Tokyo Metropolitan Government Waste Landfill Sites

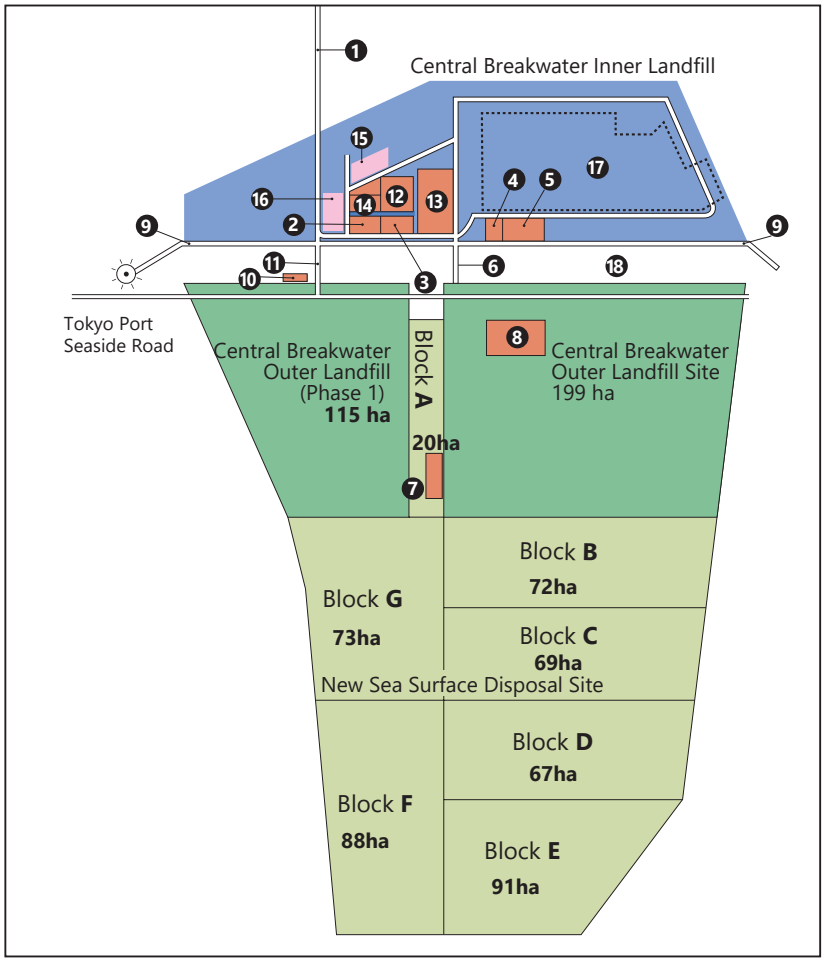
Central Breakwater Outer Landfill Site & New Sea Surface Disposal Site

Photographed on February 14, 2025

TOKYO
METROPOLITAN
GOVERNMENT

1 Overview of Landfill Sites

(1) Layout



Central Breakwater Inner Landfill

Area	Approx. 195 ha
Landfill area (waste)	Approx. 78 ha
Landfill volume (waste)	Approx. 12.3 million tonnes

Central Breakwater Outer Landfill (Phase 1)

Landfill area (dredged soil, soil from construction sites)	Approx. 115 ha

Central Breakwater Outer Landfill Site

Landfill area (waste)	Approx. 199 ha
Landfill capacity (waste)	Approx. 47.58 million m^3

New Sea Surface Disposal Site

Area (A-G)	Approx. 480 ha
Landfill capacity (A-G)	Approx. 120 million m^3
Area (A-E)	Approx. 319 ha
Waste landfill capacity (A-E)	Approx. 45.80 million m^3

Facilities associated with Super Eco Town

⑮ PCB waste treatment plant operating since November 2005

⑯ Pyrolysis and gasification power generation plant operating since August 2006

Tokyo Metropolitan Government

① Passage No. 2 Undersea Tunnel
② Central Breakwater Landfill Joint Office, Bureau of Environment
③ Wastewater Treatment Plant No. 1
④ Landfill-gas utilization facility
⑤ Wastewater Treatment Plant No. 3
⑥ Umi-no-Mori (Sea Forest)- Ohashi Bridge
⑦ Reception gate
⑧ Buffer reservoir
⑨ Central Breakwater
⑩ Wharf (marine transport unloading facility)
⑪ Chubo-Ohashi Bridge

