • Social media

6.4.5 Strategy 4: Implementation of monitoring and maintenance program of the WASH facilities

228. The monitoring and maintenance programs shall be implemented to ensure the sustainability and evaluate the performance of the city in implementing the WASH programs.

229. Adequate financial and human resources must be provided to support the implementation of the WASH PPAs. The mobilization of the resources must be strengthened to ensure that all the projects are implemented within the timeframe.

a. Implement local drinking water surveillance program

230. The LDWQMC shall carry out a local drinking water surveillance (LDWS) program to ensure the quality of the drinking water supplied in the city. However, the city must first have local ordinance on the creation of the LDWQMC and the implementation of the surveillance program.

231. As part of the surveillance program, the city must require all the drinking water service providers to develop and implement their own DOH-approved WSP. The effectiveness of the implementation of the WSPs shall be regularly monitored and audited by the LDWQMC.

b. Establish City-owned DOH-accredited Laboratory for Drinking Water Quality Analysis

232. To enhance the capacity of the CHO in monitoring the provision of safely managed drinking water in the city, a DOH-accredited laboratory that is capable to analyze the mandatory parameters of the PNSDW 2017 must be established.

c. Review and Update the 10-year Solid Waste Management Plan

233. As prescribed by the National Solid Waste Management Commission, the City Solid Waste Management Plan must be reviewed every two years to ensure its sustainability, viability, effectiveness and relevance in relation to local and international developments regarding solid waste management.

d. Develop and implement City Action Plan for Tumaga River WQMA

234. The LGU will develop and implement a local action plan for Tunaga River WQMA based on the regional action plan.

e. Develop and implement City Action Plan for Ayala River WQMA

235. The LGU will develop and implement a local action plan for Ayala River WQMA based on the regional action plan.

f. Coordination with EMB Region IX for water quality monitoring and improvement of WQMAs and other priority water bodies within its jurisdiction

236. The City LGU shall maintain coordination with the Environmental Management Bureau (EMB) Region IX, as well as other LGUs and stakeholders who are part of the WQMA Governing Boards, for the water quality monitoring and improvement activities conducted for Tumaga River, Ayala River, and other priority water bodies within its jurisdiction.

a. Provision of adequate financial and human resources support for the implementation of WASH programs, projects, and activities

237. The implementation of the sanitation projects requires financial and human resources. Failure to commit sufficient resources may lead to failure to achieve the sanitation targets.

238. A dedicated government budget line for sanitation must be established and disbursement mechanism must be defined to ensure the sustainable implementation of the projects. Realistic budgets must be allotted for the implementation of each PPA that shall cover both the capital expenses as well as the costs for the operation and maintenance. The budgets should be programmed to cover the continuous implementation and operation of the PPAs all throughout the planning period.

239. The implementation of the PPAs also requires manpower. Adequate human resources must also be allocated to deliver and oversee the sanitation projects.

6.5 Disease Surveillance

240. A disease surveillance focusing on acute gastroenteritis (AGE) and soil-transmitted helminth (STH) will be implemented in all barangays within the city, with varying degrees of intensity. Barangays will be stratified into high, medium, and low-risk categories based on incidence of AGE and STH, presence of environmental factors contributing to spread of AGE and STH, and pervasiveness of behavioral factors that promote the spread of AGE and STH.

7. Organization, Management and Implementing Mechanism

7.1 Institutional Arrangement for the Implementation of LSSP

241. The implementation of specific programs, projects, activities (PPAs) will be assigned to the various LGU agencies and committees as identified in **Table 6-3**. The lead agencies shall develop a more detailed implementation plan for the assigned PPAs in order to achieve the sanitation goals and objectives. Coordination is required to harmonize the actions of the multiple stakeholders involved in the implementation of the different sanitation projects.

242. The table below shows the summary of the roles and responsibilities of the different LGU offices and committees for the implementation of the LSSP.

Table 7-1. Roles and Responsibilities for the Implementation of the LSSP

Office	Roles and Responsibilities
Barangay Councils	• Responsible for implementing the sanitation programs within their respective barangay with technical support provided by the CHO.
City Health Office (CHO)	• Responsible for monitoring incidence of water-borne and sanitation-related diseases in the city • Regulate and monitor the operation and compliance of the water service providers specially the water refilling stations (WRS) • In coordination with the barangay officials, the CHO will also take the lead in implementing and monitoring the Zero Open Defecation (ZOD) Program within the city to eliminate open defecation. • Take the lead in improving and tracking the health and sanitation-related reporting system, aligned with national/regional/provincial key performance indicators and targets. • Will take the lead in the promotion of sanitation and hygiene practices and the conduct of IECs to the identified stakeholders • Shall take the lead in the development of local drinking water quality surveillance program
City Engineering Office (CEO)	• Will take charge on the construction of water and sanitation infrastructure projects of the city. • Shall be responsible for the master planning and maintenance of the city drainage system, in coordination with the City Planning and Development Office and DPWH, and with ZCWD should the city adopt a combined sewerage system in some parts of the city.
Office of the Building Official	• Advocate the installation of the rainwater harvesting

Office	Roles and Responsibilities
(OBO)	facilities in the buildings • Ensure compliance of the households and commercial establishments with the standards in septic tank design
Office of the City Environment and Natural Resources (OCENR)	• Shall be responsible in implementing the local solid waste management program of the city. • Responsible for implementing IEC campaigns, garbage collection, and sanitary landfill management. • Monitor the activities of all septage and wastewater treatment facilities in the city • Coordinate and provide Secretariat support for the programs and activities of the Water Security Council
City Disaster Risk Reduction and Management Office (CDRRMO)	• Must ensure that evacuation centers have safe water supply and safe, functioning and gender-segregated toilets and other needed WASH facilities
Zamboanga City Water District (ZCWD)	• In coordination with the City LGU, will be responsible for setting up and implementation of the septage management program (SMP) in the city. • Ensure the availability of safe water supply in the city. • To expand its water service area • Operate sewerage system of the city
Zamboanga City Water Security Council (ZCWSC)	• Review and recommend to the Local Chief Executive (LCE) and the City Legislative Council relevant and responsive policies, strategies, guidelines and innovations on water supply and sanitation development and management. • Monitor and evaluate the implementation of the Water Security Master Plan
Zamboanga City Septage Management Council (CSMC)	• To accredit and license private septage or desludging service providers or wastewater treatment facilities • Shall plan and implement an information and education program on wastewater and septage management systems
City Solid Waste Management Board	• To update the solid waste management plan of the city • To oversee and monitor the implementation of the city solid waste management plan
Barangay Solid Waste Management Council (BSWMC)	• Implement solid waste management within their barangays.
Local Drinking Water Quality Monitoring Committee (LDWQMC)	• Monitor and audit the water service providers in the city

Office	Roles and Responsibilities
	• Implement the LDWS program of the city

7.2 Institutional Structure for the Septage Management Program and Sewerage System

243. The City Ordinance No. 2009-152, also known as the "Septage Management System Ordinance" created the CSMC who will be in charge of policy making, planning, accreditation of desludgers and IEC activities related to the SMP.

244. As stated in the Ordinance, the City Government of Zamboanga may operate its own wastewater treatment facility and desludging services. However, the city also has the option to contract with private service providers, for desludging and/or treatment services, provided that they are financially capable to shoulder the necessary expenditures. It is also stated in the Ordinance that the city LGU may enter an agreement with the ZCWD for the collection of the desludging fee of Php 1.75 per cubic meters of water consumed per month to its customers. The ZCWD must remit the net amount monthly to the City Treasure as General Fund.

245. The Septage Management System Ordinance is currently being updated to include the provision of the sewerage system in the city.

246. Recently, the city LGU and ZCWD entered an agreement for the implementation of the SMP and the operation of the sewerage system in the city.

247. At present, ZCWD has its Sewerage Division that is responsible for the operations of the sewage treatment plant (sewerage plant operations section) and the maintenance of the sewer lines (sewerage maintenance and connection section). For the implementation of SMP in the city, the ZCWD may consider adding another section that will be responsible for the desludging operations. The operation of the septage treatment plant can be lodged under the sewerage plant operations section of the city.

248. ZCWD is responsible in collecting the septage fees from its customers. For non-customers, desludging may be done by request and payment will be collected per service. The ZCWD may also consider entering a desludging service agreement with the CSMB-accredited private desludgers in the city to provide services to the non-customers.

249. The LGU shall create a project team that will regularly monitor the operational performance of as well as financial performance of the septage and sewerage projects in the city.

250. **Figure 7-1** shows the institutional arrangement for the implementation of the SMP and sewerage system in Zamboanga City.

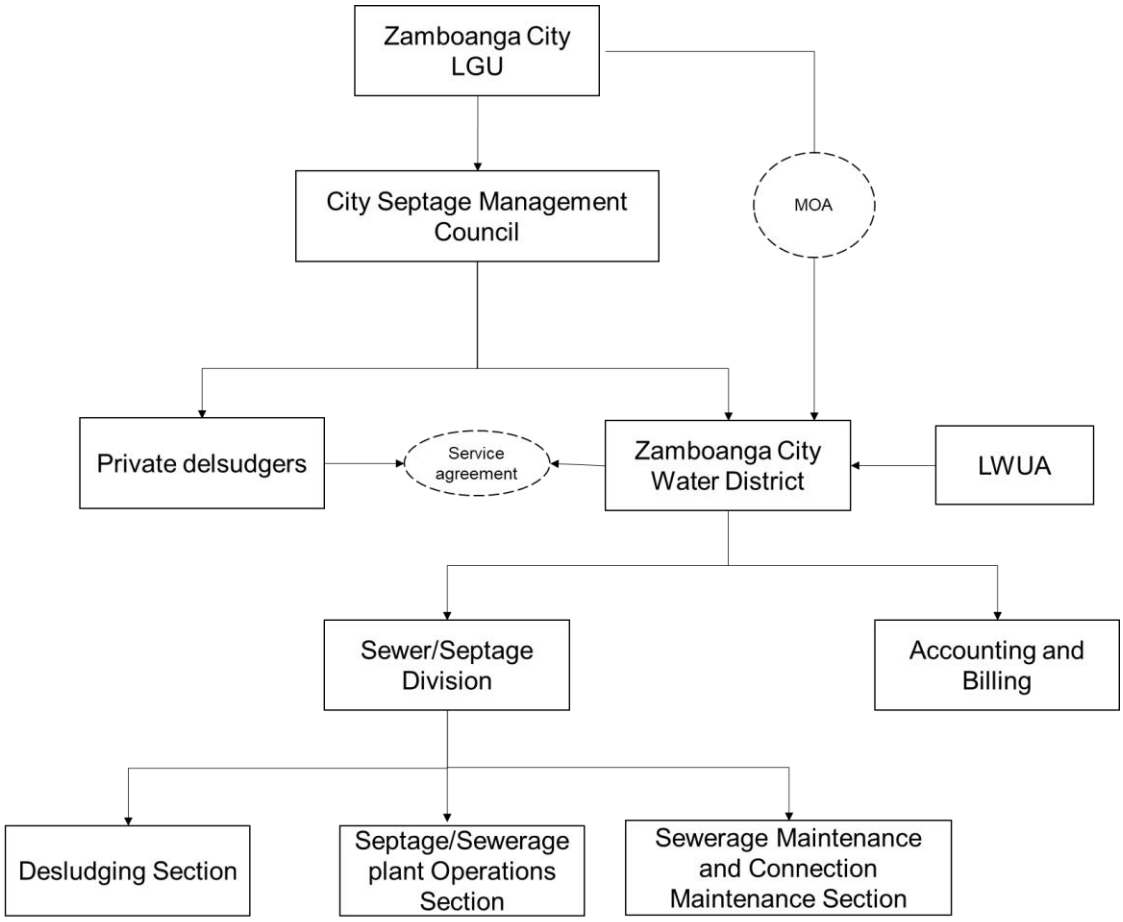


Figure 7-1: Institutional Structure for the Septage Management Program and Sewerage System in Zamboanga City

8. Financing the LSSP

251. The city shall allocate appropriate funds to ensure the sustainable implementation of the LSSP. The indicative cost and funding source for the identified PPAs are shown in **Table 6-3.**

252. In financing the sanitation projects such as septage management program and sewerage system project, the following financing and management options can be considered by the city.

Table 8-1. Financing and Management Options for Sanitation Projects[6]

Financing and Management Options	Definition
LGU-financed and managed	The LGU finances the investment from its income and other resource available to it (e.g., ITA, locally generated taxes, grants) or borrows from financial institution. It then establishes a profit center within the LGU office with a separate cost accounting system. Under this arrangement, the LGU directly manages the operations of the commercial risk. It may also allocate from additional IRA funds from the devolved functions and funding from National Government (Mandanas funds). It can also manage or assign any and all national grants and subsidy accorded the local governments.
Service contract	The LGU finances the investment and directly operates and manages the system. It enters into contract with a private party to undertake billing and collection and/or repair and maintenance activities for a fee. The LGU maintains a profit center within the LGU office and assumes the commercial risk.
Management contract	The LGU finances the investment and enters into contract with a private party to manage the system. The private party collects the tariffs set by the LGU, operates and manages the system and in turn, is paid a management fee by the LGU. The LGU maintains a profit center within the LGU office and assumes the commercial risk.
Lease contract	The LGU finances the capital expenditures and leases the facility to the private sector. The private sector assumes the commercial risks and the responsibility to operation and maintenance. To recover its costs, the private party is allowed to collect user fees as well as any other charges on behalf of the LGU.
Concession contract	The LGU enters into contract with a private party to undertake the investment. The private party

[6] Review of the National Government-Local Government Unit (NG-LGU) Cost Sharing Policy for Water Supply and Sanitation, MDGIF, 2011

Financing and Management Options	Definition
	assumes the assets of the LGU and undertakes to expand the services according to the terms and condition of the contract. The private party is allowed to operate the system and collect user fees to recover its costs and earn a reasonable return on its investment. After the contract expires, the system reverts to the LGU or may be contracted out again by the LGU.
Local water district	The local water district (WD) finances the investment from a loan from the LWUA, GFIs, or other financing institutions and operates, manages, and maintains the system. The local WD is regulated by LWUA.
Build-Operate-Transfer	Under the BOT scheme, the private sector finances the investment or any of its variants, operates it for a certain period of time after which the asset is transferred to the LGU. The private party is allowed to collect user fees to recover its costs and earn a reasonable rate of return on its investment. The LGU and the BOT proponent negotiate on the risk sharing.
Joint Venture Agreement	Under a joint venture agreement, the LGU and the private party share in the risks of the project and operate the system through a shared management and organizational structure.

253. Implementing the LSSP projects and activities may not necessarily be the whole responsibility of the city LGU. Nowadays, investment planning considers possible financiers for particular development investments. Possible financing sources which can help the city in effectively and efficiently implementing its LSSP program, projects and activities are the following:

a. Subsidies and/or grants from the national and local government which are into health and sanitation development needs of cities and municipalities

b. Area Water Quality Management Fund;

c. Subsidies and/or grants from international sources (i.e., USAID, UNICEF, World Bank, Asia Development Bank, JICA)

d. Loans from different funding institutions, national banks (i.e., Development Bank of the Philippines, Landbank, Philippine National Bank) and private financing institutions/banks

e. Microfinance loans provided to the households for the construction of sanitation facilities (i.e., toilet facilities, septic tanks), paying for desludging services, and for the access to water supply system.

f. Revolving funds (i.e., Project Development and Monitoring Facility) for sanitation projects

g. Blended financing

254. Even if facilities are already constructed, the funds must be made available to cover for the recurring operation and maintenance costs. Even if capital costs are subsidized, all sanitation systems must aim for sustainable cost recovery to cover operational, regular maintenance and capital maintenance and replacement costs, as well as planned expansion of the systems.

8.1 Government Funding to Sanitation Projects

255. The National Government, through the National Sewerage and Septage Management Program (NSSMP) of the Department of Public Works and Highways (DPWH), allocated funds to provide 50 percent subsidy to the LGUs for sewerage, septage and combined sewerage-septage projects. The target beneficiaries include the 17 highly urbanized cities (HUCs), non-HUCs and first-class municipalities. The city may consider in availing the subsidy to finance the sanitation projects in the city. The NSSMP may be expanded once the PWSSMP is implemented. To apply for the subsidy, the city shall submit to DPWH the required documents listed below[7]:

a. Local Ordinance for sewerage/septage management - Sets out the sanitation rationale, user fees, operation, management and penalties for the locality.

b. Feasibility Study - Single or separate documents that set out the technical and financial specifications for the design, construction and operation of the sanitation infrastructure.

c. Memorandum of Understanding - Where a partnership is proposed, such as between a city government and a utility builder/operator, a MoU is needed to set out the obligations and responsibilities of all parties, e.g., billing, collection, operations management, fee sharing, etc.

d. Loan Agreement(s) - This is the contract signed between the project owner(s) and the bank(s) providing loans to (partly) finance the project.

e. Building/Occupancy permit - These are ancillary regulations that relate to the nature and amount of sewerage/septage produced by different dwellings.

f. Environmental Permit(s) and other regulations - An Environmental Sanitation Clearance (ESC) must be secured by the project proponent from the Centre for Health Development of the DOH. In addition, an Environmental Compliance Certificate (ECC) and Discharge Permit (DP) must be obtained from DENR for proposed waste treatment facilities.

g. LWUA Exemption - WDs that have existing loans with LWUA are required to obtain a waiver from LWUA before they can avail of loans from other lenders.

h. Technical Working Group (TWG) & Community Participation Mandate - Successful projects will typically have a TWG established to oversee the project and assist with its implementation, as well as some formal community engagement process.

i. Duly filled-up Application Form – found on p. 181 of the NSSMP Program Operations Manual (copy available online at www.dpwh.gov.ph).

256. The city LGU was granted with the NSSMP subsidy worth Php 77.7 million to finance the proposed combined sewage and septage treatment plant in Magay. The city is on the process of downloading 50 percent of the fund through DPWH Region IX while the remaining 50 percent will be provided upon completion of the project.

[7] Department of Public Works and Highways

8.2 Government Banking Institutions

Development Bank of the Philippines (DBP)

257. The Water for Every Resident (WATER) Program of the DBP aims to provide financial assistance to private corporations, WDs, LGUs, other water service providers and private financial institutions and micro finance institutions to expand the coverage of water supply to waterless areas. Eligible projects for this program include source development, rehabilitation/expansion/upgrading of water transmission, distribution system and water treatment facilities, investment in NRW reduction and investment in CCA technologies such as rainwater collection system.

258. DBP also launched its Lending Initiative for Sanitation (LINIS) Program to help the national government in achieving universal access to sanitation. The program provides credit assistance to LGUs, WDs, private companies, cooperatives and associations for the development of sanitation facilities such as septage and sewerage systems and for the proper collection, transport, treatment and disposal of wastewater.

Land Bank of the Philippines (LBP)

259. The Water Program for Everyone (H_2OPE) Program of LBP aims to provide assistance to the LGUs and Water Districts to provide a sustainable, piped and safe water to all Filipinos.

8.3 Microfinance Loans for Low-income Households

260. Microfinance loans are provided to finance the construction of sanitation facilities at the household level (e.g., construction of toilets and septic tanks, connection to sewers, replacements using water-efficient fixtures, desludging services, etc.) that are otherwise not covered in the bigger sanitation or wastewater projects. The targets of microfinance are usually the low-income households that have no access to sanitation facilities.

Water.org Philippines

261. Water.org is an international nonprofit organization that pioneers market-driven financial solutions to the global water and sanitation crisis. Water.org provides assistance to the households by linking them to different microfinance institutions. Through its water credit program, Water.org is working with various microfinance institutions to offer affordable water and sanitation loans to poor households**.** Water.org also has its water connect program wherein they work with the water service providers to provide capacity building, training services and technical assistance.

9. Annual Implementation Review and Investment Planning

262. The 10-year LSSP Plan may serve as the City's long-term development and investment plan for sanitation. It will guide the city in investing and implementing the indicative sanitation projects and activities that they have laid out in the said LSSP development plan. Like any other long-term plan, this may be translated into respective annual plans so that the city can have the option to invest on priority sanitation and sanitation-related projects and activities within their budget. Moreover, the annual investment plan can facilitate easy review for the LGU to analyze if they have efficiently delivered their projects and activities for the year. Thus, investment planning for the next year can be drawn up better and more efficiently. It can also serve as reference plan for the review and updating of other related development plans, such as master drainage plan, solid waste management plan, the local water district's business plan and water safety plan, CLUP, zoning ordinance, etc.)

263. An operational plan and a sanitation investment program will be formulated annually to flesh out the details of this plan. Annual implementation review will be conducted to track the progress of the work plan and to feed into the annual implementation planning and budget preparation process of the city government. The annual implementation plan will incorporate all the barangay sanitation plans that require matching grants from the city government. Barangay sanitation plans requiring matching grants should be submitted prior to the budget preparation period of the city.

10. Monitoring and Evaluation

264. To improve the implementation of LSSP activities, the LSSP Team will conduct an annual monitoring and evaluation (M&E) of activities based on the key performance indicators identified in the LSSP. The results of these monitoring activities will be used to improve and enhance the implementation and communication activities. The key performance indicators and the means of verification will form part of the LSSP annual M&E report.

11. Institutionalization of the LSSP

265. The LSSP Team shall submit and present the plan to the Local Chief Executive (LCE), Zamboanga City Water Security Council (ZCWSC), other LGU key officials, ZCWD, and the Sangguniang Panlungsod (SP) for approval and adoption. A city resolution for the adoption of the LSSP must be provided to ensure the institutionalization of the plan.

12. Risk Assessment to LSSP Implementation

266. The following are the potential risks associated to the implementation and adoption of the LSSP of Zamboanga City.

- **Lack of support from the government.** The LSSP should be approved by the LCE, other LGU officials and the Sangguniang Panlungsod (SP) and be adopted formally by a resolution. This is to ensure the implementation of the identified PPAs and the allotment of required funding of the PPAs in the budget of the city. Adoption by other key stakeholders or lead implementors like the Water Security Council, the local Water District, and DPWH is also needed.

- **Lack of community participation.** Community participation is essential for the successful implementation of the LSSP activities. Effective communication to the community is fundamental for sustaining the sanitation projects.

- **Lack of available funding.** The LSSP activities requires investment in capital and operation expenditure, including initial infrastructure construction and recurring operation and maintenance costs. The city should consider different financing mechanisms to sustain the implementation of the sanitation projects.

- **Lack of space for the sanitation facilities.** With the rapid urbanization, congestion in the city may result to lack of space available for the construction of new sanitation facilities.

- **Impacts of climate change.** Climate change may affect the availability of water resources, increase the vulnerability of communities in low lying areas and increase the susceptibility of coastal communities to storm surges. Higher temperatures will result in water shortages, and increased rainfall may induce flooding. Climate change may also cause degradation of the quality of the water sources and may increase the demand and use of the sanitation services. All these factors must be considered to in the design of the sanitation infrastructures to make it resilient and climate change-proof.

12.1 CCA-DRR Considerations for Infrastructure Projects

267. Climate change may affect the safety and sustainability of the sanitation projects. Climate variability and climate change increases the risks caused by inadequate sanitation by placing considerable strain on sanitation systems. The potential impacts of climate change should be considered to ensure sanitation technologies and services are designed, operated and managed in a way that minimizes associated public health risks. Appropriate precautionary measures should be employed during the construction and operation phases of the project to avoid any complication and negative environmental impacts in the long run.

268. The impacts of climate change on water supply include damage to infrastructure from flooding, loss of water sources due to declining rainfall and changes in the water quality of water sources and within the distribution of water. While for sanitation, the impacts include damage and loss of services from floods and reduced carrying capacity of waters receiving wastewater.

269. Climate change may also affect the affordability of water and sanitation services. Changes in the quality of the water sources may require additional treatment which entails additional expenses. Increase in water demand while the availability of water sources decreases will result to rising prices for water. Moreover, when water and sanitation infrastructure is destroyed, the necessary reconstruction will also result in turning services more expensive.

270. **Table 12-1** shows the potential impacts of climate change to specific sanitation systems and the recommended adaptation measures.

Table 12-1. Climate change adaptation measures for sanitation systems[8]

Sanitation System	Potential Impact	Recommended Adaptation Measures
Rainwater harvesting	• There may be fewer rainy days and longer drought periods. More storage may be required to bridge low rainfall periods. • Rainfall events may be more intense. Danger of damage and contamination from flooding.	• Ensure proper design and sizing of RWH facilities • Build in redundancy for potential reduced rainfall and longer dry seasons. • Ensure protection against flooding.
Septic tanks	• Increased water scarcity reducing water supplies and impeding tank function. • Rising groundwater levels, extreme events and/or floods, leading to structural damage to tanks, flooding of drain fields and households, tank flotation, and environmental contamination • Increased influent pathogen load in times of outbreak	• Ensure proper design and siting of the septic tanks. • Community education on tank maintenance, and on hygiene and safe behaviors during/after extreme events • Strong occupational health and safety practices during emptying
Sewerage system – Sewer lines	• Extreme rainfall events causing discharge of excess, untreated wastewater into environment. • Extreme rainfall events causing back flooding of raw sewage into buildings. • Extreme events damaging sewers and causing leakage, resulting in environmental contamination. • Sea-level rise raising water levels in coastal sewers, causing back-flooding in infrastructure and buildings. • Increased water scarcity reducing water flows in sewers, increasing solid deposits and	• Installation of non-return valves on pipes to prevent back flows • Construction of simplified sewer networks to withstand flooding and flotation, or shorter networks connected to decentralized treatment facilities to reduce sewer overload and failure.

[8] Climate, Sanitation and Health, WHO, 2019

Sanitation System	Potential Impact	Recommended Adaptation Measures
	blockages	
Sewerage system – Sewage Treatment Plant	• Extreme weather events or floods destroying/damaging the sewage treatment plant, causing discharge of untreated sewage and sewerage overflow, creating contamination. • Extreme events including storm surges, damaging low-lying treatment plants, causing environmental contamination. • Increased water scarcity causing obstruction that reduces capacity in rivers or ponds receiving wastewater.	• Install flood, inundation and run-off defenses (e.g., dykes) and undertake sound catchment management • Invest in early warning systems and emergency response equipment (e.g., mobile pumps stored off-site, non-electricity based treatment systems) • Prepare a rehabilitation plan for the treatment works • Where feasible, site systems in locations less prone to floods, erosion, etc. • The design for the facilities should conform to the general standards for climate-resilient facilities and infrastructure to withstand strong typhoons and coastal surges. • Construction of above ground treatment facility and elevated electro-mechanical appurtenances are recommended. • Insurance coverage and provision for emergency fund
Septage Treatment Plant (SpTP)	• Extreme weather events or floods destroying/damaging the septage treatment plan, causing discharge of untreated septage and overflow of the untreated effluent, creating contamination. • Extreme events damaging low-lying treatment plants, causing environmental contamination.	• stall flood, inundation and run-off defenses (e.g., dykes), undertake sound catchment management, and hardening measure • Invest in early warning systems and emergency response equipment (e.g., mobile pumps stored off-

Sanitation System	Potential Impact	Recommended Adaptation Measures
	• Increased water scarcity causing obstruction that reduces capacity in rivers or ponds receiving wastewater.	site, non-electricity based treatment systems) • Prepare a rehabilitation plan for the treatment works. • Where feasible, site systems in locations less prone to floods, erosion, storm surges, etc. • The design for the facilities should conform to the general standards for climate-resilient facilities and infrastructure to withstand strong typhoons and coastal surges. • Construction of above ground treatment facility and elevated electro-mechanical appurtenances are recommended • Insurance coverage and provision for emergency fund

13. Environmental Impact Assessment and Safeguards Requirement

13.1 Potential Environmental Impacts of the Program, Project and Activities (PPA)

271. Environmental screening of the proposed PPAs with infrastructure components is done based on the type, location, scale, environmental sensitivity, and the magnitude of its potential environmental impacts of each PPA.

272. The environmental impacts of the proposed PPAs with infrastructure components are expected to be site-specific. In most cases, mitigation measures can be designed and implemented easily. Most of the PPAs will be located in developed or built-up areas of the city; hence, disturbance on ecological environment will be limited. As needed, an Environmental Management Plan (EMP) will be prepared, implemented, and monitored to address all potential environmental impacts and manage residual impacts and risks to acceptable levels. The EMP will identify the resource requirements, institutional mechanisms, including possible capacity building requirements for its implementation and monitoring.

13.2 Safeguards Requirement[9]

273. Safeguards are measures taken to avoid or minimize and manage the negative impacts of aid investments on people and the environment. The scope of safeguards is defined in terms of the following:

Table 13-1. Safeguards Scope

Type of Safeguard	Coverage
Environmental	1) Safeguards from environmental impacts a) Environmental quality impact management including the aesthetics and natural landscape; b) Sustainable use of natural resources; c) Biodiversity and ecosystem impact management with special consideration on the preservation of endemic and endangered species of flora and fauna; and d) Health and safety considerations including post-project implementation/post-construction risks and hazards management. 2) Resilience to man-made and natural hazards including climate change hazards 3) Climate change mitigation (e.g., reduction of greenhouse gas emissions)
Displacement	1) Right-of-way (ROW) acquisition, including acquisition of private and public properties, resettlement of informal settler families and relocation of utilities; 2) Dismantling of affected structures; 3) Management of affected employees; and 4) Compensation and livelihood restoration.

[9] Public-Private Partnership (PPP) Governing Board Resolution No. 2018-12-02, December 14, 2018. "Safeguards in PPP: Mainstreaming Environmental, Displacement, Social and Gender Concerns"

Type of Safeguard	Coverage
Social and Gender	1) Considerations for Indigenous People; 2) Protection and consideration for vulnerable groups (persons with disability, senior citizens, children, poor); 3) Culture and heritage preservation; and 4) Gender equality/responsiveness and women empowerment.

274. The following shall serve as guidance to the implementing agency to prevent avoidable delays and to ensure that safeguard concerns are addressed in the project development.

a) Environmental Safeguards

- Environmental impact assessment (EIA) shall be conducted simultaneously with the conduct of feasibility study (FS).
- For projects requiring Environmental Compliance Certificate (ECC) or Certificate of Non-Coverage (CNC), the implementing agency shall follow the requirements and procedures set forth in the EMB Revised Procedural Manual for DENR Administrative Order (AO) No. 30, Series of 2003, and any amendments thereof, to avoid delays in securing the same due to non-compliant applications. This shall include the preparation of the appropriate type of EIA report (e.g., Environmental Impact Statement or EIS or Initial Environmental Examination Checklist/Report) and securing the ECC or CNC.
- In addition to the project's impact to the environment, the implementing agency shall consider resiliency to man-made and natural hazards, including climate change risks by:
    - Including the vulnerability to short- and long-term impacts of natural hazards as part of the criteria in selecting the project location;
    - Assessing disaster risk through the identification of applicable climate and natural hazards, and considering these in the project's risk allocation matrix;
    - Coming up with an adaptation and risk management plan containing appropriate disaster resiliency measures, and incorporating the same in the project design, and if applicable, in the business continuity plan for projects with operations and maintenance components; and
    - Documenting in the FS climate change mitigation strategies (e.g., energy/water conservation measures, green building).
- Other project-specific environmental safeguard requirements (e.g., geotechnical studies, hydrological studies, charting and geotagging of trees) shall be identified and a corresponding compliance plan should be prepared during project development. These shall serve as inputs to the project siting, design, and cost, and are subject to validation during the implementation stage when the detailed engineering design has been finalized.

b) Displacement Safeguards

- The extent of physical and economic displacement shall be considered in deciding on project location alternatives. Whenever possible, forced displacement shall be avoided by considering all viable alternative actions or design options.

- For ROW and resettlement requirements, the implementing agency shall follow the rules and procedures in RA 10752 (Right of Way Act) and RA 7279 (Urban Development and Housing Act), their IRRs, and any amendments thereof.
- The implementing agency shall prepare a ROW/Resettlement Action Plan (RAP) for each project, as may be applicable. A summary of the RAP shall be incorporated in the project FS and design, and shall include, but is not limited to the following:
    - People and assets (i.e., land and improvements) that will be affected, including information on their socio-economic profile and restoration of their compensation and livelihood;
    - Extent of the impact of the required ROW and the measures to mitigate these impacts;
    - Resettlement requirements, including whether the resettlement shall be onsite, in-city, or off-site, in line with the National Housing Authority Memorandum Circular No. 2015-0015, and any amendments thereof; and
    - Schedule, timing, and costs of the required activities under the RAP.
- In projects with displacement concerns as identified in the RAP, the implementing agency is advised to coordinate with key shelter agencies, LGUs, and affected stakeholders. The implementing agency is further advised to develop a consultation plan.
- For projects that require national government support, including resettlement costs, the implementing agency shall submit to the Department of Budget and Management a request for the
- For projects involving the acquisition of government properties, the implementing agency may execute an agreement with the concerned government agency detailing the terms of the transfer of the property, such as the terms of replication, restoration, and/or removal of existing structures and/or facilities; other activities such as geotagging or tree accounting as may be applicable; appropriate compensation as may be applicable; and other obligations of the parties to ensure the smooth delivery of required ROW.

c) Social and Gender Safeguards

- In deciding the project location alternatives, the compatibility with existing/proposed development plans (e.g., CLUP) and national development plans (e.g., sectoral plans, multi-sectoral plans) shall be taken into consideration.
- Accessibility or universal design concept shall be incorporated in the project design including the physical facility, and information and communication technologies (e.g., websites).
- Gender analysis shall be undertaken to identify gender issues that the proposed project must address and anticipate, such as those that might arise from the implementation of the project. Goals, objectives, outcomes, and outputs that include gender and development (GAD) statements that will address identified gender issues shall be incorporated in the FS report. the implementing agency may refer to the Harmonized GAD Guidelines and any amendments thereof, for guidance on designing gender-responsive sector-specific projects (i.e., infrastructure, IEC).

13.2.1 Applicable Environmental Quality Standards

275. The environmental quality standards that are applicable to the proposed LSSP PPAs with infrastructure components are discussed in the succeeding paragraphs.

a) Philippine National Standards for Drinking Water (PNSDW)

276. Issued under DOH AO No. 2017-010, the PNSDW of 2017 prescribes the standards and procedures on drinking-water quality to project public health. It applies to all drinking-water service providers, including government and private developers and operators, bulk water suppliers, water refilling station (WRS) operators, and water vending machine operators; ice manufacturers, all food establishments, residential, commercial, industrial and institutional buildings that shall use/supply/serve drinking water, water testing laboratories, health and sanitation authorities, the general public and all others whore involved in determining safety of public's drinking-water. **Table 13-2** presents the mandatory parameters for drinking water quality monitoring.

Table 13-2. Mandatory Drinking Water Quality Parameters from 2017 PNSWD

Parameter	Unit	Standard Value
Thermotolerant Coliform	MPN/100mL	<1.1
E. Coli	mg/L	<1.1
Arsenic	mg/L	0.01
Cadmium	mg/L	0.003
Lead	mg/L	0.01
Nitrate	mg/L	50
Color (Apparent)	CU	10
Turbidity	NTU	5
pH	-	6.5 – 8.5
Total Dissolved Solids	mg/L	600
Disinfectant Residual	-	0.3 min and 1.5 max
Source: 2017 Philippine National Standards for Drinking Water, Department of Health.		

b) Water Quality Guidelines and General Effluent Standards

277. Issued under DENR AO No. 2016-08, the Water Quality Guidelines (WQG) and General Effluent Standards (GES) were adopted and promulgated pursuant to Section 19e and 19f of RA 9275 ("Philippine Clean Water Act of 2004") with the following objectives: providing guidelines and classification of water bodies in the Philippines; determining time trends of deterioration/enhancement in water quality; setting limits for effluent discharges; evaluating the need for taking actions in preventing, controlling, or abating, water pollution; and designating water quality management areas (WQMA).

278. The DENR also issued DENR AO No. 2021-19 to update the WQG and GES for ammonia, boron, copper as dissolved copper, fecal coliform, phosphate as phosphorus and sulfate.

279. The WQG applies to all water bodies in the country. The GES, meanwhile, applies to all point sources of pollution, regardless of volume, that discharge to receiving body of water or land. The GES shall be used regardless of the industry category. **Table 13-3** presents relevant parameters from WQG, while **Table 13-4** presents the portions of the GES that will be applied particularly for wastewater discharges.

Table 13-3. Philippine Water Quality Guidelines for Water Body Classification Applicable to the Project Site

Parameter	Unit	Water Classification				
		Class A	Class B	Class C	Class SA	Class SB
pH	-	6.5 – 8.5	6.5 – 8.5	6.5 – 9.0	7.0 – 8.5	7.0 – 8.5
Temperature*	°C	26 – 30	26 – 30	25 – 31	26 – 30	26 – 30
Color	TCU	50	50	75	5	50
Fecal Coliform	MPN/100mL	50	100	200	20	100
BOD	mg/L	3	5	7	n/a	n/a
Nitrate	mg/L	7	7	7	10	10
Phosphate	mg/L	0.025	0.025	0.025	0.1	0.2
Total Suspended Solids	mg/L	50	65	80	25	50
Ammonia	mg/L	0.06	0.06	0.06	0.04	0.06
Oil and Grease	mg/L	1	1	1	1	2

- Class A Public Water Supply Class II – intended as sources of water supply requiring conventional treatment (coagulation, sedimentation, filtration, and disinfection) to meet latest PNSDW;
- Class B Recreational Water Class I – intended for primary contact recreation (bathing, swimming, etc.);
- Class C 1. Fishery Water for the propagation and growth of fish and aquatic resources; 2. Recreational Water Class II – for boating, fishing, or similar activities; 3. for agriculture, irrigation, and livestock watering;
- Class SA 1. Protected Waters or water designated as national or local marine parks, reserves, sanctuaries, and other areas established by law (Presidential Proclamation 1801 and other existing laws), and/or declared as such by appropriate government agency, LGUs, etc.; 2. Tourist Zones – for ecotourism and recreational activities; 3. Recreational Water Class I – intended for primary contact recreation (bathing, swimming, skin diving, etc.);
- Class SB 1. Fishery Water Class II or waters suitable for commercial propagation of shellfish and intended as spawning areas for milkfish (*Chanos chanos*) and similar species; 2. Tourist Zones – for ecotourism and recreational activities; 3. Recreational Water Class I – intended for primary contact recreation (bathing, swimming, skin diving, etc.).

