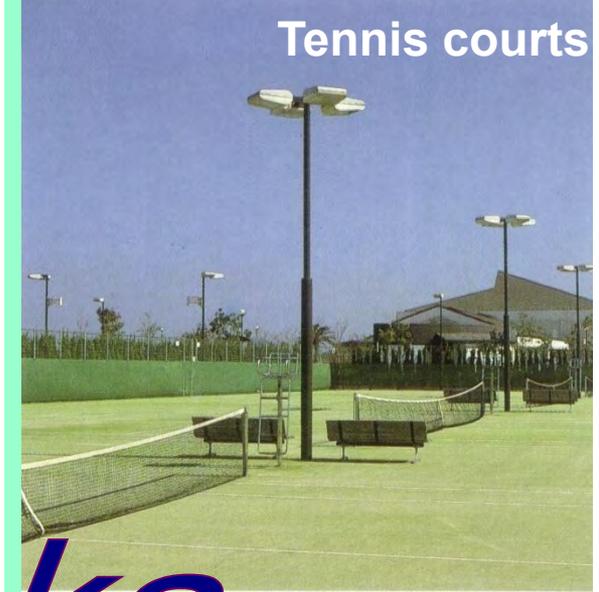




Imazu Sports Park (a completed landfill site)



Tennis courts

The Fukuoka Method



Imazu School for Handicapped Children



Imazu "Refresh" Farm

East (Fushitani) Landfill

Photo: Sep 2014
by Fire Dept, Fukuoka City

··· Landfill area

Total area of landfill facilities : 644,000 m² (All approx.)
Landfill area : 225,000 m²
Landfill capacity: 5,100,000 t (3,400,000 m³)
Landfilled amount: 2,800,000 t (as of 31 March 2014)
Landfilled period: 30 years since April 1988 (local agreement)

East (Fushitani) Landfill

Nov 2014

Completed landfill site (Zone 1)