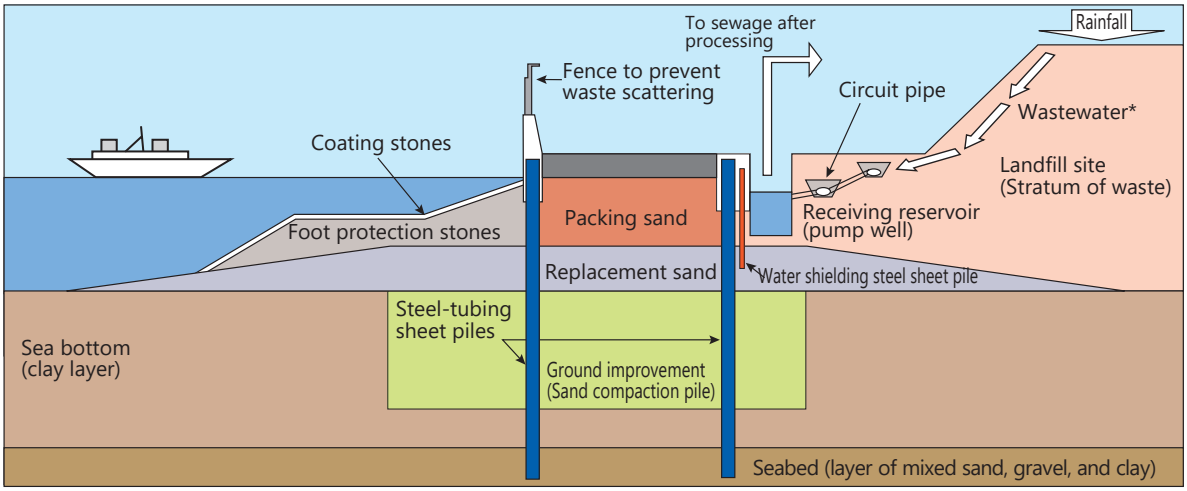
Clean Association of TOKYO 23

⑫ Facility for pulverizing bulky waste
⑬ Chubo Incombustible Waste Processing Center
⑭ Chubo Ash Melting Facility

⑰ Umi-no-Mori Park
⑱ Sea Forest Waterway

(2) Revetment Structure

Double steel-tubing sheet piles (Central Breakwater Outer Landfill Site)



* Rainwater seeps through a stratum of waste and becomes polluted, resulting in wastewater.