Notes: (*) The natural background temperature as determined by EMB shall prevail if the temperature is lower or higher than the WQG; provided that the maximum increase is only up to 10% and that it will not cause any risk to human health and the environment; MPN/100ml – Most Probable Number per 100 milliliters; n/a – Not Applicable; TCU – True Color Unit.
Source: DENR AO 2016-18, DENR AO 2021-19

Table 13-4. General Effluent Standards Applicable for Sewage and Septage Treatment Plant Project

Parameter	Unit	Water Classification				
		Class A	Class B	Class C	Class SA	Class SB
pH	-	6.0 – 9.0	6.0 – 9.0	6.0 – 9.5	NDA	6.0 – 9.0
Temperature	°C Change	3	3	3	NDA	3
Color	TCU	100	100	150	NDA	100
Fecal Coliform	MPN/100mL	100	200	400	NDA	200
BOD	mg/L	20	30	50	NDA	30
Nitrate	mg/L	14	14	14	NDA	20
Phosphate	mg/L	1	1.5	4	NDA	2
Total Suspended Solids	mg/L	70	85	100	NDA	70
Ammonia	mg/L	2	3	4	NDA	3
Oil and Grease	mg/L	5	5	5	NDA	5
Chloride	mg/L	350	350	450	NDA	n/a
Fluoride	mg/L	2	2	2	NDA	3
Iron	mg/L	5	5	7.5	NDA	7.5

Parameter	Unit	Water Classification				
		Class A	Class B	Class C	Class SA	Class SB
Surfactants	mg/L	2	3	15	NDA	500
Notes: NDA – No Discharge Allowed; n/a – Not Applicable Source: DAO 2016-18, DENR AO 2021-19						

c) Ambient Air Quality and Noise Guidelines

280. This national ambient air quality guideline value is under Rule VII Section 1 stipulated in DENR AO 2000-81 (IRR of the Philippine Clean Air Act of 1999). The 24-hour averaging time national ambient air quality guideline values are shown in **Table 13-5**.

Table 13-5. National Ambient Air Quality Guideline Values (24-Hour Averaging Time)

Parameter	Standard Value (µg/Ncm)
Nitrogen Dioxide	150
Sulfur Dioxide	180
Suspended Particulate Matter • **Total Suspended Particles (** • **Particulate Matter 10**	 230 150
Source: DAO 2000-81	

281. **Table 13-6** presents the International Finance Corporation – Environmental, Health and Safety Guidelines (IFC-EHS) for noise level at different receptors. Noise impacts should not exceed the levels presented in the table below or result in a maximum increase in background levels of 3 dB at the nearest receptor off-site.

Table 13-6. IFC-EHS Noise Level Guidelines

Receptor	One Hour L_{Aeq} (dBA)	
	Daytime (07:00 – 22:00)	Nighttime (22:00 – 07:00)
Residential; institutional; educational	55	45
Industrial; commercial	70	70
Source: IFC-EHS Guidelines		

d) Standards for Sludge Disposal

282. Sludges from the treatment facilities must comply with the toxicity characteristics leaching procedure (TCLP) limits prior to disposal to landfills as shown in **Table 13-7**.

Table 13-7. TCLP Limits for Sludges Prior to Disposal

Parameter	TCLP Limits (mg/L)
Arsenic	1.0
Barium	70
Cadmium	0.3
Chromium	0.3
Lead	1.0
Mercury	0.1
Selenium	1.0
Reference: DAO 2013-22	

e) Land Application of Biosolids

283. If there are agricultural areas near the treatment plant, the biosolids may be applied as soil conditioner or alternative fertilizers to selected crops such as sugarcane and corn. Considering public health issues, not all agricultural crops may accept biosolids from septage as soil conditioner. Such information must be obtained from the Department of Agriculture or from the local City Agricultural Office prior to any land application.

284. PNS/BAFS 183, which cancels and replaces PNS/BAFS 183:2016, specifies the minimum standards of organic fertilizer, soil conditioner, and plant supplement. According to the standards, these soil amendments may come in solid or liquid form. Such reuse of sludges is covered by standards prescribed by the Department of Agriculture. The limits for pathogens are shown in **Table 13-8**.

Table 13-8. Allowable Level of Pathogens in Organic Fertilizers, Soil Conditioner, and Organic Plant Supplements

Pathogens	Allowable Level
Fecal Streptococci	<5 x 10^2 CFU/g <2 MPN/g
Total Coliforms	<5 x 10^2 CFU/g <2 MPN/g
Salmonella	Absent in 25 g
Reference: PNS/BAFS 183: 2020	

f) Effluent Reuse

285. Wastewater re-use for irrigation must also comply with prescribed standards issued by the Department of Agriculture. For non-agricultural purposes, effluent may only be recycled (i.e., facility washing) after meeting the GES. The limits on selected wastewater quality parameters for irrigation are shown in **Table 13-9**.

Table 13-9. Limits on Wastewater Quality for Irrigation (DA AO No. 2019-11)

Parameters	Unit	Landscape and Crop Irrigation
Health-based		
Fecal Coliform	MPN/100mL	<200 Not detectable [a]
For crop productivity and protection of the environment		
BOD_5	mg/L	<150
Electrical conductivity	uS/cm	<2,000 <1,000[a, b]
Bicarbonates	mg/L	<500
Free residual chlorine	mg/L	<1
pH		6.5 to 8.0
Sodium Adsorption Ratio (SAR)		<18
Sodium	meq/L	<3
Total Nitrogen	mg/L	<30
Total Phosphorous	mg/L	<30
Total Suspended Solids	mg/L	<140
Aluminum	mg/L	5.00

Parameters	Unit	Landscape and Crop Irrigation
Chemical Parameters - Trace metals		
Barium	mg/L	6.0
Beryllium	mg/L	0.1
Boron	mg/L	0.75
Cobalt	mg/L	0.05
Fluoride	mg/L	1.00
Iron	mg/L	1.00
Lithium	mg/L	2.50
Manganese	mg/L	0.20
Molybdenum	mg/L	0.01
Nickel	mg/L	0.20
Selenium	mg/L	0.02
Vanadium	mg/L	0.10
Zinc	mg/L	2.00
Chemical Parameters - Heavy Metals		
Arsenic	mg/L	0.1
Cadmium	mg/L	0.01
Chromium	mg/L	0.10
Copper	mg/L	0.20
Lead	mg/L	0.20
Mercury	mg/L	0.002
Note: a. Foods eaten raw and not commercially processed b. Food crops commercially processed		

13.2.2 Possible Environmental Permit Requirements

286. Depending on the scale and components of the sanitation projects, requirements of the following environmental laws shall be complied.

a. Presidential Decree No. 1586: Environmental Impact Statement System
b. Republic Act No. 9275: Philippine Clean Water Act of 2004
c. Republic Act No. 8749: Philippine Clean Air Act of 1999
d. Republic Act No. 9003: Ecological Solid Waste Management Act
e. Republic Act No. 6969: Toxic and Hazardous Waste Management Act
f. Presidential Decree No. 856: Code on Sanitation of the Philippines

287. Before the construction and operation of the sanitation projects, there are specific permitting requirements needed. **Table 13-10** shows the permitting requirements needed to secure including its issuing agency and submission schedule.

Table 13-10. Specific Permitting Requirements for Construction and Operation

Permit	Issuing Agency	Submission Schedule	Remarks

Permit	Issuing Agency	Submission Schedule	Remarks
ECC	DENR-EMB	Prior to construction	▪ ECC is document issued by DENR-EMB certifying that the proposed project has complied with all the requirements of the EIS System and has committed to implement its approved EMP to address the environmental impacts.
Locational Clearance	LGU	Prior to construction	▪ Locational Clearance is issued by LGUs as pre-requisite in the issuance of Building Permit to ensure the project's conformity with City's CLUP and Zoning Ordinance.
● Building Permit ● Clearance / Fencing / Excavation Permit ● Permit to Install Mechanical Equipment	LGU	Prior to construction	▪ Issued by the LGU to ensure that the design, plans, and specifications of the facility conforms to the Building Code of the Philippines.
ENR Clearance, COC and Sticker	LGU	Prior to operation	▪ The Proponent shall submit the desludging trucks for emission test prior to issuance of ENR Clearance, COC and Sticker
Pollution Control Officer (PCO) Accreditation Certificate	DENR-EMB	Prior to Operations	▪ PCO shall be accredited based on the categorization of establishments. This categorization defines the needed qualifications of PCO.
● Hazardous Waste Generator's ID (HWID) ● PTO-Air Pollution Source Installation (PTO-APSI) ● Discharge Permit (DP)	DENR-EMB	Prior to Operations	▪ HWID is issued to facilities generating hazardous wastes regardless of size. The permit maybe amended as necessary (e.g. additional hazardous waste classification generated) ▪ PTO is issued to facilities that have air pollution source and control installations. The permit is valid for 5 years, subject for renewal. ▪ DP is issued to facilities that have wastewater discharges. The permit is renewed annually.

Permit	Issuing Agency	Submission Schedule	Remarks
Environmental Sanitation Clearance (ESC)	DOH	Prior to Operations	▪ ESC is issued to stationary and mobile service providers allowing the collection, handling, transport, treatment and disposal of domestic sludge or septage.

14 References

- Climate Change-Responsive Integrated River Basin Management and Development Master Plans for the 8 Clustered River Basin, DENR-RBCO
- Climate, Sanitation and Health, World Health Organization 2019
- DOH Field Health Services Information System Annual Report, 2016-2020
- Guidebook for a Local Sustainable Sanitation Promotion Program, Department of Health, 2010
- Guidebook for a Local Sustainable Sanitation Strategy, Department of Health, 2010
- Guidebook for a Sustainable Sanitation Baseline Study, Department of Health, 2010
- Guidelines on Sanitation and Health, World Health Organization, 2018
- Leading factors of success and failure in Asian Development Bank Urban Sanitation Projects, ADB, 2018
- Philippine Water Supply and Sanitation Master Plan, Abridged Version, 2018-2040
- Public-Private Partnership (PPP) Governing Board Resolution No. 2018-12-02, December 14, 2018. “Safeguards in PPP: Mainstreaming Environmental, Displacement, Social and Gender Concerns”
- Review of the National Government-Local Government Unit (NG-LGU) Cost Sharing Policy for Water Supply and Sanitation, MDGIF, 2011
- Solving urban sanitation – sustainability and equitability, World Water, 2020
- UN-Water, 2016: Water and sanitation interlinkages across the 2030 Agenda for Sustainable Development
- Zamboanga City Comprehensive Development Plan, 2016-2021
- Zamboanga City Comprehensive Land Use Plan, 2016-2025
- Zamboanga City Enhanced Local Disaster Risk Reduction and Management Plan, 2019-2022
- Zamboanga City Local Climate Change Action Plan, 2016-2030
- Zamboanga City Local Climate Change Action Plan, 2017-2019
- Zamboanga City Roadmap to Recovery and Reconstruction, 2014
- Zamboanga City Socio-economic Profile, 2020
- Zamboanga City Solid Waste Management Plan, 2020-2030
- Zamboanga City Water District Water Safety Plan, 2018

Annex 1:
Executive Order for the Creation of the Local Sustainable Sanitation Plan Team for Zamboanga City

EXECUTIVE ORDER No. __ Series of 2021

ORGANIZING THE LOCAL SUSTAINABLE SANITATION PLAN (LSSP) TEAM OF THE CITY OF ZAMBOANGA

WHEREAS, it is a declared policy of the State to afford full protection and the advancement of the right of the people to a healthy environment in accord with the rhythm and harmony of nature;

WHEREAS, the health of the people, being of paramount importance, all efforts of public services should be directed towards protection and promotion of health for all;

WHEREAS, the Local Government Code of the Philippines of 1991 empowers the local government units to exercise its broad powers necessary towards the promotion of the general welfare including sanitation and protection of public health;

WHEREAS, the National Sustainable Sanitation Plan (NSSP) which serves as the basis for all plans and activities on sustainable sanitation in the country, encourage the LGUs to develop their local sustainable plans and programs, and streamline such to the components of the NSSP goals and objectives for sustainable sanitation;

WHEREAS, upholding the vision of healthy people and environment, it is of utmost interest to formulate a Local Sustainable Sanitation Plan (LSSP) which shall rationalize and streamline all existing local efforts concerning local sanitation with the end-goal of holistically addressing all intersecting issues on environment, health and sanitation and other sectors;

WHEREAS, there is a need to organize the LSSP Team who will lead, oversee and ensure that the LSSP shall be drafted, approved, adopted and sustainable sanitation programs and projects are implemented and subsequently monitored and evaluated.

WHEREAS, the support and cooperation of different stakeholders shall bring about a balanced and coherent approach in the process of developing policies, strategies and plans, and make better use of resources towards long-term improvements;

WHEREAS, some members of the team belong to other government offices and agencies being stakeholders with vital role in the development of the LSSP, thus in respect to the authority of their respective agency/office are enjoined to support this initiative by allowing their representative to attend and participate in the series of LSSP activities as member, and make this an official part of their task to ensure the unification of the plan;

WHEREAS, recognizing that USAID's Strengthening Urban Resilience for Growth with Equity (SURGE) Project seeks to advance the development of the city as instrument for growth that is inclusive, environmentally sustainable and resilient by providing a range of technical assistance, drawing from resources in economic growth, health, energy, environment, governance and education, thus USAID SURGE oversight is essential to the development of the LSSP.

WHEREAS, in view of the fact that LSSP development will support the thrusts and vision of the city administration and having potential to impact the local economy, it is necessary to implement and follow the timeline by the LSSP Team;

ACTIVITIES	TARGET DATE
Development of the LSSP draft	May to October 2021
Presentation of the draft LSSP to the Local Health Board	November 2021
Presentation of the adopted LSSP	January 2022

NOW, THEREFORE, I, _____, City Mayor of _____, by the power vested in me by law, do hereby create, organize and order, as follows.

Section 1. COMPOSITION OF THE LSSP TEAM. The LSSP Team shall be composed of:

Chairperson: Maria Isabelle Climaco-Salazar
City Mayor

Co-Chairperson: Dr. Dulce Amor D. Miravite, MPH
City Health Officer

Members: Engr. Reynaldo S. Gonzales
City Environment and Natural Resources Officer

Engr. Rodrigo S. Sicat
City Planning and Development Coordinator

Dr. Elmeir E. Apolinario
City Disaster Risk Reduction Management Officer

Engr. Christopher Q. Navarro
City Engineer

Cesar G. Raz
OIC-City Administrator

Ma. Socorro A. Rojas
City Social Welfare Development Officer

Joann S. Hamili
City Accountant

Geraldine M. Dela Paz
City Budget Officer

City Agriculture Office

Mr. Leonardo Rey D. Vasquez
Manager
Zamboanga City Water District

Belen Sheila E. Covarrubias
Public Information Officer

Rodrigo Pagotaisidro
Housing and Homesite Regulation Officer V
City Housing and Land Management Division

Engr. Joy P. Sese
Sanitary Engineer/ Sanitary Inspector
City Health Office

John M. Dalipe
Chairperson, Committee on Health and Sanitation
Sangguniang Panlungsod

Khymer Adan T. Olaso
Chairperson, Committee on Natural Resources and Environment Protection
Sangguniang Panlunsod

Dr. Joshua G. Brillantes, MPH, CESE
OIC-Regional Director
Department of Health IX

Engr. Alex D. Jimenez
Regional Director

Environmental Management Bureau IX

Department of Public Works and Highways IX

Department of Education

Western Mindanao State University, Academe

Section 2. FUNCTIONS AND RESPONSIBILITIES OF THE LSSP TEAM. The LSSP Team shall render technical services in formulating the Local Sustainable Sanitation Plan specifically:

1. Conduct workshops and meetings required by the planning process.
2. Conduct baseline data gathering and information to characterize water, sanitation and hygiene status of communities thru focus group discussion and key informant interviews.
3. Consolidate and organize data culled from baseline surveys conducted by the city government and from other valid sources.
4. Identify and do risk assessment of sanitation problems, its impact and develop Problem Tree Analysis.
5. Analyze, evaluate, and assess current programs, projects and actions addressing sanitation problems of the city and propose other interventions.
6. Conduct consultation activities with major stakeholders and implementors of the LSSP.
7. Engage partnership with various city government offices, national agencies and other sectors to address the identified gaps or challenges with meaningful response plan.
8. Design and formulate information, education and communication (IEC) and advocacy campaign strategy.
9. Develop the vision, mission, goals and objectives of the LSSP and strategies for implementation of programs, projects and activities.
10. Develop methods of monitoring and evaluation strategies to ensure the LSSP programs are working and conducted successfully in the local level.
11. Validate the output by conducting stakeholders' validation workshop.
12. Ensure proper validation of all activities of the LSSP Team.
13. Finalize the LSSP and submit to the LCE and City Council for approval, adoption and implementation.

Section 3. EFFECTIVITY. This Executive Order shall take effect immediately and remains to be in force until revoked and/or modified by the undersigned. Any and all other executive issuance/s contrary or inconsistent herewith are deemed superseded.

Section 4. SEPARABILITY. Should any part of this Order be found unconstitutional or inconsistent with any higher issuance/s, the remaining provisions shall not be disturbed.

Done this ___ day of _____ 2021 in the City of _____.

_____

MAYOR MARIA ISABELLE CLIMACO-SALAZAR
City Mayor

Annex 2: Sanitation Baseline Report

LOCAL SUSTAINABLE SANITATION PLAN OF ZAMBOANGA CITY (2021-2030)

Annex 2: Sanitation Baseline Report

Zamboanga City Local Government Unit

Completion Date: October 2021

Contents

Tables

Figures

Acronyms

AGE	Acute gastroenteritis
BOD	Biochemical Oxygen Demand
BSWMC	Barangay Solid Waste Management Council
CCA	Climate Change Adaptation
CDRRMO	City Disaster Risk Reduction and Management Office
CHO	City Health Office
CLUP	Comprehensive Land Use Plan
CPDO	City Planning and Development Office
CSMC	City Septage Management Council
CSWMB	City Solid Waste Management Board
DENR	Department of Environment and Natural Resources
DO	Dissolved Oxygen
DOH	Department of Health
DRR	Disaster Risk Reduction
EMB	Environmental Management Bureau
EO	Executive Order
FHSIS	Field Health Systems Information System
IEC	Information, Education, Communication
LDWQMC	Local Drinking Water Quality Monitoring Committee
LGU	Local Government Unit
LSSP	Local Sustainable Sanitation Plan
MRF	Materials Recovery Facility
NOH	National Objectives for Health
NSSMP	National Sewerage and Septage Management Program
OBO	Office of the Building Official
OCENR	Office of City Local Environment and Natural Resources
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PDP	Philippine Development Plan
PhATSS	Philippine Approach to Sustainable Sanitation
PSA	Philippine Statistics Authority
SDG	Sustainable Development Goals
SLF	Sanitary Landfill Facility
SMP	Septage Management Program
SURGE	Strengthening Urban Resilience for Growth with Equity
SWMP	Solid Waste Management Plan
USAID	United States Agency for International Development
WQMA	Water Quality Management Areas
WRS	Water Refilling Station
WSP	Water Safety Plan
ZCWD	Zamboanga City Water District
ZOD	Zero Open Defecation

1. Introduction

1.1 Background

1. This report presents the existing conditions of the water supply, sanitation and hygiene, solid waste management and water quality management of the city. Key sanitation issues that must be addressed in the Local Sustainable Sanitation Plan (LSSP) of the city were also identified.

2. Five thematic sanitation areas were considered in the analyses of the existing sanitation baseline in the city, as discussed below.

   a. **Water supply** – this refers to the availability and access of the households to safe water supply in the city.

   b. **Management of on-site sanitation facilities including WASH in Emergencies** – this refers to the access of the households to safely managed sanitation systems. Safely managed sanitation systems ensure the separation of human excreta from human contact all throughout the sanitations service chain, from the toilet to safe use or disposal. This includes the sanitary toilet facilities, the containment (i.e., septic tanks), transport, treatment and disposal of the human excreta (i.e., septage management program (SMP)).

      This also includes the availability and provision of WASH (water, sanitation and hygiene) facilities during emergencies, including natural disasters, outbreaks and pandemics. In emergency settings, it is critical that there are available WASH facilities to prevent the spread of diseases and to reduce the health impacts of the disasters.

   c. **Wastewater, sewage and drainage management** – this includes the management of the domestic wastewater generated in the city from the households, institutional and commercial establishments, and the provision and maintenance of the city drainage to reduce the occurrence of flooding in the city.

   d. **Solid waste management** – this pertains to the collection and proper disposal of the solid wastes and health care wastes in the city.

   e. **Water quality management** – this refers to the monitoring and improving the water quality of the water bodies in the city.

3. The baseline of the city was also compared to the national targets set in Philippine Development Plan (PDP) 20217-2022, Department of Health (DOH) National Objectives for Health (NOH) 2017-2022, Philippine Approach to Sustainable Sanitation (PhATSS) 2018-2030, Philippine Water Supply and Sanitation Master Plan (PWSSMP) 2018-2040 and the 2030 UN Sustainable Development Goals (SDG) to determine the status of the city towards meeting these targets.

1.2 Methodology

1.2.1 Secondary Data Collection

4. The latest available secondary data were collected from the members of the LSSP Technical Working Group (TWG) of Zamboanga City. The table below summarizes the document and information that were requested to the respective LSSP TWG members.

Table 1-1. List of Documents and Information for Secondary Data Collection

Section	Data/Information	Responsible
City Profile	Organization chart of the City Government	City Planning and Development Office (CPDO)
	Comprehensive Land Use Plan	
	Population and household projection until 2030	
	Comprehensive Development Plan	
	Socio-economic Profile	
City CCA-DRR	Hazard maps (SHP files)	City Disaster Risk and Reduction Management Office (CDRRMO)
	Local Climate Change Adaptation Plan (2017-2019)	
	Local Disaster Risk Reduction and Management Plan 2019-2022	
Health Profile	Top ten leading causes of morbidity (for the past 5 years)	City Health Office (CHO)
	Top ten leading causes of mortality (for the past 5 years)	
	List of health care facilities (hospitals, barangay health stations, birthing facilities, rural health units, etc.)	
Water Supply	Household access to improved water supply per barangay (for the past 5 years)	CHO
	Household access per water supply level (Level 1, 2, 3, doubtful sources) per barangay	
	Household access to safely managed water services per barangay	
	List of all water service providers in the city (e.g., water district, RWSA, BWSA, private water service providers)	CHO, Zamboanga City Water District (ZCWD)
	List and location of water sources in the city	
	Water tariff rates	
	Number of service connections of ZCWD (per barangay per type of service connection)	ZCWD
	Monitoring activities regarding drinking water quality	CHO
	Past and/or on-going programs, projects and activities of the city regarding water supply	CHO
	Local policies regarding water supply	CHO
	Budget allotted for water supply Source of budget	CHO

Section	Data/Information	Responsible
On-site sanitation facilities	Household access to sanitary toilet facilities per barangay	CHO
	Number of households that are open defecating per barangay	
	Status of ZOD barangays (list of barangays that are ZOD-certified)	
	SMP - List of accredited desludgers - Septage fee - Septage Collection Area - Number of HH already served for the past years - Number of HH to be served - Number of commercial/institutional establishments served and/or to be served - Location of septage treatment plant (SpTP) - Capacity of SpTP - Number of vacuum trucks	CHO Office of City Environment and Natural Resources (OCENR) ZCWD
	Past and/or on-going programs, projects, activities regarding sanitation	CHO
	Local policies on sanitation and hygiene	
	Budget allotted for sanitation Source of budget	
WASH in Emergency	List of designated evacuation centers	CDRRMO
Wastewater and drainage	Drainage master plan	Office of the City Engineer (OCE)
	Location of outfalls	ZCWD, OCE
	Sewerage system - Sewered areas - Capacity of STP	ZCWD
	List of commercial/institutional establishments and industries with own WWTP	OCENR
	Past and/or on-going programs, projects, activities regarding wastewater and drainage	OCE
	Local policies on wastewater and drainage	
	Budget allotted for wastewater and drainage Source of budget	
Solid Waste Management	10-year Solid Waste Management Plan (SWMP)	OCENR

Section	Data/Information	Responsible
	List of barangays with operating Material Recovery Facilities (MRFs)	
	List of barangays with operating composting facility	
	List of barangays with active Barangay Solid Waste Management Committee	
	Past and/or on-going programs, projects, activities regarding solid waste management	
	Local policies on solid waste management	
	Budget allotted for solid waste management Source of budget	
Water Quality Management	Climate change responsive integrated river basin management and development of master plans for the 8 clustered river basins	OCENR

1.2.2 Sanitation Survey

5. With the technical assistance from Strengthening Urban Resilience for Growth with Equity (SURGE), a household sanitation survey was conducted in the city on August 18 to 23, 2021. The main objective of the survey was to determine the current situation of water and sanitation systems and the sanitation practices of the city. The sampling size of the survey was 425 households, considering 95 percent confidence level and 5 percent margin of error. The survey was conducted to the 89 inland barangays only.

1.2.3 Drainage Inspection

6. Selected outfalls in the city that are located along the coastal area and within the poblacion areas were visited and inspected on July 28, 2021. The main objective of this activity was to check the existing conditions of the outfalls.

1.2.4 SWOT Analysis

7. To facilitate discussion on the VMGO, a SWOT analysis was conducted on the existing sanitation baseline data of the city. An analysis to each of the thematic areas was done according to technical, financial//economic/financing, institutional (policy, communication, capacity building, environmental) including the mainstreaming of Disaster Risk Reduction-Climate Change Adaption (DRR-CCA), which served as the basis of VMGO setting.

1.2.5 Baseline Validation Online Session

8. An online session was conducted on August 3, 2021, to present the collected data to the and the results of the SWOT analysis to the LSSP TWG members of the city. The agenda of the activity was to validate the data collected and to determine additional data that can be included in the baseline study.

2. City Profile

2.1 Local Government Setup

9. The city government of Zamboanga is headed by the Office of the Mayor for administrative and executive functions, and by the Office of the Sangguniang Panlungsod for the legislative role. **Figure 2-1** shows the organizational chart of the City of Zamboanga as provided in the Comprehensive Development Plan 2016-2021.

10. There are four subgroups of various city departments which are headed by the Office of the City Administrator, under the Office of the City Mayor. These subgroups are categorized according to services rendered such as management services, technical services A, technical services B, and technical services C. In addition, there are special divisions under the Office of the City Mayor.

2.1.1 Management Services

11. The following departments and offices fall under this category of services:

- Office of the City Human Resource Management
- Office of the City Planning and Development Coordinator
- Office of the City Budget
- Office of the City Accountant
- Office of the City Legal
- Office of the City General Services

2.1.2 Technical Services A

12. The following departments and offices fall under this category of services:

- Office of the City Treasurer
- Office of the City Assessor
- Office of the City Civil Registrar
- Office of the City Disaster Risk Reduction and Management
- Office of the City Social Welfare and Development
- Office of the City Health

2.1.3 Technical Services B

13. The following departments and offices fall under this category of services:

- Office of the City Engineer
- Office of the City Agriculturist
- Office of the City Veterinarian
- Office of the City Environment and Natural Resources

2.1.4 Technical Services C

14. The following institutions fall under this category of services:

- Ayala Technical/ Vocational School
- Cristino Paragas Memorial Community Hospital
- Vitali Technical/ Vocational School

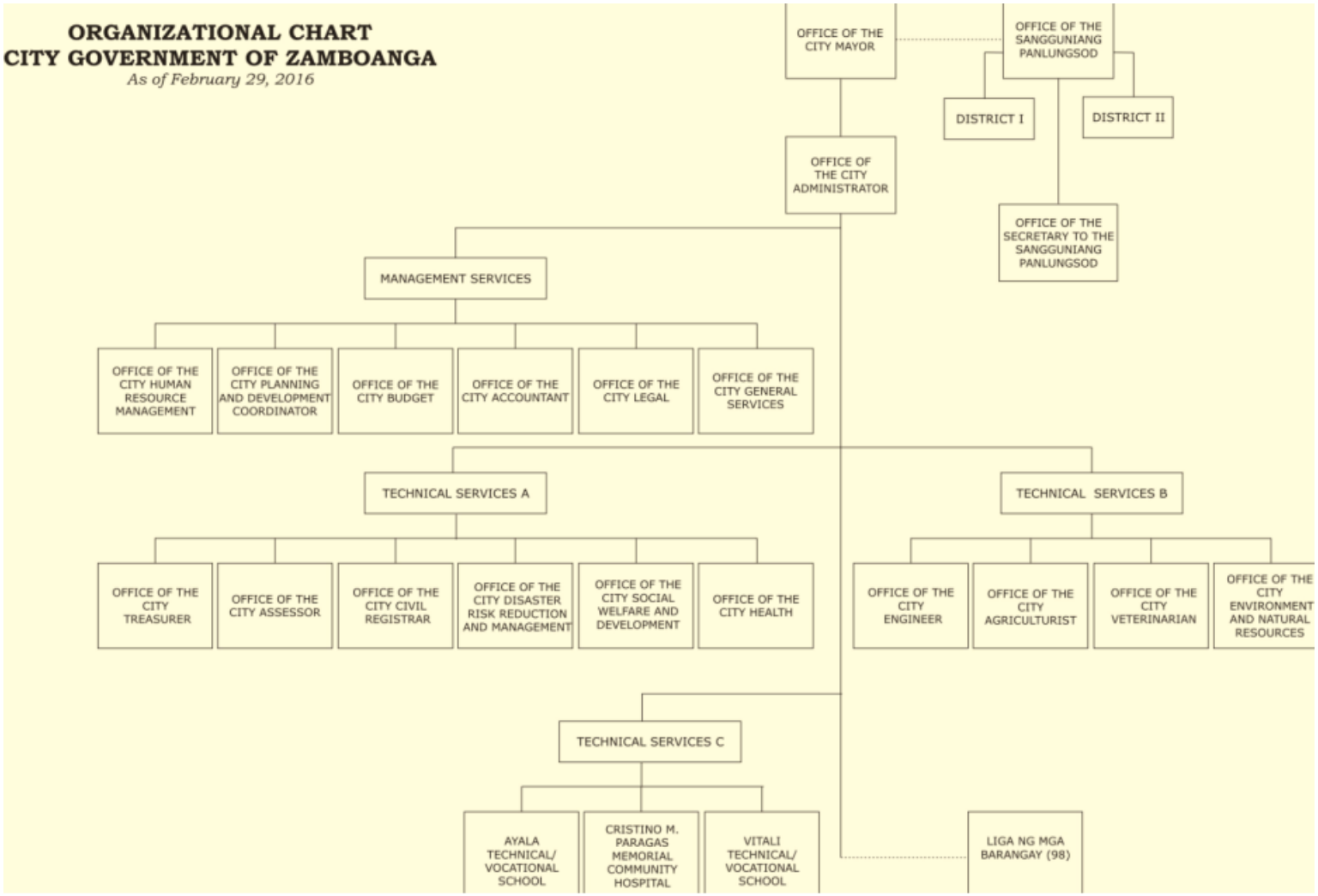
2.1.5 Special Divisions under the Office of the City Mayor

15. The following divisions fall under this category of services:

- Permits and Licensing Division
- Tourism Promotion and Development Services Division
- Maintenance of Sports Complex, Athletic Fields and Playgrounds
- Internal Audit Division
- Procurement, Acquisition and Awards Division
- Housing and Land Management Division
- Parque de Ciencia/ Museum Services
- Computer Services Division
- Information Division
- Public Affairs and Assistance Division

16. The city is subdivided into two districts with 37 and 61 barangays, respectively. Each of the barangay is headed by the Punong Barangay or barangay captain as the chief executive and the Sangguniang Barangay or barangay council as the legislative body of the Barangay government). The Barangay serves as the primary planning and implementing unit of government policies, plans, programs, projects, and activities in the community. [10]

[10] Local Government Code of 1991, Section 384.



Source: Comprehensive Development Plan 2016-2021

Figure 2-1. Organizational Chart of the City Government of Zamboanga, February 2016

2.2 Geophysical Profile

2.2.1 Location

17. The City of Zamboanga is a 1st class highly urbanized city (HUC) in the Zamboanga Peninsula. It is in the southwestern-most part of Zamboanga Peninsula and within the geographical coordinates of 6°54' North latitude and 122°4' East longitude. The city is bounded by the Provinces of Zamboanga del Norte and Zamboanga Sibugay to the north, Moro Gulf to the east, Basilan Island, Basilan Strait and Celebes Sea to the south, and Sulu Sea to the west. Zamboanga City is approximately 505 nautical miles south of Manila, 365 nautical miles northeast of Kota Kinabalu, Malaysia, and 345 nautical miles northeast of Manado, Indonesia. **Figure 2-2** presents the location map of Zamboanga City.

2.2.2 Land Use and Classification

18. The lands of public domain in Zamboanga City are classified into timber or forestland, alienable and disposable land, and national park. Out of the total area, 63,156.70 hectares or 43.46 percent is classified as timber or forestland. It is followed by alienable and disposable land of 62,604.99 hectares or about 43.08%, and national park covers 17,771.50 hectares or 12.23 percent. The remaining 1,793.83 hectares is still unclassified. **Table 2-1** shows the land classification in Zamboanga City.

Table 2-1. Land Classification in Zamboanga City

Land Classification	Area (ha)	Percent (%)
Timberland/Forestland	63,156.70	43.46
Alienable and Disposable Land	62,604.99	43.08
National Park	17,771.50	12.23
Unclassified	1,793.83	1.23
TOTAL	**145,327.02**	**100.00**
Source: Zamboanga City CLUP 2016-2025		

19. The City of Zamboanga has a total land area of 145,327.02 hectares. The general land use in the city is categorized into forest, agriculture, water/fishery, urban use, and other uses. During the period of 1997-2012, the forest covers about 88,991 hectares or 60 percent of the total land area. It is followed by agriculture land use with 31,633 hectares (21%), and urban use with 16,567 hectares (12%).

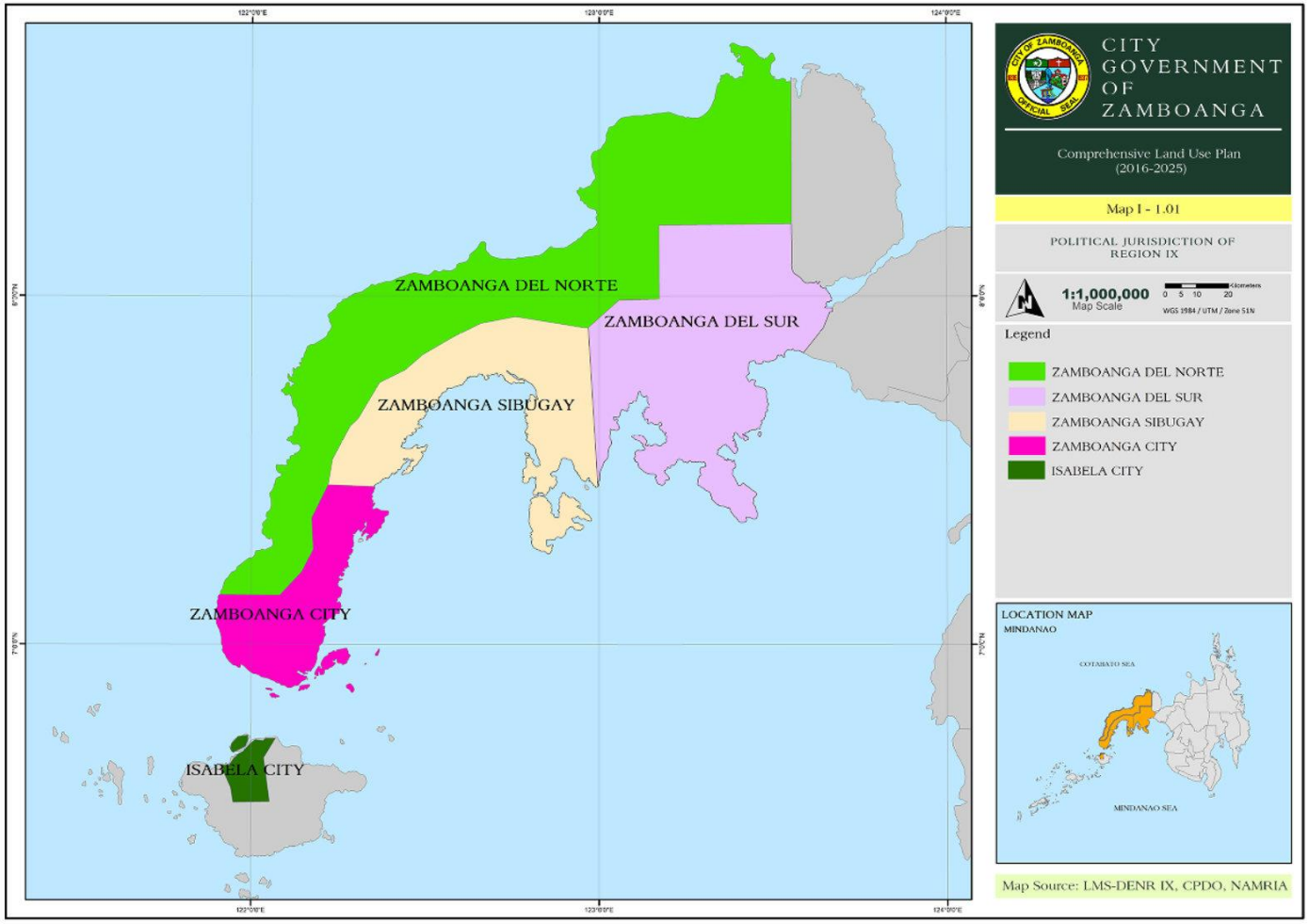
20. In the proposed general land use of the city for 2016-2025, there was a significant reduction on the allocated land area for forest and urban use. The decrease in the total forest area and urban use is allocated for agriculture, water/fishery and other uses. Other uses in the city include waterfront, lake, parks and recreational, salt bed/buffer/greenbelt, historical preservation, and cemetery/memorial park. **Table 2-2** presents the comparative land uses of the city. Meanwhile, the general land uses maps are presented in **Figure 2-3** and **Figure 2-4**, respectively.

21. The urban land use in the city consists of residential, commercial, industrial, institutional, ecozone, utilities/transport and tourism. There was about 17.5 percent decrease on the land area dedicated for urban land use in 2016-2025. The proposed urban land use map of the city is shown in **Figure 2-5**.