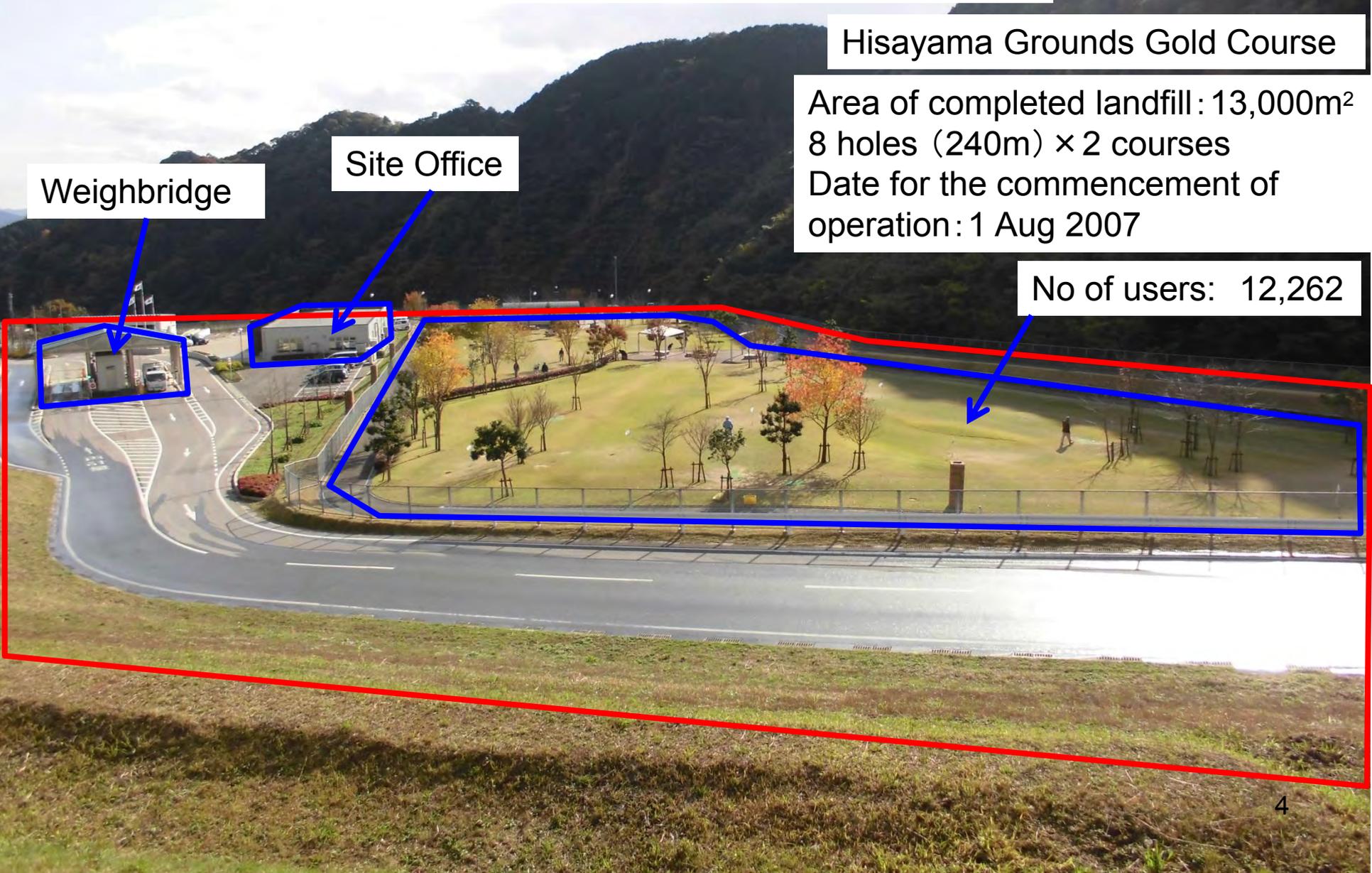
Hisayama Grounds Gold Course

Area of completed landfill : 13,000m²
8 holes (240m) × 2 courses
Date for the commencement of operation : 1 Aug 2007

Weighbridge

Site Office

No of users: 12,262



West (Nakata) landfill

Photo: Sep 2014
by Fire Dept, Fukuoka City

Designated total area)

... landfill area

Zone 4

Zone 3

Zone 2

Zone 1

Total area of landfill facilities: 380,000 m² (All approx.)