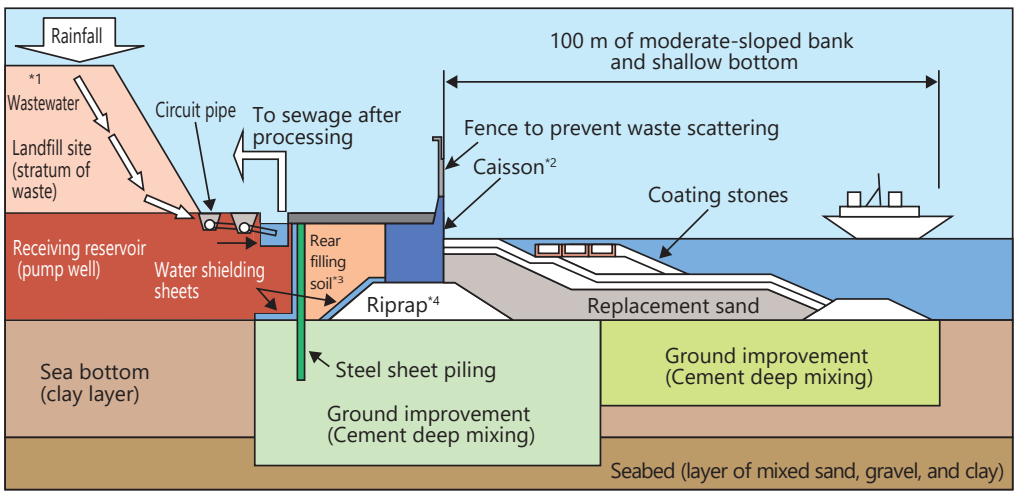
(3) Waste Disposal by Landfill Plan

The Tokyo Metropolitan Government establishes"Waste Disposal by Landfill Plan", aiming to extend the lifetime of waste disposal facilities by stipulating the types of acceptable waste and the volume of waste disposal. The Waste Disposal by Landfill Plan is reviewed approximately every five years (the latest revision was performed in February, 2022).

Acceptance policy by type of waste

Type of waste		Acceptance policy
Waste	Municipal solid waste	All amount of household waste generated in 23 wards of Tokyo is accepted once it has undergone intermediate processing, while efforts are also undertaken to reduce the amount of waste and maximize the reuse and recycling of resources.
	Industrial waste	Regarding industrial waste produced by small and medium-sized businesses in Tokyo, such waste that has undergone intermediate processing is accepted up to a certain amount.
	Waste from public facilities	Waste discharged from water supply and sewage facilities in Tokyo is accepted once it has undergone intermediate processing.
Earth and sand	Dredged soil	Dredged soil generated in the Port of Tokyo and from rivers in Tokyo is accepted by removing the one that can be effectively used for the maintenance of the Port of Tokyo and rivers according to the public nature of the business.
	Soil from construction sites etc.	Prioritizing the soil generated from the public work in Tokyo, the volume required for maintaining the infrastructure of landfill sites is accepted. Additionally, improved construction-derived from soil is accepted for reuse as construction material

Caisson outer shore protection for the New Sea Surface Disposal Site B and C Blocks



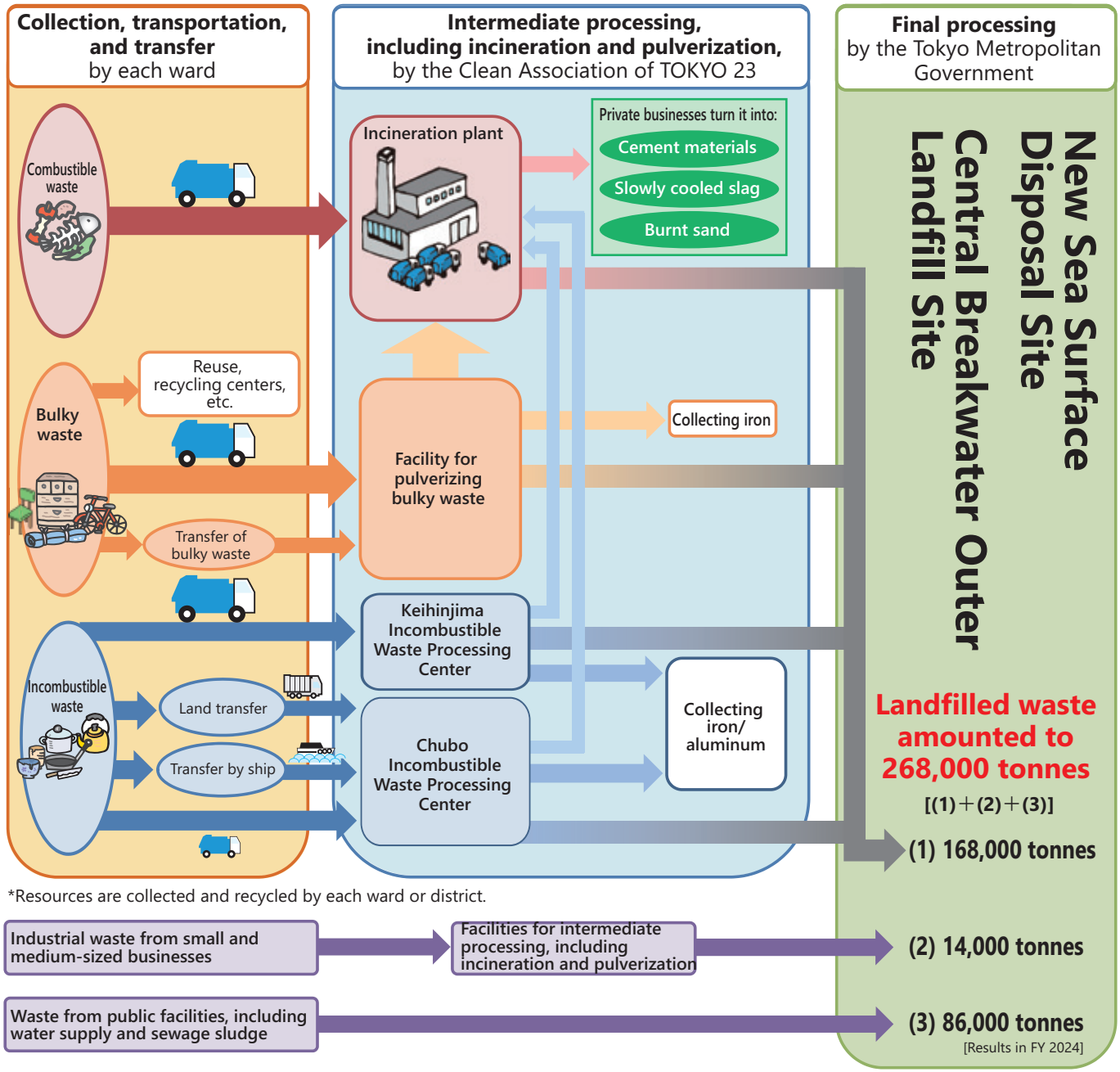
*1 Rainwater seeps through a stratum of waste and becomes polluted, resulting in wastewater.