Table 2-2. Comparative Land Uses in Zamboanga City, 1997-2012 and 2016-2025

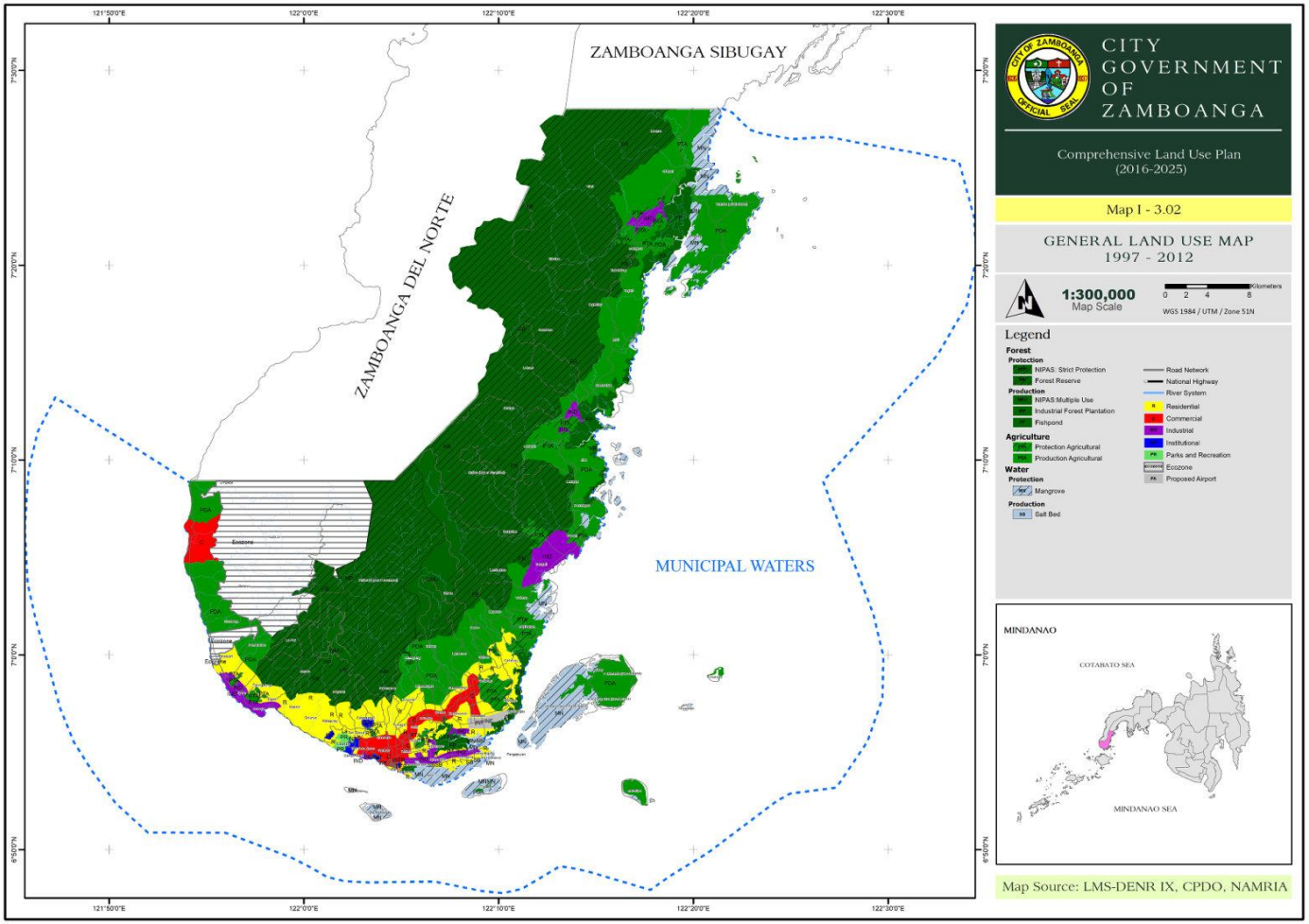
Category	Area (ha)	
	1997-2012	2016-2025
Forest	**88,991.15**	**68,014.49**
Protection	68,836.78	38,231.30
Production	4,455.10	14,201.80
Ecozone (Reserve)	15,699.27	15,581.39
Agriculture	**31,632.81**	**51,375.49**
Protection	3,004.17	2,553.49
Production	28,628.64	48,322.99
Agri-Industrial		519.47
Water/Fishery	**10,807.66**	**11,434.43**
Fishpond	4,506.02	4,896.87
Mangrove	6,301.64	6,453.59
Foreshore Land		16.55
Urban Use	**16,566.65**	**13,634.16**
Residential	8,678.25	5,290.73
Commercial	3,286.24	3,708.73
Industrial	3,194.75	2,056.51
Institutional	305.82	453.77
Ecozone (Industrial)	736.92	801.66
Utilities/ Transport	364.67	707.44
Tourism		662.27
Other Uses	**322.17**	**868.45**
Waterfront (Rivers & Creeks)	2.85	166
Lake	113.49	140.38
Parks & Recreational	88.74	165.37
Salt Bed/ Buffer/ Greenbelt	100.7	242.58
Historical Preservation	16.39	
Cemetery/ Memorial Park		154.12
TOTAL	**148,320.44**	**145,327.02**
	Contested Area	8,828.40

Source: Zamboanga City CLUP 2016-2025



Source: Zamboanga City CLUP 2016-2025

Figure 2-2. Zamboanga City Location Map



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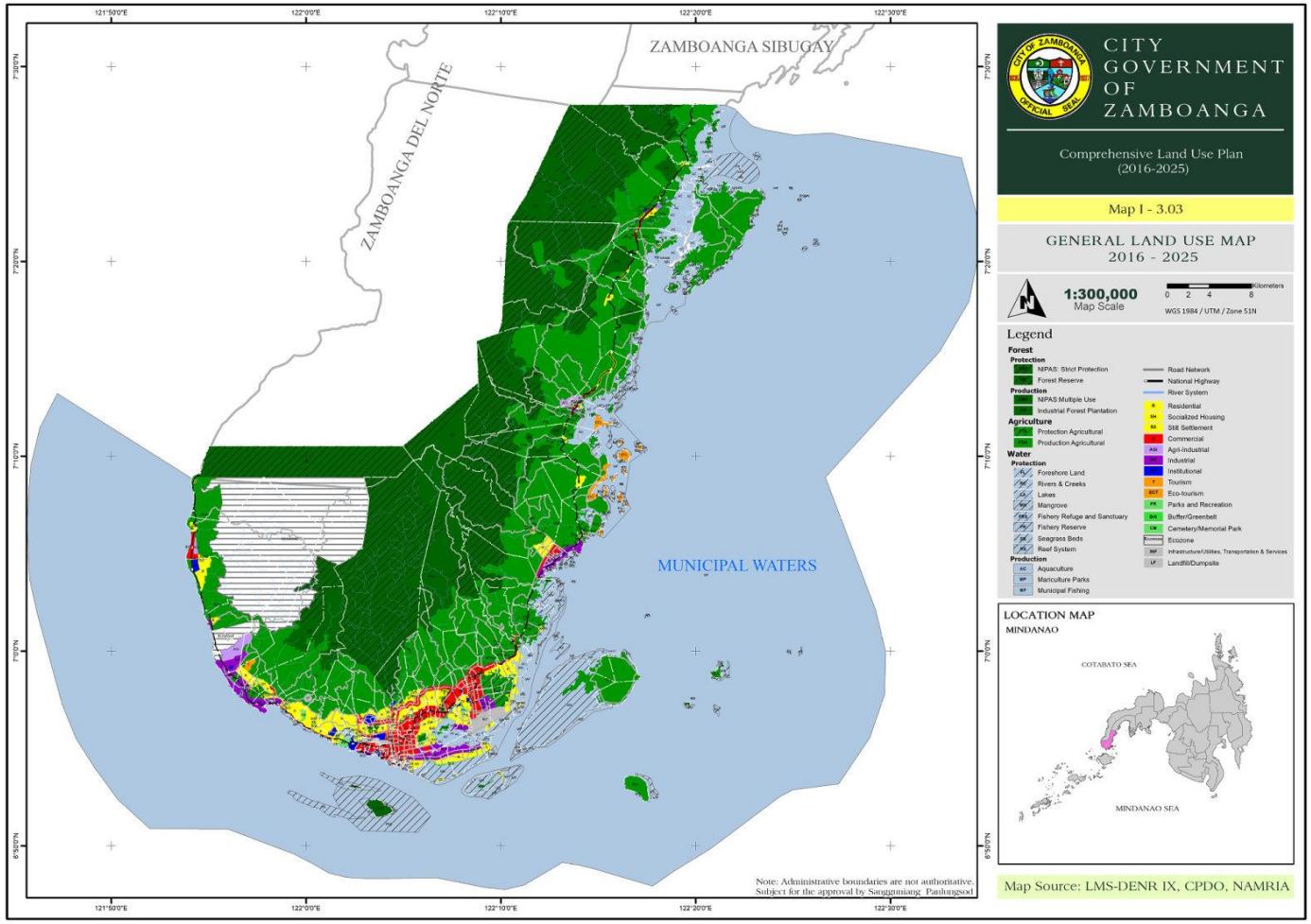
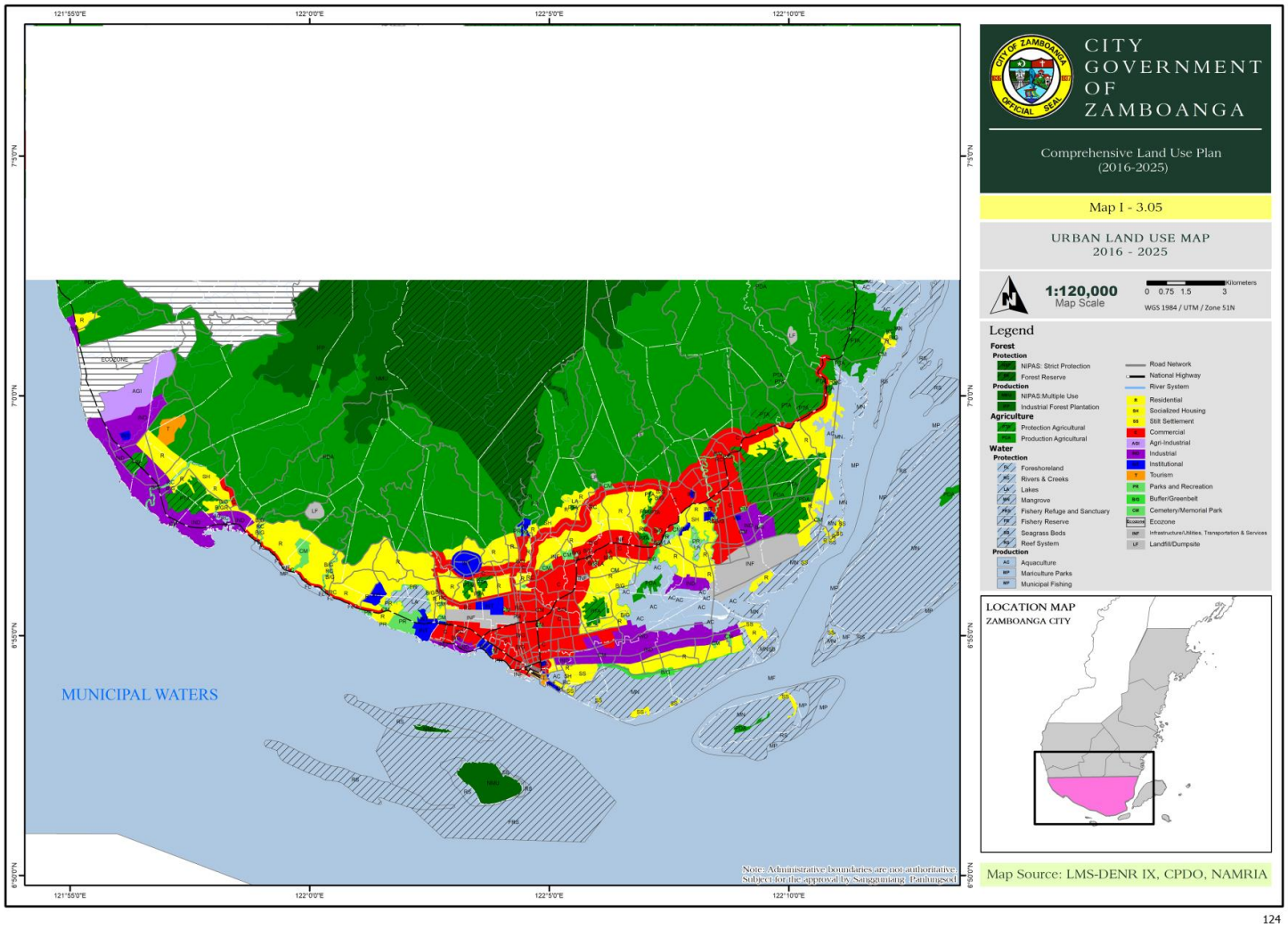
Source: Zamboanga City CLUP 2016-2025

Figure 2-3. Zamboanga City General Land Use Map (1997-2012)



Source: Zamboanga City CLUP 2016-2025

Figure 2-4. Zamboanga City General Land Use Map (2016-2025)



Source: Zamboanga City CLUP 2016-2025

Figure 2-5: Zamboanga City Proposed Urban Land Use Map (2016-2025)

2.2.3 Climate and Weather Conditions

22. The climate in Zamboanga City is classified as Type III under the Modified Corona's Classification System used by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). Areas under this climate type has seasons which are not very pronounced, and dry seasons lasting from one to three months.

23. **Table 2-3** shows the monthly and annual rainfall normals from 1981 to 2010 recorded from the PAGASA station in Zamboanga Del Sur – the nearest climatic station to the city. As shown in the table, the average annual rainfall recorded for this period is about1,266.5 mm. The month of July recorded the highest average monthly rainfall of 152.6 mm, while February recorded the lowest with 43.7 mm.

Table 2-3. Zamboanga Del Sur Station Rainfall Normals (1981 to 2010)

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Mean, mm	49.7	43.7	56.3	69.0	90.0	149.1	152.6	144.9	144.9	178.9	120.6	66.8	1266.5
Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)													

24. **Table 2-4** presents the recorded temperature normal from 1981 to 2010 with recorded mean annual temperature of 28.3°C. The month of January recorded the coldest average temperature of 27.9°C while the warmest average temperature recorded is in the months of April and May at 28.8°C.

Table 2-4. Zamboanga Del Sur Station Temperature Normals (1981-2010)

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Maximum (°C)	32.3	32.6	33	33.1	32.8	32.1	31.8	32.1	32.3	32.2	32.5	32.5	32.4
Minimum (°C)	23.5	23.6	24	24.4	24.7	24.4	24.2	24.3	24.2	24	23.9	23.7	24.1
Mean (°C)	27.9	28.1	28.5	28.8	28.8	28.2	28.0	28.2	28.3	28.1	28.2	28.1	28.3
Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)													

25. Climatological extremes provide the highest or lowest values ever recorded in the location. **Table 2-5** presents the climatological extremes from Zamboanga Del Sur as of 2012.

Table 2-5. Zamboanga Del Sur Station Climatological Extremes (as of 2012)

Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
Greatest Daily Rainfall, mm	128	156.5	79.6	106	88.9	123.5	140.4	136.6	193.2	199.1	163.3	161	199.1
Highest Temperature (°C)	35.5	35.5	36	36.9	36.1	36	35.2	35.7	35.8	36	35.5	35.2	36.9
Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)													

2.3.4 Geology and Soil Types

26. The City of Zamboanga has seven broad landforms as enumerated by the Bureau of Soil and Water Management. These landforms are coastal landscape, broad alluvial plain, minor alluvial plain, plain, hills, mountain, and miscellaneous. The landforms in the city are described in the table below.

Table 2-6: Type of Landforms in Zamboanga City

Type of Landform	Description

Type of Landform	Description
Coastal landscape	Located along the northeastern coast of the city. The areas with this type of landforms are mostly lower alluvial lowlands and small low-lying areas. These areas have soil texture of clay to silty clay and very deep
Broad alluvial plain	Composed of areas in the valley floors and flood plains. Soil in this type of landform is from deposition and accumulation of unsorted and unconsolidated sand, silt, clay, pebbles, and boulders
Minor alluvial plain	Has the same characteristics with the broad alluvial plain. Soils are silty clay loam and moderately deep
Plain landform	Comprises of low-lying areas with silty clay loam soils which are moderately deep.
Hills	Covers a large portion of the city. This type of landform is formed from sedimentary rock formations, and soils are clay to loam which are moderately deep
Mountain areas	Has clay soil texture which has moderate depth. Meanwhile, miscellaneous areas consist of urban areas and salt bed
Source: Zamboanga City CLUP 2016-2025	

2.3.5 Water Bodies

27. There are several river systems traversing the City of Zamboanga. These river systems originate from the watershed forest reserves in the city and consist of main river, primary, secondary and its tributaries. This group of rivers usually discharges to a sea or bay. **Table 2-7** enumerates the major river systems in the city from watershed forest reserves to their respective service areas, and outfall.

28. There are six major river systems that are considered as potential water supply source in the city. These are the Vitali River, Curuan River, Bolong River, Manicahan River, Culianan River and Ayala River.

Table 2-7. Major River System in Zamboanga City

Major River System	Watershed Forest Reserve	Service Area (Barangay)	Outfall
Ayala River	Ayala	Talisayan, Tulungatung, Ayala, Recodo, Cawit	Sulu Sea
San Ramon River	Ayala	La Paz, Pamucutan, Talisayan	Sulu Sea
Patalon River	Ayala		Sulu Sea
Saaz River	Ayala		
Tumaga River	Pasonanca	Pasonanca, Sta. Maria, Tumaga, Tetuan, Guiwan, Tugbungan	Basilan Strait
Culianan River	Culianan	Tolosa, Culianan, Zambowood	Moro Gulf
Mercedes River	Culianan		Moro Gulf
Bolong River	Bolong	Bunguiao, Bolong	Moro Gulf
Manicahan River	Manicahan	Victoria, Manicahan, Lamisahan	Moro Gulf
Curuan River	Curuan	Curuan	Moro Gulf
Vitali River	Vitali	Vitali	Moro Gulf

Source: Zamboanga City CLUP 2016-2025

2.3 Demography and Socio-economic Profile

2.3.1 Population and Population Projection

29. There are a total of 98 barangays in the city of which, 58 are urban barangays while the remaining 40 are rural barangays. There are also nine island barangays in the city namely barangays Tigtabon, Santa Barbara, Pangapuyan, Landang Laum, Landang Gua, Busay, Pasilmanta, Manalipa and Tumalutab.

30. According to the census conducted by the Philippine Statistics Authority (PSA) in 2020, Zamboanga City had population of 977,234 that is about 25 percent of the total population in Zamboanga Peninsula. About 87.27 percent of the total population resides in the urban barangays and the remaining 12.73 percent are in the rural barangays. Also, about three percent were living in the island barangays.

31. From 2015 to 2020, the city exhibited a population growth rate of 2.68 percent which is higher than the national and regional growth rate of 1.63 percent and 1.39 percent, respectively. Furthermore, the population density of the city was computed to be 691 persons per square kilometer of land.

32. In 2015, the city had a total number of households 193,970 households with average household size of the city of 4.4.

33. The projected population in the city per barangay is presented in **Table 2-8.** Population projections are used to estimate the basic needs and resources that would be needed to support the next generations. They give an insight to what needs to be developed to support the future population. Given the current growth rate of Zamboanga City, the population size is expected to increase significantly and may reach up to 1,226,405 by 2030.

Table 2-8: Zamboanga City Baseline and Projected Population

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
Urban						
1	Arena Blanco	13,671	2,688	4.7	15,927	17,915
2	Ayala	26,658	5,390	4.1	28,526	32,086
3	Baliwasan	17,932	6,553	3.7	31,683	35,637
4	Boalan	11,541	1,892	4.6	11,002	12,375
5	Bolong	8,068	1,544	4.2	8,173	9,193
6	Buenavista	8,154	1,444	4.5	8,205	9,229
7	Bunguiao	7,952	1,810	4	9,219	10,370
8	Cabaluay	8,849	1,557	4.1	8,034	9,037
9	Cabatangan	17,812	3,088	4.4	17,308	19,468
10	Calarian	33,563	6,764	4.3	36,562	41,125
11	Camino Nuevo	7,421	1,736	4.4	9,791	11,013
12	Campo Islam	11,730	3,303	3.8	16,258	17,862

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
13	Canelar	10,512	2,380	4.7	14,043	15,796
14	Cawit	10,244	1,836	5	11,702	13,162
15	Culianan	10,851	1,799	4.6	10,524	11,837
16	Curuan	11,954	2,081	4.2	11,128	12,517
17	Divisoria	13,172	2,053	4.5	11,662	13,118
18	Guiwan	13,231	3,207	4.4	18,095	20,353
19	Kasanyangan	28,819	2,641	5.3	17,857	20,085
20	La Paz	8,724	1,652	4.6	9,561	10,754
21	Labuan	16,095	2,524	4.5	14,495	16,304
22	Licomo	5,888	1,177	4.5	6,727	7,566
23	Limpapa	6,060	1,264	4.6	7,315	8,228
24	Lunzuran	13,232	2,238	4.4	12,564	14,133
25	Maasin	9,267	1,995	4.5	11,333	12,748
26	Malagutay	8,265	1,598	4.2	8,422	9,473
27	Mampang	31,975	7,436	4.6	43,411	48,828
28	Manicahan	11,999	2,129	4.7	12,754	14,346
29	Mariki	6,310	258	6.9	2,246	2,526
30	Mercedes	22,321	3,211	4.6	18,625	20,949
31	Pasonanca	27,215	6,216	4.4	34,633	38,955
32	Patalon	11,127	1,791	4.5	10,283	11,567
33	Putik	22,271	4,451	4.4	24,900	28,007
34	Recodo	23,254	4,126	4.2	22,008	24,754
35	Rio Hondo	8,827	638	5.2	4,208	4,733
36	San Jose Cawa-Cawa	4,292	1,240	4.5	7,810	8,785
37	San Jose Gusu	16,260	3,984	4.2	21,158	23,798
38	San Roque	28,829	5,905	4.7	35,285	39,688
39	Sangali	26,758	4,754	4.4	26,273	29,552
40	Sinunuc	22,918	3,714	4.4	20,884	23,491
41	Sta. Barbara	6,711	794	5.8	6,025	6,777
42	Sta. Catalina	16,644	3,694	4.7	21,880	24,611
43	Sta. Maria	24,133	5,889	4.3	31,863	35,840
44	Sto. Niño	3,888	1,058	3.8	5,224	5,876
45	Talisayan	11,428	1,482	4.5	10,400	11,698
46	Talon-Talon	37,350	7,724	4.5	44,175	49,688
47	Taluksangay	9,437	1,769	5.8	12,952	14,568
48	Tetuan	29,621	7,351	4	37,683	42,386
49	Tigtabon	5,365	1,156	4.6	6,695	7,531
50	Tugbungan	26,538	5,589	4.3	30,158	33,922
51	Tulungatung	11,741	1,944	4.8	11,698	13,158
52	Tumaga	33,399	6,833	4.5	38,998	43,865
53	Vitali	10,716	2,237	4.2	11,900	13,385
54	Zambowood	12,870	2,431	4.2	12,862	14,467
55	Zone I	4,806	553	4.2	5202	5852
56	Zone II	1,802	489	4.1	2711	3050
57	Zone III	1,146	350	4.2	1922	2162

No.	Barangay	Baseline Population	Number of Household	Average Household Size	Projected Population	
		2020	2015	2015	2025	2030
58	Zone IV	1,174	295	4.3	1656	1863
Sub-Total		**852,790**	**167,705**	**4.4**	**944,598**	**1,062,062**
Rural						
1	Baluno	3,865	711	4.4	3,992	4,490
2	Busay	2,290	825	4.1	4,250	4,780
3	Cacao	1,311	318	4.2	1,704	1,917
4	Calabasa	2,936	775	4.2	4,076	4,585
5	Capisan	1,488	308	4.6	1,781	2,004
6	Dita	2,028	491	4.2	2,638	2,967
7	Dulian (UB)	2,569	658	3.9	3,252	3,657
8	Dulian (UP)	1,489	309	4.3	1,676	1,886
9	Guisao	2,583	812	4.2	4,299	4,836
10	Lamisahan	2,764	581	3.9	2,896	3,257
11	Landang Gua	3,154	628	4.8	3,787	4,259
12	Landang Laum	3,095	940	5.1	6,032	6,785
13	Lanzones	3,689	848	3.9	4,159	4,678
14	Lapakan	1,868	322	4.3	1,743	1,961
15	Latuan	2,615	668	3.7	3,109	3,496
16	Limaong	4,766	892	4.5	5,061	5,692
17	Lubigan	3,249	687	4.3	3,726	4,191
18	Lumayang	1,999	320	4.6	1,861	2,093
19	Lumbangan	4,461	763	4.2	4,093	4,604
20	Manalipa	2,588	462	4.6	2,711	3,050
21	Mangusu	5,608	1,014	4.7	6,051	6,807
22	Muti	3,420	631	4.7	3,774	4,245
23	Pamucutan	4,404	941	4.3	5,135	5,776
24	Pangapuyan	767	133	4.4	746	840
25	Panubigan	982	336	4.8	2,037	2,291
26	Pasilmanta	3,138	515	4.1	2,685	3,020
27	Pasobolong	5,624	925	4.1	4,755	5,348
28	Quiniput	4,015	826	4	4,212	4,737
29	Salaan	3,623	913	4.4	5,153	5,796
30	Sibulao	4,167	980	4.3	5,369	6,040
31	Sinubong	3,601	745	6.3	5,932	6,673
32	Tagasilay	3,998	698	4.3	3,759	4,228
33	Taguiti	1,328	324	4.5	1,847	2,078
34	Talabaan	5,907	1,174	4.5	6,756	7,599
35	Tictapul	3,527	796	4.8	4,829	5,432
36	Tigbalabag	2,109	460	3.9	2,281	2,566
37	Tolosa	3,859	673	4.1	3,508	3,946
38	Tumalutab	3,436	548	4.4	3,058	3,440
39	Tumitus	2,731	656	4.6	3,828	4,306
40	Victoria	3,393	659	4.3	3,545	3,987
Sub-Total		**124,444**	**26,265**	**4.4**	**146,106**	**164,343**
TOTAL		**977,234**	**193,970**	**4.4**	**1,090,704**	**1,226,405**

Sources: PSA 2020, POPCEN 2015; CDP of Zamboanga City 2016-2021

2.3.2 Gender Ratio

34. The gender ratio of a population has significant effects on other demographic statistics such as the birth rate and death rate. It can also affect the number of families in the Local Government Unit (LGU) as well as influence incidences of certain diseases that are gender specific. According to the 2015 data the population of Zamboanga City comprised of 49.79 percent female and 50.21 percent male. This results in a gender ratio of almost 100 males for every 100 females.

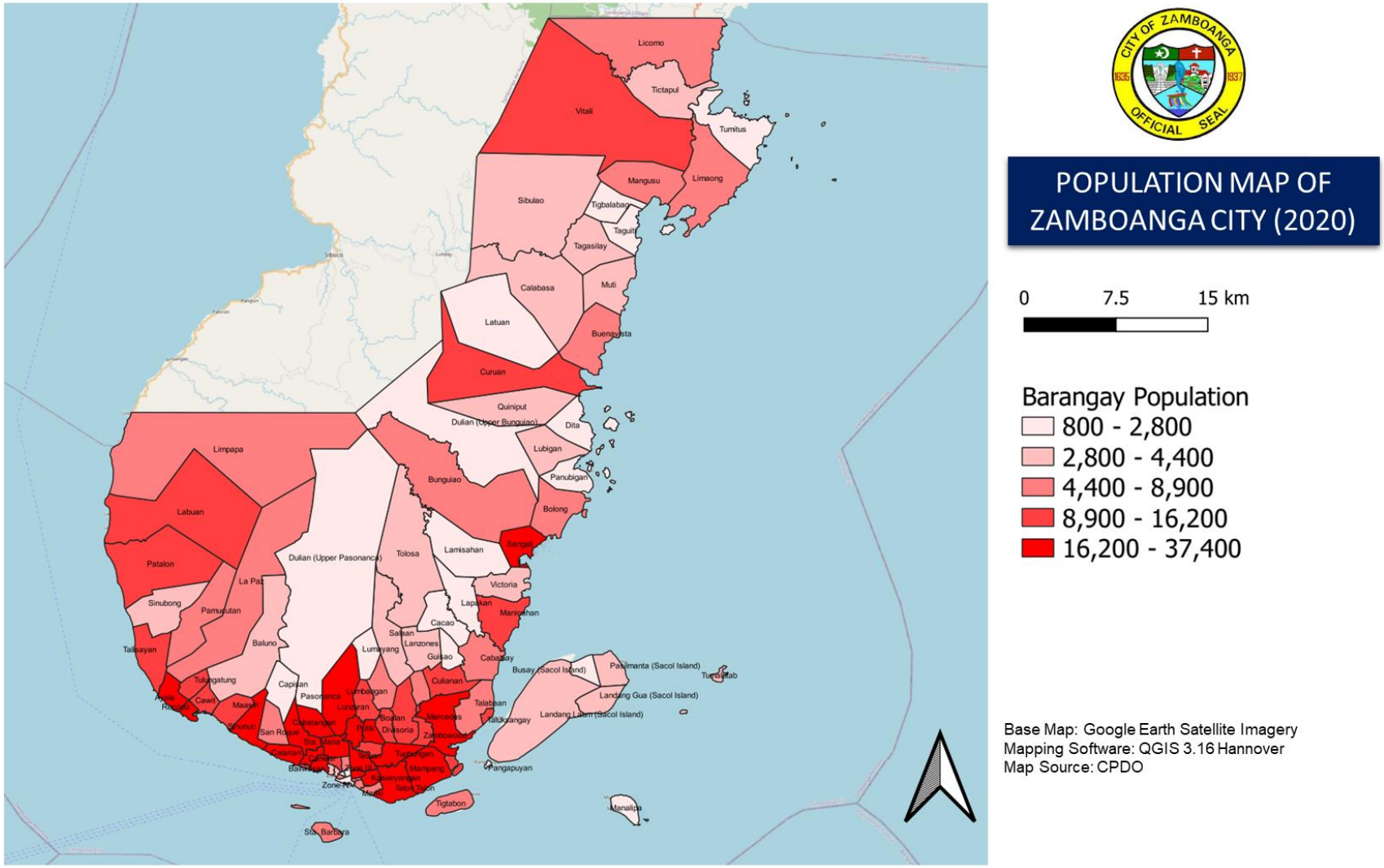


Figure 2-6: Population Map in Zamboanga City (2020)

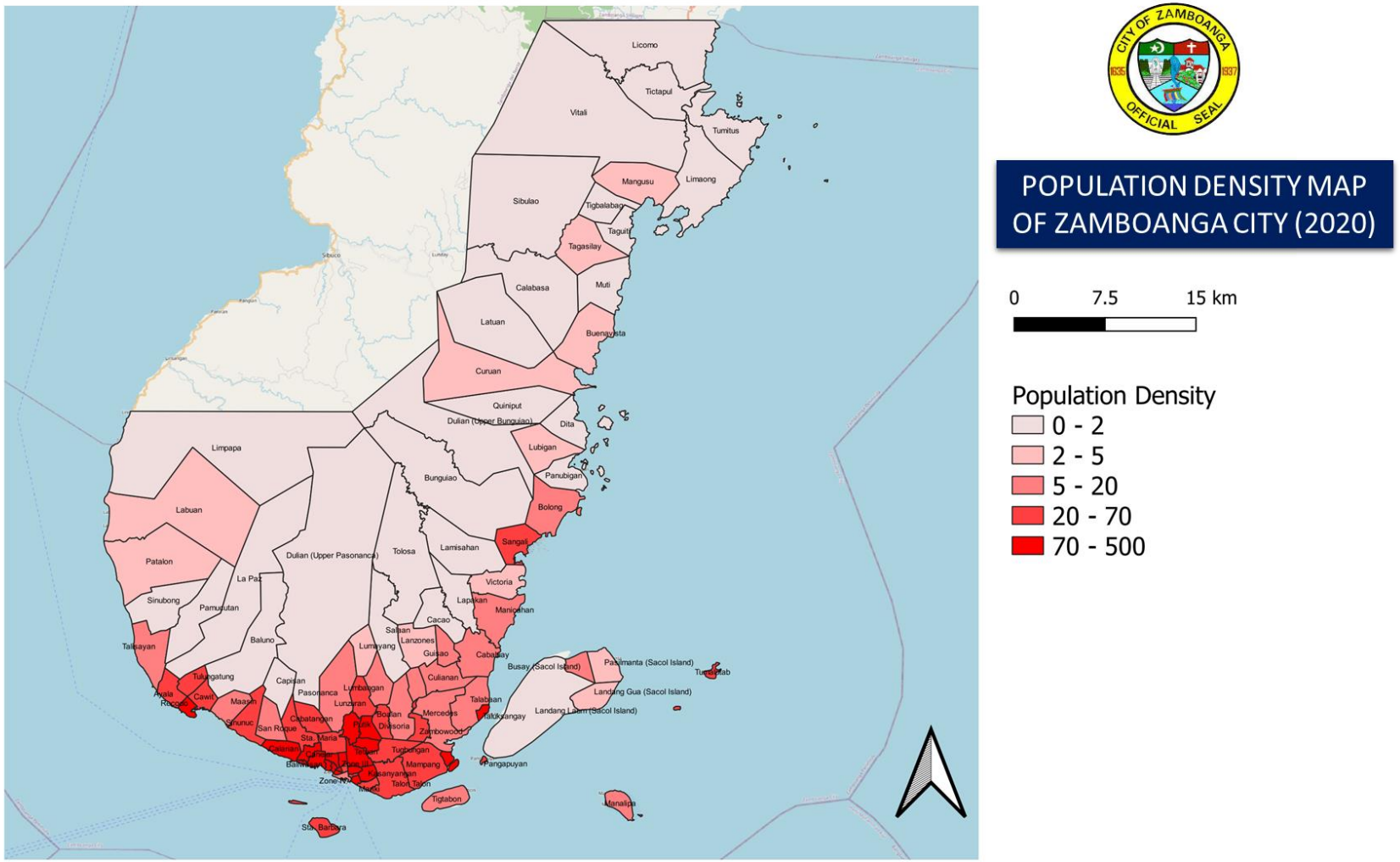


Figure 2-7: Population Density Map in Zamboanga City (2020)

2.3.3 Major Economic Activities

35. The economic structure of Zamboanga City is categorized into primary, secondary and tertiary levels. Primary economic activities include agriculture and fishing due to vast agricultural land and settlements situated in coastal areas in the city. Agricultural production includes major crops such as banana, mango, corn, and rubber. Meanwhile, fishery comprises of seaweeds, Big-eyed Scad (Matangbaka), Frigate Tuna (Tulingan), and Roundscad (Galunggong).

36. The secondary sources of the city's economy are major industries such as canning and fish processing. Zamboanga City is labeled as the Sardines Capital of the Philippines since it provides 75 percent of the country's domestic requirements for canned sardines. In addition, another major manufacturing venture in the city is shipbuilding and repair.

37. Lastly, the tertiary economic activities in Zamboanga City are wholesale and retail businesses. In 2020, there are about 12,611 registered business establishments in the city.

38. Tourism also contributes to the city's economy. From 2016 to 2019, there were a total of 1,745,031 recorded number of tourist arrivals in the city.

39. The boost in the economic activities of the city results to the increase in the demand on the water supply, sanitation, and other urban services and infrastructure utilities of the locality. Thus, the LSSP must be integrated in the comprehensive development and investment plans of Zamboanga City.

2.3.4 Vital Health Indices

Morbidity

40. **Table 3-3** presents the ten leading causes of morbidity in Zamboanga City, including the number of cases recorded from 2016 to 2020. For the past five years, acute gastroenteritis (AGE) was recorded to be one of the leading causes of morbidity in the city. The occurrence of AGE can be attributed to the lack of access to sanitary facilities in the city and due to poor sanitation practices. Diarrhea was also observed to be one of the leading causes of morbidity in 2016 and 2017.

Mortality

41. **Table 3-4** presents the ten leading causes of mortality in the city, including the number of cases recorded from 2016 to 2020. As shown, AGE was also recorded to be one of the leading causes of mortality in city in 2018 and 2019.

42. A rotavirus outbreak happened in the city in 2016. Rotavirus usually spreads from fecal-oral contact which usually happens because of poor hand-washing practices or from consuming contaminated food or water. To stop the spread of the rotavirus, the CHO strengthened its WASH IEC programs on proper hygiene practices and the importance of the use of sanitary toilet facilities. The CHO also disinfected the groundwater sources of the households and strictly monitored the quality of the drinking water from the service providers

Table 2-9: Top 10 Leading Causes of Morbidity in Zamboanga City, 2016-2020

Rank	2016		2017		2018		2019		2020	
1	Acute Respiratory Infection	34,881	Acute Respiratory Infection	65,544	Acute Respiratory Infection	80,473	Acute Respiratory Infection	57,706	Animal Bite	10,691
2	Animal Bite	6,073	Fever	9,993	Systemic Viral Illness	12,640	Animal bites	10,329	Acute Respiratory Infection	8,024
3	Fever	5,947	Animal Bite	6,945	Animal Bite	9,041	Systemic Viral Illness	9,691	Wounds/Injuries	4,178
4	Wounds	4,949	Hypertension	5,590	Hypertension	9,021	Dengue	7,315	Systemic Viral Illness	1,864
5	Hypertension	3,232	Wounds	5,468	Skin Diseases	6,932	Trauma	6,852	Hypertension	1,603
6	Acute Gastroenteritis*	3,015	Skin Diseases	4,230	Trauma	6,190	Hypertension	4,881	Acute Gastroenteritis*	1,398
7	Skin Diseases	2,135	Acute Gastroenteritis	2,154	Acute Gastroenteritis*	6,085	Acute Gastroenteritis*	3,717	Skin Diseases	1,221
8	Urinary Tract Infection	1,521	Diarrhea*	1,865	Tuberculosis (all forms)	3,181	Tuberculosis (all forms)	3,414	Tooth ache	1,113
9	Injuries	1,386	Injuries	1 683	Urinary Tract Infection	2 121	Skin Diseases	3 081	Urinary Tract Infection	586
10	Diarrhea*	1,217	Headache	1 455	Dental caries	1 852	Type 2 Hypersensitivity Reaction	1 350	Headache	558

Source: CHO 2020
*Can be due to poor sanitation

Table 2-10: Top 10 Leading Causes of Mortality in Zamboanga City, CY 2016-2020

Rank	2016		2017		2018		2019		2020	
1	Diseases of the Heart	730	Diseases of the Heart	1180	Diseases of the Heart	1015	Diseases of the Heart	1555	Diseases of the Heart	1610
2	Pneumonia	453	Pneumonia	640	Pneumonia	529	Diseases of the Vascular System	638	Diseases of the Vascular System	499
3	Malignant Neoplasms	373	Diseases of the Vascular System	561	Diseases of the Vascular System	397	Pneumonia	525	Cancer (All Types)	492
4	Diseases of the Vascular System	367	Malignant Neoplasms	465	Cancer (All Types)	232	Cancer (All Types)	495	Pneumonia	419
5	Tuberculosis (All forms)	128	Tuberculosis (All forms)	148	Tuberculosis (All forms)	128	Renal Disease	296	Hypertension and its complications	219
6	Chronic Obstructive Pulmonary Disease	86	Diabetes Mellitus	134	Diabetes and its complications	107	Tuberculosis (All forms)	245	Tuberculosis (All forms)	202
7	Diabetes Mellitus	85	Chronic Obstructive Pulmonary Disease	99	Trauma	78	Trauma	186	Renal Disease	182
8	Vehicular Accident	56	Hypertension and its Complications	89	Chronic Obstructive Pulmonary Disease	60	Diabetes and its complications	132	COVID-19 confirmed	174
9	Diabetic Nephropathy	53	Asthma	76	Undetermined cause of death	57	Chronic Obstructive Pulmonary Disease	122	Diabetes and its complications	133
10	Aspiration Pneumonia	51	End Stage Renal Disease	71	Acute Gastroenteritis*	54	Acute Gastroenteritis*	79	Chronic Obstructive Pulmonary Disease	84

Source: CHO 2020
*Can be due to poor sanitation

2.3.5 Heath Facilities

43. The CHO is the primary health agency of the City Government of Zamboanga. The DOH-licensed health care facilities in the city consist of 14 hospitals (6 government and 8 private), 17 birthing homes, 13 institution-based clinical laboratories (2 government and 11 private) and five private free-standing facilities (see **Table 2-11**). There are also 99 barangay health centers in the city.