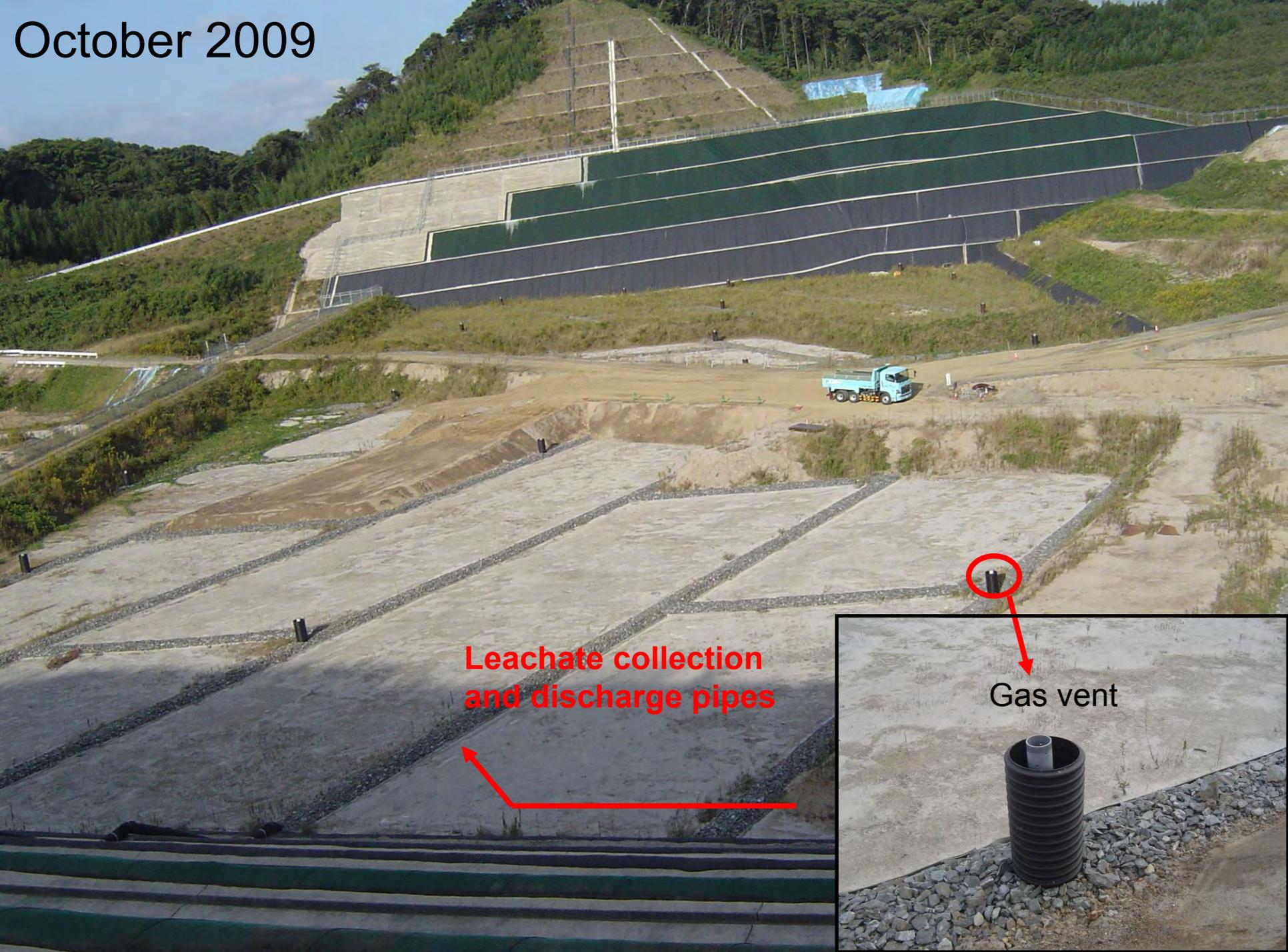
Landfill area: 180,000 m²

Landfill capacity: 2,380,000 ton = 1,833,000 m³

Landfilled amount: 810,000 ton (as of 31 March 2014)

Landfilled period : 20 years from April 1996 (local agreement)

October 2009



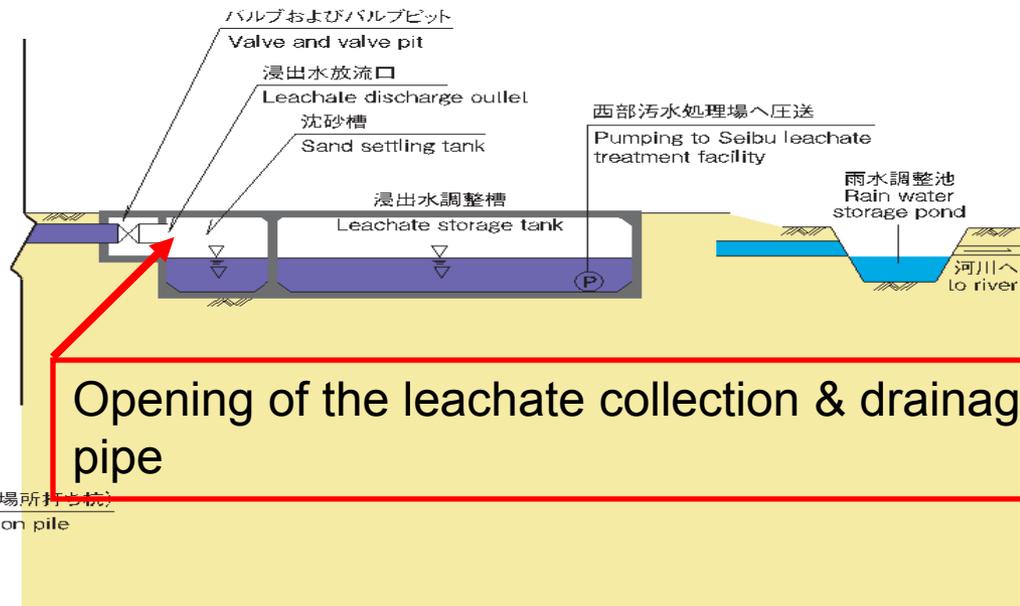
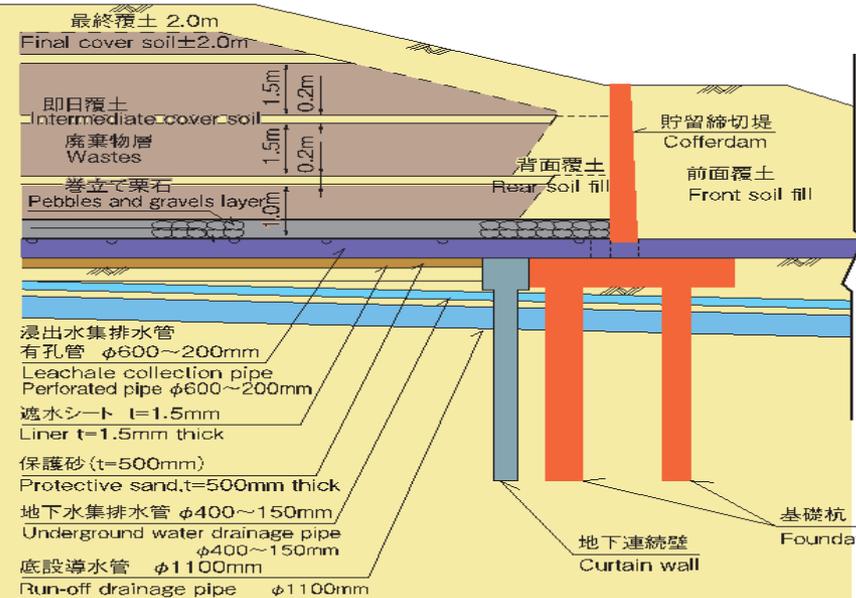
Leachate collection
and discharge pipes