*2 A concrete or steel box filled with sand, slag, etc.

*3 Earth and sand placed behind the caisson revetment.

*4 Rocks to support the caisson revetment.

2 Workflow of Waste Processing in 23 wards



[Intermediate processing]

- Combustible waste is incinerated at incineration plants. Incinerating waste contributes to preventing generation of bacteria, vermin and offensive odors. Additionally, the volume of waste is reduced to approximately one-twentieth by incineration. The volume of waste disposal has been reduced through reuse and recycling of a part of incineration ash as cement materials etc.
- Bulky waste is treated (pulverization/sorting) at facilities for pulverizing bulky waste at facilities for pulverizing bulky waste. Bulky waste is pulverized after being sorted into combustible one and incombustible one. After pulverization, iron is sorted out and collected as resources. Additionally, among residue, the combustible waste is incinerated at incineration plants and the incombustible one is subject to landfill disposal.
- Incombustible waste is treated (pulverizing/sorting) at incombustible waste processing centers. At first, incombustible waste is finely pulverized to reduce its volume. Next, iron and aluminum contained in incombustible waste is collected as resources and incombustible objects are subject to landfill disposal. Other combustible waste left is incinerated at incineration plants.

Garbage collection

Garbage incineration

Landfill of ash

3 Landfill disposal

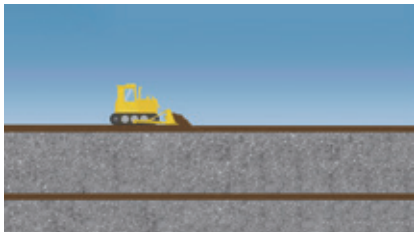
(1) Workflow of landfill disposal

① Measuring weight of garbage to be landfilled at reception gate

② Dumping garbage at specific locations.

③ Covering the locations where garbage is dumped with soil

(2) Method for landfill disposal



[Sandwich Method]

Landfill is performed by specifying the locations for each kind of waste, through "Sandwich Method" by which soil of 50cm covers the waste for each waste layer of 3m and waste is piled up to up to the height of 30m.

