Metropolitan Waterworks Authority

# GREEN FINANCE FRAMEWORK

June 2026

Quality Water for Quality Living

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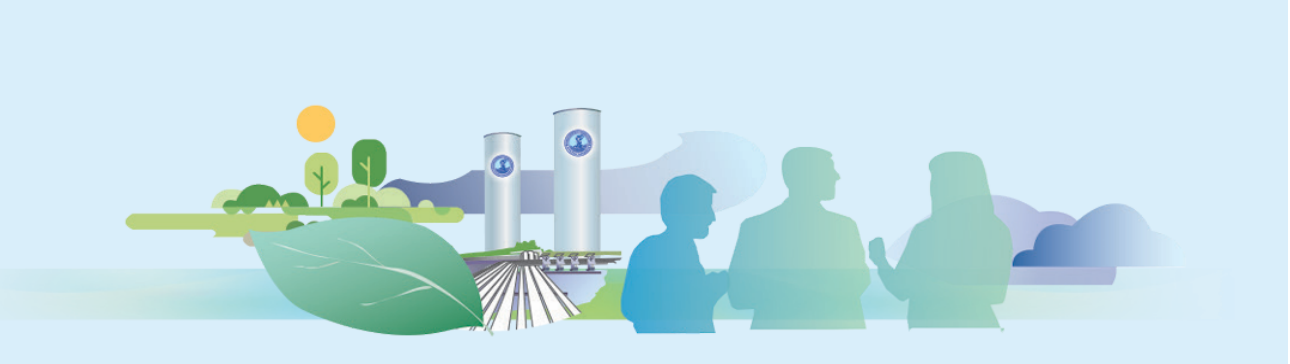


# 1. INTRODUCTION

## 1.1. About the Metropolitan Waterworks Authority

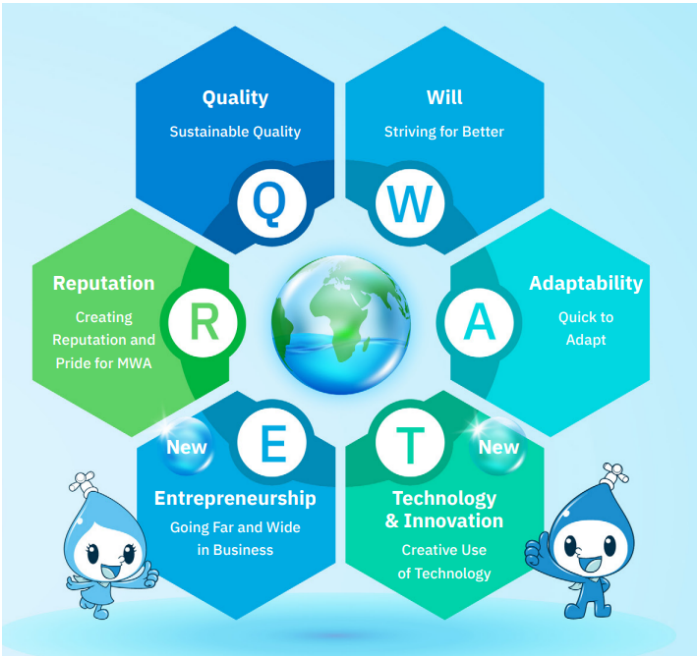
The Metropolitan Waterworks Authority (MWA) is a state enterprise under the supervision of the Ministry of Interior that has been operating since 16 August 1967, pursuant to the Metropolitan Waterworks Authority Act, B.E. 2510 (1967). MWA's primary mission is to procure raw water resources for waterworks; produce, deliver, and distribute water in Bangkok, Nonthaburi, and Samut Prakan; and operate other businesses related or beneficial to waterworks.

**Vision:** Quality Water for Quality Living

**Missions:**

- To operate one-stop core water business adhering to water quality standards for improving the people's quality of life
- To become a crisis-capable organization
- To operate related business for creating value to stakeholders while creating sustainable organizational growth

*Figure 1: Shared Values: QWATER*




There are three distinct policy levels for the public sector shareholders of state enterprises:

1) **Policies for State Enterprises (Overall)**: Serving as state mechanisms to drive the country's socioeconomic security, prosperity, and sustainability.