Table 2-11: Licensed Health Care Facilities in Zamboanga City

Type of Facility	Ownership	No. of Licensed Facilities	Name of Licensed Facilities
Hospitals	Government	6	• Cristino Paragas Memorial Hospital • Edwin Andrews Airbase Hospital • Labuan Public Hospital • Mindanao Central Sanitarium • Zamboanga City Medical Center • Camp Navarro General Hospital
	Private	8	• Brent Hospital and Colleges, Inc. • Ciudad Medical Zamboanga • Hospital de Zamboanga • Universidad de Zamboanga Medical Center • West Metro Medical Center • Zamboanga City Puericulture • Zamboanga Doctor's Hospital • Zamboanga Peninsula Medical Center
Birthing Homes	Government Private	17	• Ayala Lying-in Clinic • Baliwasan Lying-in • Calarian Health Center • Canelar Health Center • Labuan Health Center • Sta. Catalina Health Center • Sta. Maria Health Center • Talon-talon Health Center • Tugbungan Health Center • Curuan Health Center • Guiwan Health Center • Manicahan Health Center • Mercedes Health Center • Tetuan Main Health Center • Sangali Main Health Center • Tumaga Health Center • Brent Hospital & Colleges, Inc.
Institution-based	Government	2	• Zamboanga City Health Office • Western Mindanao State University
	Private	11	• Dr. Sac Memorial Hospital • BP Diagnostic and Clinical Laboratory • Speed Medicheck

Type of Facility	Ownership	No. of Licensed Facilities	Name of Licensed Facilities
			• JAR Medical Networker and Mobile Service (2) • ZC Heart Laboratory • T.L. Estacio Clinical Laboratory • St. Vincent Diagnostic Center • Dia-Meth Drug Testing and Clinical Laboratory • Pointcare Diagnostic Clinical Laboratory • ZC New Seajer Clinical Laboratory
Free Standing	Private	5	• SIA Clinical Laboratory • AMPI Diagnostic Clinical Laboratory • Qualimed Diagnostic Laboratory • Corteza Clinical Laboratory • Jocel Clinical Laboratory
Sources: DOH- Regional Office IX Masterlist of Licensed Birthing Facilities as of August 2016; DOH-Regional Office IX List of Licensed Clinical Laboratories as of 2016 City Health Office 2020			

Table 2-12: List of Barangays with Barangay Health Centers in Zamboanga City

No.	Barangay	No.	Barangay	No.	Barangay
1	Canelar	34	Talon-Talon Loop	67	Patalon
2	Sto. Niño	35	Talon-Talon	68	Latap
3	San Jose Cawa-Cawa	36	Manalipa	69	Cabaluay
4	Camino Nuevo	37	Tictabon	70	Manicahan
5	Zone I	38	Zone III & IV	71	Guisao
6	Zone II	39	Divisoria	72	Tolosa
7	Sta. Maria	40	Putik	73	Lanzones
8	Km. 7 Pasonanca	41	Boalan	74	Landang Gua
9	Pasonanca	42	Guiwan	75	Lapakan
10	Shanty Town (Luyahan)	43	Pasobolong	76	Tumalutap
11	Dulian Upper Pasonanca	44	Mercedes	77	Cacao
12	Cabatangan	45	Culianan	78	Pasilmanta
13	Rio Hondo	46	Talabaan	79	Landang Laum
14	Mariki	47	Zambowood	80	Sangali
15	Sta. Catalina	48	Salaan	81	Dulian, Upper Bunguiao
16	Sta. Barbara	49	Taluksangay	82	Lamisahan
17	Kasanyangan	50	Culianan	83	Victoria
18	Campo Islam	51	Mercedes	84	Bunguiao
19	San Jose Gusu	52	Ayala	85	Sangali
20	Star Apple Baliwasan	53	Tulungatung	86	Vitali
21	Baliwasan	54	Recodo	87	Limaong
22	Calarian	55	Baluno	88	Tigbalabag
23	Malagutay	56	Maasin	89	Tagasilay
24	Southcom Village	57	Cawit	90	Licomo
25	Capisan	58	Ayala	91	Sibulao
26	San Roque	59	Labuan	92	Tumitus

No.	Barangay	No.	Barangay	No.	Barangay
27	Tugbungan	60	Talisayan	93	Curuan
28	Tetuan	61	Labuan	94	Calabasa
29	Lumbangan	62	Lapaz	95	Dita
30	Lunzuran	63	Sinubong	96	Buenavista
31	Tumaga	64	Limpapa	97	Latuan
32	Lumayang	65	Pamucutan/Annuling	98	Lubigan
33	Mampang	66	Camp Susana	99	Muti
Source: City Health Office 2020					

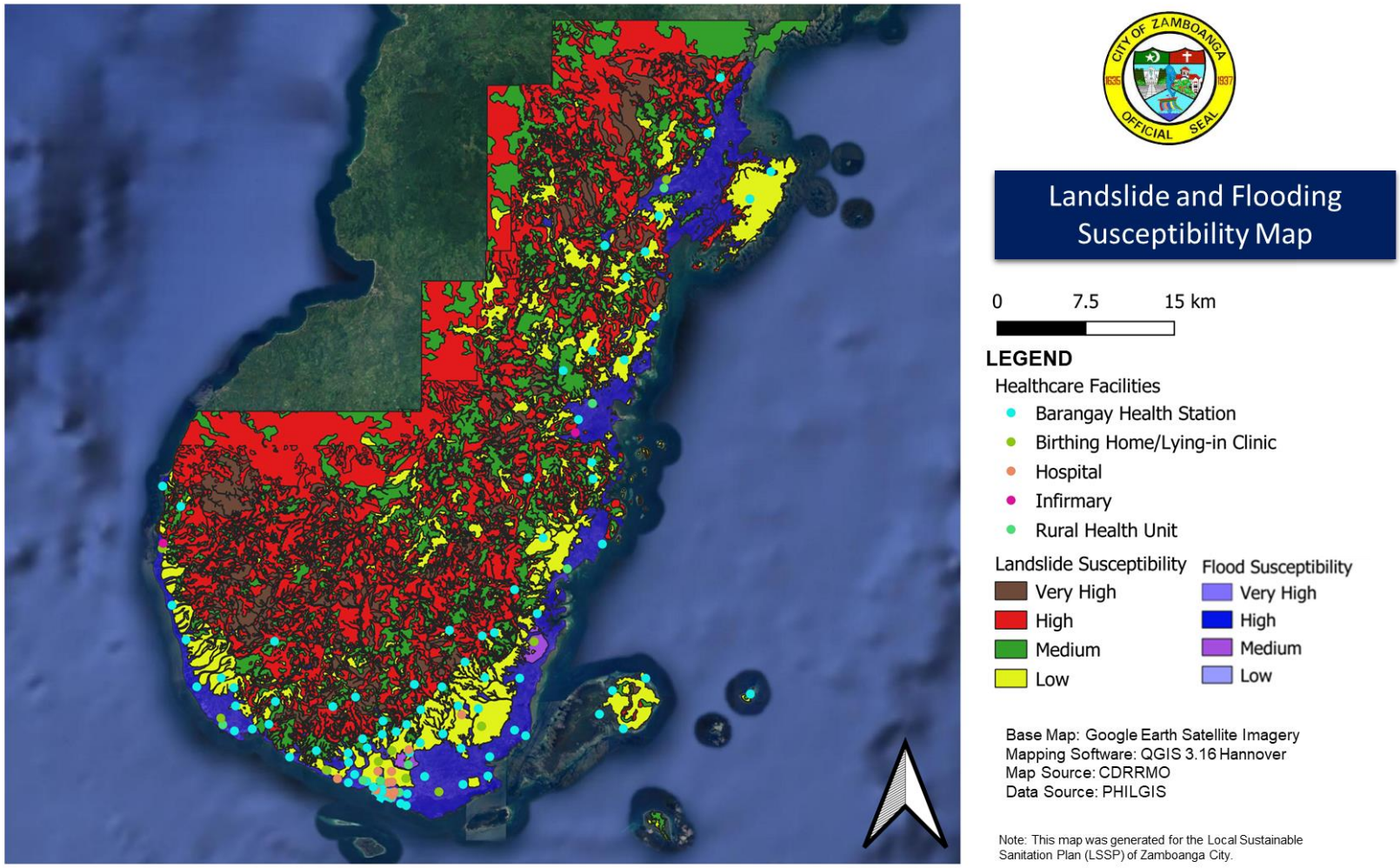


Figure 2-8: Healthcare Facilities in Zamboanga City Landslide and Flood Susceptibility Map

2.4 Natural Hazards

2.41 Flooding

44. Based on the study conducted by Department of Environment and Natural Resources (DENR) Mines and Geosciences Bureau, at least 77 barangays in the city are highly susceptible to flooding. These barangays are located mostly in coastal areas. In addition, five river systems greatly contribute to flooding in the city namely, Tumaga River, Putik River, Culianan River, San Jose Gusu River, and Vitali River.

45. The areas within the city center are also susceptible to flooding due to its low-lying elevation of five meters above mean sea level. **Table 2-13** presents the list of affected areas by flooding of the river systems, while **Figure 2-9** shows the landslide and flood susceptible map of the city.

Table 2-13: List of Affected Areas by Flooding of the River Systems

River System	Areas
Tumaga River	Barangays Sta. Maria, Tumaga, Guiwan, Tetuan, Tugbungan
Putik River	A&W Subdivision, low lying areas within Sitio Caputatan, areas downside of Marcos Drive in Putik, Sitio Tibak in Divisoria
Culianan River	Barangay Pasobolong
San Jose Gusu River	San Jose Gusu, San Roque, Baliwasan
Vitali River	-
Source: Zamboanga City CLUP 2016-2025	

2.4.2 Rain-induced Landslide

46. Among all the barangays, at least 44 barangays are highly susceptible to landslide. The city has recorded actual occurrences of landslides or down slope movement in the following areas.

- Sitio Muruk, Barangay Pasonaca (July 2007)
- Sitio Tres Tabukan, Barangay Tulungatung (February 2008)
- Kalambuan Housing Project-Phase III (June 2008)
- Sitio Tuwalang, Barangay Muti (July 2008)
- Sitio Daap, Barangay Victoria (July 2008)

47. The landslide susceptibility map of the city is presented in **Figure 2-9**.

2.4.3 Tsunami

48. The Philippine Institute of Volcanology and Seismology (PHIVOLCS) identified Zamboanga City as one of the tsunami prone areas in the country. Portions of the 80 barangays in the city are prone to tsunami. Coastal barangays may experience tsunami from 2 kilometers (km) to 5 km landward. The waves may also reach up to the Central Business District area. This hazard can cause damage to the coastal settlements, business, commercial, institutional buildings, and educational establishments.

2.4.4 High Temperature or Drought

49. Based on the study conducted by the Manila Observatory, 12 barangays have been identified as drought prone. In addition, the Office of the City Agriculturist recorded about 2,179 hectares of rice lands, covering more than 20 barangays, are susceptible to drought. The affected agricultural farms were situated in barangays Mercedes, Boalan, Putik, San Roque, Mampang, Lapakan, Bolong, Talabaan, Cabaluay and Mangusu.

50. Possible impacts of this type of hazard include drying of communal irrigation, decrease in production capacity of water sources and lesser water supply. Drought may worsen the availability and access to safe water supply in the city.

2.4.6 Sea Level Rise and Storm Surge

51. All 54 coastal and island barangays in Zamboanga City are highly susceptible to sea level rise and storm surge. The possible impacts of this hazard include total/massive settlement and livelihood displacement and destruction.

2.5 Climate Projections

52. From PAGASA projection in 2020 and 2050 in **Table 2-14,** Region IX would experience higher temperatures during summer season and increased rainfall during the rainy season by year 2020 and 2050. Higher temperatures will result in water shortages, and increased rainfall may induce flooding.

53. Frequency of extreme events under medium-range emission scenario will also increase in 2050. Considering these figures, appropriate precautionary measures must be employed during the construction and operation phases of the sanitation projects to avoid any complication in the long-run.

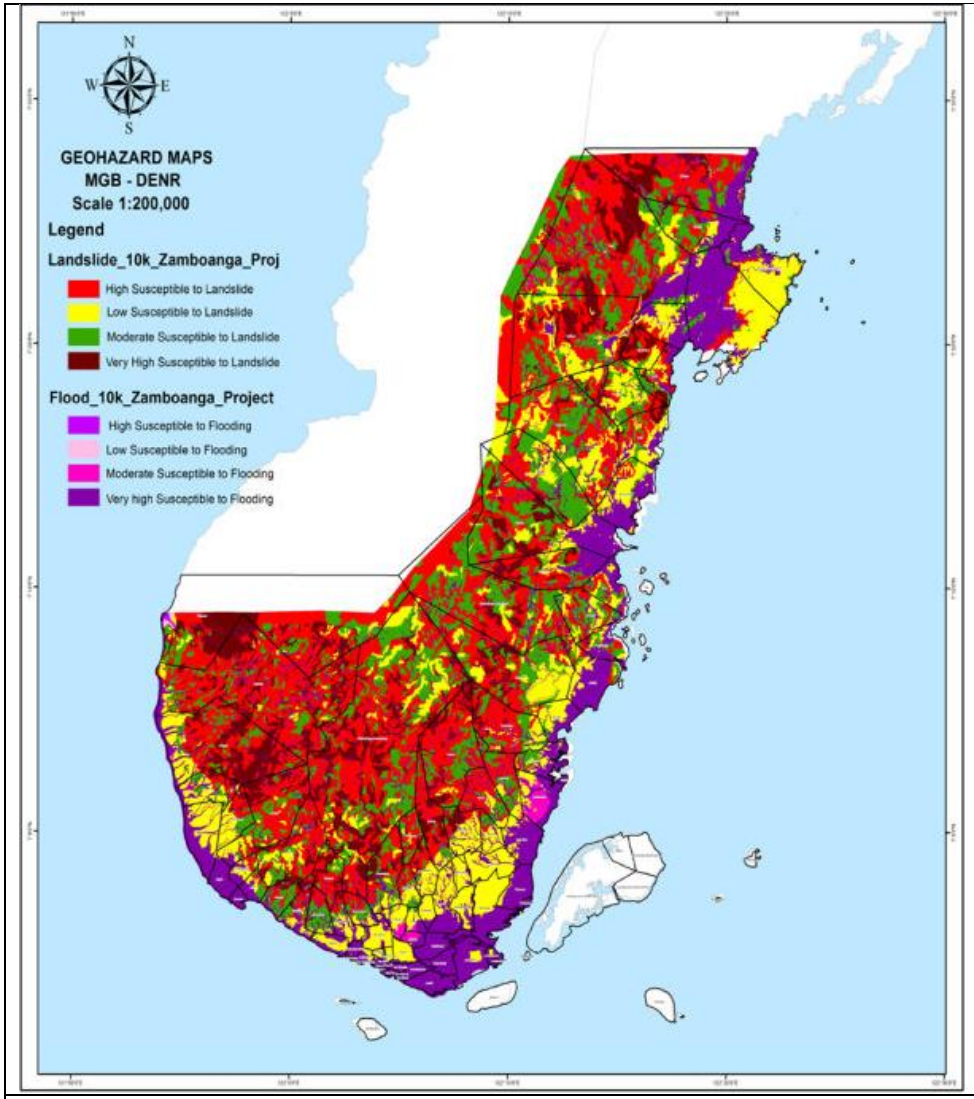
Table 2-14: Climate Projections in 2020 and 2050 in Provinces in Region 9

Seasonal temperature increases (in °C) in 2020 and 2050 under medium-range emission scenario in provinces in Region 9												
	OBSERVED BASELINE (1971-2000)				CHANGE IN 2020 (2006-2035)				CHANGE IN 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Region 9												
ZAMBOANGA DEL NORTE	27.0	27.9	27.6	27.5	1.0	1.1	1.1	1.0	2.0	2.1	2.2	2.0
ZAMBOANGA DEL SUR	26.8	27.6	27.3	27.2	0.9	1.1	1.0	1.0	1.9	2.1	2.0	1.9
ZAMBOANGA SIBUGAY	27.1	27.9	27.5	27.5	1.0	1.0	1.0	1.0	2.0	2.0	1.9	2.0

Seasonal rainfall change (in %) in 2020 and 2050 under medium-range emission scenario in provinces in Region 9												
	OBSERVED BASELINE (1971-2000)				CHANGE IN 2020 (2006-2035)				CHANGE IN 2050 (2036-2065)			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
Region 9												
ZAMBOANGA DEL NORTE	324.5	279.7	599.1	718.1	11.0	3.2	-3.2	13.8	2.6	1.7	-0.7	5.4
ZAMBOANGA DEL SUR	294.5	298.7	593.8	663.2	11.2	2.2	-0.4	13.8	3.6	0.0	9.9	7.1
ZAMBOANGA SIBUGAY	284.1	290.5	597.2	674.1	9.9	6.6	6.5	14.8	4.8	10.3	22.0	8.9

Frequency of extreme events in 2020 and 2050 under medium-range emission scenario in provinces in Region 9										
PROVINCES	STATIONS	NO. OF DAYS W/ Tmax > 35°C			NO. OF DRY DAYS			NO. OF DAYS W/ RAINFALL > 300mm		
		OBS	2020	2050	OBS	2020	2050	OBS	2020	2050
ZAMBOANGA DEL NORTE	Dipolog	217	2155	4004	7481	5384	5470	0	5	2
ZAMBOANGA DEL SUR	Zamboanga	54	114	714	8531	7058	6781	0	1	4

Sources PAG-ASA



Source: Zamboanga City CLUP 2016-2025

Figure 2-9. Zamboanga City Landslide and Flood Susceptible Map

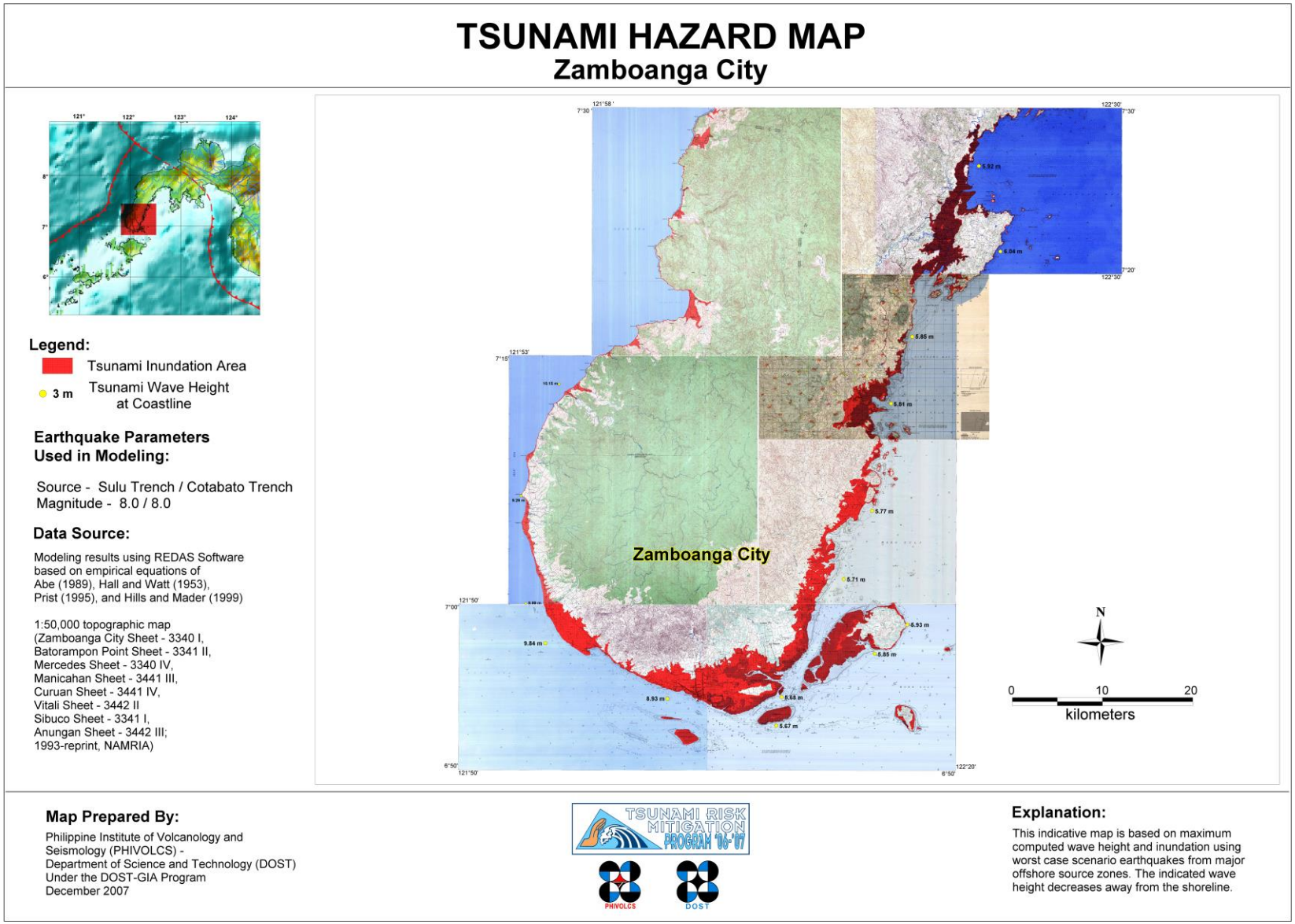


Figure 2-10: Tsunami Hazard Map of Zamboanga City

3. Existing Access, System and Programs on Sanitation

3.1 Water Supply

3.1.1 Household Access to Improved Water Supply

54. In 2020, about 90.7 percent of the households have access to improved water supply. The historical data on the access of households to improved water supply is presented in **Figure 3-1**. As shown in the figure, the percentage of households with access to improved water supply decreased in 2016 to 2018 and the number of households without access increased. The highest number of households without access to improved water supply was recorded in 2018 with 28,717 households or about 15% of the total households in the city.

55. Improved water supply includes piped water, public taps, boreholes, protected dugwells, protected sprigs and rainwater collection. The access of the households to level 1, 2 and 3 water systems are shown in **Figure 3-2**.

56. Based on the accomplished validation of CHO on the access of improved water supply in 2019, there were 30 barangays that do not access to Level 3 water supply system (see **Table 3-1**).

57. The CHO is not yet capacitated to monitor SDG 6.1 indicator that is the percent households with access to safely managed drinking water.

Table 3-1:Household Access to Drinking Water Services in Zamboanga City (2019)[11]

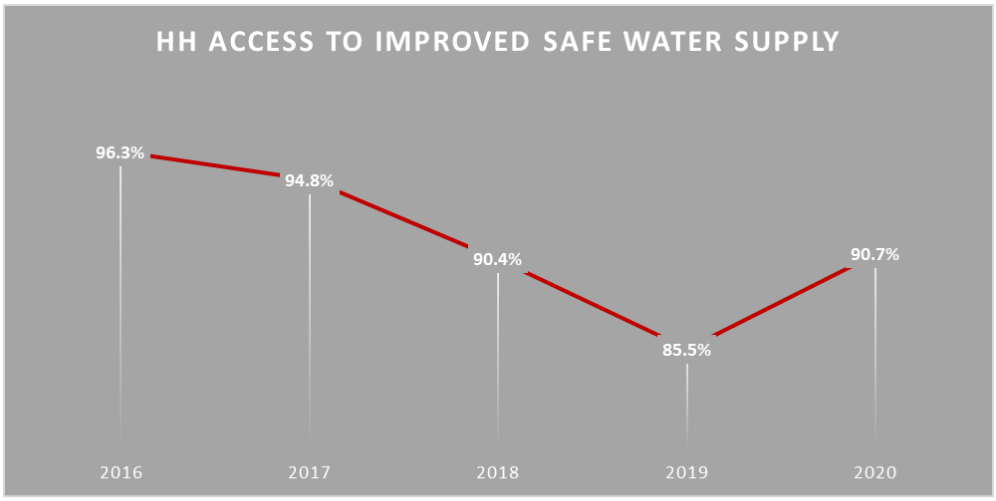
Barangay	Total Household	Level 1		Level 2		Level 3		Improved Water Supply	
		HH	%	HH	%	HH	%	HH	%
Ayala	5,164	-	0%	-	0%	4,812	93%	4,812	93%
Tulungatong	2,118	-	0%	29	1%	1,904	90%	1,933	91%
Recodo	3,984	-	0%	43	1%	3,718	93%	3,761	94%
Baluno	723	-	0%	105	15%	452	63%	557	77%
Cawit	2,118	-	0%	35	2%	1,904	90%	1,939	92%
Maasin	2,052	-	0%	18	1%	1,835	89%	1,853	90%
Sinunuc	3,781	-	0%	36	1%	3,584	95%	3,620	96%
Labuan	2,624	849	32%	49	2%	1,398	53%	2,296	87%
Talisayan	1,882	379	20%	57	3%	1,153	61%	1,589	84%
La Paz	1,731	282	16%	108	6%	1,047	60%	1,437	83%
Pamucutan	930	188	20%	101	11%	393	42%	682	73%
Sinubong	1,074	667	62%	54	5%	101	9%	822	77%
Limpapa	1,324	1,000	76%	53	4%	-	0%	1,053	80%
Patalon	1,861	1,142	61%	343	18%	88	5%	1,573	85%
Calarian	6,619	-	0%	642	10%	5,369	81%	6,011	91%
Capisan	322	21	7%	167	52%	100	31%	288	89%
Malagutay	1,525	17	1%	703	46%	481	32%	1,201	79%
San Roque	6,387	-	0%	886	14%	4,916	77%	5,802	91%
Baliwasan	5,735	-	0%	602	10%	4,676	82%	5,278	92%
San Jose Gusu	3,830	-	0%	868	23%	2,578	67%	3,446	90%
Campo Islam	2,875	-	0%	542	19%	1,973	69%	2,515	87%
Guiwan	3,276	-	0%	283	9%	2,525	77%	2,808	86%
Putik	4,507	-	0%	569	13%	3,544	79%	4,113	91%
Divisoria	2,111	-	0%	314	15%	1,455	69%	1,769	84%
Boalan	1,992	-	0%	390	20%	1,361	68%	1,751	88%
Zambowood	2,328	428	18%	62	3%	1,004	43%	1,494	64%

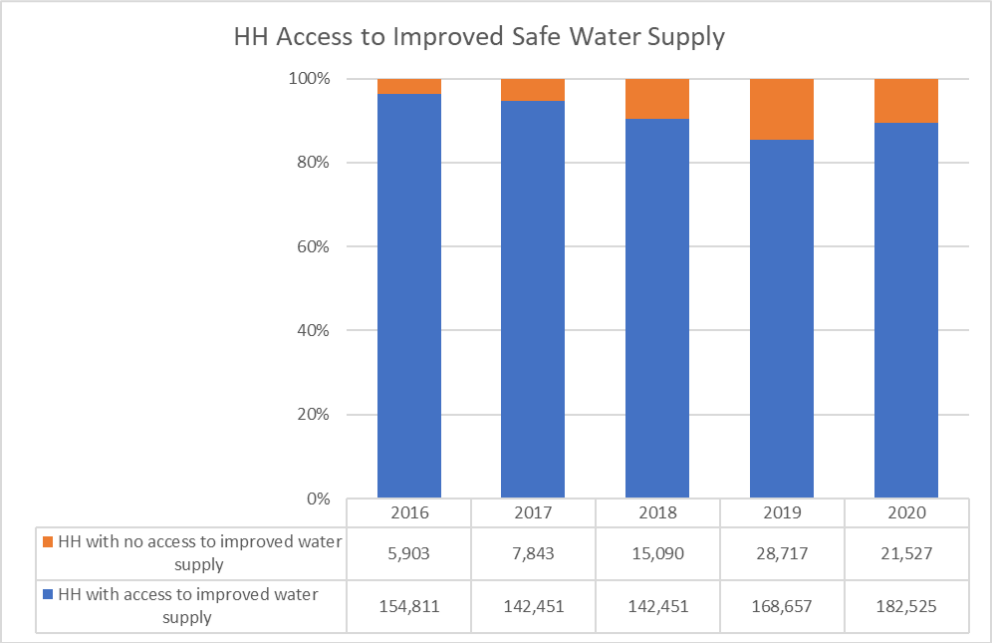
[11] Based on the accomplished validation of CHO in 2019

Barangay	Total Household	Level 1		Level 2		Level 3		Improved Water Supply	
		HH	%	HH	%	HH	%	HH	%
Pasobolong	861	200	23%	102	12%	352	41%	654	76%
Salaan	933	454	49%	43	5%	200	21%	697	75%
Mercedes	3,371	250	7%	436	13%	2,141	64%	2,827	84%
Talabaan	1,223	200	16%	240	20%	438	36%	878	72%
Taluksangay	2,345	350	15%	510	22%	1,004	43%	1,864	80%
Culianan	1,905	365	19%	142	7%	1,104	58%	1,611	85%
Guisao	778	401	52%	53	7%	28	4%	482	62%
Lanzones	753	254	34%	98	13%	18	2%	370	49%
Tolosa	635	229	36%	121	19%	28	4%	378	60%
Cacao	309	107	35%	18	6%	64	21%	189	61%
Cabaluay	1,454	173	12%	304	21%	597	41%	1,074	74%
Lapakan	316	105	33%	93	29%	46	15%	244	77%
Manicahan	2,309	53	2%	131	6%	1,633	71%	1,817	79%
Busay	769	390	51%	100	13%	-	0%	490	64%
Pasilmanta	486	175	36%	75	15%	-	0%	250	51%
Landang Gua	685	272	40%	148	22%	-	0%	420	61%
Landang Laum	1,092	589	54%	311	28%	-	0%	900	82%
Tumalatub	554	210	38%	200	36%	-	0%	410	74%
Victoria	642	323	50%	154	24%	-	0%	477	74%
Lamisahan	524	200	38%	204	39%	-	0%	404	77%
Sangali	4,756	800	17%	2,300	48%	600	13%	3,700	78%
Bunguiao	1,669	562	34%	700	42%	39	2%	1,301	78%
Dulian	589	130	22%	272	46%	-	0%	402	68%
Bolong	1,480	750	51%	550	37%	-	0%	1,300	88%
Panubigan	369	320	87%	-	0%	-	0%	320	87%
Lubigan	674	460	68%	120	18%	-	0%	580	86%
Dita	477	160	34%	253	53%	-	0%	413	86%
Quiniput	762	246	32%	387	51%	-	0%	633	83%
Curuan	2,015	615	31%	528	26%	390	19%	1,533	76%

Barangay	Total Household	Level 1		Level 2		Level 3		Improved Water Supply	
		HH	%	HH	%	HH	%	HH	%
Latuan	563	360	64%	120	21%	-	0%	480	85%
Calabasa	738	210	28%	250	34%	-	0%	460	62%
Buenavista	1,485	453	30%	764	51%	-	0%	1,217	82%
Muti	683	320	47%	310	45%	-	0%	630	92%
Tagasilay	680	430	63%	38	6%	-	0%	468	69%
Sibulao	972	740	76%	55	6%	-	0%	795	82%
Tigbalabag	413	230	56%	15	4%	-	0%	245	59%
Tumitus	693	450	65%	80	12%	-	0%	530	76%
Taguiti	334	210	63%	51	15%	-	0%	261	78%
Mangusu	1,095	910	83%	103	9%	-	0%	1,013	92%
Vitali	2,154	1,500	70%	62	3%	110	5%	1,672	78%
Limaong	916	750	82%	30	3%	-	0%	780	85%
Tictapul	874	550	63%	150	17%	-	0%	700	80%
Licomo	1,218	1,060	87%	10	1%	-	0%	1,070	88%
Canelar	2,542	-	0%	48	2%	2270	89%	2,318	91%
Camino Nuevo	1,772	-	0%	33	2%	1,543	87%	1,576	89%
Sto. Nino	946	-	0%	15	2%	847	90%	862	91%
Zone I	942	-	0%	29	3%	762	81%	791	84%
San Jose Cawa Cawa	1,414	-	0%	39	3%	1,202	85%	1,241	88%
Zone 2	491	-	0%	-	0%	362	74%	362	74%
Sta. Maria	5,768	-	0%	-	0%	5,169	90%	5,169	90%
Cabatangan	3,133	-	0%	-	0%	2,453	78%	2,453	78%
Pasonanca	6,269	-	0%	-	0%	5,719	91%	5,719	91%
Dulian	304	-	0%	-	0%	185	61%	185	61%
Sta. Catalina	3,961	-	0%	-	0%	3,507	89%	3,507	89%
Kasanyangan	3,232	-	0%	1,198	37%	1,795	56%	2,993	93%
Sta. Barbara	1,091	-	0%	11	1%	714	65%	725	66%
Zone 3	348	-	0%	-	0%	233	67%	233	67%
Zone 4	300	-	0%	-	0%	186	62%	186	62%

Barangay	Total Household	Level 1		Level 2		Level 3		Improved Water Supply	
		HH	%	HH	%	HH	%	HH	%
Mariki	406	-	0%	203	50%	81	20%	284	70%
Rio Hondo	762	-	0%	35	5%	682	90%	717	94%
Talon Talon	7,997	-	0%	800	10%	6,433	80%	7,233	90%
Mampang	7,858	-	0%	742	9%	5,950	76%	6,692	85%
Arena Blanco	2,883	-	0%	987	34%	1,567	54%	2,554	89%
Tigtabon	1,212	-	0%	1,050	87%	-	0%	1,050	87%
Manalipa	491	-	0%	450	92%	-	0%	450	92%
Pangapuyan	135	-	0%	98	73%	-	0%	98	73%
Tetuan/Sta Cruz	6,822	-	0%	-	0%	5,801	85%	5,801	85%
Tugbungan	5,459	-	0%	-	0%	4,840	89%	4,840	89%
Tumaga	7,059	-	0%	-	0%	6,457	91%	6,457	91%
Lunzuran	2,274	-	0%	-	0%	1,856	82%	1,856	82%
Lumbangan	741	-	0%	-	0%	665	90%	665	90%
Lumayang	337	-	0%	-	0%	298	88%	298	88%
TOTAL	**197,375**	**22,489**	**11%**	**23,428**	**12%**	**122,740**	**62%**	**168,657**	**85%**

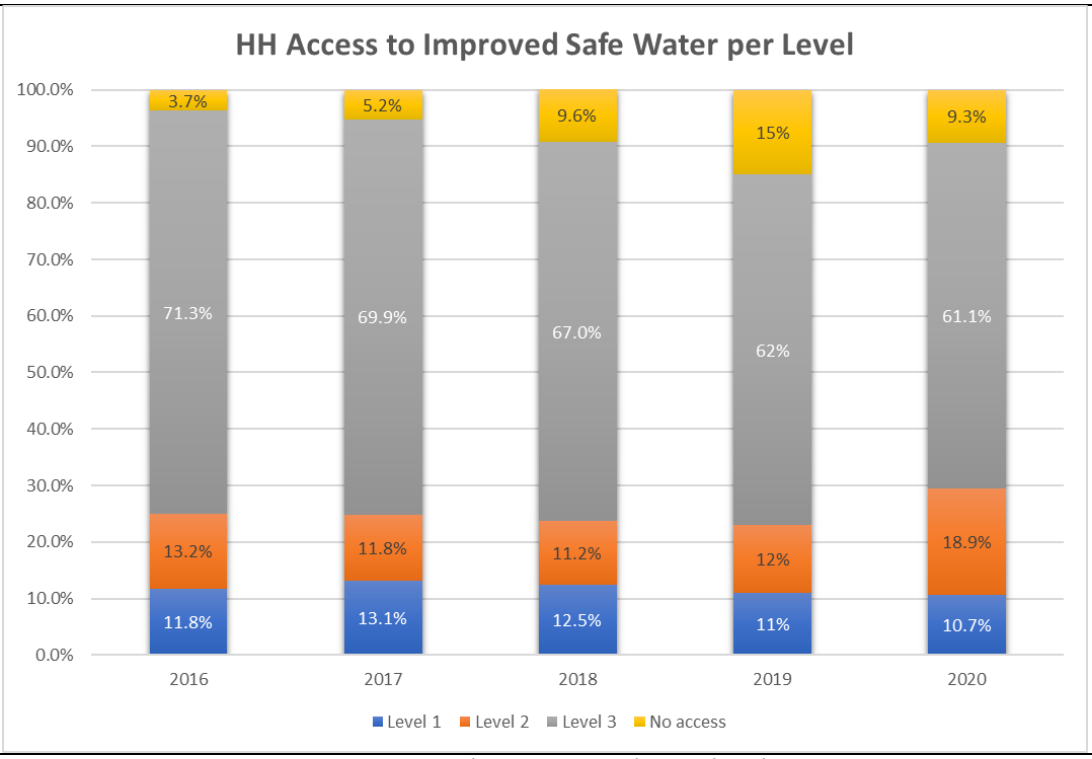




	2016	2017	2018	2019	2020
HH with no access to improved water supply	5,903	7,843	15,090	28,717	21,527
HH with access to improved water supply	154,811	142,451	142,451	168,657	182,525

Source: FHSIS (2016-2018, 2020), CHO (2019)

Figure 3-1: Household Access to Improved Safe Water Supply



Source: FHSIS (2016-2018, 2020), CHO (2019)

Figure 3-2: Household Access to Water Supply per Service Level

3.1.2 Water Service Provider

Zamboanga City Water District

58. Zamboanga City Water District (ZCWD) is the main water service provider in the city. ZCWD, formerly known as the Zamboanga City Waterworks and Sewerage System, was created through the City Resolution No. 446 (amended by Resolution No. 77 dated March 6, 1974) that was passed on November 8, 1973.

59. As of December 2020, ZCWD serves 61 out of the 98 barangays (see **Figure 3-3**) in the city with a total of 66,462 active service connections (ASC). This consists of 59,483 residential, 4,852 commercial, 1,535 semi-commercial, 524 government, 25 industrial ASC and 43 ZCWD facility ASCs. The table below shows the number of ASCs per barangay.