<Effects of Sandwich Method>

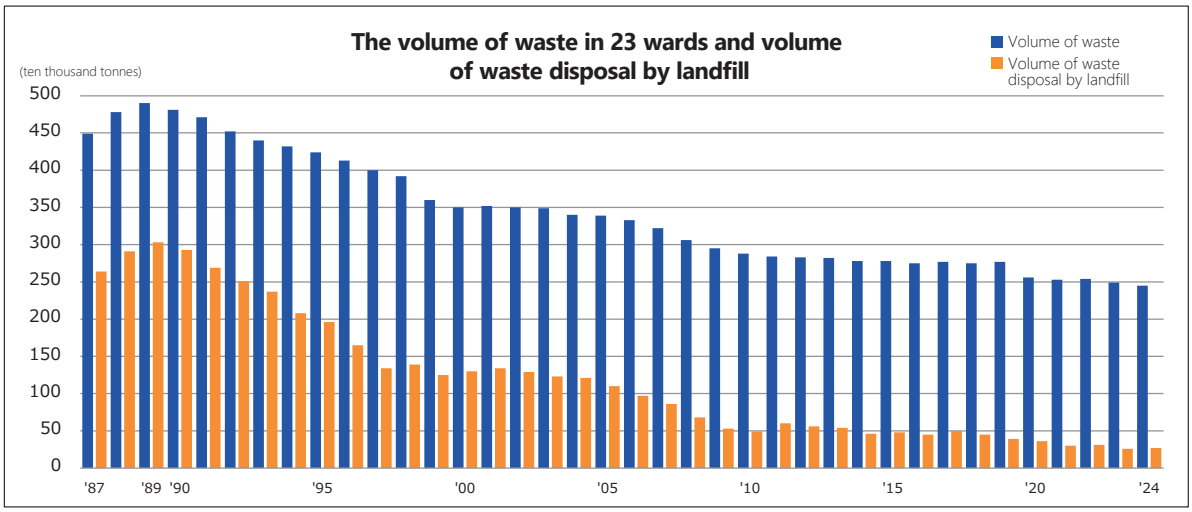
- Preventing waste from scattering
- Preventing spread of offensive odors
- Preventing occurrence of vermin
- Preventing waste from burning

[Frame Method]

Incineration ash is landfilled by "Frame Method". It is the method to cover incineration ash and sludge by the soil by dropping out such incineration ash and sludge etc. from excavated dropping site into the flatland.

(3) Volume of Waste in 23 Wards and Change in the Volume of Waste Disposal by Landfill

Approximately 10,000,000 citizens that consists 70% of the total in Tokyo live in 23 wards of Tokyo, generating approximately 2,500,000 tonnes per year. However, compared to the largest volume of waste during the economic bubble from the late 1980s to early 1990s, the volume of waste has been reduced by nearly half.
In addition to the efforts to reduce the volume of waste through cooperation by Tokyo citizens, business operators, 23 wards and TMG, due to charging for all volume of waste generated from buildings and offices, development of waste treatment system, and promotion of recycling of waste plastics, the volume of waste disposal by landfill has been reduced by approximately 90% compared to the one in FY1989.



4 Environmental measures

(1) Wastewater treatment

Receiving reservoir (pump well)

The wastewater from the landfill sites is collected in the receiving reservoir located at the side of the peripheral road.