Gas vent

Removing gas during landfilling of waste



貯留締切堤周辺 Detailed view of cofferdam area



Construction of leachate collection & drainage pipe



浸出水集排水管放流口 Collected leachate outlet pipe

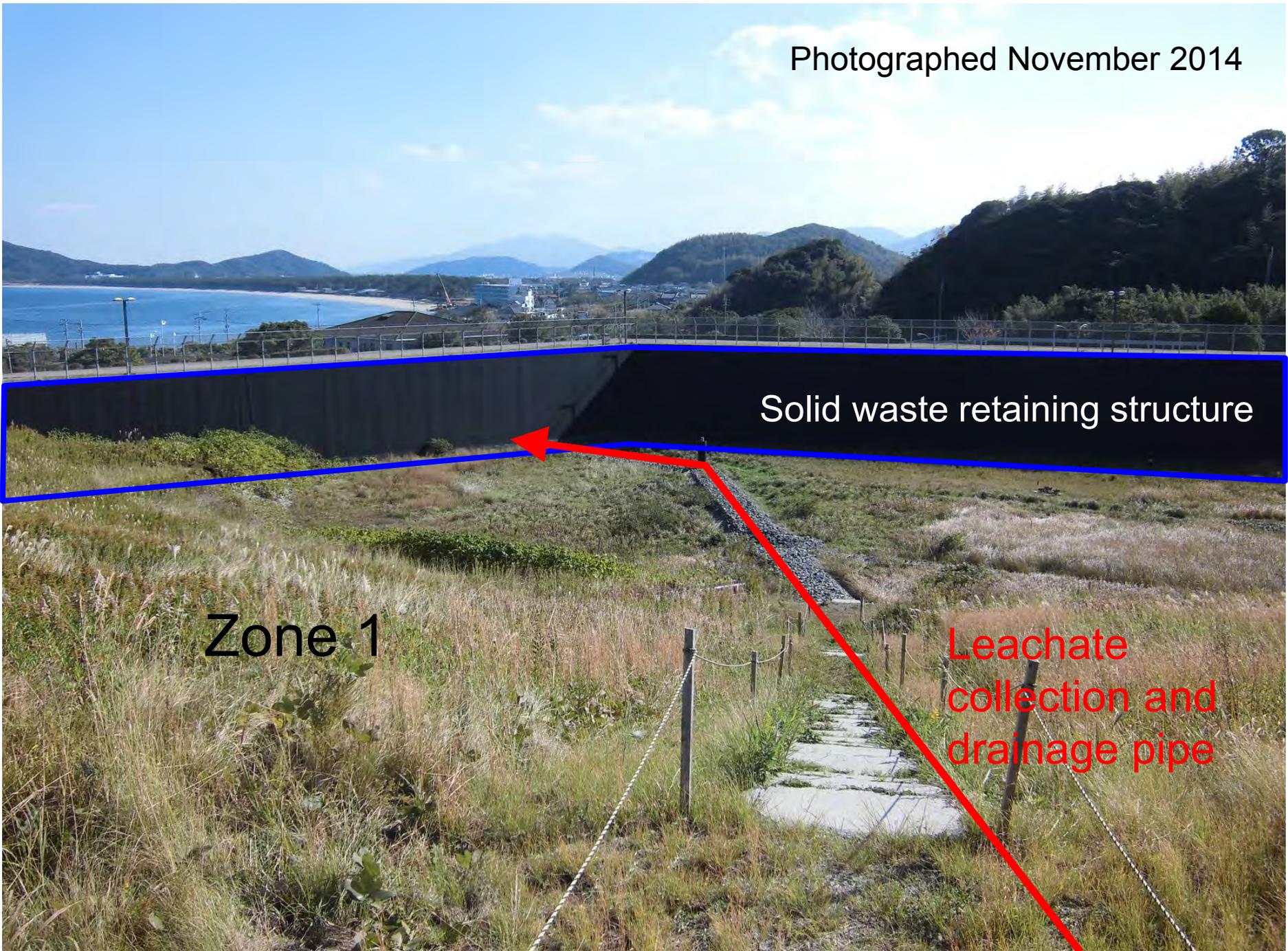


Photographed November 2014

Solid waste retaining structure

Zone 1

Leachate
collection and
drainage pipe



Nov 2014

leachate

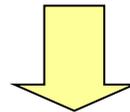


Development of the Fukuoka Method (Semi-Aerobic Landfill Structure)