2) **Policies for State Enterprises (Public Utilities)**: Developing basic infrastructure and land use to raise the quality of life while sustainably supporting urbanization and economic growth.
3) **Policies for the MWA**: Improving and expanding quality water networks to sufficiently meet emerging urbanization demand while also creating added value through the organization's related businesses.

**Business Categories.** MWA has enhanced services to deliver value and meet consumer needs beyond their expectations via "One Stop Water Services by MWA" under the theme "Good Water for Good Life," which aims to meet consumer requirements through the following five business categories:

- **Water System Design and Improvement Services:** Provide expert consulting teams to meet every requirement in water system management, whether small or large, in both the public and private sectors.

- **One Stop Water Services for Consumers:** Address all water supply concerns in building, residential, and commercial properties through service packages—including inspecting, surveying, and repairing water systems, as well as cleaning both large and small water storage tanks—to maintain water quality according to standards.

- **Water System Standard Testing Center:** Perform testing services for water quality, meter accuracy, and material standards used in water systems according to ISO 17025 standard and using experts and certified laboratories.

- **Water Technology and Innovation:** Develop water management technology and water management platforms via CIS 365 digital system to enhance organizational effectiveness in support of effective infrastructure system expansion.

- **MWA Water Excellence Center:** Serve as a center of training and water personnel development, in collaboration with the public and private sectors, for knowledge transfer and the development of water technology courses, in accordance with industrial standards, while strengthening personnel competence to enhance water services and develop sustainable water systems.

*Figure 2: The Water Production Process*


*Figure 3: Locations of MWA Facilities*


**The Sixth MWA Strategic Management Plan**

1) Short-term goals (fiscal year 2027) focus on driving the organization towards “Smart Enterprise for Smart Value”; for instance, providing alternative raw water reserves, service enhancement, and operational efficiency for digital services and utilities; being a technology-driven organization with easy access to related businesses while emphasizing proactive communication and product and service

development to meet consumer needs and expectations; and may establish an affiliated company in preparation for relevant business operations and business expansion opportunities, with the aim of generating sustainable returns and reducing the government's investment burden.

2) Medium-term goals (fiscal year 2032) focus on providing "One Stop Water Services for Smart Water for Smart City" with the aim of being an organization with "One Stop Water Services" that meet consumer needs in every area, emphasizing the use of technology to manage environmentally friendly products for maximum efficiency; for instance, establishing linkages between water resources in western and eastern regions, smart water networks, and one stop water businesses.

3) Long-term goals (fiscal year 2037) focus on clean water through "Smart Life for Smart Living," becoming a social responsibility organization supporting the social well-being and significant environmental and economic needs of society; for instance, improving entire water distribution systems and pursuing diversification beyond the core business.

*Figure 4: Roadmap of the Sixth MWA Strategic Management Plan*

MWA has developed four strategic objectives to drive the organization towards its goals.

*Figure 5: MWA's Strategic Objectives*


In 2025, MWA produced 2,008.8 million cubic meters of water from four treatment plants across Bangkok. A total of 1,515.8 million cubic meters was distributed, of which 52.61% was supplied to residential users; 41.56% to businesses, state enterprises, and government agencies; and 5.83% to public water services. The service areas include a population of 8.1 million people and 4.9 million households.