Buffer reservoir

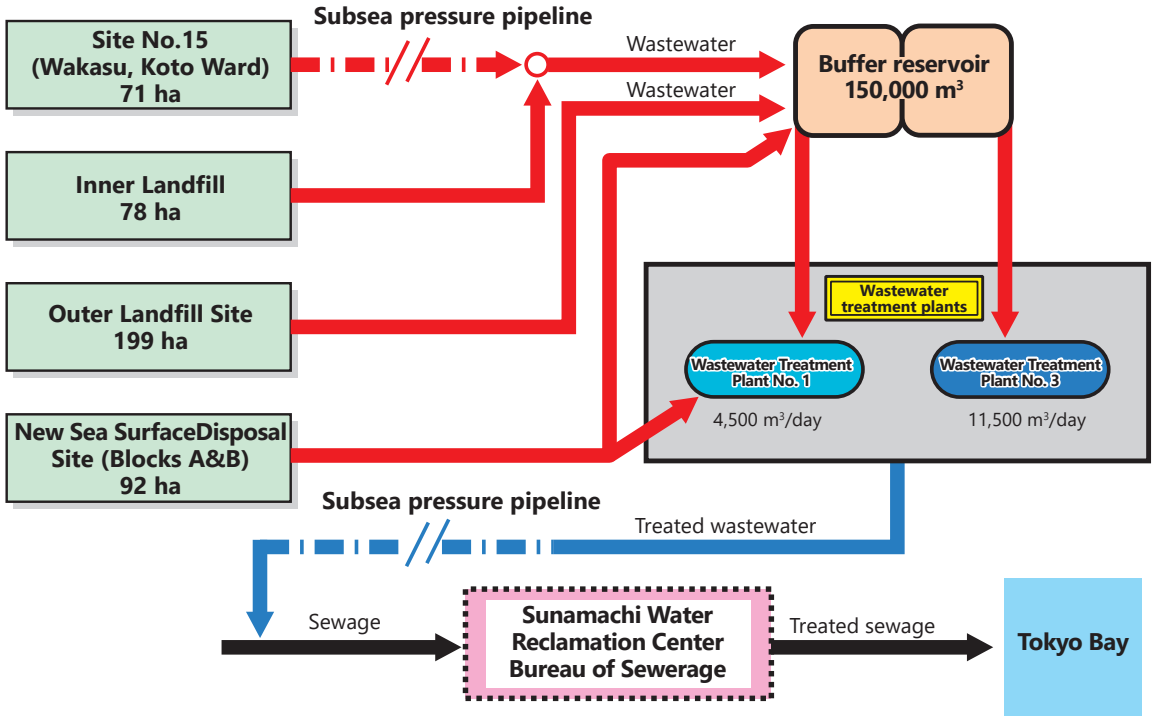
The buffer reservoir adjusts the flow rate of wastewater and homogenizes its quality before sending it to the wastewater treatment plants.

Wastewater treatment plant

The wastewater from the landfill sites is purified through various methods at the wastewater treatment plants located in the inner landfill.

Workflow of wastewater treatment

These disposal sites are final disposal management facilities that are cut off from the sea. The water from rainfall in the facilities seeps through a stratum of waste and becomes polluted. This dirty rainwater, called wastewater, is purified at the wastewater treatment plants before being released into the sewage system.

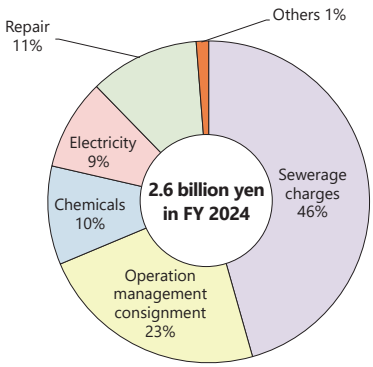


Quality of treated wastewater

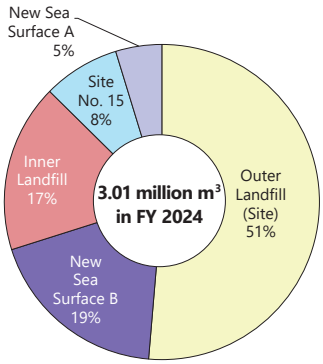
pH..... 7.4 (5 to 9 in the Sewage Discharge Standards)
Nitrogen .... 14 mg/L (120 in the Sewage Discharge Standards)
COD..... 51 mg/L (150 in terms of the level agreed with the Bureau of Sewerage)

Raw water quality at Treatment Plant No. 3
pH..... 8.1
Nitrogen .... 280 mg/L
COD..... 179 mg/L

Cost of wastewater treatment



Amount of wastewater treated



(2) Effective use of energy

Landfill waste generates methane gas. Such methane gas and sunlight is utilized for power generation. The electricity generated in this way is utilized in waste landfill sites.