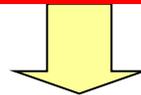


Fukuoka City's landfill around 1970 (Hatta Landfill)

Until the 1960~70s, Japan, like many other Asian countries today, used anaerobic landfills



Lead to environmental problems such as toxic leachate and foul odor



The start of experiments to improve landfills, aiming to purify leachate

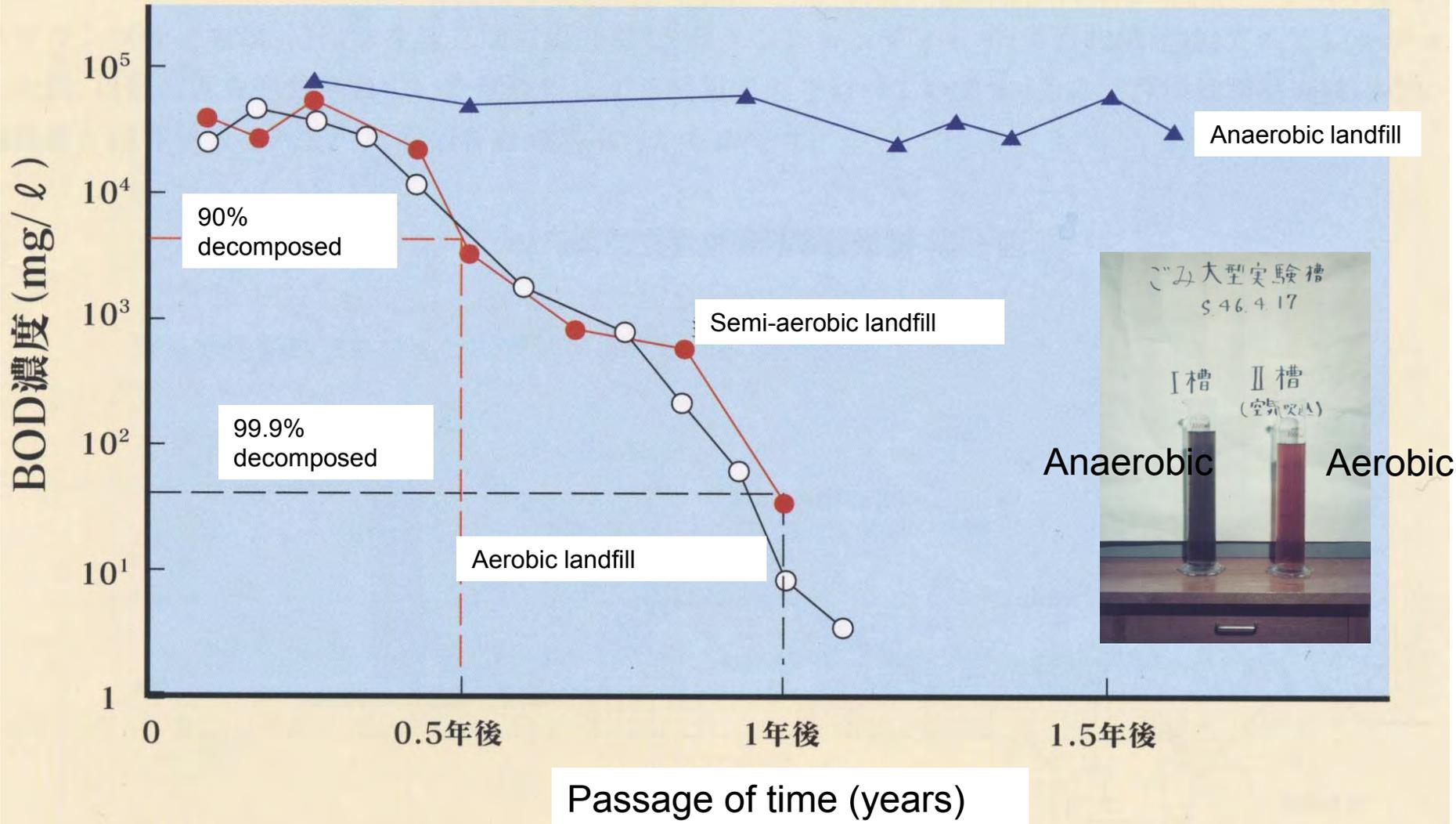
Experiments by Fukuoka City and Fukuoka University