## 1.2. Sustainability at MWA

Recognizing the importance of all sectors of stakeholders, MWA has adopted the principles of social and environmental responsibility in line with ISO 26000 standard, which consists of seven behavioral principles to be incorporated throughout an organization's entire value chain. These principles include Accountability, Transparency, Ethical Behavior, Respect for Stakeholder Interests, Respect for the Rule of Law, Respect for International Norms, and Respect for Human Rights. The formulation of a Corporate Social and Environmental

Responsibility Policy also established practical guidelines for the MWA Board of Directors, the Governor, and its executives and employees:

- Commit to improving water services, owing to a primary organizational mission, along with Corporate Social and Environmental Responsibility in process (CSR in Process) and carry out social activities (CSR after Process), complying with core issues of ISO 26000 standard with an emphasis on stakeholder involvement to prevent negative impacts that might arise from the organization's operations.
- Promote employee awareness at all functional levels for performing functions in line with social responsibility, ethics, and morals until becoming an intrinsic part of corporate culture.
- Build systematic stakeholder engagement according to the AA1000 Stakeholder Engagement Standard, resulting in effective stakeholder management on significant issues focusing on the organization's expertise to advocate for and meet stakeholder needs and expectations.
- Promote sustainable development and corporate performance reporting relying on a sustainability reporting framework based on the guidelines of the Global Reporting Initiative to enhance the organization's operational potential and the international recognition of reliable performance reports.

## 1.3. Examples of Green Initiatives

### Existing Projects

- **Improvement of water pipe system for stability of the water distribution system** (2012–2030): Improve water distribution pipes for water loss reduction and develop the overall efficiency of the MWA's pipe network.
- **Improvement of raw water transmission system and permanent flood protection** (2013–2029): Improve the eastern raw water transmission system (the raw water source for Bang Khen Water Treatment Plant, Sam Sen Water Treatment Plant, and Thonburi Water Treatment Plant) from Bang Khen Water Treatment Plant to the Sam Lae Raw Water Pumping Station for transmission potential and permanent flood protection along water-supply canals.

- **The Ninth Bangkok Water Supply Improvement Project** (2017–2032): Enhance production capacity at the Maha Sawat Water Treatment Plant *(see text box for details).*

**Addressing Climate Change Challenges in the Water Supply through the Ninth Bangkok Water Supply Improvement Project**

**1. Background**

Climate-related hazards and impacts on the raw water supply

- **Flooding**. Flooding is a recurring climate hazard in Thailand, which occurred most notably during the severe floods of 2011. In 2025, above-average rainfall in upstream areas triggered flash floods and increased surface runoff, leading to greater soil erosion and sediment transport into the river, which significantly elevated raw water turbidity levels in the Chao Phraya River.[1] These events inundated critical MWA facilities, including the Sam Lae Raw Water Pumping Station, the Maha Sawat Water Treatment Plant, and conveyance canals. Floodwaters degraded raw water quality and disrupted the operation of water quality monitoring stations and water treatment operations, forcing the Maha Sawat Plant—which supplies water to the western bank of the Chao Phraya River—to temporarily suspend operations.[2]
- **Drought and saltwater intrusion**. Prolonged drought has reduced raw water inflows from the Bhumibol and Sirikit dams, while increased agricultural water use has further constrained available

[1] MWA. 2026. Fact-based Climate Change Adaptation.
[2] MWA. 2016. Supporting documents for Cabinet approval of the Ninth Bangkok Water Supply Improvement Project.

supplies.[3] Based on historical data from 2020-2024, saltwater intrusion in the Chao Phraya River has become increasingly severe, as evidenced by higher salinity levels, greater upstream intrusion distances, and increased frequency and duration of intrusion events, particularly during El Niño years.[4] Insufficient freshwater flows weaken the river's ability to repel saltwater intrusion, allowing salinity to migrate upstream to the Sam Lae Raw Water Pumping Station. This has affected both the quantity and quality of raw water supplied to the Bang Khen, Sam Sen, and Thonburi Water Treatment Plants, resulting in treated water salinity exceeding regulatory standards. Prolonged saltwater intrusion could lead to more severe operational and service disruptions.[5]