Landfill-gas utilization facility with micro gas turbines

Maximum power generation capacity		275 kW
Gas consumption		Approx. 1.6 million m^3N/year
Gas composition	Methane	Approx. 55%
	Carbone dioxide	Approx. 25%
	Nitrogen	
	Oxygen	1% or less
Gas calorific value		Approx. 18 MJ/m^3N (Approx. 4,300 kcal/m^3N)
		(Project in FY 2005 subsidized by NEDO)

Solar power generation system

Power generation capacity	20 kW
Solar panels	4.0 m × 18.2 m × 2 sets
Modules	178.6 W/module × 112 modules
Quality	Polycrystalline silicon
	(Project in FY 2007 subsidized by the Ministry of the Environment)

(3) Preventing waste from scattering

In order to prevent waste from scattering, fence to prevent waster scattering is installed surrounding the part of outer shore protection.

(4) Utilization of sprinkling of treated water

In order to reduce tap water consumption, the water from rainfall in the facilities and treated water is utilized for water sprinkling.

(5) Raising awareness of environment

Toward establishment of a recycling society, observation tours are held targeted at Tokyo citizens, students and business operators etc.

Of about 46,000 visitors in FY 2024, 42,000 were elementary and junior high school students.

5 Changes in disposal sites

Tokyo has a history of designating the water area as waste treatment sites since Edo era.

At the beginning of Showa era, landfill at ① Lot No.8 (Shiomi, Koto-ku) was started and continued until 1962.

Japan entered a high economic growth period and embarked on mass production, mass consumption and mass disposal.

In 1957, landfill was started at ② Lot No.14 (Yumenoshima, Koto-ku).

In 1964, the Tokaido Shinkansen line started its operation, followed by the run-up to the Tokyo Olympic. The Japanese economy continued to grow rapidly.

In 1965, landfill was started at ③ Land No.15 (Wakasu, Koto-ku).

In 1971, the Governor of Tokyo declared "Garbage War" and expressed to take thorough measures against garbage.

After that, ④ Central Breakwater Inner Landfill, ⑤ Central Breakwater Outer Landfill and ⑥ Offshore Haneda were established. In 1998, landfill of ⑦ New Sea Surface Disposal Site was started.

The landfill sites whose landfill was completed have been effectively utilized for Tokyo citizens.

② Lot No.14 (Yumenoshima, Koto-ku) is utilized as a comprehensive sports ground, a tropical greenhouse dome and a park, and ③ Lot No.15 (Wakasu, Koto-ku) as a golf course and a park, contributing to Tokyo citizens as places for their recreational activities and rest and relaxation.

In "the 2020 Tokyo Olympics and Paralympics", competition took place at Umi-no-Mori Park of ④ Central Breakwater Inner Landfill as "Umi-no-Mori cross-country course" of eventing competition, and the waterway between ④ Central Breakwater Inner Landfill and ⑤ Central Breakwater Outer Landfill as "Sea Forest Waterway" for rowing event and canoeing.

[Around 1994]
Raw garbage and incombustible waste was landfilled without being treated.

[Presen]
After undergoing intermediate processing such as incineration of raw garbage and pulverization of incombustible waste, waste is landfilled.

Disposal Site Transition

	Area	Landfill waste disposal volume
① Lot 8 (Shiomi, Koto-ku)	364,000m²	Approx. 3.71 million tonnes
② Lot No. 14 (Yumenoshima, Koto-ku)	450,000m²	Approx. 10.34 million tonnes
③ Lot 15 (Wakasu, Koto-ku)	712,000m²	Approx. 18.44 million tonnes
④ Central Breakwater Inner Landfill	780,000m²	Approx. 12.3 million tonnes
⑤ Central Breakwater Outer Landfill Site	1,990,000m²	Approx. 55.50 million tonnes (As of the end of FY 2024)
⑥ Offshore Haneda (Haneda Airport, Ota-ku,)	124,000m²	Approx. 1.68 million tonnes
⑦ New Sea Surface Disposal Site	3,190,000m²	Approx. 9.81million tonnes (As of the end of FY 2024)

Current town names are shown in parentheses.

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