A Test Plant was constructed at Hisayama Landfill in 1973

Left: Aerobic landfill experiment, Right: Improved anaerobic landfill experiment



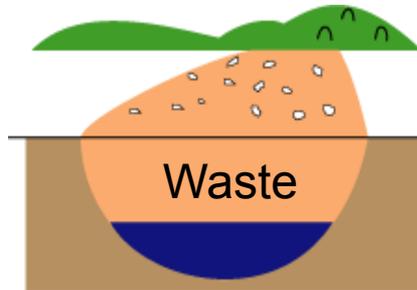
Impact of Fukuoka Method: Leachate Treatment



Improvement over time of the landfill structures and leachate's biological oxygen demand (BOD) (combustible waste)

There are primarily 3 landfill methods

① Anaerobic



- High emissions of harmful substances such as CO₂, methane, etc
- Waste is moistened in anaerobic condition

② Aerobic

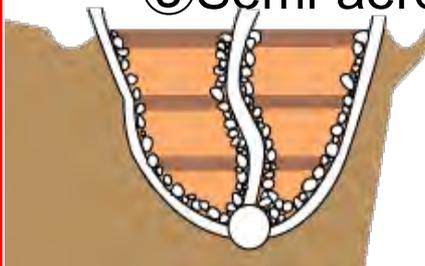


(Cross-section)

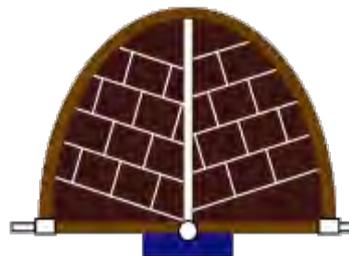


- Relatively less emission of harmful substances such as CO₂, methane, etc
- Easy treatment of leachate
- **High cost of construction and maintenance**

③ Semi-aerobic



(Cross-section)