Table 3-2: Total Number of Active Service Connections per Classification (as of 2020)

Barangay	Commercial	Government	Industrial	Residential	Semi-commercial	ZCWD Facility
Ayala	135	12	2	1,761	32	3
Baliwasan	152	16	3	1,956	73	1
Baluno	-	3	-	117	-	-
Boalan	26	3	-	558	6	1
Cabaluay	24	3	-	550	6	1
Cabatangan	23	18	-	1,345	3	2
Cacao	2	2	-	105	-	-
Calarian	123	31	-	2,648	35	-

Barangay	Commercial	Government	Industrial	Residential	Semi-commercial	ZCWD Facility
Camino Nuevo	233	3	-	585	50	-
Campo Islam	4	1	-	2	279	-
Canelar	281	4	-	1,481	102	1
Capisan	-	5	-	121	-	1
Cawit	2	1	-	240	1	-
Divisoria	77	5	-	1,336	21	1
Dulian	2	2	-	50	-	1
Guisao	-	2	-	34	1	-
Guiwan	230	3	-	2,806	76	1
Kasanyangan	34	2	-	507	5	-
La Paz	-	-	-	28	-	-
Labuan	6	6	-	188	6	-
Lamisahan	9	1	-	190	1	-
Lanzones	1	2	-	90	-	-
Licomo	-	-	-	8	-	-
Lumayang	-	4	-	101	-	-
Lumbangan	4	3	-	231	-	-
Lunzuran	21	2	-	737	4	-
Maasin	20	-	-	214	1	-
Malagutay	24	29	-	1,092	3	-
Mampang	27	4	2	581	5	-
Pamucutan	4	3	-	125	-	-
Pasobolong	13	8	-	509	4	-
Pasonanca	122	27	-	4,758	39	9
Patalon	1	4	-	128	-	-
Putik	171	6	-	2,725	42	3
Recodo	49	3	4	529	7	-
Rio Hondo	3	21	-	82	1	-
San Jose	159	29	-	575	94	-
San Jose Cawa Cawa	15	-	-	63	7	-
San Jose Gusu	100	4	-	1,713	28	
San Roque	136	17	1	3,734	46	5
Sangali	19	2		523	7	-
Sinunuc	50	10	1	1,994	25	-
Sta. Barbara	4	-	-	67	5	-
Sta. Catalina	62	2	1	1,021	31	-
Sta. Maria	370	48	-	4,264	103	2
Sto. Niño	95	2	-	528	58	-
Talisayan	10	-	4	73	-	-
Talon-Talon	145	8	1	3,135	80	-
Tetuan	542	11	2	4,493	159	2

Barangay	Commercial	Government	Industrial	Residential	Semi-commercial	ZCWD Facility
Tictapul	1	4	-	111	-	-
Tolosa	-	6	-	138	-	-
Tugbungan	113	4	-	1,681	64	-
Tulungatung	17	5	-	607	11	1
Tumaga	202	15	-	4,165	115	2
Vitali	11	6	-	190	4	-
Zambowood	19	1	-	611	10	-
Zone I	227	24	1	221	58	-
Zone II	230	5	-	233	33	-
Zone III	185	3	1	262	23	-
Zone IV	317	79	-	286	50	6
Total	**4,852**	**524**	**23**	**59,206**	**1,814**	**43**

Source: ZCWD, 2020

Other Water Service Providers

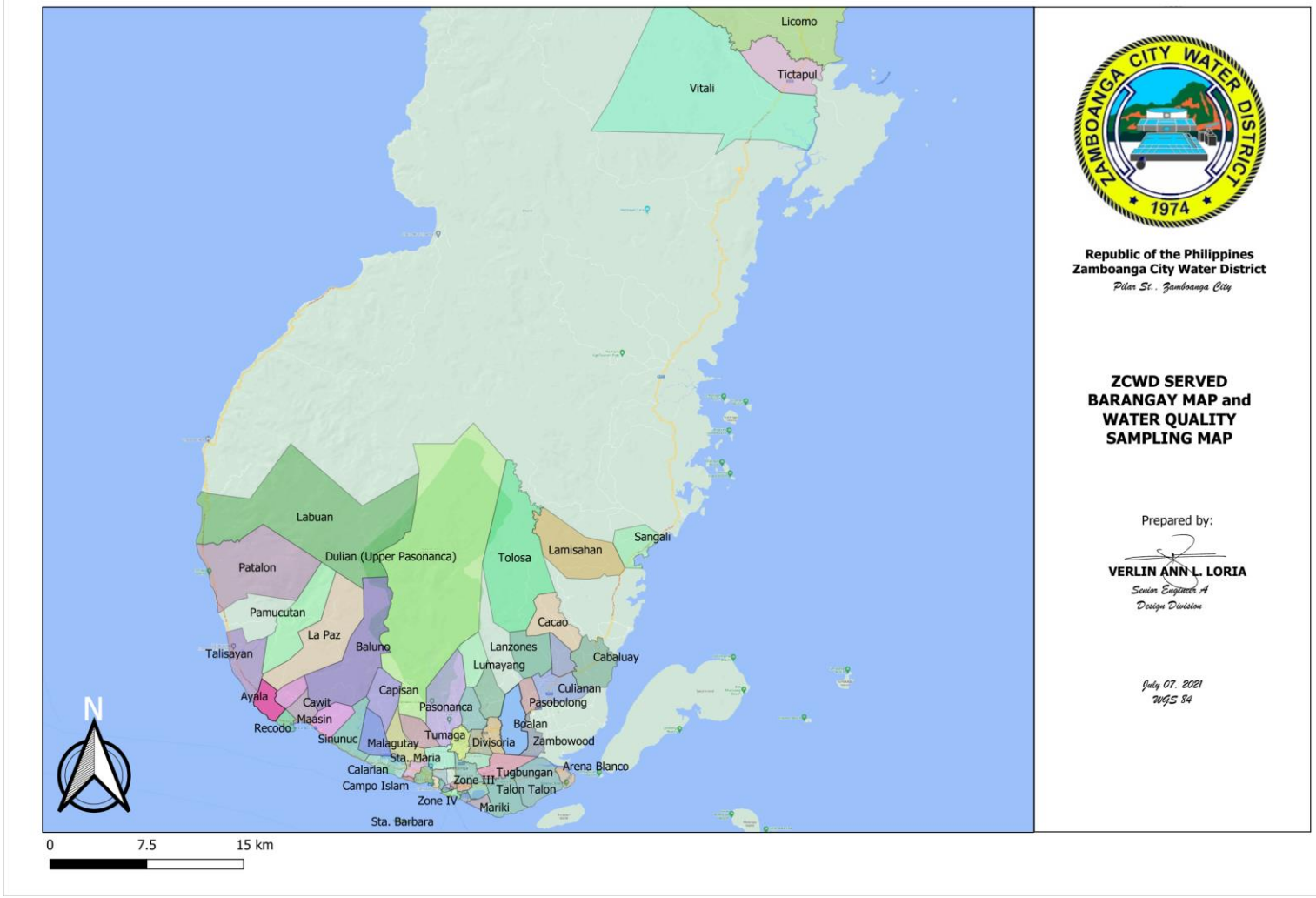
60. Other water service providers that operate in the city are shown in the table. These serve barangays that are not within the service area of ZCWD.

61. In addition to this, there were 378 water refilling stations (WRS) in the city in 2020. Water from these is used by the households for drinking.

Table 3-3: Other Water Service Providers in Zamboanga City (2020)

Water Service Provider	Served Barangay	Number of Served Households
Communal water source	Muti	
Communal water source	Taluksangay and Talabaan	
Curuan Parish Water System	Quiniput and Curuan	581
Manicahan Rural Waterworks and Sanitation Association	Victoria and Manicahan	1,700
Culianan Rural Waterworks and Sanitation Association	Culianan	350
Monte Verde Resort Water System	Boalan and Divisoria	400
Talisayan Rural Waterworks and Sanitation Association	Talisayan	
Mercedes Barangay Waterworks and Sanitation Association	Mercedes, Part of Talabaan, Part of Culianan, Part of Pasobolong, Part of Zambowood	5,191
Taguinod Water System	Buenagatas Boalan	225
Budda Water System	Lunzunan	187

Source: CHO



Source: ZCWD

Figure 3-3: ZCWD Served Barangay Map

3.1.3 Water Supply System and Sources

62. The common water sources of the water service providers in the city include surface water, d deep well and spring. There are also households that use open shallow well or unprotected spring as their water source.

Zamboanga City Water District

63. The Tumaga River supplies about 60 percent of the water requirement in the city. Water from this river is treated in the three water treatment plants of ZCWD using conventional water treatment process. This supplies water to the 14 barangays in the city.

64. In addition to the treatment plants, ZCWD also operates six water systems in the city wherein the water is sourced from springs. ZCWD taps the Dumalon Creek to feed water in the Dumalon Water System, seven spring sources supply the Tolosa Water System and one spring source each for Lamisahan, Lumayang and Vitali water systems. The spring sources of ZCWD had average production of 117,552 cubic meters per month in 2020. Water from these sources is chlorinated prior to distribution.

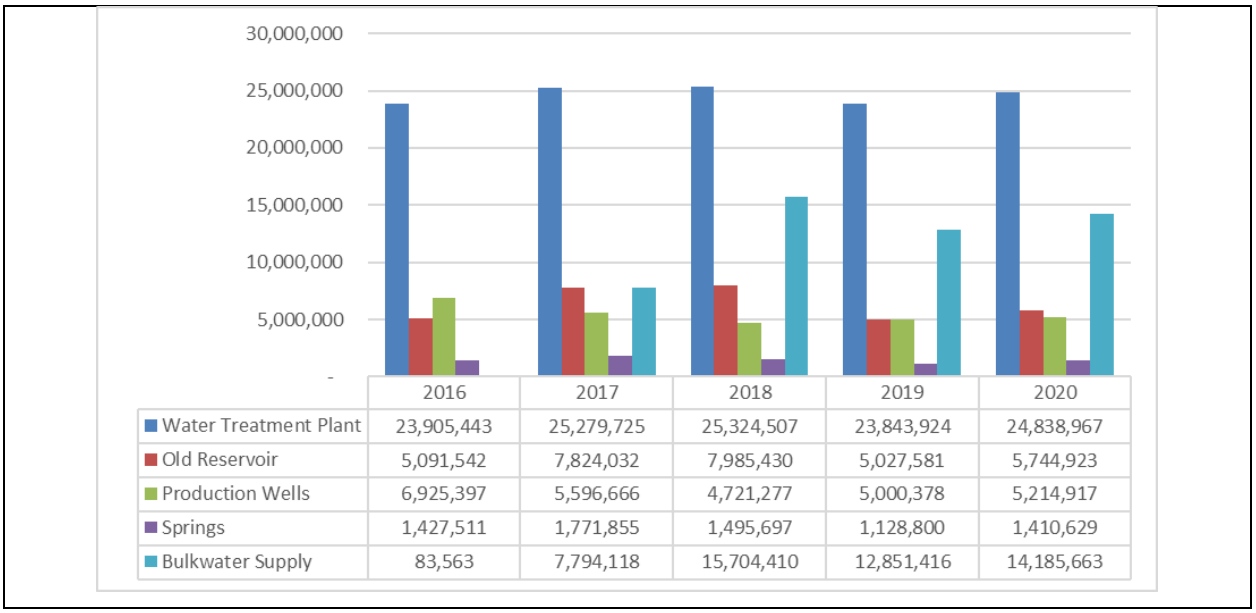
65. ZCWD has a total of 24 deep wells located within the city. However, only 13 are being operated, three were already decommissioned and eight are on stand-by. These deepwells supply water to barangays Boalan, Divisoria, Pasobolong, Putik and Zambowood. In 2020, the average production of the deepwells was 434,476 cubic meters per month. Chlorination is also done in the water from these sources before distribution to the customers.

66. Lastly, ZCWD also entered an agreement with the PrimeWater Infrastructure Corp for a bulk water supply to serve 24 barangays in the city.

Table 3-4: Water Sources of ZCWD (2020)

Water Source	Water System	Barangays Served
Tumala River	WTP 1, WTP 2, WTP in Old Reservoir	Cabatangan, Camino Nuevo, Canelar, Guiwan, Lumbangan, Lunzuran, Mampang, Pasonaca, Sta. Maria, Ston. Nino, Talon-Talon, Tetuan, Tugbungan, Tumaga
Deep well		Boalan, Divisoria, Pasobolong, Putik, Zambowwod
Spring	Dumalon Water System	Baluno, Capisan, Dulian
	Vitali Water System	Licomo, Vitali
	Labuan Water System	Labuan, Patalon
	Lamisahan Water System	Cabaluay, Lamisahan, Sangali
	Lumayang Water System	Lumayang, Tictapul
	Tolosa Water System	Cacao, Guisao, Lanzones, Tolosa
Bulkwater		Ayala, Baliwasan, Calarian, Campo Islam, Cawit, Kasanyangan, La Paz, Maasin, Malagutay, Pamucutan, Recodo, Rio Hondo, San Jose Cawa Cawa, San Jose Gusu, San Roque, Sinunuc, Sta. Barbaram Sta. Calamba, Talisayan, Zones 1 to 4

67. The annual water production of the water sources of ZCWD is shown in **Figure 3-4.** In 2020**,** about 51 million cubic meter of water was produced by ZCWD.



	2016	2017	2018	2019	2020
Water Treatment Plant	23,905,443	25,279,725	25,324,507	23,843,924	24,838,967
Old Reservoir	5,091,542	7,824,032	7,985,430	5,027,581	5,744,923
Production Wells	6,925,397	5,596,666	4,721,277	5,000,378	5,214,917
Springs	1,427,511	1,771,855	1,495,697	1,128,800	1,410,629
Bulkwater Supply	83,563	7,794,118	15,704,410	12,851,416	14,185,663

Source: ZCWD

Figure 3-4: Annual Water Production of the Water Sources of ZCWD

68. Based on the hazard susceptibility maps of Zamboanga City, the production wells and water systems of ZCWD are susceptible to flooding, landslide and prone to tsunami.

Other water service providers

69. The water sources of the other water service providers in the city are shown in **Table 3-5**.

70. The WRS source their water from their own deep wells. However, some WRS operate their deep well without securing the permit to operate from the Department of Health (DOH).

Table 3-5: Water Sources of Other Water Service Providers

Water Service Provider	Water source
Communal water source	Developed spring
Communal water source	Deep well
Curuan Parish Water System	Deep well
Manicahan Rural Waterworks and Sanitation Association	Spring
Culianan Rural Waterworks and Sanitation Association	Deep well
Monte Verde Resort Water System	Deep well
Talisayan Rural Waterworks and Sanitation Association	Deep well
Mercedes Barangay Waterworks and Sanitation Association	Deep well with 11 pumping stations
Taguinod Water System	Deep well
Budda Water System	Deep well

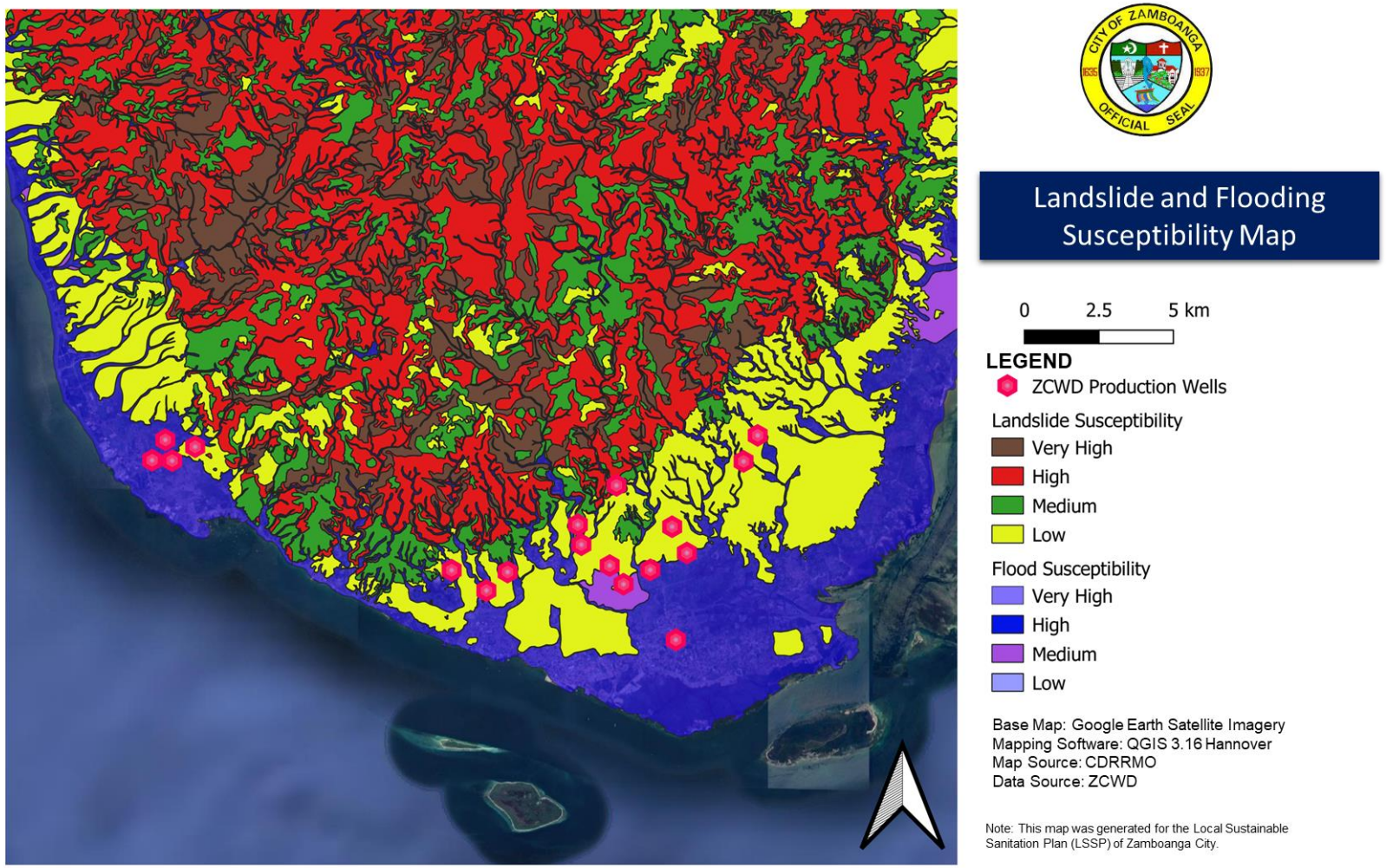


Figure 3-5: ZCWD Production Wells Landslide and Flood Susceptibility Map

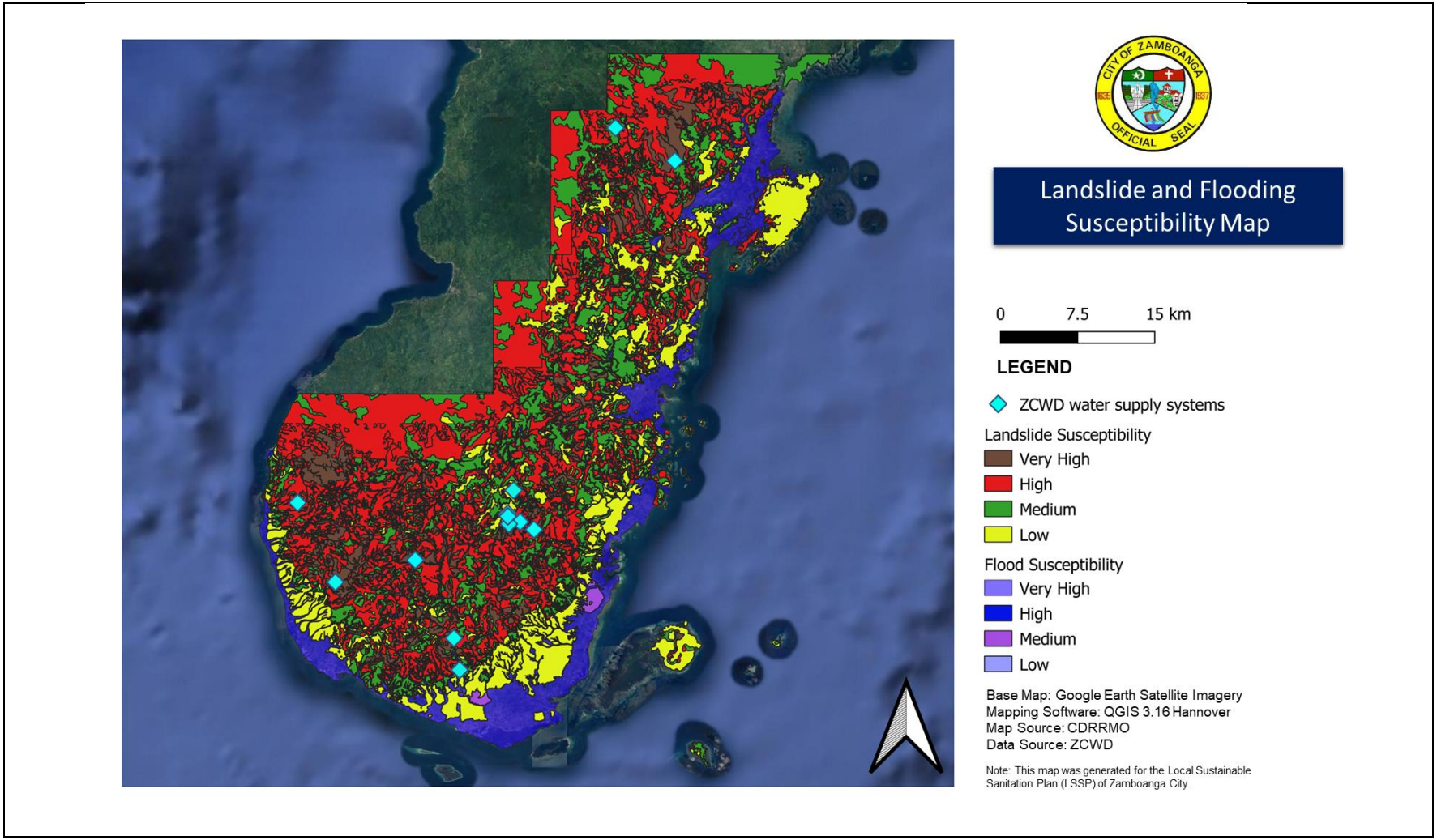


Figure 3-6: ZCWD Water Supply Systems Landslide and Flood Susceptibility Map

3.1.4 Water Availability and Demand

71. Based on the survey conducted, more than half (53 percent) reported that their water supply is available all year round. However, about 20 percent have water that is not sufficient during summer and about 13 percent have water that is insufficient all year round.

72. In 2016, ZCWD observed that there has been a drastic change in the water level in Tumaga and Saaz Rivers.

73. The average unit water consumption in the city is 165 liters per day per capita[12]. Using this, the annual water demand from the population was projected and estimated to reach 73.9 million cubic meters per year in 2030.

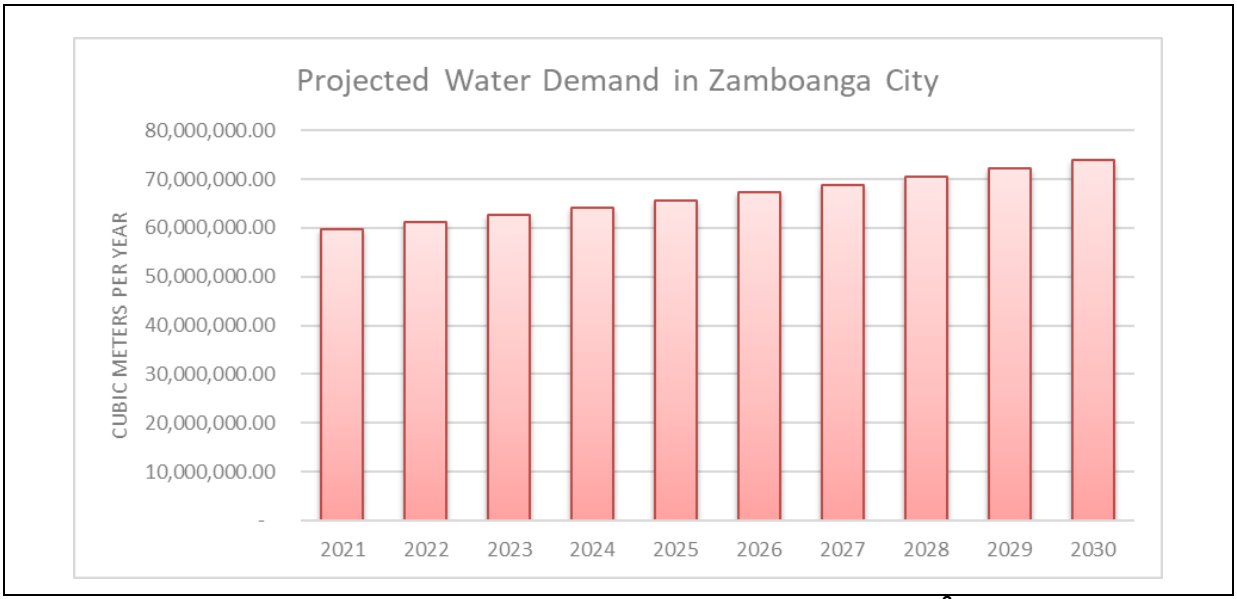


Figure 3-7: Project Water Demand in Zamboanga City (m^3/year)

3.1.5 Water Tariff

74. The approved water tariff of ZCWD is presented in **Table 3-6** while the water tariffs of the other water service providers are shown in **Table 3-7**.

Table 3-6: Approved Water Rates of ZCWD

Classification	Size	Minimum Charge	Commodity Charges				
			11-20	21-30	31-40	41-50	51-Up
Residential/ Government	1/2"	210.00	29.50	30.65	35.20	39.75	44.25
	3/4"	336.00	29.50	30.65	35.20	39.75	44.25
	1"	672.00	29.50	30.65	35.20	39.75	44.25
	1 1/2"	1,680.00	29.50	30.65	35.20	39.75	44.25
	2"	4,200.00	29.50	30.65	35.20	39.75	44.25
	3"	7,560.00	29.50	30.65	35.20	39.75	44.25
	4"	15,120.00	29.50	30.65	35.20	39.75	44.25
	6"	25,200.00	29.50	30.65	35.20	39.75	44.25
	8"	40,320.00	29.50	30.65	35.20	39.75	44.25

[12] Zamboanga City Water District MDS

Classification	Size	Minimum Charge	Commodity Charges				
			11-20	21-30	31-40	41-50	51-Up
	10"	57,960.00	29.50	30.65	35.20	39.75	44.25
Commercial/ Industrial	1/2"	420.00	59.00	61.30	70.40	79.50	88.50
	3/4"	672.00	59.00	61.30	70.40	79.50	88.50
	1"	1,344.00	59.00	61.30	70.40	79.50	88.50
	1 1/2"	3,360.00	59.00	61.30	70.40	79.50	88.50
	2"	8,400.00	59.00	61.30	70.40	79.50	88.50
	3"	15,120.00	59.00	61.30	70.40	79.50	88.50
	4"	30,240.00	59.00	61.30	70.40	79.50	88.50
	6"	50,400.00	59.00	61.30	70.40	79.50	88.50
	8"	80,640.00	59.00	61.30	70.40	79.50	88.50
	10"	115,920.00	59.00	61.30	70.40	79.50	88.50
Commercial A	1/2"	367.50	51.60	53.60	61.60	69.55	77.40
	3/4"	588.00	51.60	53.60	61.60	69.55	77.40
	1"	1,176.00	51.60	53.60	61.60	69.55	77.40
	1 1/2"	2,940.00	51.60	53.60	61.60	69.55	77.40
	2"	7,350.00	51.60	53.60	61.60	69.55	77.40
	3"	13,230.00	51.60	53.60	61.60	69.55	77.40
	4"	26,460.00	51.60	53.60	61.60	69.55	77.40
	6"	44,100.00	51.60	53.60	61.60	69.55	77.40
	8"	70,560.00	51.60	53.60	61.60	69.55	77.40
	10"	101,430.00	51.60	53.60	61.60	69.55	77.40
Commercial B	1/2"	315.00	44.25	45.95	52.80	59.60	66.35
	3/4"	504.00	44.25	45.95	52.80	59.60	66.35
	1"	1,008.00	44.25	45.95	52.80	59.60	66.35
	1 1/2"	2,520.00	44.25	45.95	52.80	59.60	66.35
	2"	6,300.00	44.25	45.95	52.80	59.60	66.35
	3"	11,340.00	44.25	45.95	52.80	59.60	66.35
	4"	22,680.00	44.25	45.95	52.80	59.60	66.35
	6"	37,800.00	44.25	45.95	52.80	59.60	66.35
	8"	60,480.00	44.25	45.95	52.80	59.60	66.35
	10"	86,940.00	44.25	45.95	52.80	59.60	66.35
Commercial C	1/2"	262.50	36.85	38.30	44.00	49.65	55.30
	3/4"	420.00	36.85	38.30	44.00	49.65	55.30
	1"	840.00	36.85	38.30	44.00	49.65	55.30
	1 1/2"	2,100.00	36.85	38.30	44.00	49.65	55.30
	2"	5,250.00	36.85	38.30	44.00	49.65	55.30
	3"	9,450.00	36.85	38.30	44.00	49.65	55.30
	4"	18,900.00	36.85	38.30	44.00	49.65	55.30
	6"	31,500.00	36.85	38.30	44.00	49.65	55.30
	8"	50,400.00	36.85	38.30	44.00	49.65	55.30
	10"	72,450.00	36.85	38.30	44.00	49.65	55.30
Bulk/ Wholesale	1/2"	630.00	88.50	91.95	105.60	119.25	132.75
	3/4"	1,008.00	88.50	91.95	105.60	119.25	132.75
	1"	2,016.00	88.50	91.95	105.60	119.25	132.75
	1 1/2"	5,040.00	88.50	91.95	105.60	119.25	132.75
	2"	12,600.00	88.50	91.95	105.60	119.25	132.75
	3"	22,680.00	88.50	91.95	105.60	119.25	132.75
	4"	45,360.00	88.50	91.95	105.60	119.25	132.75

Classification	Size	Minimum Charge	Commodity Charges				
			11-20	21-30	31-40	41-50	51-Up
	6"	75,600.00	88.50	91.95	105.60	119.25	132.75
	8"	120,960.00	88.50	91.95	105.60	119.25	132.75
	10"	173,880.00	88.50	91.95	105.60	119.25	132.75

Table 3-7: Water Service Charges of Other Water Service Providers

Water Service Provider	Water source
Communal water source	Free
Communal water source	Free
Curuan Parish Water System	Php 95 for first 10 m^3 Additional Php 5 per cubic meter
Manicahan Rural Waterworks and Sanitation Association	Php 200 for first 10 m^3 Additional Php 10 per cubic meter
Culianan Rural Waterworks and Sanitation Association	Php 150 for first 5 m^3 Additional Php 20 per cubic meter
Monte Verde Resort Water System	Php 300 for first 10 m^3 Additional Php 30 per cubic meter
Talisayan Rural Waterworks and Sanitation Association	
Mercedes Barangay Waterworks and Sanitation Association	Php 15.00 per m^3 for bonafide member Php 18.00 per m^3 for honorary member
Taguinod Water System	
Budda Water System	Php 320 for first 10 m^3 Additional Php 20 per cubic meter

3.1.6 Drinking Water Quality Monitoring

75. The City Health Office (CHO) regularly monitors the quality of the water supplied by the service providers in the city. The sanitary inspectors of the city conduct site survey to the deep well sources in the city. Also, the CHO issues the sanitary permit and certificate of potability to all drinking water service providers in the city. As a requirement, the CHO collects water samples from the service providers to check their compliance with the Philippine National Standards for Drinking Water 2017.

76. The CHO is regularly collecting water samples from all the drinking water service providers in the city to validate its compliance to the standards. However, the analysis of the water samples collected is limited only to the presence or absence of E. coli. The city does not yet have a laboratory that can analyze the water samples based on the PNSDW mandatory parameters.

77. In addition to this, the city also created its Local Drinking Water Quality Monitoring Committee (LDWQMC). The members of the LDWQMC regularly meet to discuss the water supply in the city.

78. In 2020, there were 378 WRS in the city however, only 248 secured a Certificate of Potability from CHO.

Table 3-8: Water Quality Monitoring Activities in Zamboanga City

Sampling Points	Frequency of sampling
Deep wells	Microbiological Analysis - Monthly

Sampling Points	Frequency of sampling
	Physical and Chemical Analysis- Every Six (6) months
Water Refilling Stations	Microbiological Analysis - Monthly
	Physical and Chemical Analysis- Every Six (6) months

3.1.7 Current Programs, Projects, and Activities for Water Supply

79. The following are the on-going projects of ZCWD regarding water supply

- Service expansion under the Salintubig Project
- On-going construction of the Ranchio Frio Water System in Brgy. Vitali
- On-going construction of Sumidero Water System in Brgy. Bunguiao
- On-going construction of Cahumban Water System
- On-going construction of water system as part of the Z3R Buld Back Better rehabilitation project

80. On the other hand, the following are the existing activities of the CHO regarding water supply.

- Information, Education, Communication (IEC) distribution on water supply, sanitation and environmental health
- Site survey of deep well sources
- Regular water sampling (WRS, ice plants and food processing plants, restaurants, water services providers)
- Water supply disinfection
- Monitoring of household's water supply
- Regular monitoring of WRS and water service providers
- Created LDWQMC to monitor the quality management of water supply in the city

3.1.8 Local Policies on Water Supply

81. The existing local ordinances and policies in Zamboanga city regarding water supply are summarized in the table below.

Table 3-9: Existing Local Policies on Water Supply

Local Ordinance	Features
City Ordinance No. 519 – The Environment Code of Zamboanga Article XII Urban and Development and Green Design Signed: January 27,2020	Section 4. Scope of Powers: Water efficiency. It requires the adoption of efficient practices, materials, fixtures, equipment and methods that reduce water consumption resulting in cost savings. Its scope includes water fixtures and water management (i.e., rainwater harvesting and water recycling)
City Ordinance No. 500 – The Sanitation Code of Zamboanga	Chapter V. Water Supply Section 18. No public water system shall be constructed nor a well intended for public use shall be dug in any place without the previous approval of the CHO. Section 19. No new source of public water supply shall be place in service or used until a sample water from the same source has been collected by the CHO.

Local Ordinance	Features
City Executive Order (EO) No. BC 396-2019 Signed: July 19, 2018	An Act Constituting the Composition of the Local Drinking Water Quality Monitoring Committee of the City of Zamboanga
City Ordinance No. 524 The Rainwater Harvesting, Storage and utilization Ordinance of the City of Zamboanga Signed: April 1, 2020	The Ordinance is enacted to promote the collection, storage and harvesting of rainwater from rooftops of houses, buildings, as well as from agricultural land and other land development to augment water supply, contribute to groundwater recharges, and reduce demand for non-potable water. It also aims to reduce run-off and consequently, flooding in sealed ground surfaces. Title III: Coverage and Standard Rainwater Harvesting System (RHS) The installation of RHS is mandatory for the following: • Residential, commercial, institutional and industrial buildings with at least 50 square meters total roof area • Subdivisions and human settlement area • Golf course Title VII: Penal Provisions Section 19. Penal Clause – a fine of Php 5,000.00 or imprisonment of not more than one year will be imposed to those who will be found violating this Ordinance. Section 20. Administrative Fine – an administrative fine of Php 5,000.00
EO No. BC-661-2021 An Executive Order Creating the Zamboanga City Water Security Council (ZCWSC) Signed: June 14, 2021	The EO was executed for the following objectives. • Strengthen the enabling environment for sustainable management of water supply and water demand; • Strengthen the capacity of water supply and wastewater treatment service providers to expand and improve services; • Strengthen the collection, analysis and sharing of water and climate data; • Reduce risks from climate, natural and other related disasters; • Engage multi-stakeholders participation in governance of water resources; • Improve capacity of service providers in ensuring long-term water security; and, • Engage the expert services and adoption of water conservation-related technologies in ensuring water quality standards.

3.1.9 Existing Institutional Mechanism

Local Drinking Water Quality Monitoring Committee (LDWQMC)

82. The LDWQMC is chaired by the City Health Officer and co-chaired by the General Manager of ZCWD. The following are the members.

- Chairperson, Committee on Health and Sanitation
- City Planning and Development Coordinator
- City Engineer
- Regional Director, Department of Science and Technology
- CENRO, DENR
- Director, DOH Region IX
- Sanitary Engineer, CHO
- President, Pollution Control Association of the Philippines region IX Chapter
- Rural Health Units

83. As stated in City EO No. BC 396-2019, the LDWQMC shall be responsible for:

- Regular collection/analysis of water samples
- Evaluating laboratory results as to their compliance to standards
- Conducting regular or immediate sanitary survey during the existence of a potential cause of contamination
- Instituting remedial measures to correct the deficiency of the water system
- Informing the public of the latest quality of drinking water in the locality
- Performing other functions related to water quality assurance

Rainwater Harvesting, Storage and Utilization Ordinance of the City of Zamboanga

84. The Office of City Engineer (OCE) and the Office of the Building Official (OBO) are responsible to implement and enforce the City Ordinance No. 524. One of the requirements of the building and occupancy permits must be the compliance of the building to the provisions of this ordinance.

85. The OCE and OBO together with the Office of the City Environment and Natural Resources (OCENR), Office of the City Agriculture, CHO and the barangays in monitoring the implementation of RHS in city. An annual report on the impact of the RHS in terms of decreasing the water demand and reducing the occurrence of flooding in the city must be submitted by the monitoring team. The CHO can inspect the RHS of the buildings to ensure that it is not used as potable water.

86. The OCE and OBO, in coordination with the Office of the City Assessor, must issue a Notice to Comply and Reminder to all building owners regarding the Ordinance. After the grace period of three year, a Notice of Violation will be issued to those who have not complied yet with the ordinance.

87. The Watershed Management Council and/or River Basin Management Council must develop a simplified technical manual on the planning and development of RHS.

88. An initial budget of Php 10,000,000 shall be appropriated to ensure the immediate installation of the rainwater collectors by the City for its own structures.

Zamboanga City Water Security Council (ZCWSC)

89. The ZCWSC, as stated in EO BC-661-2021, is chaired by the City Vice Mayor and co-chaired by ZCWD while the vice chairperson and technical secretariat is the OCENR. The following are the members of the ZCWSC.

- Chair, SP Committee on Energy and Public Utilities
- Chair, SP Committee on Natural Resources and Environmental Protection
- Chair, SP Committee on Health and Sanitation
- City Administrator
- City Planning and Development Coordinator
- City Agriculturist
- City Health Officer
- City Disaster Risk Reduction Management Officer
- Office of the City Mayor, Division Head, Barangay Affairs Office
- Regional Executive Director, DENR IX
    - Regional Director, EMB IX
    - CENRO Zamboanga City
    - PENRO Zamboanga Sibugay
- President, Western Mindanao State University
    - Department Head, Environmental Engineering Department
    - Department Head, Sanitary Engineering
- President, Ateneo de Zamboanga University
    - Head, Ateneo Center for Environment and Sustainability
- President, Zamboanga City Chamber of Commerce and Industry Foundation Inc
- President, Industrial Group of Zamboanga, Inc.

90. The following are the functions of the members of the ZCWSC.

- Collaborates with concerned government and non-government agencies, water service providers, and stakeholders in crafting the Zamboanga City Water Security Master Plan and the Zamboanga City Septage Management Plan.

- Review and recommend to the Local Chief Executive (LCE) and the City Legislative Council relevant and responsive policies, strategies, guidelines and innovations on water supply and sanitation development and management that's serve as bases in establishing the targets and directions for water and sanitation expansion and improvement [programs along the following thematic areas of concerns.

    - Water recharge area restoration, protection and management (watershed area protection)
    - Water resources protection, development, and management (source development, water supply systems)
    - Renewable water resources (i.e., rainwater harvesting, surface runoff)
    - Water conservation and efficiency
    - Wastewater and sewage treatment and re-use
    - Septage management
    - Point and non-point water pollution
    - Water remediation and rehabilitation
    - Water supply and sanitations services in emergencies

- Reinforces public information, education and communication (IEC) campaigns, advocacies and promotions on water conservation and proper and efficient water use including the installation/use of rainwater harvesting systems
- Promotes use of water efficient fixtures and products in publics and private structures in coordination with the business sector which shall make available fixtures, products, and appliances that are water efficient, and
- Reviews plan and programs on the construction of small impounding dams and other water supply system projects in strategic areas across the city and provide recommendations to the LGU and water service providers.