Current measures to mitigate this risk include (i) **continuous raw water quality monitoring** through an automated remote monitoring system to track seawater intrusion levels and water situations, and dam discharges that impact the raw water quality in Chao Phraya River. During periods when raw water salinity remains within standard limits, the MWA manages raw water by maximizing intake into the raw water canal to full capacity. Concurrently, (ii) **production at the Bang Khen Water Treatment Plant can be increased** to maximize capacity to maintain high levels in the clear water tanks. Additionally, (iii) **water transmission to various pumping stations can be increased** to maintain high levels in their respective clear water tanks, thereby mitigating impacts during periods when raw water salinity exceeds standards, during which the MWA will reduce production at the Bang Khen Water Treatment Plant. Finally, (iv) **coordination with the Royal Irrigation Department can be maximized** to increase upstream water release from dams to help repel salinity. The first three measures have a response window of approximately 2–3 hours, while the effectiveness of the fourth measure depends on the available reservoir storage.[6] More frequent and prolonged saltwater intrusion events have already been observed, including periods lasting up to 3 months in 2020 and 4.5 months in 2021, despite the raw water intake being located nearly 100 kilometers from the river mouth.[7]

- **Rising temperature.** In combination with factors such as nutrient pollution and low river flows, rising temperatures and elevated carbon dioxide concentrations in water bodies contribute to rapid and prolonged algae blooms.[8] In the Chao Phraya River, a significant algae bloom on 12 May 2015 clogged filter at the Bang Khen Water Treatment Plant, causing a 2-hour production shutdown. The water supply to eastern pumping stations dropped sharply, resulting in temporary shortages.[9] With projected temperature increases, the frequency and severity of algae blooms may rise in the future.

<u>Rising demand and system resilience</u>

- **Increasing water demand**. According to an MWA assessment, future water demand is projected to grow steadily at around 1% per year. Expected average daily water demand is expected to reach 6.94 million cubic meters, with peak demand rising to 7.63 million cubic meters per day in 2052, representing an increase of nearly 38% compared with peak demand in 2015.[10]

**2. Objectives**

Based on water stress assessments conducted across all MWA water treatment facilities, the project is designed to maintain system stability, strengthen climate resilience to flooding and droughts, and meet long-term urban water demand. The project aims to achieve the following:

[3] Footnote 2.
[4] Footnote 1.
[5] Footnote 2.
[6] Footnote 2.
[7] Pokavanich, T., and X. Guo. 2024. "Saltwater Intrusion in Chao Phraya Estuary: A Long, Narrow and Meandering Partially Mixed Estuary Influenced by Water Regulation and Abstraction." *Journal of Hydrology: Regional Studies*: 52 [online].
[8] United States Environmental Protection Agency. 2026. *Climate Change and Freshwater Harmful Algal Blooms. Washington, DC.*
[9] Footnote 2.
[10] Footnote 2.

- **Expand water production capacity** at the Maha Sawat Water Treatment Plant to meet increasing water demand and enhance efficiency in managing risks within the production system.
- **Strengthen stability and reliability of the transmission system** through the construction of a water transmission tunnel from the Maha Sawat Water Treatment Plant, along with an additional tunnel connecting the eastern and western service areas.
- **Improve the efficiency of water pumping and distribution**, particularly along the lower western bank of the Chao Phraya River, by constructing a new pumping station (Bang Mod) and the installation of water distribution pipelines.
- **Enhance water distribution efficiency** by constructing and expanding clear water tanks at Min Buri, Lat Krabang, Bang Phli, Lat Phrao, and Samrong raw water pumping stations to allow for maintenance shutdowns and to manage climate variability.
- **Support equitable water supply services**, particularly in outer areas along the boundaries of the MWA's service zones.
- **Avoid maladaptation** by coordinating with the Ministry of Agriculture and Cooperatives to assess and monitor freshwater availability, recognizing the ministry's responsibility for water allocation and oversight across agricultural and other users.

**3. Expected outcomes**

- **Increase water production capacity** at the Maha Sawat Water Treatment Plant by 800,000 cubic meters, raising the total capacity from 1,600,000 to 2,400,000 cubic meters per day, benefiting 2 million residents in western service areas.
- **Expand clear water tanks** by 480,000 cubic meters, strengthening supply reliability during climate-related disruptions and maintenance periods.