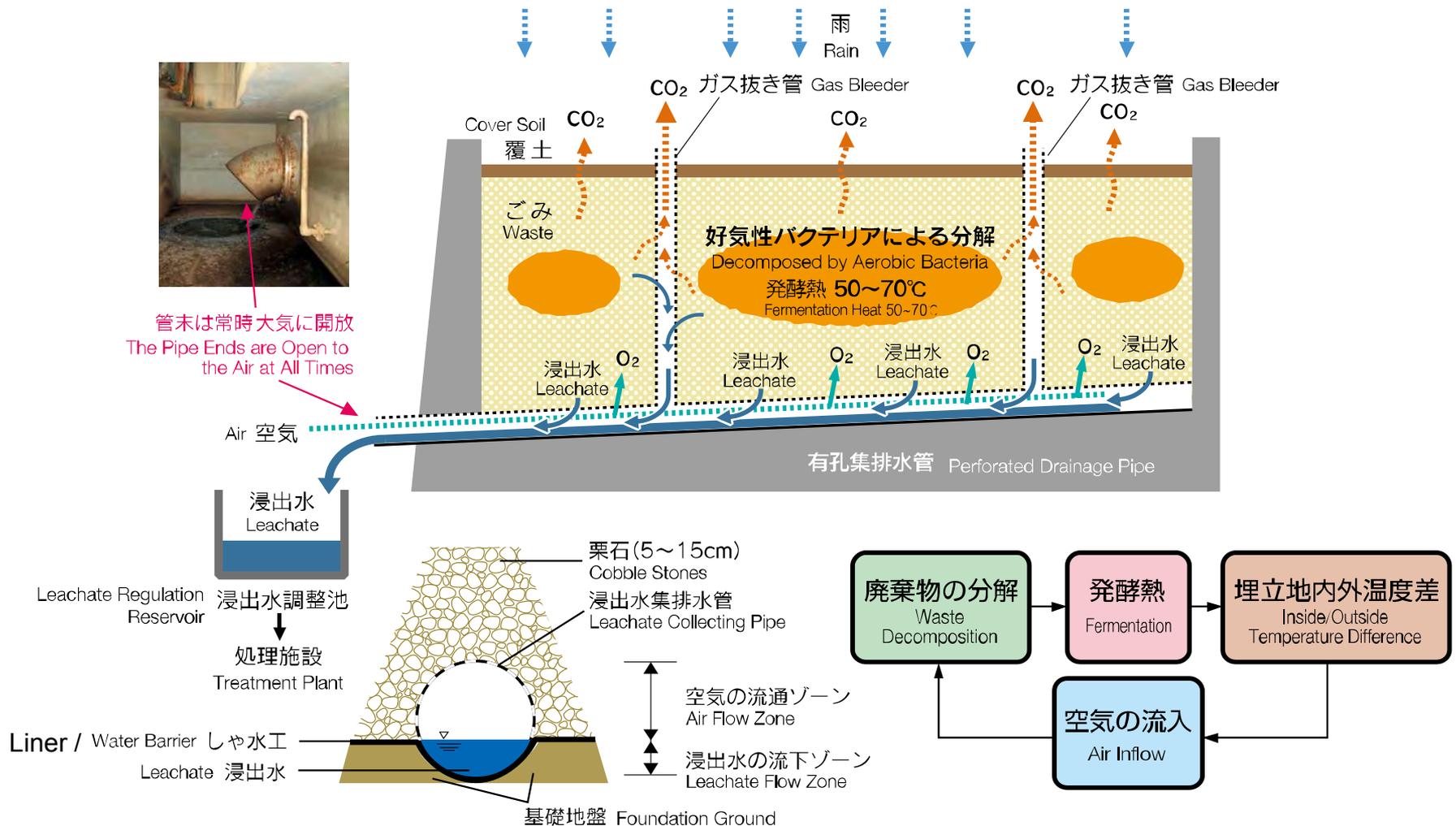


Fukuoka Method

- Relatively less emission of harmful substances such as CO₂, methane, etc
- Easy treatment of leachate
- **Low construction and maintenance costs**

Fukuoka Method (Semi-aerobic type of landfill structure) Diagram

準好気性埋立構造のメカニズム Mechanism of the Semi-Aerobic Landfill Structure



The Fukuoka Method:

An efficient landfill method (=Semi-aerobic landfill structure) with low environmental impact, developed jointly by Fukuoka City and Fukuoka University

Key aspects

- 1 Advanced technology is not necessary**
- 2 Low cost**
- 3 Environmentally friendly**

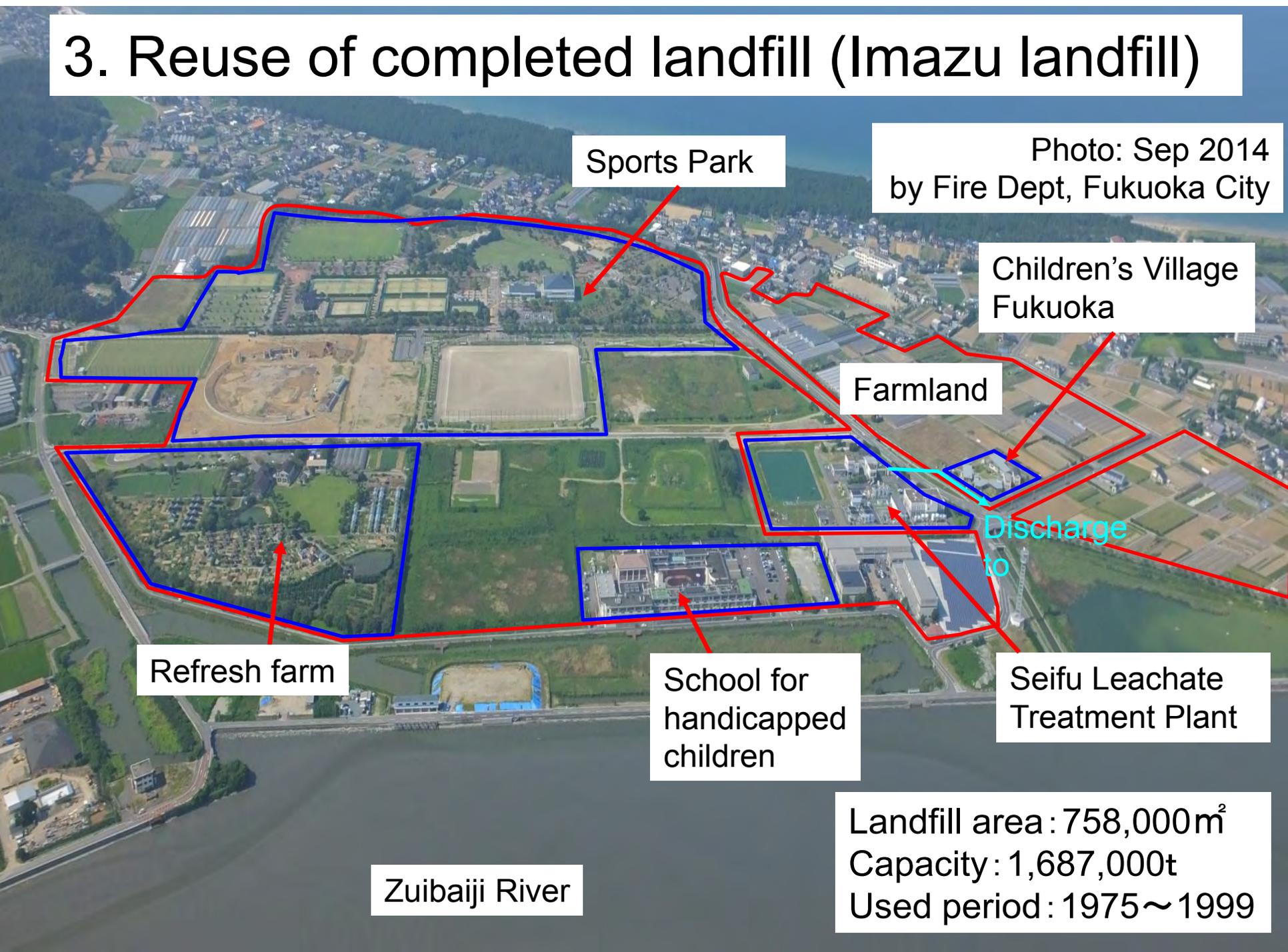
Example of the construction of Fukuoka Method Landfill: Fukuoka