91. A technical working group (TWG) was also formed composing of OCENR, CPDO, DENR-CENRO Zamboanga City, WMSU-Environmental Engineering Department and ZCWD. The main function of the TWG is to provide administrative and technical support to the ZCWSC.

92. The ZCWSC, upon the recommendation of the TWG, shall review, deliberate and approve any water and sanitation-related interventions including the utilization of the city's water resources.

3.2 Management of On-site sanitation facilities (toilet, septic tanks and septage management) including WASH in Emergencies

3.2.1 Household Access to Sanitary Toilet

93. The household access to sanitary toilet facilities from 2016 to 2020 is shown in **Figure 3-8**. There were about 81.3 percent households in the city that have sanitary toilet facilities in 2020. The remaining 18.7 percent were either sharing toilet facilities with other households or were open defecating. At present, the CHO does not have available data on the number of households that practice open defecation (OD).

94. Sanitary toilet facilities include sanitary pit privy, ventilated improved pit, pour flush toilet to a receiving sewer, septic tank or leaching pit and flush toilet to receiving sewer or septic tank.

95. Barangays that have low access (less than 10 percent) to sanitary toilet facilities include the island barangays Landang Gua, Tigtabon, Manalipa and Pangapuyan, and urban barangay Mariki where houses on stilts and informal settlers were mostly observed (see **Table 3-10**).

96. The houses on stilts in barangays Mariki, Rio Hondo, Arena Blanco, Sta. Catalina and other coastal barangays were funded by the National Housing Authority. Sanitation facilities with septic tanks were also provided per household. However, during the inspection of CHO, the sanitation facilities installed in the houses on stilts were already detached thus, the households resort to open defecation or sharing of toilet facilities and the wastes are directly discharged to the coastal water. Also, some of the households converted the space allotted for the sanitary toilet facility into a living space.

97. Based on the household survey conducted, there are still households that use insanitary toilet facilities such as flush toilet to open drain, composting toilet, hanging toilet/latrine, pit latrine with slab and open pit.

Table 3-10: Household Access to Sanitary Toilet Facilities (2019)[13]

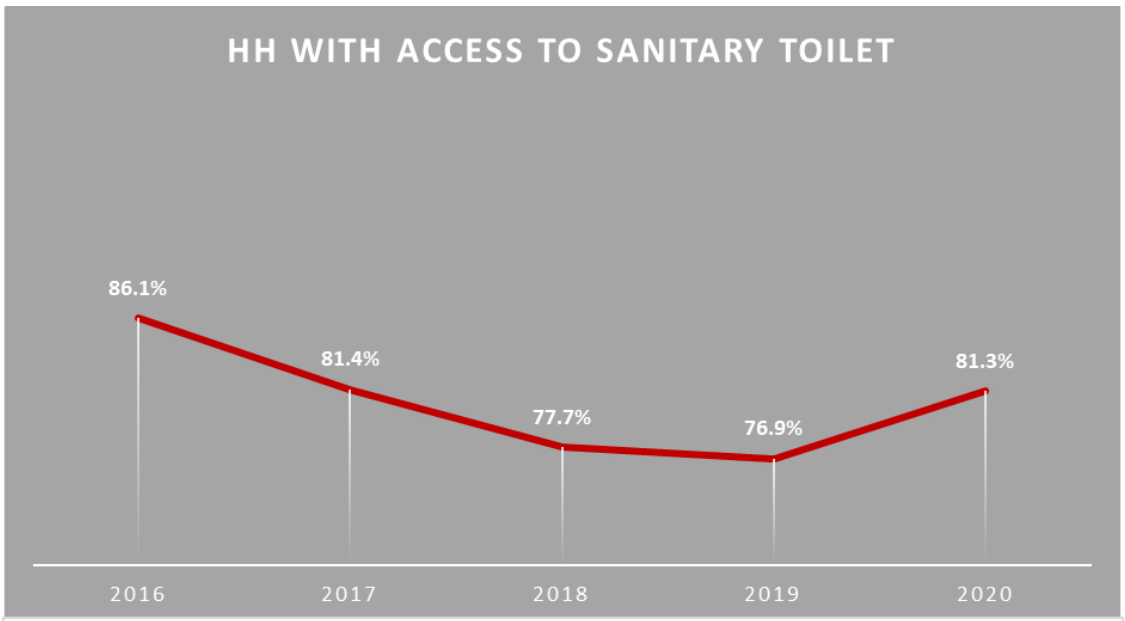
Barangay	Total Household	Sanitary Toilet Facility	
		HH	%
Ayala	5,164	4,954	96%
Tulungatong	2,118	1,975	93%
Recodo	3,984	3,830	96%
Baluno	723	559	77%
Cawit	2,118	1,930	91%
Maasin	2,052	1,844	90%
Sinunuc	3,781	3,770	99%
Labuan	2,624	1,950	74%
Talisayan	1,882	1,345	71%
La paz	1,731	1,421	82%
Pamucutan	930	725	78%
Sinubong	1,074	865	81%
Limpapa	1,324	1,013	76%

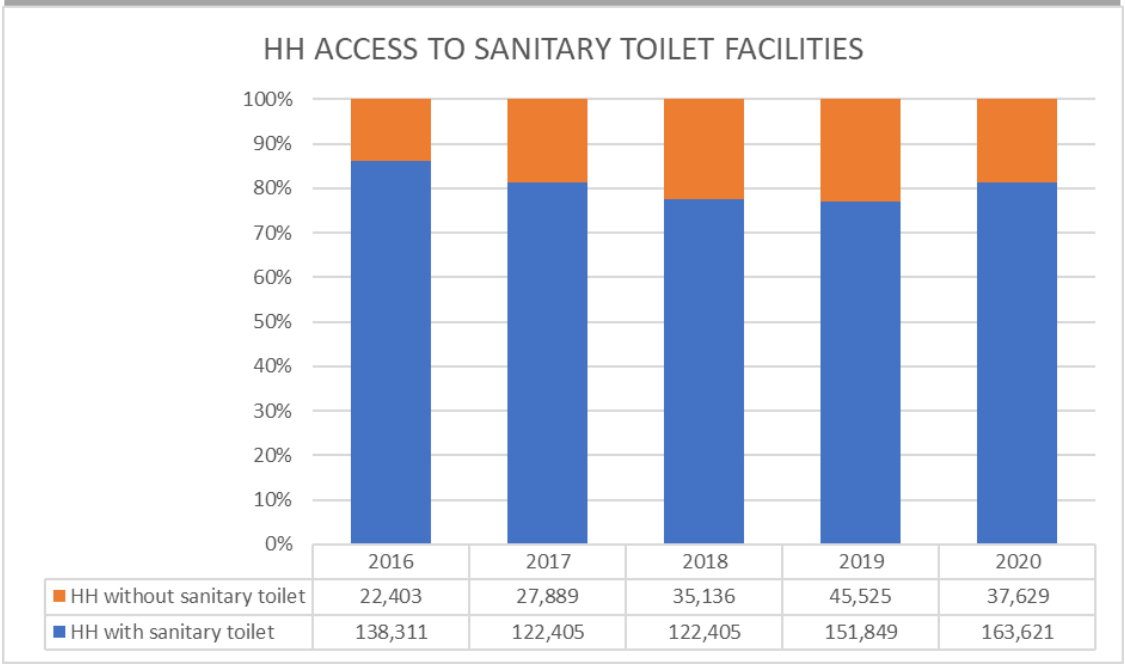
[13] Based on the accomplished validation of CHO in 2019

Barangay	Total Household	Sanitary Toilet Facility	
		HH	%
Patalon	1,861	1,524	82%
Calarian	6,619	5,580	84%
Capisan	322	268	83%
Malagutay	1,525	1,217	80%
San roque	6,387	5,136	80%
Baliwasan	5,735	4,617	81%
San jose gusu	3,830	3,117	81%
Campo islam	2,875	2,150	75%
Guiwan	3,276	2,640	81%
Putik	4,507	3,545	79%
Divisoria	2,111	1,689	80%
Boalan	1,992	1,680	84%
Zambowood	2,328	1,985	85%
Pasobolong	861	760	88%
Salaan	933	750	80%
Mercedes	3,371	2,578	76%
Talabaan	1,223	886	72%
Taluksangay	2,345	1,556	66%
Culianan	1,905	1,290	68%
Guisao	778	525	67%
Lanzones	753	379	50%
Tolosa	635	456	72%
Cacao	309	180	58%
Cabaluay	1,454	540	37%
Lapakan	316	155	49%
Manicahan	2,309	1,116	48%
Busay	769	350	45%
Pasilmanta	486	100	21%
Landang gua	685	50	7%
Landang laum	1,092	123	11%
Tumalatub	554	145	26%
Victoria	642	395	62%
Lamisahan	524	375	72%
Sangali	4,756	2,560	54%
Bunguiao	1,669	1,225	73%
Dulian	589	375	64%
Bolong	1,480	1,050	71%
Panubigan	369	300	81%
Lubigan	674	557	83%
Dita	477	390	82%
Quiniput	762	655	86%
Curuan	2,015	1690	84%

Barangay	Total Household	Sanitary Toilet Facility	
		HH	%
Latuan	563	407	72%
Calabasa	738	620	84%
Buenavista	1,485	1250	84%
Muti	683	620	91%
Tagasilay	680	548	81%
Sibulao	972	714	73%
Tigbalabag	413	370	90%
Tumitus	693	510	74%
Taguiti	334	235	70%
Mangusu	1,095	827	76%
Vitali	2,154	1,781	83%
Limaong	916	654	71%
Tictapul	874	750	86%
Licomo	1,218	956	79%
Canelar	2,542	2073	82%
Camino nuevo	1,772	1,053	59%
Sto. Nino	946	540	57%
Zone I	942	562	60%
San jose cawa cawa	1,414	948	67%
Zone 2	491	227	46%
Sta. Maria	5,768	4,653	81%
Cabatangan	3,133	2,632	84%
Pasonanca	6,269	5,362	86%
Dulian	304	252	83%
Sta. Catalina	3,961	3,502	88%
Kasanyangan	3,232	2,802	87%
Sta. Barbara	1,091	777	71%
Zone 3	348	279	80%
Zone 4	300	260	87%
Mariki	406	2	0.5%
Rio hondo	762	342	45%
Talon talon	7,997	6,594	82%
Mampang	7,858	6,553	83%
Arena blanco	2,883	552	19%
Tigtabon	1,212	22	2%
Manalipa	491	18	4%
Pangapuyan	135	4	3%
Tetuan/sta cruz	6,822	5,398	79%
Tugbungan	5,459	4,778	88%
Tumaga	7,059	6,170	87%
Lunzuran	2,274	1,558	69%
Lumbangan	741	556	75%

Barangay	Total Household	Sanitary Toilet Facility	
		HH	%
Lumayang	337	298	88%
TOTAL	**197,375**	**151,849**	**77%**





Source: FHSIS (2016-2018, 2020), CHO (2019)

Figure 3-8: Household Access to Sanitary Toilet Facilities

3.2.2 Status of Zero Open Defecation (ZOD)

98. As of 2020, there were no barangays in the city that were certified or declared to have zero open defecation. The CHO does not yet have a monitoring program for OD.

99. The ZOD program of the city is implemented through the conduct of WASH IECs in the communities.

2021 Household Sanitation Survey Results – Septic Tank Profile

Based on the survey, about 80.5 percent (74.4% owned, 6.1% shared) of the households have septic tanks. The following are the existing conditions of the septic tanks in the city based on the survey.

- About 64 percent are water-tight or has concrete bottom while 35 percent are bottomless.
- Majority of the septic tanks (73%) do not have an outlet for the overflow or are bottomless in which the waste is being seeped underground.
- More than half (56.70%) of the existing septic tanks has one chamber only, about 42 percent have two chambers while less than one percent have more than three chambers.
- About 76 percent has septic tanks with manhole and 24 percent does not have manhole provided.
- About 84 percent of the septic tanks are accessible; 81 percent are located outside the house and 3 percent located inside the house

2021 Household Sanitation Survey Results – Willingness to Install Sanitary Toilet Facilities

About 73 percent of the households that do not have their own sanitary toilet facilities are willing to construct their own facility. However, 19 percent of the households who were willing said that they do not have enough space within their property to construct the sanitary toilet facility.

The households that are not willing to construct their own sanitary toilet facilities had the following reasons:

- No available space within the property (46.7%)
- Do not have enough budget (41.6%)
- Do not own the land or house (11.2%)
- Informal settler (4.5%)

2021 Household Sanitation Survey Results – Willingness to Install/Retrofit Septic Tanks

Majority (76%) of the households are willing to install a new septic tank or to retrofit their existing septic tanks to comply to the standards of the DOH. However, about 9.5 percent of the willing households do not have available space within their property.

The following were the reasons why the households are not willing to install a new septic tank or retrofit their existing septic tanks:

- No available space within the property (19.6%)
- Do not have enough budget (54.3%)
- Do not own the land or house (10.1%)
- Informal settler (15.9%)

3.2.3 Septage Management Program (SMP)

100. At present, the city is not yet implementing a city-wide formal SMP. However, there are three registered private desludgers in the city that provide desludging services to the households, commercial and institutional establishment upon request. Two of the private desludgers in the city operate their own septage treatment facility. The third private desludger transports the collected septage to one of the SpTPs for proper treatment and disposal (see **Table 3-11**).

Table 3-11: Registered Private Desludgers in Zamboanga City

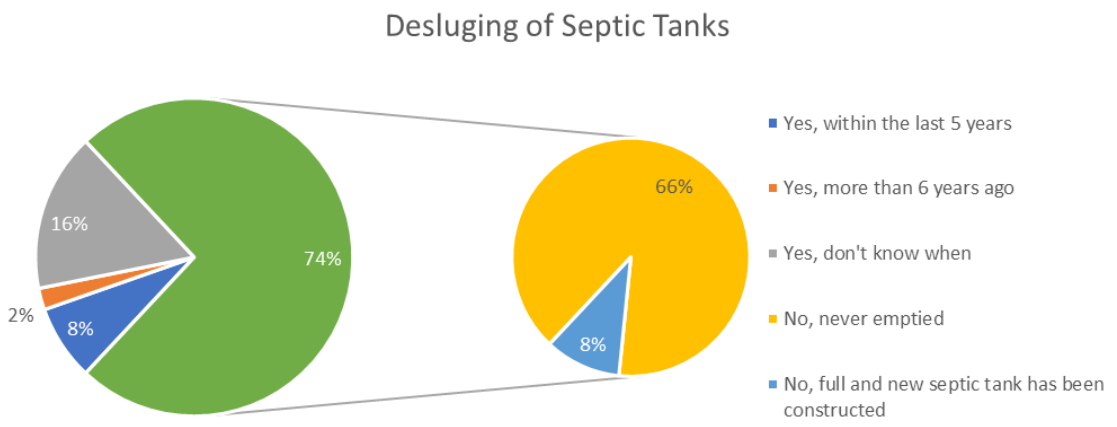
Private Desludger	Barangays Served	No. of VTU trucks	Frequency of desludging	SpTP Location and Capacity	Desludging fee
Christine Haresco Wastewater Treatment Services	Labuan to Curuan and all barangays in between	1 unit x 3700 L 1 unit x 4200 L	2 to 3 trips per day	50 m^3/day Brgy. Sinubong	Php 3,500.00 within 10 km radius. Additional Php 500.00 for every km thereafter
Veterans Builders Ents.	All 98 barangays	4 units x 4500 L 1 unit x 17,000 L 1 unit x 19000 L	3 trips per day	Brgy. Pamucutan Brgy. Cabaluay	Php 4,000.00-4,500.00 Additional payment depends on the distance
K-Gees Services				Trucking services only. MOA with Christine Haresco	

101. The city LGU and ZCWD plans to operate and implement the city-wide SMP. The city LGU and ZCWD entered an agreement for the implementation of the SMP in the city. ZCWD, in partnership with the city LGU, will take the lead in the implementation of the SMP in the city which includes the desludging of the septic tanks, operation and maintenance of the septage treatment plants and collection of the septage fee from its customers. There are two combined septage-sewage treatment plants being constructed in the city.

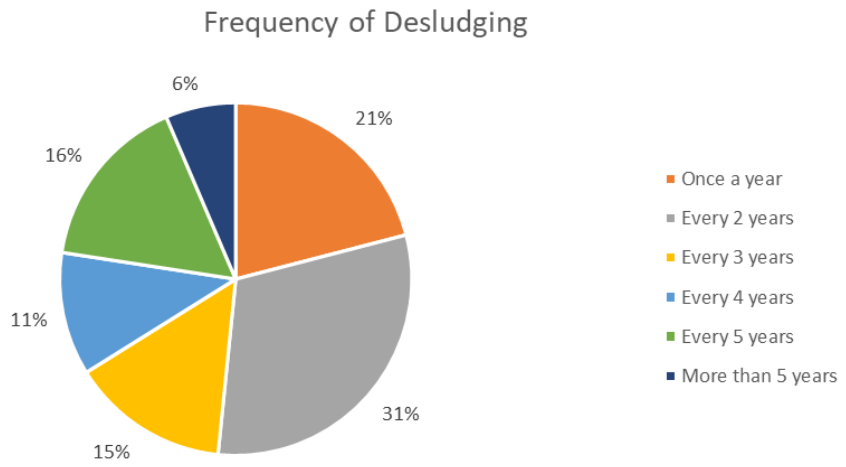
102. Once the SMP is implemented, the households will have to pay a septage fee. This means an additional expense for them. The survey revealed that 60 percent of the households are willing to avail the desludging services and about 40 percent do not want to avail the desludging services mainly because of the cost of the services. However, some of the households especially those from rural barangays said that they are willing to avail but cannot afford to pay the corresponding desludging fee.

103. Based on the survey conducted, about 35.4 percent of the households are not aware of the SMP of the city. Also, there were 13.6 percent of the households that do not know the sanitation local ordinance of the city.

2021 Household Sanitation Survey Results – Desludging of Septic Tanks

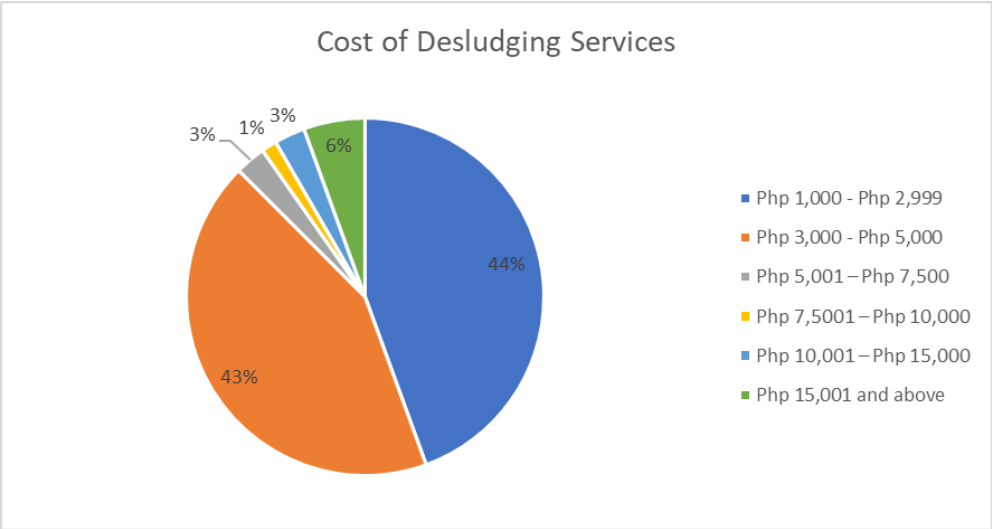


About 74 percent of the households never emptied their septic tank or a new septic tank has been constructed once full. Meanwhile, the remaining 27 percent had desludged their septic tank in the past years.



Majority or about 31 percent observed desludging of their septic tanks every two years and 21 percent desludge their septic tanks every year. Other desludging frequencies are every three, four, and five years. About six percent claimed that their septic tank is being emptied every more than five years.

2021 Household Sanitation Survey Results – Desludging of Septic Tanks



In terms of the cost of desludging, majority claimed that they paid for less than Php 5,000 per desludging activity. About six percent claimed that they spent more than Php 15,000 for the desludging services.

3.2.4 WASH in Emergencies

104. The city has three designated evacuation centers. These are in barangays Cabatangan, Curuan and Vitali. Also, 75 out of the 98 barangays designated schools and covered courts as their temporary evacuation centers during emergency situations.

105. The existing WASH facilities in these evacuation centers are not enough to cater the needs of the population during emergencies. With this, the CHO and CDRRMO provides additional temporary WASH facilities during emergencies to ensure that all affected individuals have access to proper WASH facilities.

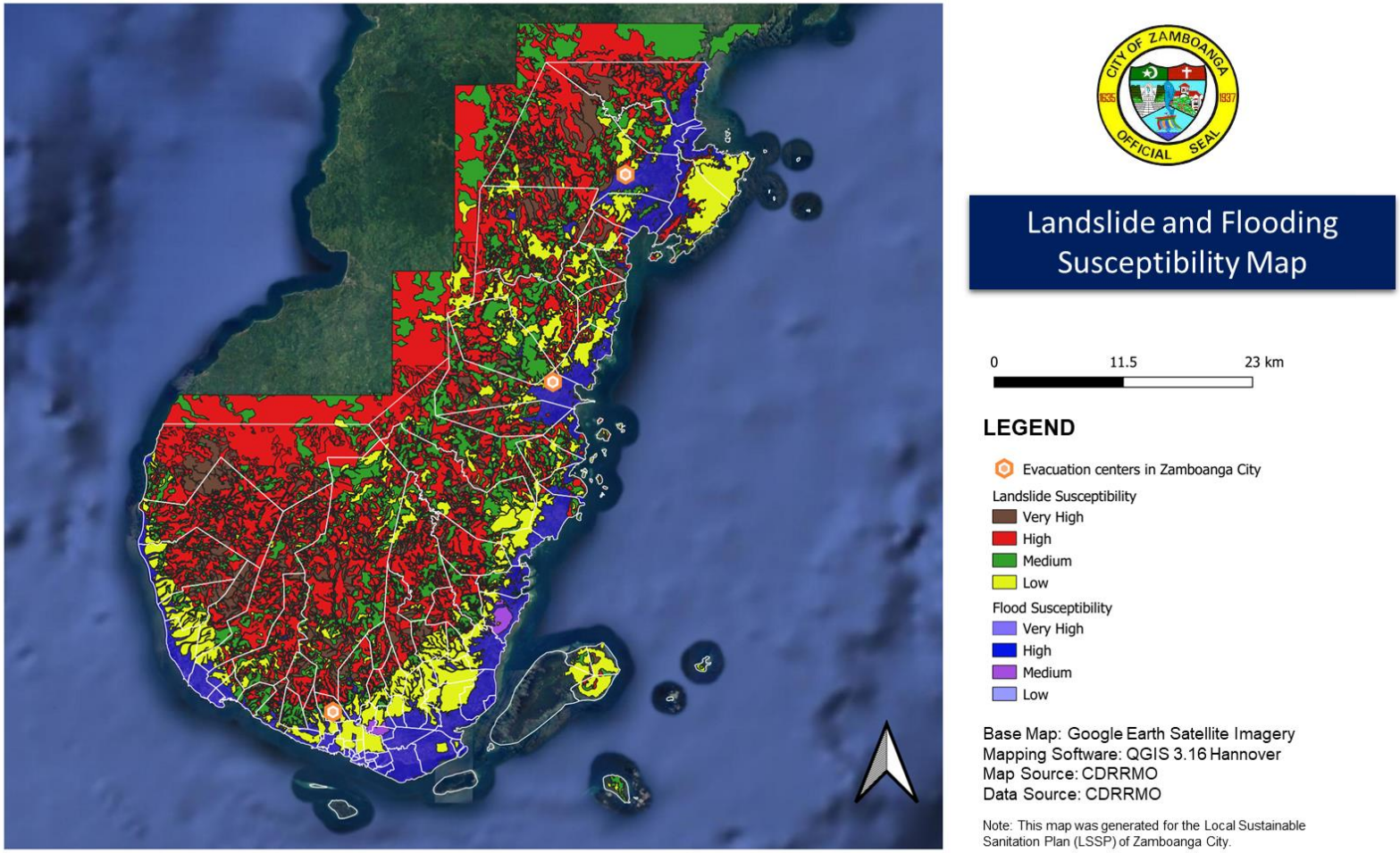


Figure 3-9: Evacuation Centers in Zamboanga City Landslide and Flood Susceptibility Map

Table 3-12: List of Temporary Evacuation Centers in each barangay

Barangay	Temporary Evacuation Center	Barangay	Temporary Evacuation Center	Barangay	Temporary Evacuation Center
Ayala	Central School	Landang Laum	None	San Jose Cawa-Cawa	none
Arena Blanco	None	Lanzones	Buenakapuk E/S and Near Barangay Hall	San Jose Gusu	Elementay School and Armor Village
Baliwasan	Central School	Lapakan	none	San Roque	Elementary School and Near Barangay Hall
Baluno	Near Barangay Hall	Latuan	Near Barangay Hall	Sibulao	National High School
Boalan	Elementary School and Near Barangay Hall	Licomo	Near Barangay Hall	Sinubong	National High School and Near Barangay Hall
Bolong	None	Limaong	None	Sinunuc	National High School and Near Barangay Hall
Buenavista	Elementary School	Limpapa	National High School & Along the road	Sta. Maria	Don Pablo Lorenzo MHS and Central School
Bunguiao	None	Lubigan	Near Barangay Hall	Sta. Catalina	Don Gems Memorial School
Busay	Near Day Care Center	Lumayang	Near Barangay Hall	Sta. Barbara	Elementary School
Cabaluay	Gym and Mini-Covered Court at E/S	Lumbangan	Near Barangay Hall	Sto. Niño	None
Cabatangan	Near Barangay Hall	Lunzuran	Near Barangay Hall	Tagasilay	National High School
Cacao	None	Maasin	Near Barangay Hall and Elementary School	Taguiti	Near Barangay Hall
Calabasa	Elementary School	Malagutay	Camp General Arturo T. Enrile	Talabaan	Near Barangay Hall
Calarian	Flamingo and Elementary Scool	Mampang	Elementary School and Another one	Talisayan	National High School
Camino Nuevo	None	Manalipa	None	Talon-Talon	Elementary School and High School

Barangay	Temporary Evacuation Center	Barangay	Temporary Evacuation Center	Barangay	Temporary Evacuation Center
Campo Islam	None	Manicahan	Central School	Taluksangay	Tuan Datu High School and Near Barangay Hall
Canelar	Elementary School	Mangusu	Near Residence of Former Brgy. Chairman	Tetuan	Central School and ZCHNS Main
Capisan	None	Mariki	none	Tictabon	Elementary School
Cawit	Attached to Barangay Hall	Mercedes	Central School and National High School	Tictapul	Near Barangay Hall and Elementary School
Culianan	Culianan Barangay Complex	Muti	Near Barangay Hall	Tigbalabag	Near Barangay Hall
Curuan	Gymnasium	Pamucutan	Near Barangay Hall	Tolosa	Near Barangay Hall and National High School
Divisoria	Lobregat NHS, Near Barangay Hall & Mini Covered Court at Elementary School	Pangapuyan	None	Tugbungan	Elementary School
Dita	Elementary School	Panubigan	Near Barangay Hall	Tumaga	NIA / Catalina Vda. De Jalon Memorial School
Dulian-Bunguiao	Elementary School	Pasilmanta	none	Tumalutab	Sitio Luuk
Dulian-Pasonanca	Near Barangay Hall	Pasobolong	Elementary School	Tumitus	none
Guisao	None	Pasonanca	Shanty Town, Luyahan/ Upper Pasonanca E/S / Near ZCWD / Regional Training Center (NAPOLCOM)	Tulungatung	Near Barangay Hall
Guiwan	Near Barangay Hall	Patalon	Near Barangay Hall	Victoria	Elementary School (mini-covered court)
Labuan	Don Enriquez High School and Along	Putik	Central School / Lobregat Village /	Vitali	Voctech / High School and Elementary

Barangay	Temporary Evacuation Center	Barangay	Temporary Evacuation Center	Barangay	Temporary Evacuation Center
	Highway		Perez Drive		School
Kasanyangan	None	Quiniput	None	Zambowood	Elementary School
Lamisahan	Calibato and Elementary School	Recodo	Barangay Hall Complex, NHS	Zone I	Zamboanga Central School
La Paz	Elementary School	Rio Hondo	Elementary School	Zone 2	None
Landang Gua	Near Barangay Hall	Salaan	Elementary School and Near Barangay Hall	Zone 3	None
		Sangali	Sitio Malasugat (fronting Barangay Hall)	Zone IV	None

3.2.5 Current Programs, Projects and Activities for on-site sanitation facilities and WASH in emergencies

106. The following are the activities of the City LGU regarding on-site sanitation facilities including WASH in emergencies.

- Together with the barangay officials, provides technical assistance to households for the construction of toilet facilities.
- Conduct orientation on personal hygiene to elementary and daycare students
- Distribution of hygiene kits to students to schools and daycare centers
- Monitoring of households' sanitation facilities
- Provision of hygiene and medical kits during emergency situations
- Assessment and provision of temporary WASH facilities at evacuation centers during emergencies (i.e., portalets)
- On-going review of existing city septage management ordinance

107. The following are the current activities of ZCWD:

- On-going construction of combined septage-sewage treatment facilities in Magay and Vale Vista
- Conducts IEC on WASH as part of its Community Relations and External Affairs activities
- On-going pre-feasibility study for the proposed septage management program in Zamboanga City

3.2.6 Local Policies on On-site sanitation facilities and WASH in emergencies

108. The existing local ordinances and policies in Zamboanga City regarding the management of on-site sanitation facilities are summarized in the table below.

Table 3-13: Existing Local Policies on On-site sanitation facilities and WASH in emergencies

Local Ordinance	Features
City Ordinance No. 500 – The Sanitation Code of Zamboanga	All dwelling, houses and buildings shall be provided with suitable kind and number of privy accommodations.
City Ordinance No. 2009-153 – Septage Management System Ordinance	• The ordinance requires that all water users that are discharging below 40 cubic meters of sewage per day shall have at least two-closed chamber septic tank; 41 to 500 cubic meters of sewage per day shall have at least three-closed chamber septic tank and 501 to 1,000 cubic meters shall have at least five-closed chamber with pond. All establishments that generate more than 1,000 cubic meters shall have its own wastewater treatment facility or shall have an existing contract of service with any duly accredited wastewater treatment facility.

Local Ordinance	Features
	• The City Government of Zamboanga may operate a wastewater or treatment facility and/or desludging services and in the absence of service facilities may contract with Private Service Providers, either desludging, transporting or wastewater treatment facility, provided that they shall have the necessary funds to support capital expenditures and operating and maintenance expenses of their septage management systems. • The Zamboanga City Water District is hereby authorized to collect user's fees and shall remit the same to the City Treasurer and shall accrue to the General Fund.
Implementing Rules and Regulations of City Ordinance No. 2009-153	• The Septage Management System Ordinance (SMSO) shall apply to all buildings, facilities and structures whether public or private, residential or commercial, industrial, institutional, recreational, proposed/planned or existing or any activity/endeavor that are currently connected and supplied with water by the Zamboanga City Water District (ZCWD). A supplemental IRR will be formulated in the future for those who are not currently connected and supplied with water from ZCWD. • The City Government has three options that it may exercise: (1) purchase septage trucks and build a septage treatment facility, which shall be operated and maintained through administration or management contract(s); (2) enter into a contract with the ZCWD to provide septage collection, treatment and disposal services; and/or (3) enter into a contract(s) with private companies to provide septage collection, treatment and disposal services. **Section 14. User fee** • The amount of P1.75 per cubic meter of water consumed per month will be collected from all residents, government offices and other agencies, and added to the Zamboanga City Water District (ZCWD) monthly water bill. • Commercial establishments that have

Local Ordinance	Features
	their own water source shall be required to install a production meter. The quantity of water produced shall be the basis for computing the cost of desludging the septic tank • Users who have their own onsite wastewater treatment system, certified by the City Government as functioning and compliant and those who are connected to the existing ZCWD sewerage pipe shall be exempt from paying the required user fee.
City Ordinance 107	An ordinance regulating and controlling the discharge of industrial wastes and other wastes within the territorial limits of the City of Zamboanga for the purpose of environmental protection from the hazards of pollution, providing penalties for violation thereof and for other purposes
City Ordinance No. 519 – The Environment Code of Zamboanga Article X: Waste Management and Sanitation Maintenance Signed: January 27,2020	**Section 4. Scope of Powers** D. Sanitation Maintenance The duty to enforce the provisions of the Sanitary Code shall be the responsibility of the City Health Officer and his/her duly authorized representatives.

3.2.7 Existing Institutional Mechanism

City Septage Management Council (CSMC)

109. The CSMC is headed by the City Mayor or his duly authorized representative while the Secretariat is assigned to OCENR. The following are the members of the CMSC:

- SP Chairperson, Com. On Health and Sanitation
- SP Chairperson, Com. On Environment and Natural Resources
- City Health Officer
- City Planning and Development Coordinator
- City Engineer
- City Treasurer
- City Licensing Office
- Zamboanga City Water District
- Environmental Management Bureau Region 9
- Representative from DOH- Center for Health and Development Region 9
- Representative from Pollution Control Officer Association of the Philippines – Zamboanga City Chapter
- Representative from the Barangay
- Representative from Industrial Sector

110. As stated in the City Ordinance 2009-152, the following are the responsibilities of the CSMC.

- To oversee the conduct of a survey of all properties and premises in coordination with barangay officials to determine if a septic tank is present, and if it is accessible for desludging.
- To accredit and license private septage or desludging service providers or wastewater treatment facilities.
- To review and approve application for service providers and to recommend the same approval of the SP thru the Office of the City Mayor.
- If a septic tank is not present or it is inaccessible for desludging, the CSMC shall serve notices of non-conformance to the provisions of this Ordinance to the owners/administrators, or occupants. At this time, information on proper methods of complying with this Ordinance will be disseminated.
- The CSMC, or its authorized representatives in coordination with the deputized barangay official shall be permitted to visit properties for the purpose of inspection, observation, measurement, sampling and testing. A prior notice shall be given property-owners to facilitate inspection and provide assistance to the CSMC or barangay representatives.
- For those property owners, administrators or occupants served with notices of non-conformance, a compliance period shall be set by the property owners, administrators or occupants and the CSMC. The compliance period shall be based on the proper installation of an acceptable septic tank of which design is specified in this Ordinance and by national law.
- For new developments, the occupancy permit issued by the building officials shall serve as certificate of compliance until the CSMC conducts another round of inspection.
- The CSMC shall plan and implement an information and education program on wastewater management and the city's septage management system.

3.3 Wastewater, Sewage and Drainage Management

3.3.1 Sewerage System

111. The existing sewerage system in Zamboanga City was constructed from 1933 to 1939 under the United States Colonial Government. The existing sewerage system is a separate system wherein the sewer lines are directly connected to the households to collect sewage only. However, the collected sewage from the households is directly discharged to the coastal water without treatment. The operation and maintenance of the sewerage system is done by ZCWD.

112. The existing sewer lines is only within the Central Business District of the city which covers barangays Zone I, Zone II, Zone III and Zone IV. In 2017, there were 887 households that are connected to the sewer lines, all of which are ZCWD customers. The average flow rate is about 2,500 cubic meters per day of sewage.

113. The sewer lines are composed of vitrified clay pipes with a total length of 11.4 kilometers. The sizes of the sewer pipes are shown in the table below.

Table 3-14: Existing Sewer Lines in Zamboanga City

Diameter, mm	Length, meters
100	830
150	5,390
250	4,960
300	220

114. The sewage collected from the households is conveyed to the two pumping stations of ZCWD. Sewage from barangays Zone III and Zone IV are transported to the east pumping station. From the east pumping station, the sewage is pumped to the west pumping station. The west pumping station is also receiving the sewage collected from barangays Zone I and Zone II. The west pump station then pumps the collected sewage to the outfall.

115. The existing sewerage system is already antiquated and must be rehabilitated. The ZCWD proposes to rehabilitate and expand the sewer lines in the CBD. At present, the ZCWD applied for a loan to ADB to rehabilitate the existing sewer lines and expand to about 1.8 kilometers. The ZCWD also plans to further expand the sewer lines to additional 6.84 kilometers.

116. ZCWD is monitoring the sewage quality in the east and west pumping stations as presented in **Table 3-15**. The values presented were based on the average concentrations of the monitoring results of ZCWD. These are compared to the general effluent standards of EMB for Class SC water. As expected, the sewage disposed in the outfall does not comply to GES since there is no treatment provided prior to disposal.

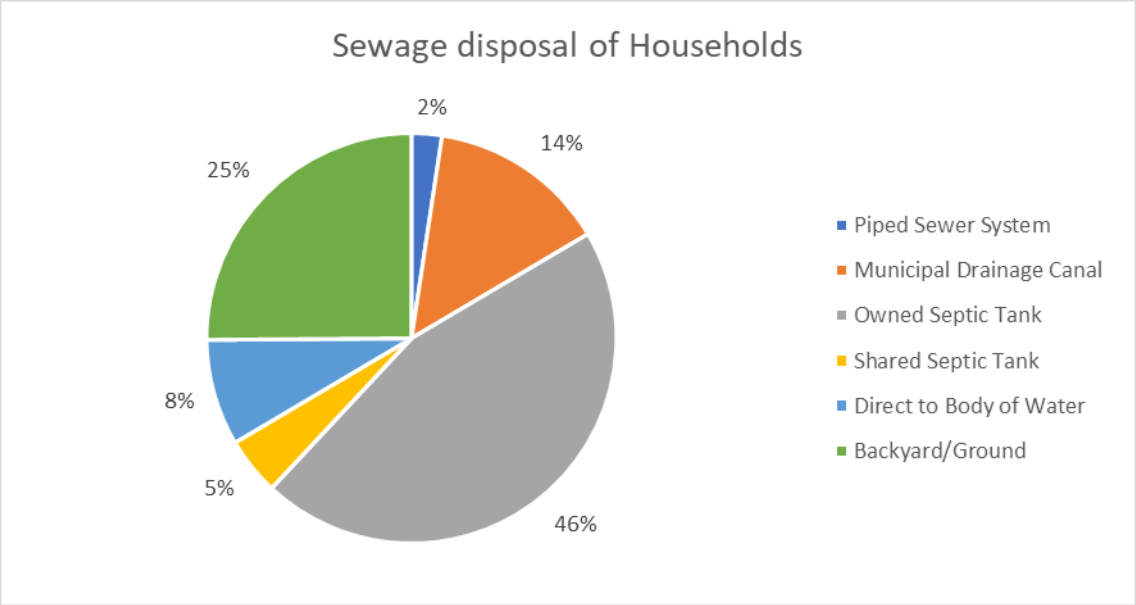
Table 3-15: Sewage Quality Monitoring in ZCWD Pumping Stations

Station	2017	2018	2019
BOD, mg/L			
East Pumping Station	287.4	205.0	404.5
West Pumping Station	234.6	108.6	315.5
EMB GES for Class SC (DAO 2016-08)	100		

Station	2017	2018	2019
O&G, mg/L			
East Pumping Station	18.4	7.7	16.3
West Pumping Station	19.3	4.6	13.7
EMB GES for Class SC (DAO 2016-08)	10		
Phosphate, mg/L			
East Pumping Station	35.17	54.3	26.5
West Pumping Station	38.9	52.46	32.9
EMB GES for Class SC (DAO 2021-19)	4		
Nitrate, mg/L			
East Pumping Station	No Data	24.0	0.75
West Pumping Station	No Data	58.00	1.2
EMB GES for Class SC (DAO 2016-08)	20		
COD, mg/L			
East Pumping Station	No Data	580	467
West Pumping Station	No Data	341	517
EMB GES for Class SC (DAO 2016-08)	200		
Ammonia, mg/L			
East Pumping Station	No Data	24.0	27.2
West Pumping Station	No Data	58.00	30
EMB GES for Class SC (DAO 2021-19)	4		
TSS, mg/L			
East Pumping Station	No Data	No Data	124
West Pumping Station	No Data	No Data	155
EMB GES for Class SC (DAO 2016-08)	100		

Note: Red items – Failed to meet GES
DAO 2016-08, DAO 2021-19
*Concentrations were based on the average of the available monthly monitoring results of ZCWD.
Source: ZCWD

2021 Household Sanitation Survey Result - Wastewater Discharge Point of Households



Majority or about 46 percent of the households were discharging their domestic wastewater directly to their own septic tank. Other households discharge their wastewater directly to their backyard/ground, to the municipal drainage canal, to the nearby bodies of water, and to a shared septic tank. About two percent discharge their wastewater to a city sewer lines It was noted during the survey that there are no existing canals in some barangays. Based on the interview, there are areas with no existing drainage outfalls.