## Future Projects

- **Smart Water Grid**

  Establish water loss monitoring areas in sub-areas to clearly separate the amount of water loss between trunk main system and distribution system by installing buried flow meters; water pressure meters; remote water gate control devices; and pipe leak detection devices for activities to detect pipe leaks, monitor water loss, and manage water pressure in the area. Those activities assist the efficiency of analysis and decision-making in high water loss areas, in addition to implementing other related activities and supporting effective high-pressure water distribution.

- **Construction Project for Raw Water Reservoir on the East Side**

  Increase the amount of raw water storage in the Eastern Waterwork Canal by 0.5 million cubic meters in fiscal year 2029.

# 2. GREEN FINANCE FRAMEWORK

In alignment with the MWA's missions and strategy to provide high-quality water and ensure water security for improved quality of life and urban development, operational stability and climate resilience is central to MWA's operations and its objectives to deliver trusted and reliable services. With this strong commitment, MWA has established its Green Finance

Framework ("the Framework") to outline its approach to issuing green financing instruments, including but not limited to green bonds and green loans.

The Framework is designed to align with market practices, principles, and standards—including the Green Bond Principles 2025 (GBP), published by the International Capital Market Association (ICMA); [11] Association of Southeast Asian Nations (ASEAN) Green Bond Standards (GBS), published by the ASEAN Capital Markets Forum in 2018;[12] and Green Loan Principles 2025 (GLP) published by the Loan Market Association (LMA), Loan Syndications and Trading Association (LSTA), and Asia-Pacific Loan Market Association (APLMA).[13]

The Framework comprises four core components and a key recommendation:

1) Use of Proceeds
2) Process for Project Evaluation and Selection
3) Management of Proceeds
4) Reporting
5) External Review

## 2.1. Use of Proceeds

An amount equivalent to the net proceeds of any green finance instruments issued by MWA and its subsidiaries or affiliates will be used to finance or refinance, in part or whole, new or existing eligible projects in accordance with this Framework. Eligible projects may include asset value, capital expenditures, operating expenditures, and related activities. Refinancing for eligible projects may be subject to a maximum look-back period of three years from the time of issuance date.

In addition, eligible projects will, where possible, align with the ASEAN Taxonomy for Sustainable Finance version 4 (ASEAN Taxonomy), published in November 2025;[14] and/or the Thailand Taxonomy, published in 2025; [15] as well as the relevant United Nations Sustainable Development Goals (UN SDGs).

**Table 1: Eligible Green Projects Categories and Sample Impact Indicators**

[11] Green Bond Principles
[12] ASEAN Green Bond Standards
[13] Green Loan Principles
[14] ASEAN Taxonomy V4
[15] Thailand Taxonomy

| Eligible Green Project Category and Alignment with UN SDGs | Sub-theme | Eligibility Criteria, Environmental Objectives, and Relevant ASEAN Taxonomy and/or Thailand Taxonomy | Sample Impact Indicators |
|---|---|---|---|
| **Water Supply**<br>  | **Climate Change Adaptation** | Construction, extension, operation, and maintenance of water collection and supply systems and related infrastructure to reduce climate risks and ensure reliable and sufficient water supply for the public. Examples of eligible projects are the Ninth Bangkok Water Supply Improvement project and the Construction Project for Raw Water Reservoir on the East Side.<br>• **ASEAN Taxonomy (Climate Change Adaptation)**: 36[001] Construction, extension and operation of water collection, treatment and supply system | • Expected capacity of new water supply facility ($m^3$/year)<br>• Expected additional water availability or increased water catchment ($m^3$/year or %) |
| **Renewable Energy**<br>  | - | Installation, operation, and maintenance of solar energy systems and energy storage systems.<br>• **ASEAN Taxonomy (Climate Change Mitigation)**: 351[021] Electricity generation using solar photovoltaic technology<br>• **ASEAN Taxonomy (Climate Change Mitigation)**: 351[072] Storage of electricity, including pumped storage<br>• **Thailand Taxonomy–Energy Sector (Climate Change Mitigation)**: 1. Solar energy generation<br>• **Thailand Taxonomy–Energy Sector (Climate Change Mitigation):** 14. Storage of electricity, thermal energy and low-carbon hydrogen and its derivatives | • Installed capacity of renewable energy (MW) |
| **Energy Efficiency**<br>  | - | Installation, upgrade, and replacement of equipment, devices, and technologies that enhance energy efficiency in buildings and water supply systems and networks.<br>• **ASEAN Taxonomy (Climate Change Mitigation)**: 68[003] Energy performance measurement, regulation, control<br>• **Thailand Taxonomy–Construction and Real Estate Sector (Climate Change Mitigation)**: 4. Installation, maintenance, and repair of special-purpose building equipment<br><br>Note: energy efficiency projects in water supply systems and networks – such as Pump Efficiency Optimization and District Metering Area Pressure Management – are referenced | • Annual energy saving (MWh)<br>• Annual GHG emissions reduced/ avoided (tCO2e) |