Shinkamata Landfill, Fukuoka City

The first landfill in Japan which used the semi-aerobic landfill method (1975)

3. Reuse of completed landfill (Imazu landfill)



Sports Park

Photo: Sep 2014
by Fire Dept, Fukuoka City

Children's Village
Fukuoka

Farmland

Discharge
to

Refresh farm

School for
handicapped
children

Seifu Leachate
Treatment Plant

Zuibaiji River

Landfill area : 758,000m²
Capacity : 1,687,000t
Used period : 1975~1999



Imazu landfill – photos from the period of landfill construction (1975-1999)

Imazu Today: Utilization of a Former Fukuoka Method Landfill Site

Imazu Sports Park



**Imazu School for
Handicapped Children**



**Imazu Refresh
Farm**



**Children's village
Fukuoka**



4. Int'l Cooperation

(Nakata Landfill)

JICA training



Demo workshop of the installation of leachate collection & drainage pipes

Making leachate collection & drainage pipes from bamboos



Two Cities which use “Fukuoka Method” in the People’s Republic of China



A planned landfill construction site in Weifang city, Shandong province, China



July 2002

Landfill in Weifang City, Shandong Province, China

October 2003

Landfill area: 64,000 m²

Capacity: 1.16 million m³

Time duration: 3 years

Daily waste intake: 700 t



Landfill in Weifang City, Shandong Province, China



Sep 2004

A planned landfill construction site in Mengzi County, Yunnan Province, China



January 2003

Landfill in Mengzi County, Yunnan Province, China

Landfill area: 64,000 m²
Capacity: 1.42 million m³
Time duration: 15 years
Daily waste intake: 200 t

Tsinghua University → Fukuoka Univ.
Fukuoka City

March 2007

Landfill in Mengzi County, Yunnan Province, China



Oct 2008

Landfill in Mengzi County, Yunnan Province, China



Aug 2011

Dinh Vu Landfill, Hai Phong City, Vietnam



2010: before the improvement

Dinh Vu Landfill, Hai Phong City, Vietnam

2011: during the improvement work



Dinh Vu Landfill, Hai Phong City, Vietnam

**2012: improvement
work completed**



Dinh Vu Landfill, Hai Phong City, Vietnam

Leachate collection /adjustment pond and ECO-FAN*

* ECO-FAN = A stirring facility made by recycling waste materials, using wind power for leachate collection/ adjustment pond



**2012: improvement
work completed**

Fukuoka City / Hakata Bay west coast zone

An aerial photograph of Fukuoka City, Japan, showing the dense urban landscape and the coastline of Hakata Bay. The city is built on a peninsula, with a large bay to the west and south. The image shows a mix of modern high-rise buildings and older, more densely packed structures. The water is a deep blue, and the sky is clear.

Thank you,

The End