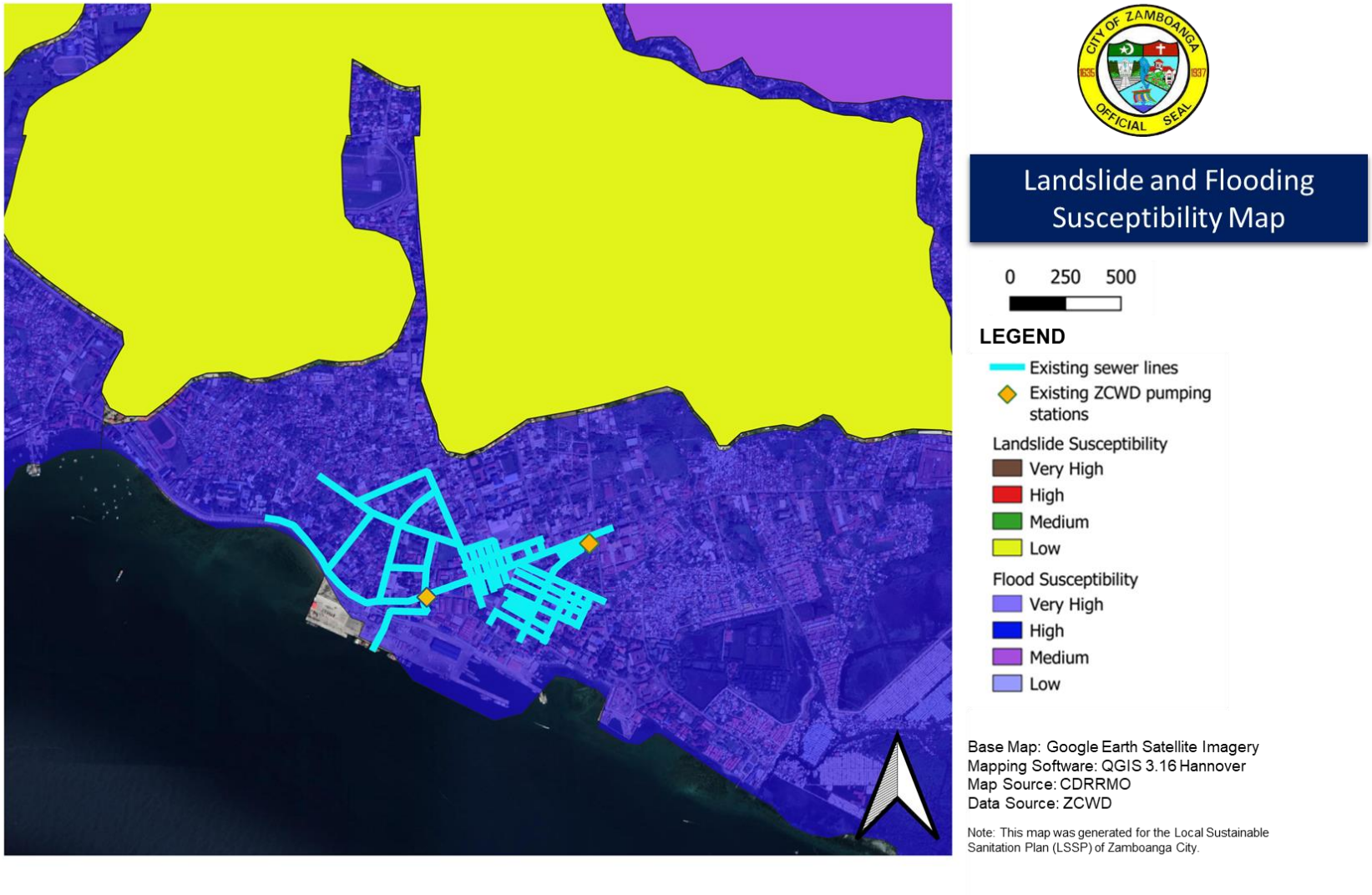


Figure 3-10: Existing Sewerage System in Zamboanga City Landslide and Flood Susceptibility Map

3.3.2 City Drainage

117. The existing drainage system is only available within the 15-km radius from the city proper. Rural barangays do not have proper drainage system which cause flooding during heavy rainfall. The city does not yet have a drainage master plan.

118. Selected drainage outfalls located along the coastal area and población areas in the city were inspected last July 28, 2021. The photos and location of the drainage outfalls visited are shown in **Table 3-16**.

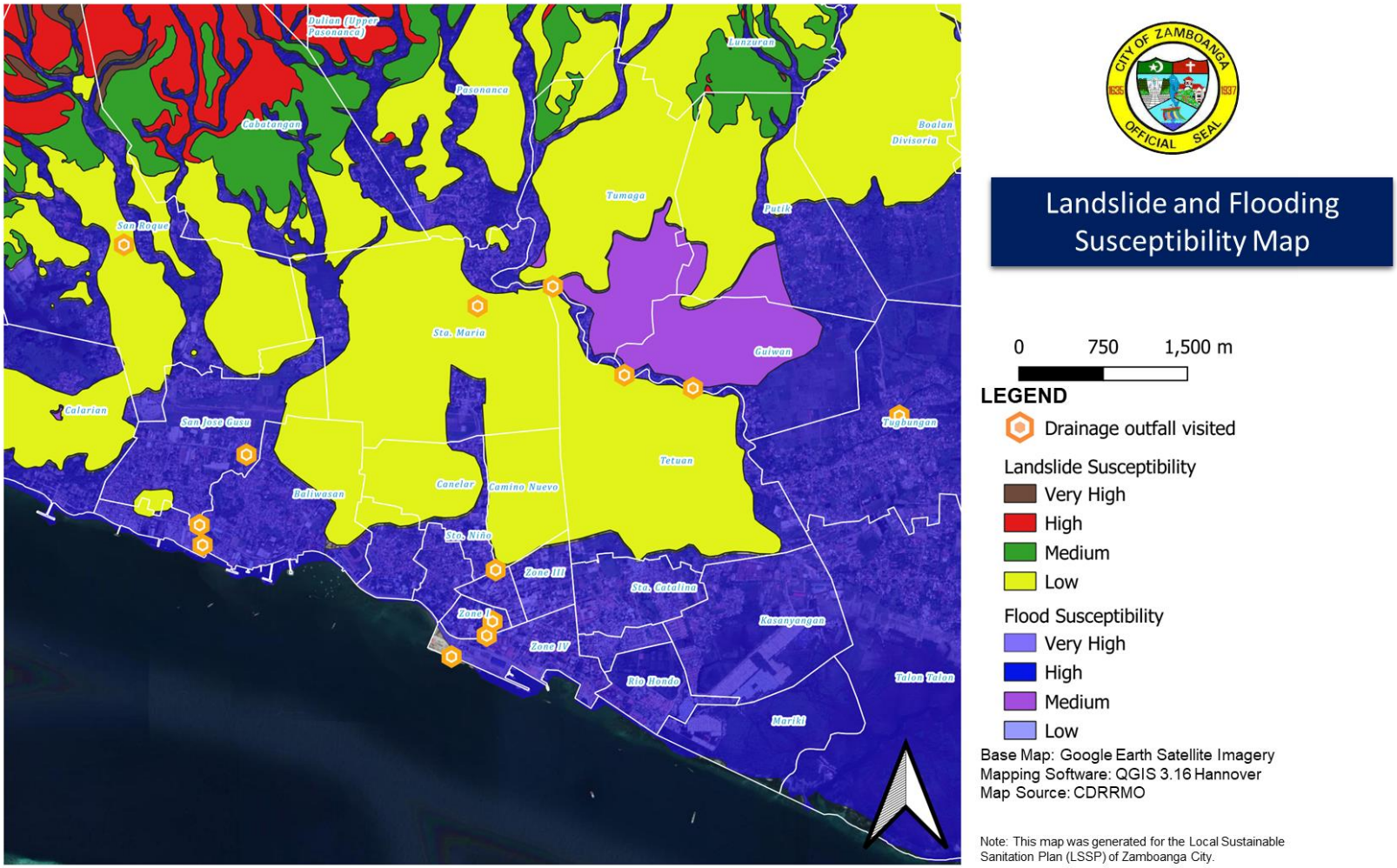


Figure 3-11. Landslide and Flood Susceptibility of the Visited Drainage Outfalls

Table 3-16: Photos of Drainage Outfalls Inspected (July 28, 2021)

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(1) Downstream**	Outfall of existing sewerage system	6°54'11.89"	122° 4'13.11"
 **(2) Drainage**	Brgy. Campo Islam	6°54'44.09"	122° 3'0.84"

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(3) Outlet Drainage RCPC**	Brgy. Tetuan	6°55'33.58"	122° 5'3.10"
 **(4) Upstream**	Brgy. San Jose Gusu	6°55'10.34"	122° 3'13.51"

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(5) Sidewalk Outlet Drainage**	Brgy. San Jose Gusu	6°54'49.88"	122° 2'59.95"
 **(6) Outlet Drainage Box**	Brgy. Tugbungan	6°55'21.96"	122° 6'22.88"

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(7) Outlet Drainage RCPC**	Brgy. Guiwan	6°55'29.84"	122° 5'22.99"
 **(8) Outlet Drainage RCPC**	Brgy. Sta Maria	6°55'59.26"	122° 4'42.29"

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(9) Sidewalk Outlet Drainage**	Brgy. Zone 1	6°54'18.01"	122° 4'23.30"
 **(10) Downstream**	Brgy. Zone 1	6°54'22.11"	122° 4'24.98"

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(11) Upstream**	Brgy. Canelar	6°54'37.03"	122° 4'25.87"
 **(12) Upstream**	Brgy. San Roque	6°56'11.08"	122° 2'37.86"

Photo	Location	Geographical Coordinates	
		Latitude (N)	Longitude (E)
 **(13) Outlet Drainage RCPC**	Brgy. Sta Maria	6°55'53.52"	122° 4'20.47"

3.3.3 Point Sources of Pollution

119. Possible point sources of water pollution in the city are from the following. Discharge of untreated wastewater from these sources may cause pollution of the rivers and may also contaminate the ground water sources.

- Sewage from households
- Industrial agriculture – crop production, livestock and poultry
- Major industries – canning and fish processing
- Commercial establishments – malls, restaurants
- Institutional establishments - hospitals
- Manufacturing industries

120. As of May 2021, there are 44 establishments in the city that have operational wastewater treatment facilities[14].

Table 3-17: List of Establishments in Zamboanga City with Wastewater Treatment Facilities

Firm Name	Type of Industry
Aquatic Food Mfg. Corp.	Fish Canning
Ayala Seafoods Corp.	Fish Canning
Bigfish Foods Corp.	Fish Canning
Brent Hospital & Colleges, Inc.	Hospital
Century Pacific Food, Inc.	Fish Canning
Chaoching Marine Corp.	Buying Station of Marine Products
Coca Cola FEMSA Phils., Inc.	Beverage Manufacturing
CTK Asia Rubber Corp.	Rubber Processing
Filinvest Land, Inc.	Housing
Garden Orchid Hotel & Resorts Corp.	Hotel & Restaurant
Goldstar Seafoods	Fish Canning
Jollibee - Camins Branch	Food Establishment
Jollibee - Sta. Cruz Branch	Food Establishment
KCC Mall de Zamboanga	Commercial Establishment
Labuan Public Hospital	Hospital
Marcel Trading Corp.	Carrageenan Manufacturing
Mega Fishing Corp. - Talisayan	Fish Canning
Mega Polygums Corp.	Seaweeds Processing
Millenium Ocean Star Corp.	Ice Plant
MKBVI Poultry Dressing Plant	Dressing Plant
Myler Agribusiness, Inc. - Pamucutan	Poultry Farm
Pepsi Cola Products Phils., Inc.	Beverage Manufacturing
Permex Producer & Exporter Corp.	Fish Canning
Phil. Fisheries Dev't. Authority	Port
Prime DDG Commercial Centers, Inc.	Commercial Establishment
Seachamp Int'l. Export Corp.	Marine Product Processing

[14] DENR-EMB Region IX

Firm Name	Type of Industry
SM City Mindoro	Commercial Establishment
Southway Square	Commercial Establishment
Southwest Asian Canning Corp.	Fish Canning
Ten Point Mfg. Corp.	Marine Product Processing
Toyota - Zamboanga City	Car Dealer
Universal Canning, Inc.	Fish Canning
Universidad de Zamboanga Medical Center	Hospital
Western Mindanao Power Corp.	Power Plant
YL Fishing Corp. (Cold Storage & Blast Freeze)	Cold Storage & Blast Freeze
Yubenco - Tetuan	Commercial Establishment
Yubenco Starmall - Putik	Commercial Establishment
Z.C. E & L Corp.	Fish Canning
Zamboanga Carrageenan Mfg. Corp.	Carrageenan Manufacturing
Zamboanga City Medical Center	Hospital
Zamboanga Doctors Hospital, Inc.	Hospital
Zamboanga GNS Corp. - Sta. Catalina	Feed Mill & Cold Storage
Zamboanga Peninsula Medical Center	Hospital
Zamboanga United Food Processing, Inc.	Poultry Dressing

Source: DENR-EMB Region IX

3.3.4 Current Programs, Projects and Activities for Wastewater, Sewage and Drainage Management

121. Sewerage systems in barangays Rio Hondo and Mariki are being constructed. The sewerage system in Rio Hondo will serve about 2,500 households and will have an STP with capacity of 1,500 cubic meters per day. The project is funded by the Local Water Utilities Administration (LWUA) as part of the Zamboanga City Roadmap to Recover and Reconstruction (Z3R) Plan.

122. A combined septage and sewage treatment plant is also being constructed to serve Vale Vista Subdivision in Brgy. Kasanyangan. The project will serve about 3,920 households with design capacity of 2,500 cubic meters per day.

123. A combined septage and sewage treatment plant in Magay will also be constructed by ZCWD. It will serve barangays Zone 1 to IV, Santa Catalina, Camino Nuevo, Canelar, Santo Nino and San Jose Cawa-Cawa. The treatment facility will have a capacity of 4,000 cubic meters per day.

124. In terms of improving the drainage system in the city, the projects implemented by DPWH Region IX in the city are presented in **Table 3-18.** The DPWH Region IX also developed a master plan for the drainage and flood control in the urban core and central areas in Zamboanga City.

Table 3-18: Past Projects of DPWH Region IX regarding the Drainage of the City

Year	Project Name	Scope of Works	Remarks
2016	Zamboanga City-Labuan-Limpapa Rd (Calarian Section) - Construction of Drainage Structure along Road	Construction of Drainage along Road	ZCDEO Project
2016	Pagadian City-Zamboanga City Rd - Construction of Drainage Structure along Road	Construction of Drainage along Road	Regional Office
2017	Construction of Drainage Structure along Road - Zamboanga City-Labuan-Limpapa Rd	Construction of Drainage along Road	ZCDEO Project
2017	Construction of Drainage Structure along Road - Pagadian City-Zamboanga City Rd	Construction of Drainage along Road	ZCDEO Project
2018	Construction of Drainage Structure along Road - Pagadian City-Zamboanga City Rd	Construction of Drainage along Road	ZCDEO Project
2018	Construction of Flood Mitigation Structure - Flood Contol for Urban Core and Central District of Zamboanga City to include Pumping Station and RROW, Zamboanga City (Package I)	Construction of Flood Mitigation Structure	Regional Office
2018	Construction of Flood Mitigation Structure - Flood Contol for Urban Core and Central District of Zamboanga City to include Pumping Station and RROW, Zamboanga City (Package II)	Construction of Flood Mitigation Structure	Regional Office
2019	Construction of Drainage Structure - Construction of Drainage System and Outfall at RT Lim Boulevard, Campo Islam, Lower Calarian, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Rehabilitation / Major Repair of Drainage Structure - Construction/Rehabilitation of Drainage Facilities, Barangay Baliwasan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Rehabilitation / Major Repair of Drainage Structure - Construction/Rehabilitation of Drainage Facilities, Barangay Tumaga, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Rehabilitation / Major Repair of Drainage Structure - Construction/Rehabilitation of Drainage Facilities, Barangay Upper Calarian, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System, Barangay Kasanyangan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project

Year	Project Name	Scope of Works	Remarks
2019	Construction of Drainage Structure - Construction of Drainage System, Barangay Guiwan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System, Barangay Culianan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System at MC Enriquez Drive, Barangay Tetuan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System, Barangay Manicahan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System, Barangay Sta. Catalina, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System at AS Alvarez Drive, Barangay Tetuan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System at Dona Maria Drive, Barangay Tetuan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project
2019	Construction of Drainage Structure - Construction of Drainage System at Tugbungan Elementary School, Barangay Tugbungan, Zamboanga City	Rehabilitation / Major Repair of Drainage Structure	ZCDEO Project

Source: DPWH Region IX

3.3.5 Local policies on Wastewater, Sewage and Drainage Management

125. The existing local ordinances and policies in Zamboanga city regarding wastewater, sewage and drainage management are summarized in the table below.

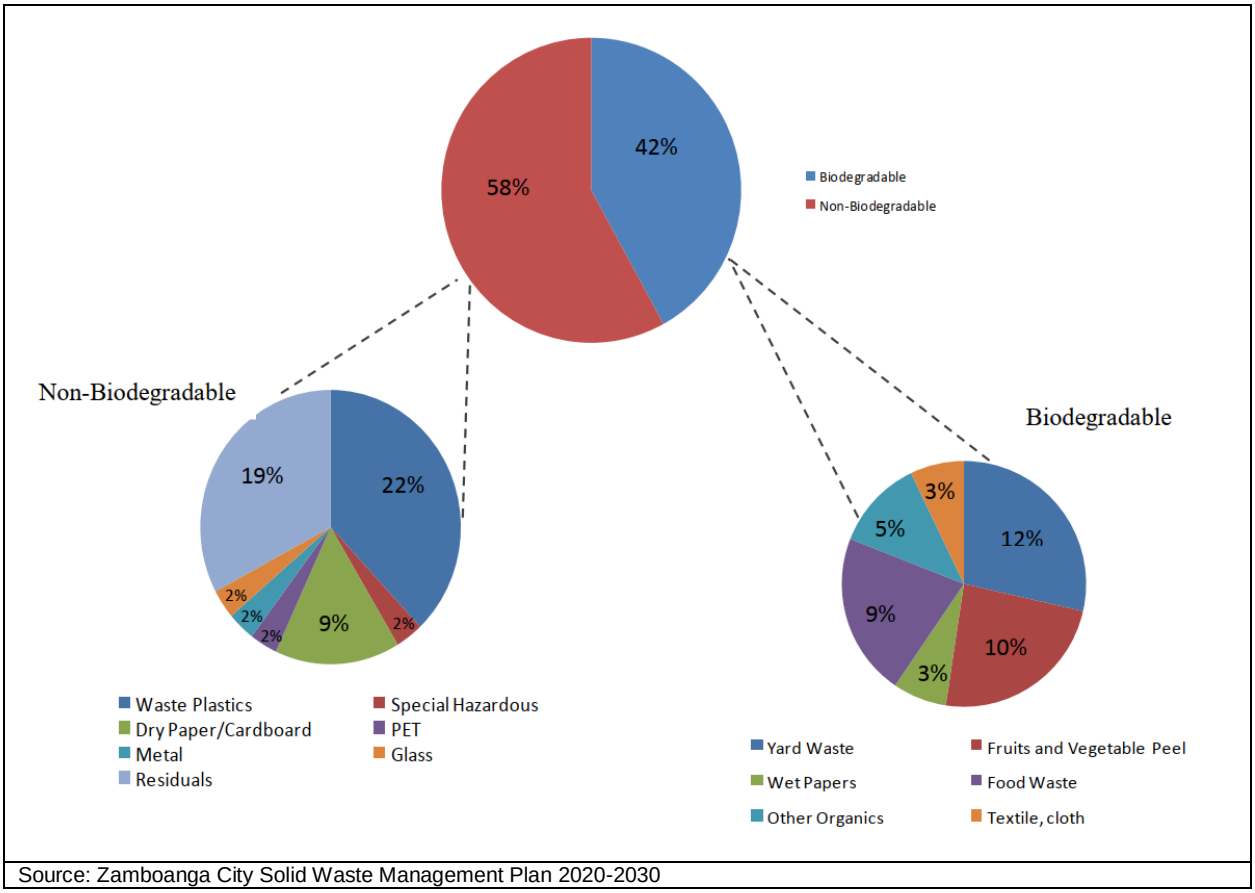
Table 3-19: Existing Local Policies on Wastewater, Sewage and Drainage Management

Local Ordinance	Features
City Ordinance 107	An ordinance regulating and controlling the discharge of industrial wastes and other wastes within the territorial limits of the City of Zamboanga for the purpose of environmental protection from the hazards of pollution, providing penalties for violation thereof and for other purposes
City Ordinance No. 519 – The Environment Code of Zamboanga Article X: Waste Management and Sanitation Maintenance Signed: January 27,2020	Section 4. Scope of Powers B. Wastewater Management • Multi-sectoral governing board shall be established to manage water quality issues within their jurisdiction. • The governing board shall formulate strategies to coordinate policies necessary for the effective implementation of the Clean Water Act; create a multi-sectoral group to establish and effect water quality surveillance and monitoring • All owners or operators of facilities that discharge wastewater are required to get a permit to discharge from the DENR. • Anyone discharging wastewater into a water body shall have to pay a wastewater charge. • All possible discharges are required to put up an Environmental Guarantee Fund (EGF) as part of their environmental management fund.

3.4 Solid Waste Management

3.4.1 Solid Waste Generation and Composition

126. The estimated daily waste generation rate of the city is 0.45 kilograms per person. Based on the waste audit conducted by OCENR, about 42 percent of the total wastes generated in the city are biodegradable. Biodegradable wastes include yard waste, fruits and vegetable peels, wet papers, food waste, textile and cloth, and other organics. The remaining 58 percent are non-biodegradable or recyclables which consist of waste plastics, special hazardous, dry paper/cardboard, polyethylene terephthalate, metal, glass, and residuals. **Figure 3-12** shows the waste composition per category in Zamboanga City.



Source: Zamboanga City Solid Waste Management Plan 2020-2030

Figure 3-12: Zamboanga City Solid Waste Composition

3.4.2 Current Solid Waste Management System

127. The City of Zamboanga has an existing 10-Year SWMP covering the period of 2020 to 2030. The current solid waste management system of the city was divided into the following approaches:

1. Source Reduction
2. Collection
3. Transfer
4. Waste Diversion
5. Final Disposal

Source Reduction

128. The following are the practices in the city to reduce the generation of the residual wastes in the city.

- Non-biodegradable plastic sando bags are not allowed to be used as bagging materials every Saturday and Sunday.
- The OCENR is also coordinating with inter-agencies to inform the public on how to minimize solid waste generation through barangay forum, focus group discussions, print-out advocacies, engagement with social media, and information and education campaign (IEC).
- Plastic shopping bags when going to the market are reused, use of bottles/jars are reduced, and old newspapers and boxes are being used as wrapping or packaging materials
- In the City Government offices, printable reverse side of old forms are being reused in photocopying and various reproductions.
- The use and bringing of a single-use plastic within the campus are banned in most of the schools in the city.

Collection

129. As shown in **Table 3-20,** the City Government, through OCENR, and the barangay units share the responsibility in collecting the solid wastes from the households.

130. The shared collection services scheme collects from 40 barangays with an average collection rate of 235 tons per day. About 75 percent of the wastes collected are from residential, 5 percent are commercial waste, 8 percent are market wastes and 11.5 percent are recyclables.

131. The city designated 22 regular waste collection routes to serve the core area, and an additional 12 waste collection schedules are used for the expansion area.

Table 3-20: Shared Collection Services in Zamboanga City

Barangays	Shared Collection Services				
	Waste Collection Vehicle	Provision of fuel	Manpower	Brgy. Trucks & Status	Coverage
Baliwasan	OCENR	OCENR	OCENR		Main Road
	Barangay	Barangay	Barangay	2 running; 1 Barangay; 1 Private	Remaining Areas
Calarian	OCENR	Barangay	Barangay		Main Road
	Barangay	Barangay	Barangay	2 running	Entire Brgy
Camino Nuevo	OCENR	OCENR	OCENR		Entire Brgy
Campo Islam	OCENR	OCENR	OCENR		Entire Brgy
Canelar	OCENR	OCENR	OCENR		Main Road
	OCENR	Barangay	Barangay		Interior
Divisoria	OCENR	OCENR	OCENR		along hi-way
Guiwan	OCENR	OCENR	OCENR		Main Road

Barangays	Shared Collection Services				
	Waste Collection Vehicle	**Provision of fuel**	**Manpower**	**Brgy. Trucks & Status**	**Coverage**
	Barangay	Barangay	Barangay	2 running	Remaining Areas
	OCENR	Barangay	Barangay		Interior
Kasanyangan	OCENR	OCENR	OCENR		Main Road
Lunzuran	OCENR	OCENR	OCENR		Main Road
Mariki	OCENR	OCENR	OCENR		Main Road
Pasonanca	OCENR	OCENR	Barangay		Entire Brgy
	Barangay	Barangay	Barangay	2 running	
Putik	OCENR	OCENR	OCENR		Main Road
	Barangay	Barangay	Barangay	1 running	Remaining Areas
Rio Hondo	OCENR	OCENR	OCENR		Main Road
San Jose Cawa Cawa	OCENR	OCENR	OCENR		Main Road
San Jose Gusu	OCENR	OCENR	OCENR		Designated Route
	Barangay	Barangay	Barangay	1 running & 1 reserved	Remaining Areas
San Roque	OCENR	OCENR	Barangay		Entire Brgy
	Barangay	Barangay	Barangay	20 running	
Sta. Barbara	OCENR	OCENR	OCENR		Entire Brgy
Sta. Catalina	OCENR	OCENR	OCENR		Designated Route
	OCENR	Barangay	Barangay		Entire Brgy
	Barangay	Barangay	Barangay	1 running	Entire Brgy
Sta. Maria	OCENR	Barangay	Barangay		Entire Brgy
	Barangay	Barangay	Barangay	3 running units	
Sto. Niño	OCENR	OCENR	OCENR		Main Road
Talon-Talon	OCENR	Barangay	Driver OCENR & Barangay		Entire Brgy
	Barangay	Barangay	Barangay	1 running; 1 down	
Tetuan	OCENR	OCENR	OCENR		Entire Brgy
	Barangay	Barangay	Barangay	3 running units	
Tugbungan	OCENR	OCENR	Barangay	2 running	Entire Brgy
Tumaga	OCENR	OCENR	OCENR		Designated Route
	OCENR	OCENR	Barangay		Remaining

Barangays	Shared Collection Services				
	Waste Collection Vehicle	**Provision of fuel**	**Manpower**	**Brgy. Trucks & Status**	**Coverage**
					Areas
	Barangay	Barangay	Barangay	2 running units	Entire Brgy
Zone I	OCENR	OCENR	OCENR		Main Road
Zone II	OCENR	OCENR	OCENR		Main Road
Zone III	OCENR	OCENR	OCENR		Main Road
Zone IV	OCENR	OCENR	OCENR		Main Road
Expansion					
Cabatangan	OCENR	OCENR	OCENR		Main Road
Boalan	OCENR	OCENR	OCENR		Main Road
Mampang	Barangay	Barangay	Barangay	1 running unit	Entire Brgy
Culianan	Barangay	Barangay	Barangay	1 running unit	Entire Brgy
Mercedes	Barangay	Barangay	Barangay	1 running unit	Entire Brgy
Sinunuc	OCENR	OCENR	OCENR		Main Road
Cawit	OCENR	OCENR	OCENR		Main Road
Maasin	OCENR	OCENR	OCENR		Main Road
Labuan	Barangay	Barangay	Barangay	2 running units	Entire Brgy
Manicahan	Barangay	Barangay	Barangay	2 running units	Entire Brgy
Ayala	Barangay	Barangay	Barangay	2 running units	Entire Brgy
Sangali	Barangay	Barangay	Barangay	1 running unit	Entire Brgy

Transfer

132. While the final closure is on-going, the Lumbangan Controlled Disposal Facility is being used as a temporary transfer station to store wastes that are collected at night.

133. The City Government allocated Php 20 Million to construct transfer station facilities in the west and east coasts of the city.

Waste Diversion

134. Currently, the City Government operates five material recovery facilities (MRF) located in Bagsakan Center (Sta. Cruz Market), Main Public Market (Magay), City Abattoir (San Roque), Lumbangan Controlled Disposal Facility, and Sanitary Landfill Facility-MRF (Salaan).

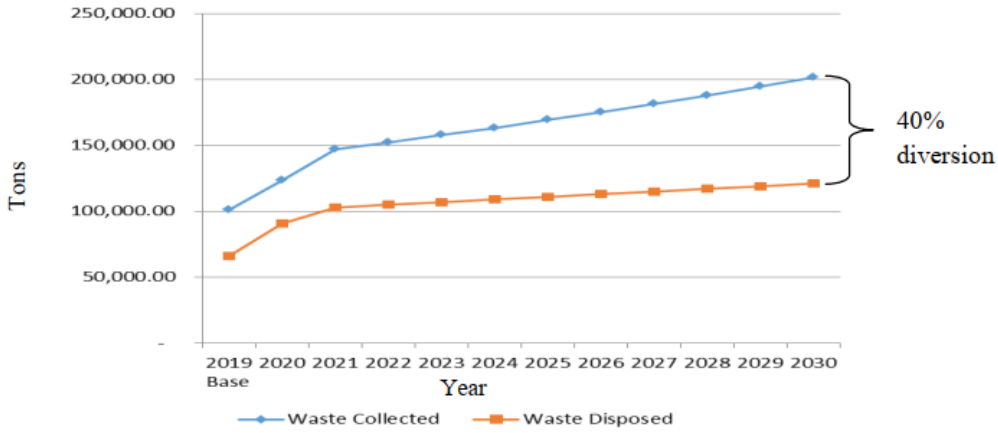
135. All the city MRFs have installed a total of 152 units of 2-tonner rotary stainless steel composter drums with bioreactor that is donated by the Villar Foundation to produce sun-dried compost. The sun-dried composts are packaged and sold to the local farmers. The maximum amount of biodegradable wastes that the facilities can process is 34.5 tons per day.

136. At present, the existing facilities accommodates an average of 28 tons per day of biodegradable waste or approximately 30 percent of the total daily biodegradable wastes disposed in the city.

137. Barangay San Roque also has one unit bioreactor with a capacity of 0.5 ton per day.

138. For private operated facility, Atech Renewable Energy in Barangay Lapakan operates a plastic waste recycling facility with a capacity of 10 tons per day. The facility is producing OILTECH through the process of converting plastic wastes into petroleum fuels to serve as an alternative to Light Diesel Oil.

139. In 2019, the waste diversion rate in Zamboanga City is at 23.40 percent and is targeted to increase to 40 percent by the end of 2030. As presented in Zamboanga City SWMP 2020-2030, **Figure 3-13** shows the waste diversion targets in the city.



Source: Zamboanga City Solid Waste Management Plan 2020-2030

Figure 3-13. Zamboanga City Waste Diversion Targets

Final Disposal

140. An existing 10.6-hectare Sanitary Landfill Facility (SLF) in Barangay Salaan is owned and operated by the City Government of Zamboanga. Based on the design, the SLF will have a total of six cells. Each cell has a minimum lifespan of three years that can accommodate 292,000 cubic meters of wastes based on the estimated average disposal rate of 200 tons per day.

141. At present, two disposal cells are already operating. Cell No. 1 is being operated since March 2015. An additional cell, Cell No. 2, has been constructed and operational since 2019 to cater the city's final disposal for the next three years.

142. The City also plans to establish waste-to-energy facilities in order to recycle, reuse and treat all wastes, to reduce the demand for landfill space and to reduce potential environmental risk of land filling.

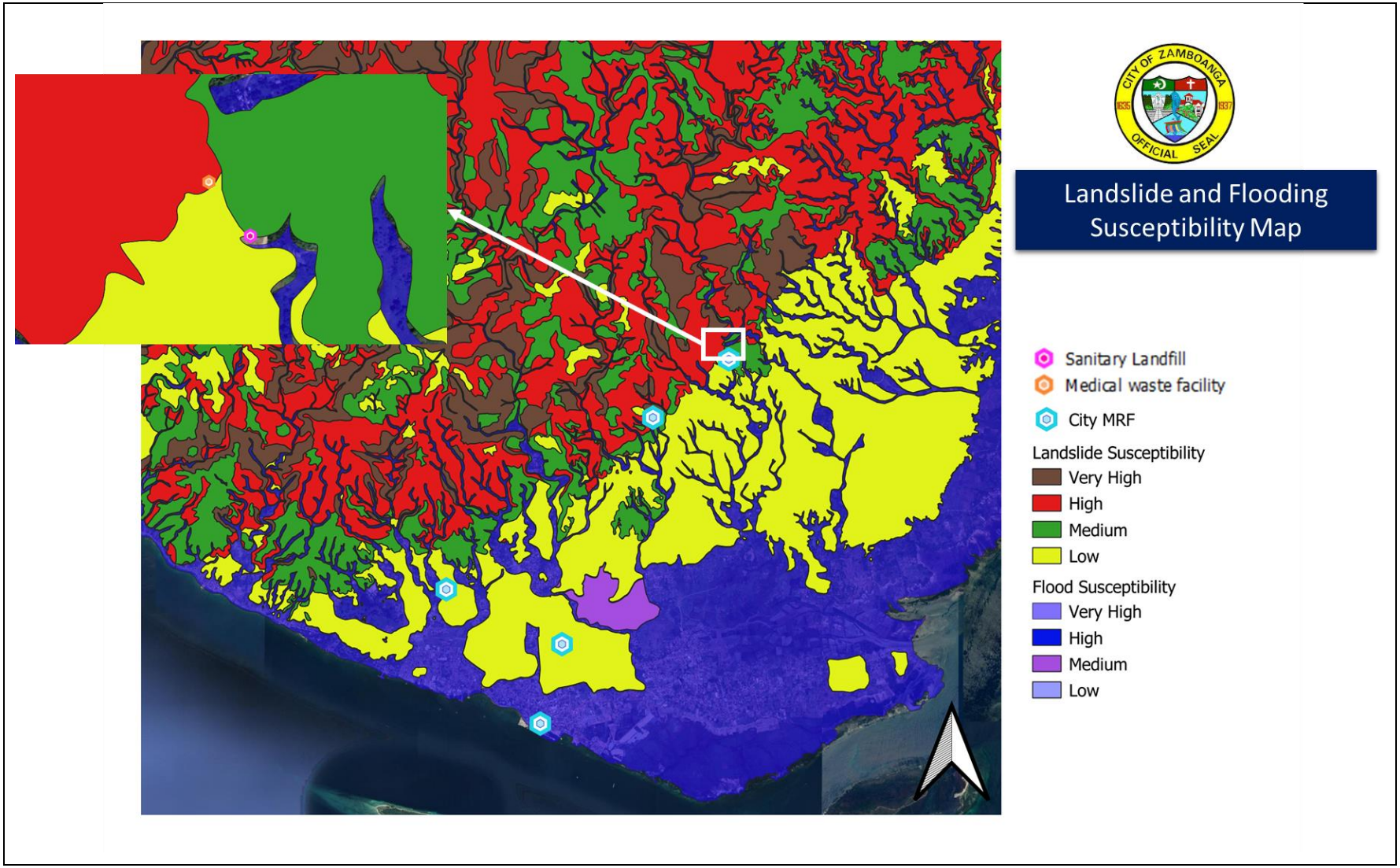


Figure 3-14: City MRFs Landslide and Flood Susceptibility Map

3.4.3 Health Care Waste Management

143. The city constructed a medical waste treatment facility in Brgy. Salaan however, it is not yet being operated. This is to treat the wastes generated from the city-managed health care facilities prior to disposal. It will have an annual treatment capacity of 9.5 metric tons of medical wastes or about 150 kilograms per hour. The facility will be operated and maintained by the City Health Office.

144. The private health care facilities in city are responsible for their own health care waste management through at source treatment and on-site septic vaults or private partnership with other facilities.

145. The SLF does not accept treated health care waste and hazardous waste.

3.4.4 SWM Revenues

146. The costs and revenues of the current SWM system in the city from 2017 to 2019 are summarized in **Table 3-21**. The city has collected Php 20,675,418.36 in 2018 and Php 13,281,067.49 for the first semester of 2019. Garbage fees are only collected from commercial/business establishments as part of the business permits.

Table 3-21. Costs and Revenues of the SWM System

Object of Expenditure	Appropriation		
Current Operating Expenses	**2017**	**2018**	**2019**
Personal Services	22,385,559.76	24,232,202.82	27,532,953.17
MOOE	56,885,377.00	65,833,150.00	78,490,932.68
Capital Outlay	23,070,000.00	51,690,000.00	30,000,000.00
TOTAL	**102,340,936.76**	**141,755,352.82**	**136,023,885.85**

Source: Zamboanga City Solid Waste Management Plan 2020-2030

3.4.5 Current Programs, Projects, and Initiatives on Solid Waste Management

147. OCENR is coordinating with inter-agencies through barangay forum, focus group discussions, print-out advocacies, engagement with social media, and information and education campaign (IEC). The primary objective of the IEC is to inform the public about the behavioral change towards ecological SWM practice of waste reduction at the community, households, and schools.

148. Furthermore, the City Government offices conduct orientation and action planning workshops together with the public and private organizations on source reduction and segregation, reuse and recycling.