| Eligible Green Project Category and Alignment with UN SDGs | Sub-theme | Eligibility Criteria, Environmental Objectives, and Relevant ASEAN Taxonomy and/or Thailand Taxonomy | Sample Impact Indicators |
|---|---|---|---|
| | | against the ASEAN Taxonomy Foundation Framework, as the relevant technical screening criteria are unavailable. | |

Excluded Categories

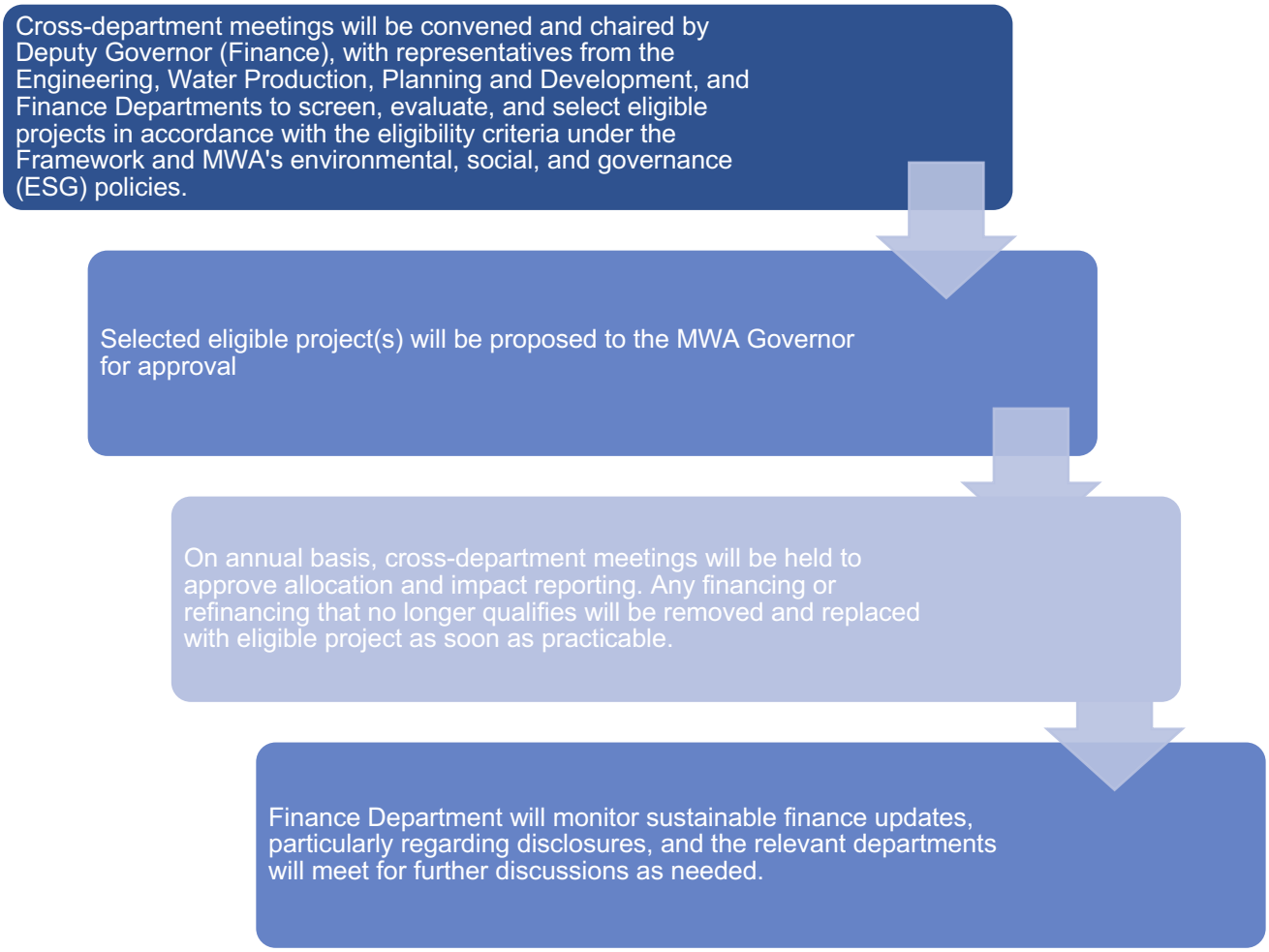
MWA confirms that it will not intentionally use the net proceeds of its green finance instruments to finance or refinance any assets, expenditures, and activities included in the excluded categories set out below:

- Development, refining, and transportation of fossil fuels (including coal, oil, and gas)
- Fossil fuel power generation
- Nuclear power generation
- Weapons and defense
- Gambling and casinos
- Alcohol and tobacco (excluding beer and wine)
- Activities with forced or child labor
- Production or trade of dangerous chemicals, radioactive materials, or endangered species
- Commercial logging in old growth or primary tropical forests
- Harmful marine or coastal fishing practices

Projects, assets, or expenditures associated with human or labor rights violations or environmental harm are also excluded.

## 2.2. Process for Project Selection and Evaluation

MWA applies the following process to evaluate and select eligible projects within the Framework:




## 2.3. Management of Proceeds

An amount equivalent to the net proceeds from MWA's green finance instruments will be deposited and tracked in general funding account and managed on a portfolio approach using internal reporting system. The Finance Department will be responsible for tracking and managing the net proceeds. MWA intends to ensure that the eligible projects financed and/or refinanced match or exceed the net proceeds outstanding under this Framework while the green finance instrument remains outstanding.

For temporary holdings, unallocated proceeds will be held in cash or cash equivalent instruments in line with MWA's financial policies and will exclude any projects and activities listed under the excluded categories in this Framework.

## 2.4. Reporting

Until full allocation, MWA is committed to providing investors or lenders with the following information on an annual basis, either through an annual report or a standalone report, and thereafter in case of material changes, with reporting published on the MWA's website at www.mwa.co.th.

Allocation report

- A register of outstanding green finance instruments, including ISIN code and Thai Bond Market Association symbol (where applicable), along with the allocation of net process broken down by project category
- A brief overview of key eligible projects, including locations, objectives and expected benefits
- The share of new financing and refinancing
- The remaining balance of unallocated proceeds (if any)

Impact report

MWA will, on a best effort basis, provide qualitative and/or quantitative reporting of positive environmental impacts of the eligible project. Impact reporting may be reported on an aggregated basis. A sample of such impact indicators are provided in the Table 1. This may include key calculation methodologies used for quantitative reporting (where applicable).

# 3. EXTERNAL REVIEW

MWA will engage an independent external reviewer to evaluate this Framework's alignment with the relevant ICMA GBP; ASEAN GBS; and LMA, LSTA, and APLMA GLP. The Second Party Opinion (SPO) will be made publicly available on MWA's website at www.mwa.co.th.

# 4. FUTURE AMENDMENTS TO THE FRAMEWORK

This Framework will be reviewed from time to time, including in relation to major updated version of relevant principles and standards, and to ensure alignment with market best practices. The update, if not minor in nature, will be subject to the external review and both the updated Framework and the corresponding SPO will be published on MWA's website.

# Metropolitan Waterworks Authority

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