149. The City Government and the concerned academic institutions developed an environmental education module with the following theme:

- Environmental and health effects of improper waste management
- E's of Empowerment- Environmental organization, Education, Engineering, Equity, Enforcement, and Entrepreneurship
- Related laws and regulations
- 3 R's of Waste Management (Reduce, Reuse, and Recycle) and Composting

- Establishment of Barangay Ecological Solid Waste Management Programs/Committees and Action Planning

150. The city donated 90-units of garbage vehicles to the barangays.

151. The existing 10-Year SWMP of the city has a planning period of 2020 to 2030. The implementation of the SWMP in the city is already on-going. The following are the projects in the SWMP that were already accomplished or currently being implemented.

- Constructed Cell No. 2 in the sanitary landfill
- Constructed the medical waste treatment facility
- On-going construction of additional transfer stations and city MRFs
- Continuous IEC campaign and promotional programs on proper waste segregation, source reduction and recycling

3.4.6 Local Policies on Solid Waste Management

152. The local laws on solid waste management in Zamboanga City are listed in the following table:

Table 3-22: Local Laws/Regulations on Solid Waste Management

Ordinance	Relevant Provisions
Ordinance No. 2016-176	An Ordinance Establishing the Integrated Solid Waste Management System of the City of Zamboanga, Prescribing Rates and Charges, Providing Penalties for Violation Thereof, and for Other Purposes
Ordinance No. 2002-092	Regulating and prescribing fees for the sale of compost fertilizers produced by the Materials Recovery Facilities
Ordinance No. 211	An Ordinance codifying all existing sanitary ordinances, rules and regulations, to provide suitable changes and modifications, and other purposes
Ordinance No. 92-013	An ordinance prescribing guidelines to regulate the mode of operation of the City garbage collection system and imposing a fee in the disposal of garbage in the City of Zamboanga and providing penalty for violations thereof
Ordinance No. 108	An ordinance amending Section 184, Chapter XVIII of Ordinance No. 500, Series of 1952
Ordinance No. 43	An ordinance amending Section 2, Chapter 1 of Ordinance No. 500, Series of 1952
Ordinance No. 500	An Ordinance codifying all existing sanitary ordinances, rules and regulations to provide suitable changes and modifications and other purposes
City Ordinance No. 519 – The Environment Code of Zamboanga Article X: Waste Management and Sanitation Maintenance Signed: January 27,2020	Section 4. Scope of Power C. Health Care Waste Management including toxic substances and hazardous wastes • The handling of health care wastes must be compliant to the provisions of RA 8749, RA 6969, RA 9003 and the Doh Health Care Waste Management Manual.

Source: Zamboanga City Solid Waste Management Plan 2020-2030

3.4.7 Existing Institutional Mechanism

City Solid Waste Management Board (CSWMB)

153. The CSWMB is headed by the City Mayor. As required by the City EO No. BC 208-2016, the following are the members of the CSWMB.

- Chairperson, Committee on Health and Sanitation, SP
- Chairperson, Committee on Natural Resources and Environmental Protection, SP
- President, Sangguniang Kabataan Federation
- City Health Officer
- City Planning and Development Coordinator
- City Engineer
- City Public Services Officer
- City Agriculturist
- Regional Director or representative, Department of Science and Technology IX
- Regional Director or representative, Environmental Management Bureau IX
- Regional Director or representative, Department of Trade and Industry IX
- Regional Director or representative, National Economic & Development Authority IX
- School Divisions Superintendent, Department of Education IX
- Representative, Junkshop Owners

Barangay Solid Waste Management Committee (BWSMC)

154. As stated in the City Ordinance No. 2016-176, the BSWMC is headed by the Barangay Captain. The following are the composition of the BSWMC.

- Barangay Kagawad (Chairman on Environmental Protection, Health and Sanitation)
- SK Chairman\President
- Homeowners' Association
- Public/Private School Principal or representative
- President of School's Parents-Teachers Association
- President of representative of the religious organizations
- President or representative from the business community (commercial or industrial sector)
- NGO representative (with concern on environment)
- President of Market Vendors Association
- Junkyard owners

155. The following are the duties and responsibilities of the BSWMC.

- Formulate a community Solid Waste Management Program consistent with the City SWMP
- Segregate and collect biodegradable, compostable, reusable waste
- Establish a Material Recovery Facility (MRF)
- Allocate barangay funds
- Organize core coordinators
- Submit SWM monthly reports; and - Enter into contract or MOA with any private entity regarding the Solid Waste Management, subject to the concurrence of *Sangguniang Panlungsod.*

156. The City Mayor may deputize Barangay Officials, Tanods and Purok Officials of the respective barangays and other law enforcers in the issuance of citation tickets in violation of the Ordinance as provided under this Ordinance

3.5 Water Quality Management

157. **Table 3-23** enumerates the watershed and river systems in Region IX which were designated as water quality management areas (WQMAs).

Table 3-23: Designated WQMA in Zamboanga City

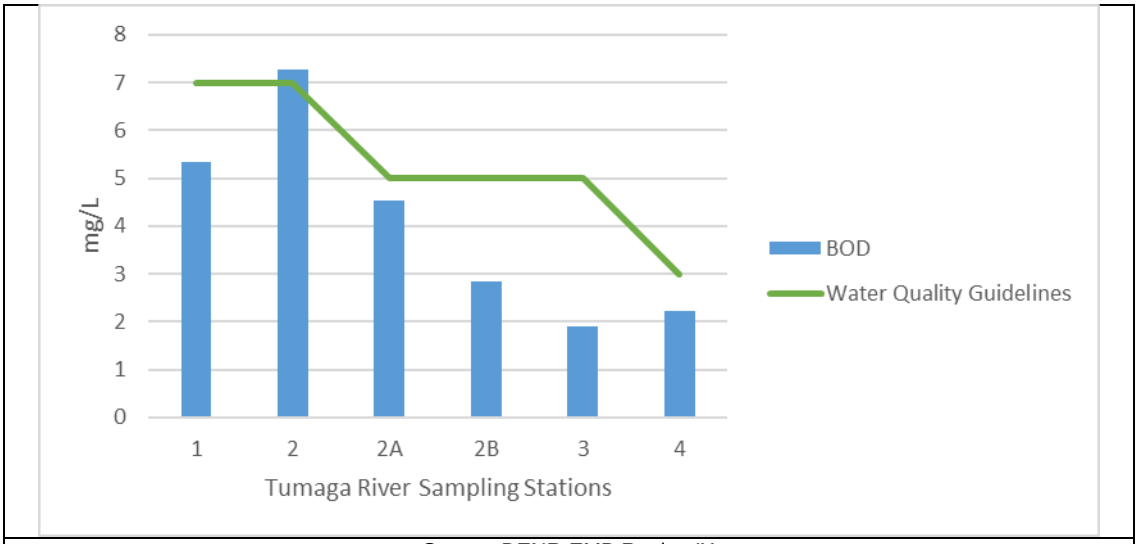
WQMA	Legal Basis	Cities/Municipalities Covered
Tumaga River WQMA	DAO No. 2013-01	Zamboanga City (Barangays Pasonanca, Sta. Maria, Tumaga, Guiwan, Tetuan, Tugbungan, Lumayang, Lumbangan, Lunzuran, Putik, Divisoria, Salaan, Culianan, Mercedes, Pasobolong, Boalan, Zambowood, Talon-Talon, Mampang)
Ayala River WQMA	DAO No. 2016-15	Zamboanga City (Barangays Baluno, La Paz, Cawit, Tulungatung, Recodo, Ayala)

158. The above-mentioned laws and policies aim to effectively implement the prevention, control, and abatement of pollution thus improving the water quality and contributing to the enhancement of cities and municipalities covered by this WQMA.

159. The EMB Region IX developed the 10-year WQMA action plan for both WQMAs and were already adopted by the respective governing boards of the WQMAs.

160. The River Basin Control Office of DENR also funded the formulation of the Climate Change-Responsive Integrated River Basin Management and Development Master Plans for the eight clustered river basins in the city which consists of the Ayala, Bolong, Curuan, Manicahan, Tumaga and Vitali-Taguite rivers.

161. In terms of water quality monitoring, EMB Region IX monitors 13 sampling stations for Tumaga River and six sampling stations for Ayala River (6). **Figure 3-15** below shows the 2019 annual average biochemical oxygen demand (BOD) at six monitoring stations of Tumaga River.



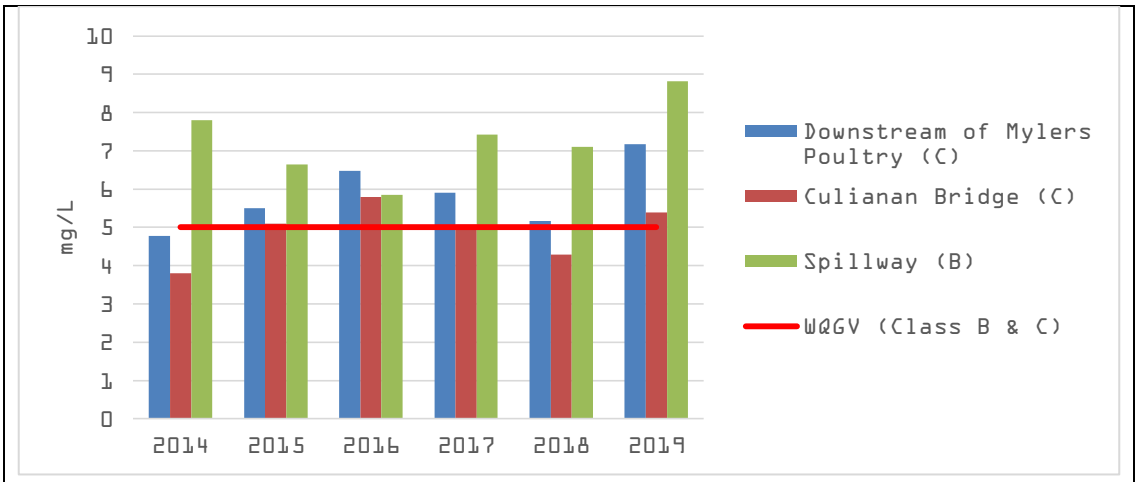
Source: DENR-EMB Region IX

Figure 3-15: 2019 Annual Average BOD at Tumaga River Monitoring Stations

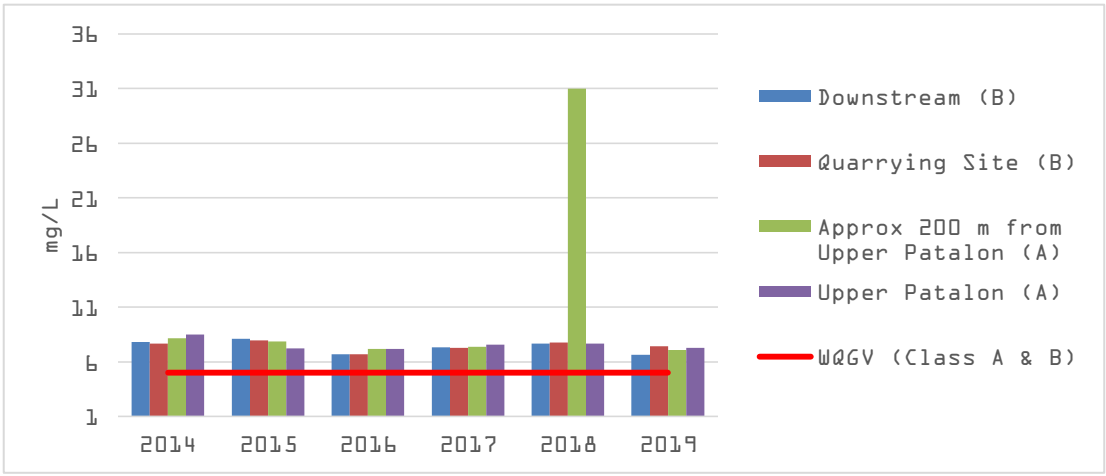
162. From 2014 to 2019, EMB Region IX monitored several rivers in Zamboanga City such as Mercedes River, Saaz River and Patalon River. These rivers are considered as the priority rivers in the whole region.

163. Mercedes River is monitored at three stations, two of which are classified as Class B and the remaining as Class C water body. Saaz River and Patalon River have four monitoring stations each wherein two are classified as Class B and the other two as Class A.

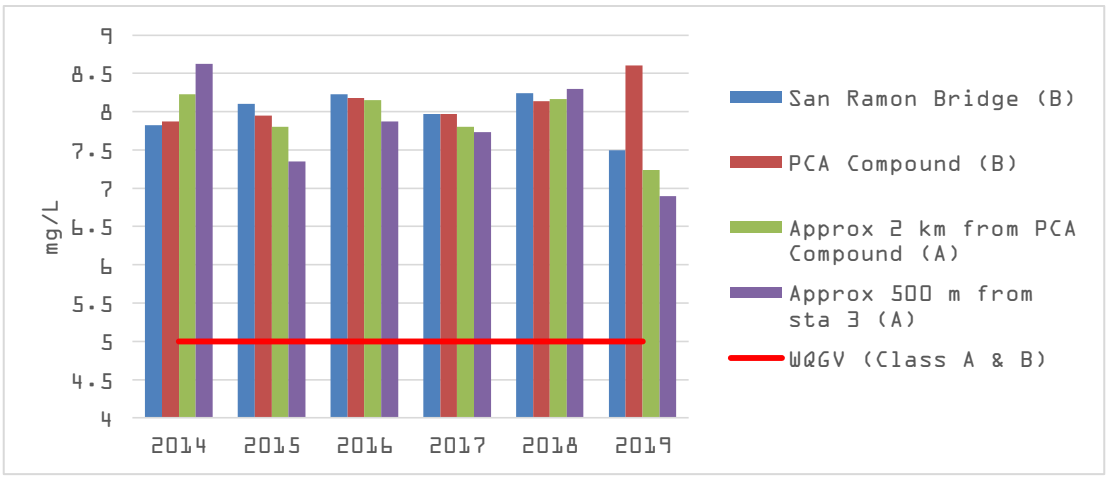
164. **Figure 3-16** to **Figure 3-18** show the annual trends of average dissolved oxygen (DO), BOD and TSS concentration for the priority rivers. Water quality monitoring results were compared with the established water quality guideline specified in DAO 2016-08.



Mercedes River



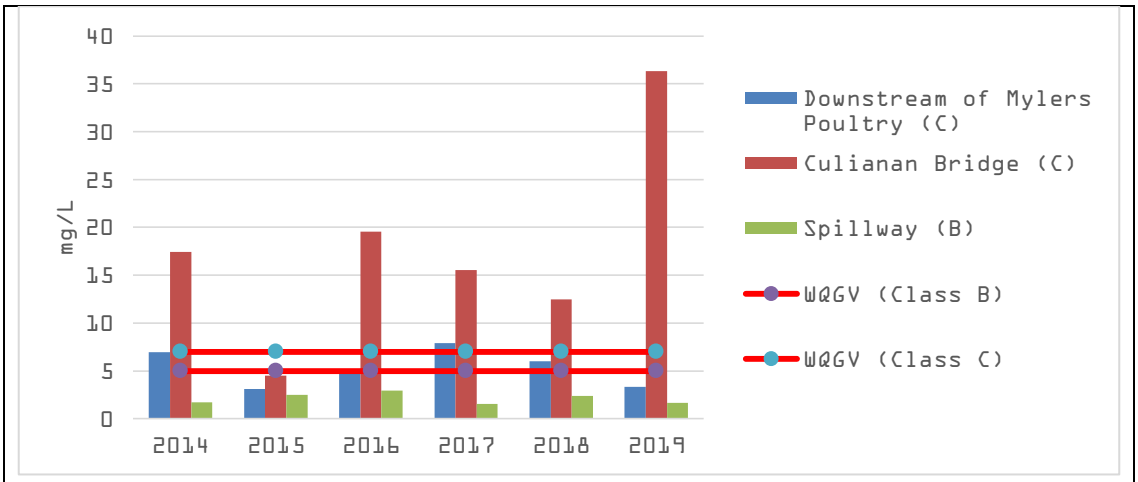
Patalon River



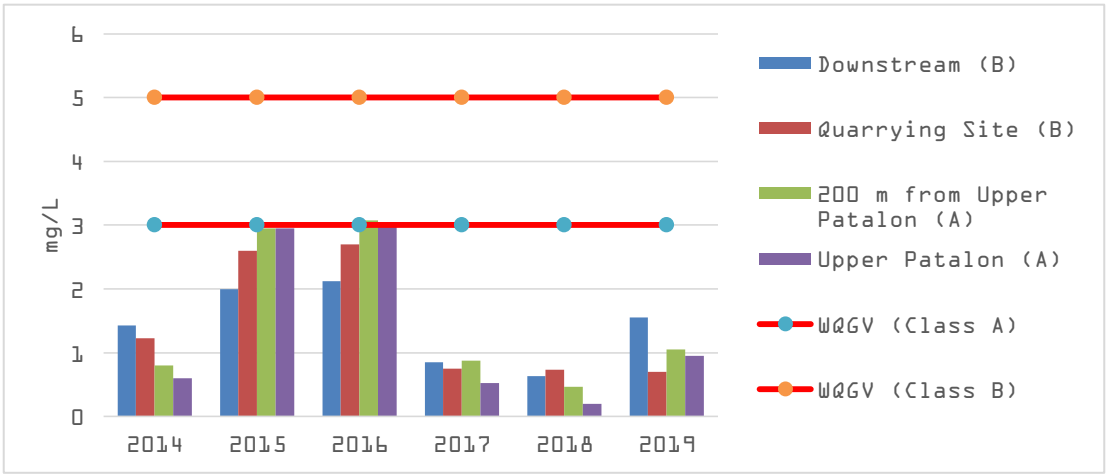
Saaz River

Source: DENR-EMB Region IX

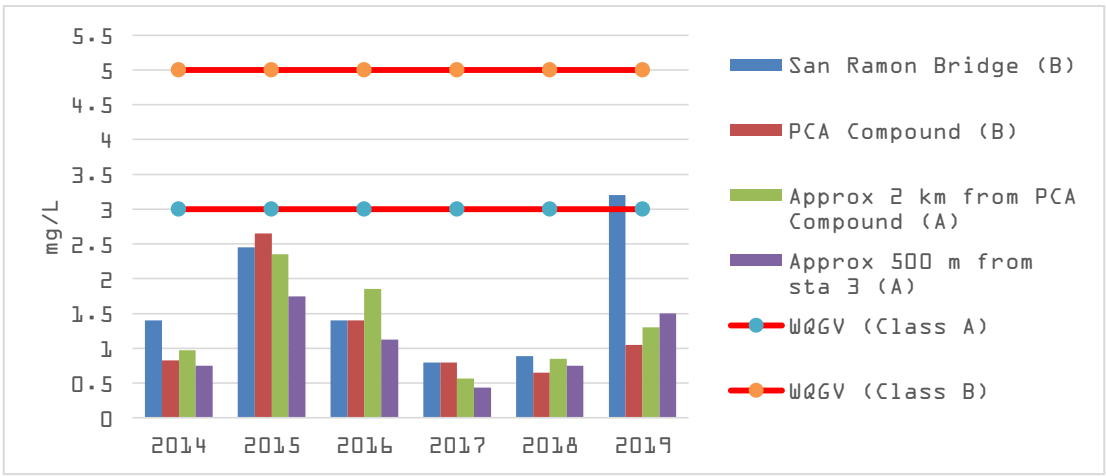
Figure 3-16: Annual Trend of Average DO Concentration in the Priority Rivers



Mercedes River



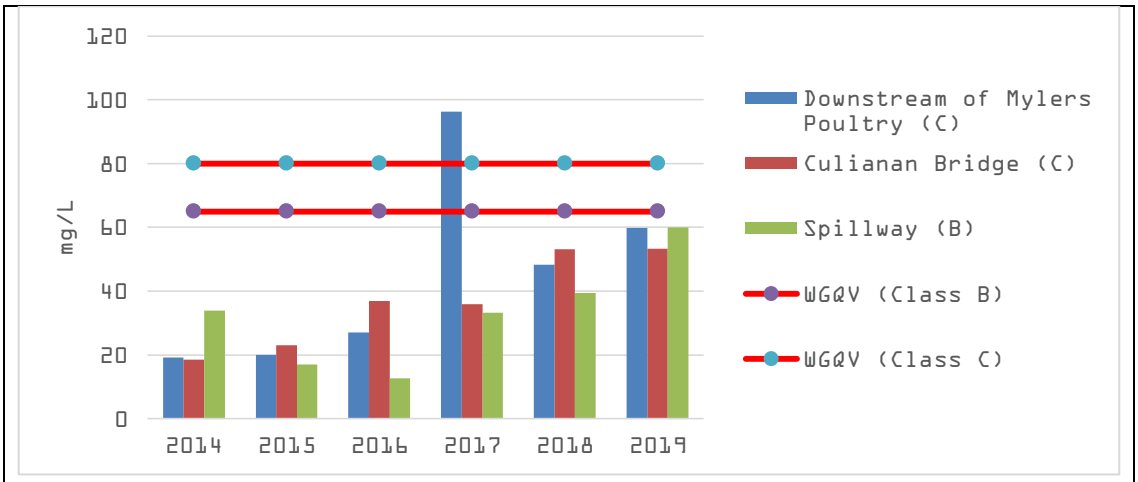
Patalon River



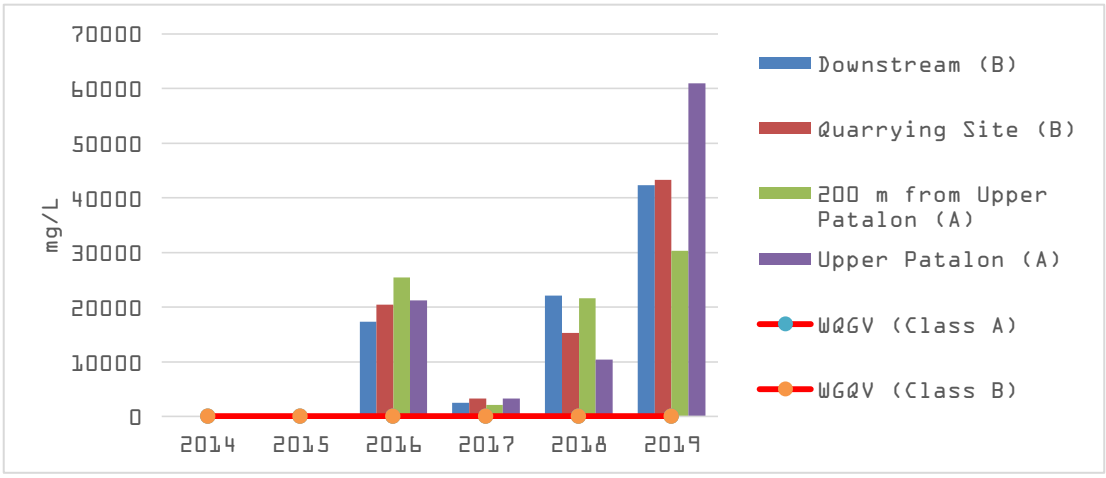
Saaz River

Source: DENR-EMB Region IX

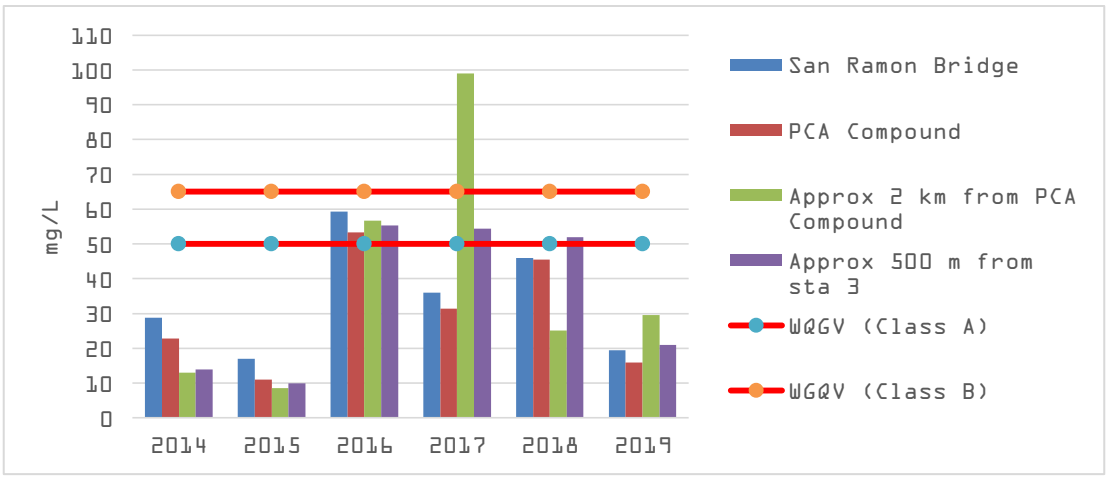
Figure 3-17: Annual Trend of Average BOD Concentration in the Priority Rivers



Mercedes River



Patalon River



Saaz River

Source: DENR-EMB Region IX

Figure 3-18: Annual Trend of Average TSS Concentration in the Priority Rivers

4 Summary of Baseline

165. **Table 4-1** shows the summary of the status of the water supply, sanitation and hygiene, SWM and water quality management in Zamboanga City as compared to the national targets set in Philippine Development Plan (PDP) 2017-2022, DOH National Objectives for Health (NOH) 2017-2022, Philippine Approach to Sustainable Sanitation (PhATSS) 2018-2030, Philippine Water Supply and Sanitation Master Plan (PWSSMP) 2018-2040 and the 2030 UN Sustainable Development Goals (SDG) to determine the status of the city towards meeting these targets.

Table 4-1. Summary of Sanitation Baseline in Zamboanga City

Component	Indicator	Baseline	National Target	
			Value	Reference
Water Supply	Percent households with access to improved water supply	90.7% (2020)	95.16% (2022)	PDP 2017-2022
	Percent households with access to Level III systems	61.1% (2020)	77.1% (2030)	PWSSMP 2018-2040
	Percent household with access to safely managed drinking water services	No data	62.5% (2022)	NOH 2017-2022
			100% (2030)	SDG 6.1
Management of on-site sanitation facilities (toilets, septic tanks, septage management)	Percent households with access to improved sanitation facilities	81.3% (2020)	100% (2022)	PWSSMP 2018-2040
	Percent households with septic tanks (on-site system)	81.3% (2020)	97% (2022) 100% (2030)	PWSSMP 2018-2040
	Percent households practicing open defecation	No data	0% (2022)	PWSSMP 2018-2040
	Percentage of households with access to septage collection services	No data	69% (2022) 100% (2030)	PWSSMP 2018-2040
	Percent household with access to safely managed sanitation facilities, including a hand-washing facility with soap and water	No data	53% (2022)	NOH 2017-2022
			100% (2030)	SDG 6.2
	Percent barangay certified ZOD	0 %	100% (2025)	PhATSS 2018-2030
Wastewater, sewage and drainage management	Percent of households connected to sewerage system	0.4% (2020)	20% (2022) 50% (2030)	PWSSMP 2018-2040

Component	Indicator	Baseline	National Target	
			Value	Reference
Solid Waste Management	Percent solid waste diversion rate	23.40% (2019)	80% (2022)	PDP 2017-2022
	Percent barangays with access to sanitary landfill	41% (2020)	29.26% (2022)	PDP 2017-2022
	Percent of municipal solid waste collected and managed in controlled facilities out of total municipal wastes generated	65% (2019)	100% (2030)	SDG 11.6
Water Quality Management	Percent recreational waters improving	Two WQMAs in the city	>80% (2022)	PDP 2017-2022

5 Identified Problems and Issues

166. The key issues identified in the city in terms of water supply, excreta disposal, wastewater and drainage management, solid waste management, water quality management, and WASH in emergency are summarized in the following table.

Table 5-1. Summary of Identified Sanitation Problems and Issues

Component	Identified Issues
Water Supply	a. About 30 barangays in the city do not have access to Level 3 water system. - Remote areas are still utilizing level 1 water source as drinking water. - Some barangays do not have available water service provider (source of water is commonly open well) - Barangays Muti, Taluksangay and Talabaan use communal water system as water source which are not maintained to ensure delivery of safe water. b. Some areas are experiencing low water pressure c. In 2016 and 2019, ZCWD experienced low water production/supply due to drought that resulted to the implementation of water rationing and/or intermittent water supply to its customers. d. Some residents have inadequate knowledge on alternative strategies and procedure/s in provision of safe drinking water. e. Some WRS are still utilizing deep well source without Permit to Operate issued by DOH IX f. Lack of monitoring of households located at far flung barangays with doubtful sources g. City Health Office has no capacity to test or conduct water analysis as required in SDG 6.1 h. The requirement of DOH-approved water safety plans (WSPs) is not enforced for all water service providers. There is also no local policy requiring the implementation of WSP by the drinking water service providers. i. The city does not have an established local drinking water quality surveillance program. j. Existing water sources and water supply infrastructure in the city are susceptible to landslide and flooding. k. The city needs to strengthen its IEC on water conservation practices and safe water handling practices
Management of on-site sanitation facilities (toilets, septic tanks, septage management)	a. Poor sanitation practices are still observed in the city. There are households that share their toilet facilities to other households, use insanitary toilet facilities or practice open defecation. - The houses-on-stilts, informal settlers and indigenous people in barangays Mariki, Rio Hondo, Sta. Barbara, Sta. Catalina, Kasanyangan, Talon-talon and Zone IV have low access to sanitary toilet facilities - Some indigenous communities have difficulty in adapting proper sanitation practices. - Households in the island barangays also have low access to sanitary toilet facilities

Component	Identified Issues
	- Sanitation facilities provided in houses-on-stilts had been detached b. The city does not have monitoring system for the households that practice open defecation. There is also no procedure or guidelines for ZOD barangay certification and monitoring in place. c. Weak implementation of sanitation policies and no existing city ordinance on WASH d. The existing septage management ordinance of the city must be reviewed and updated to reflect the recent developments on the implementation of the SMP in the city. e. There are septic tanks that are not compliant to the prescribed standard design of DOH and the households cannot afford to retrofit their septic tanks. f. Formal septage management program (SMP) is not yet being implemented in the city. g. There is a need to strengthen the IEC programs on proper sanitation and hygiene practices h. The city LGU must raise the awareness of the households regarding the city ordinance on sanitation and the proposed SMP of the city. i. City LGU representatives/leaders/community lack on training and awareness on WASH for j. Lack of training and awareness advocacy on WASH for COVID-19 and emerging diseases for health care facilities (HCFs) (health workers/ sanitary inspectors) k. Inadequate financing and resources to establish WASH facilities. l. Weak coordination and implementation of WASH programs and policies. m. Lack of potable water supply infrastructure in evacuation centers n. Inadequate WASH facilities in schools that serve as evacuation centers o. The city does not have local policy for the provision of WASH facilities during emergencies p. Existing sanitation facilities in the city are susceptible to landslide and flooding.
Wastewater, Sewage and Drainage Management	a. Disposal of untreated wastewater in the environment - Sewer lines are only limited to city proper, and no treatment is provided to the collected wastewater b. Lack on policy regarding sewerage system c. The drainage is reportedly undersized and are usually clogged with solid wastes which causes flooding in the area. d. Absence of drainage system outside city proper especially in rural barangays e. No maintenance of drainage systems and outfalls f. No drainage master plan g. Sewerage and drainage infrastructures in the city are susceptible to landslide and flooding.
Solid Waste Management	a. There are barangays unserved by the city and barangay waste collection. b. Limited waste reduction and segregation practice in the city - Not all barangays have functional MRFs and composting facility - Inadequate programs to improve diversion rate - Lack of local market for recyclables and reusable waste

Component	Identified Issues
	- Lacks information and awareness on effective solid waste management - Lack of infrastructure to support the resource recovery initiatives c. Barangay Solid Waste Management Councils (BSWMCs) of the city are inactive. d. Absence of proper on-site treatment and disposal of health care waste (HCW) in HCFs e. Lack of training and capacity building on proper HCW management in the HCFs. f. Location of the City MRFs, SLF and medical waste treatment facility are susceptible to landslide and flooding.
Water Quality Management	a. Lack of information and awareness advocacy of relevant stakeholders in water quality management in the community and commercial establishments. b. Presence of informal settlers near bodies of water directly discharging untreated sewage.

6 SWOT Analysis

167. To guide the LSSP team in setting their vision, mission, goals and objectives (VMGOs) and in determining the strategies to improve the sanitation in the city, the strengths, weaknesses, opportunities and threats (SWOT) of the city were identified based on the assessment of the present conditions of each thematic area.

168. With the whole picture of the current situation in place, setting the vision, mission, goals and strategies will become strategic by capitalizing the strength and opportunities and overcoming the weaknesses and threats of the sanitation in the city.

169. Different alternative strategies were identified by the LSSP Team considering the following. The SWOT matrices for each sanitation intervention area are presented in the succeeding tables.

- **Strength-Opportunity (SO) Strategies.** – These are based on using key internal strength to take advantage of external opportunities.
- **Weakness-Opportunity (WO) Strategies.** – The are based on overcoming of weakness by taking advantage of opportunities.
- **Strength-Threat (ST) Strategies.** – These are based on using strengths to avoid threats.
- **Weakness-Threat (WT) Strategies.** – There are strategies to minimize the weakness and avoid the threats.

Table 6-1: SWOT Matrix for Water Supply

	Strengths (S)	
WATER SUPPLY	**Infrastructure** • Existing water supply infrastructures of ZCWDs and RWSAs • Availability of water supply sources including partnership of ZCWD with Primewater **Policy/Plans** • Institutionalized and functional LDWQMC through EO • Created Zamboanga City Water Security Council and TWG • Adoption of Water Demand Management program • Water sufficiency is included in the Local Climate Change Action Plan of the city • Policy on rainwater harvesting **IEC, Monitoring Activities** • Implementation of IEC on water supply • Regular monitoring of drinking water quality	**In** • • • • • **IE** • • •
Opportunities (O)	**Strength-Opportunity Strategies**	
• Increase in demand for water supply due to increase in population • Availability of alternative water sources • Rainwater harvesting facility • Implementation of WSP • Programs of national agencies on water supply (i.e., DILG) • Microfinance institutions • Partnership with NGOs • Water supply programs from funding donors/banks (i.e., DBP, LBP)	• Enhance existing availability of water through the development of additional water sources, and installation, upgrading and expansion of water supply facilities. • Increase the use of rainwater as alternative water source through strict enforcement of the rainwater harvesting city ordinance and conduct of promotion and advocacy programs. • Strengthen the existing water quality management through the institutionalization of drinking water quality surveillance by the LGU and stakeholders and safety by the water service providers • Enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the implementation of water and water resource management projects, studies, promotion, and capacity building. • Strengthen advocacy and lobbying in support to the adoption of support policies, institutional arrangements and structures, allocation and or leveraging of funding for sustainable and resilient water services and the promotion of water conservation, water	• • • • • •

Table 6-2: SWOT Matrix for Management of On-site Sanitation Facilities

	Strengths (S)	
Management of On-site Sanitation Facilities (toilet, septic tanks, septage management)	**Policies** • City Ordinance 1009-152: Septage Management System in Zamboanga City • City Ordinance 500: Sanitation Code of Zamboanga City **Institutional Framework** • Institutionalized Zamboanga City Septage Management Council • Coordination between BLGUs and CHO to assist the households in the construction of toilet facilities • There are available private desludgers in the city **Infrastructure and Programs** • On-going construction of Septage Treatment Plant at Vale Vista and Magay **IEC** • WASH programs in schools	**P** • • **In** • • • • **IE** • • • **F** •
Opportunities (O)	**Strength-Opportunity Strategies**	
• Implementation Philippine Water Supply and Sanitation Master Plan to increase demand for sanitation services • National sanitation programs (i.e., National Sewerage and Septage Management Program (NSSMP)) • Technical assistance from international agencies (i.e., USAID SURGE) • Micro-finance institutions (i.e., Water.org) • Partnership with NGOs • Sanitation programs from funding donors/banks (i.e., DBP) • Possible additional revenues from treated effluent and bio-solids reuse	• Enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the implementation of sanitation projects, studies, promotion, and capacity building • Integrate the sanitation residual processing and recovery in the design of the SpTPs • Review and update existing sanitation policies to integrate the new national policies, guidelines, plans and developments.	•

Table 6-3: SWOT Matrix for WASH in Emergencies

	Strengths (S)	
WASH in Emergencies	**Policies** • Local Climate Change Action Plan 2016-2030 • Local Disaster Risk Reduction and Management Plan 2019-2022 • On-going formulation of Zamboanga City Resilience Plan **Institutional Framework** • All barangays have DRRM committees **Capacity Building** • Trained personnel on emergency health and sanitation **Infrastructure and Programs** • Has designated evacuation centers in the city • Available mobile water treatment unit • Provision of hygiene kits during emergency	**P** • **In** • • **In** • • •
Opportunities (O)	**Strength-Opportunity Strategies**	
• Technical assistance from international agencies (i.e., USAID SURGE) • Partnership with private sectors and NGOs • Sanitation programs from funding donors/banks (i.e., DBP)	• Enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the provision of WASH services during emergency situations. • Consider external support from international agencies and funding donor/banks in the implementation of WASH-related PPAs in the LCCAP and LDRRMP • Tap private sectors and NGOs in the provision of hygiene kits during emergencies	• •
Threat (T)	**Strength-Threat Strategies**	
• Sustaining the interest and priority of the LGU • Changes in administration and leadership • Lack of political commitment • Lack of participation of BLGUs • Impacts of climate change to the sanitation facilities • Cultural behavior	• Enhance BDRRMP of barangays by integrating the provision of WASH services during emergencies • Institutionalize the provision of WASH facilities during emergencies through formulation and enforcement of local policies.	•

Table 6-4: SWOT Matrix for Wastewater, Sewage and Drainage Manageme

	Strengths (S)	
Wastewater, Sewage and Drainage Management	**Wastewater/Sewage Infrastructure** • Presence of existing sewer line in the city • Available ZCWD sewage pumping stations • On-going construction of sewage treatment plants in Magay, Rio Hondo and Vale Vista • On-going rehabilitation and expansion of the existing sewer lines in Magay **Drainage Infrastructure** • Availability of drainage system within the city proper	**W** **In** • • • **IE** • • **P** • **D** **In** • • • •
Opportunities (O)	**Strength-Opportunity Strategies**	
• Implementation Philippine Water Supply and Sanitation Master Plan to increase demand for sewerage services • National sanitation programs (i.e., NSSMP, LWUA) • Technical assistance from international agencies (i.e., USAID SURGE, ADB) • Sanitation programs from funding donors/banks (i.e., DBP) • Possible additional revenues from treated effluent and bio-solids reuse	**Wastewater/Sewage** • Enhance collaboration and partnerships with the private sector, donors, national government, academic institutions, NGOs for the implementation of sewerage projects, studies, promotion, and capacity building • Establish partnerships with private sectors, NGOs, academic institutions and other stakeholders for the reuse of the sanitation residuals • Integrate the sanitation residual processing and recovery in the design of the STPs **Drainage** • Seek technical and financial assistance from international agencies and funding donors/banks for the rehabilitation, improvement, expansion of the existing city drainage network	**W** • • • **D** •
Threat (T)	**Strength-Threat Strategies**	
• Sustaining the interest and priority of the LGU • Changes in administration and leadership • Lack of political commitment	**Wastewater/Sewage** • Institutionalize the sewerage system in the city through formulation and enforcement of local policies and guidelines	**W** •