



Integrated Solid Waste Management Technology & Infrastructure



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United Nations Environment Programme
Division of Technology, Industry and Economics
International Environmental Technology Centre



Waste Management Chain



1. Source segregation & primary disposal
2. Collection & transportation
3. Transfer stations and MRF
4. Treatment & disposal



Primary Disposal



1. Communal collection
2. Block collection
3. Kerbside collection
4. Door-to-door collection



Collection Vehicles

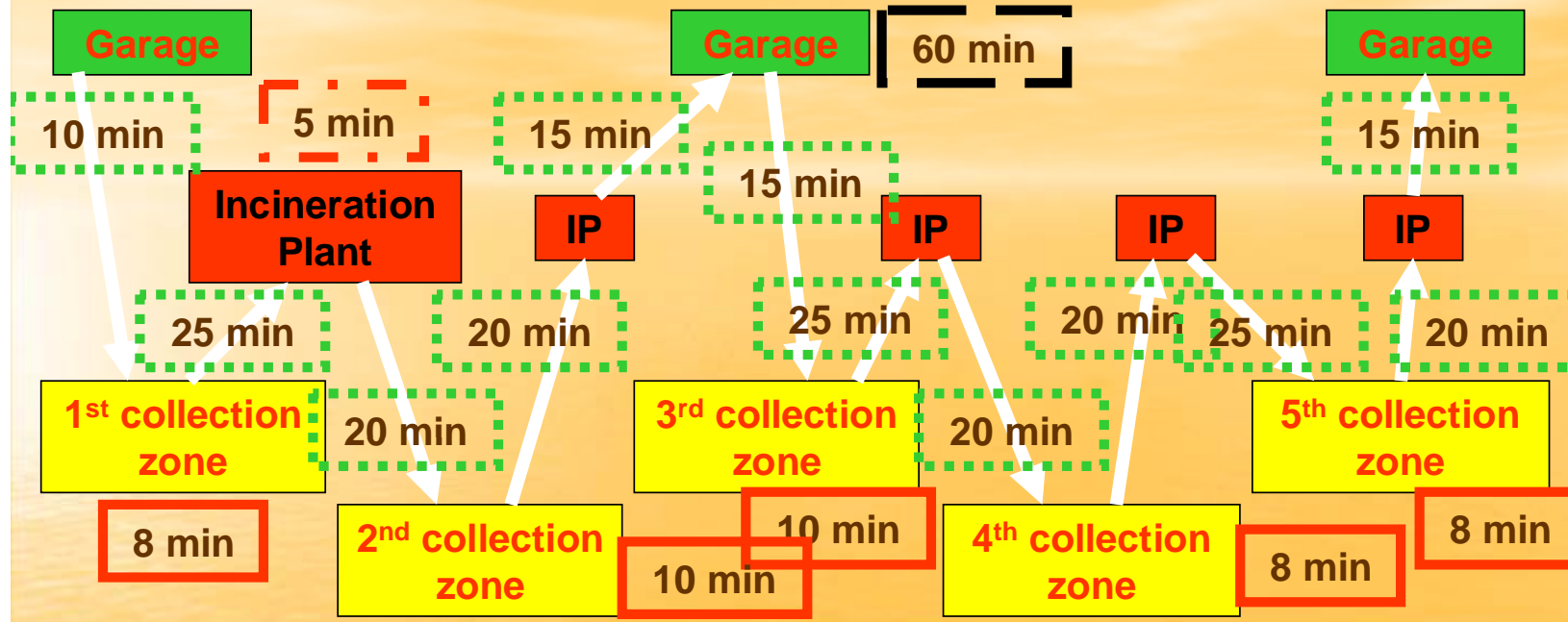


1. Handcarts, animal carts, small vehicles
2. Compactor trucks
3. Fore and aft tipper
4. Container hoist
5. Open/closed top trailers



Operations

Time Count Study in Osaka



Working Hour		8.00 hour	100 %
Travel Time	$10+25+20+20+15+15+25+20+20+25+20+15=230\text{min}$	3.83 hour	48 %
Collection Time	$8+10+10+8+8=44\text{min}$	0.73 hour	9 %
Dump Time	$5 \times 5=25\text{min}$	0.42 hour	5 %
Lunch Time	60 min	1.00 hour	12 %
Maintenance Time	35 min	0.58 hour	7 %
Unnecessary Time	86 min	1.43 hour	19 %

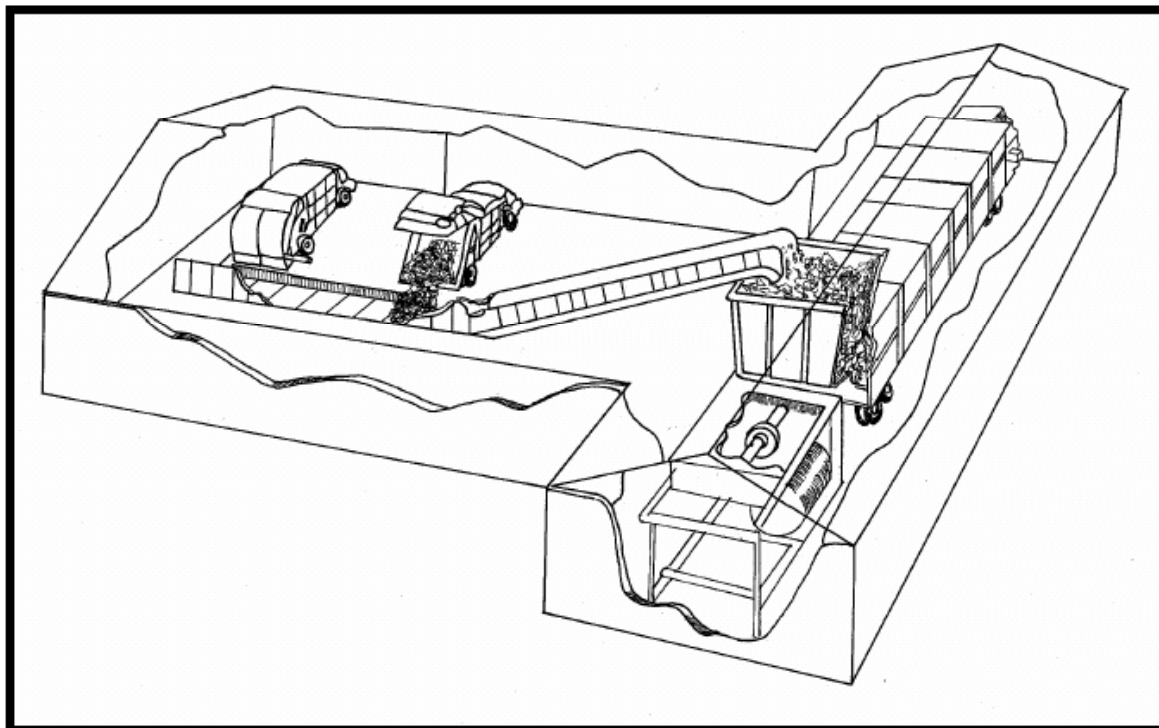
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Transfer Stations & MRF



1. Manual separation
2. Mechanical separation
3. Smaller to bigger vehicles for long-haul





Biological Treatment



1. Compost

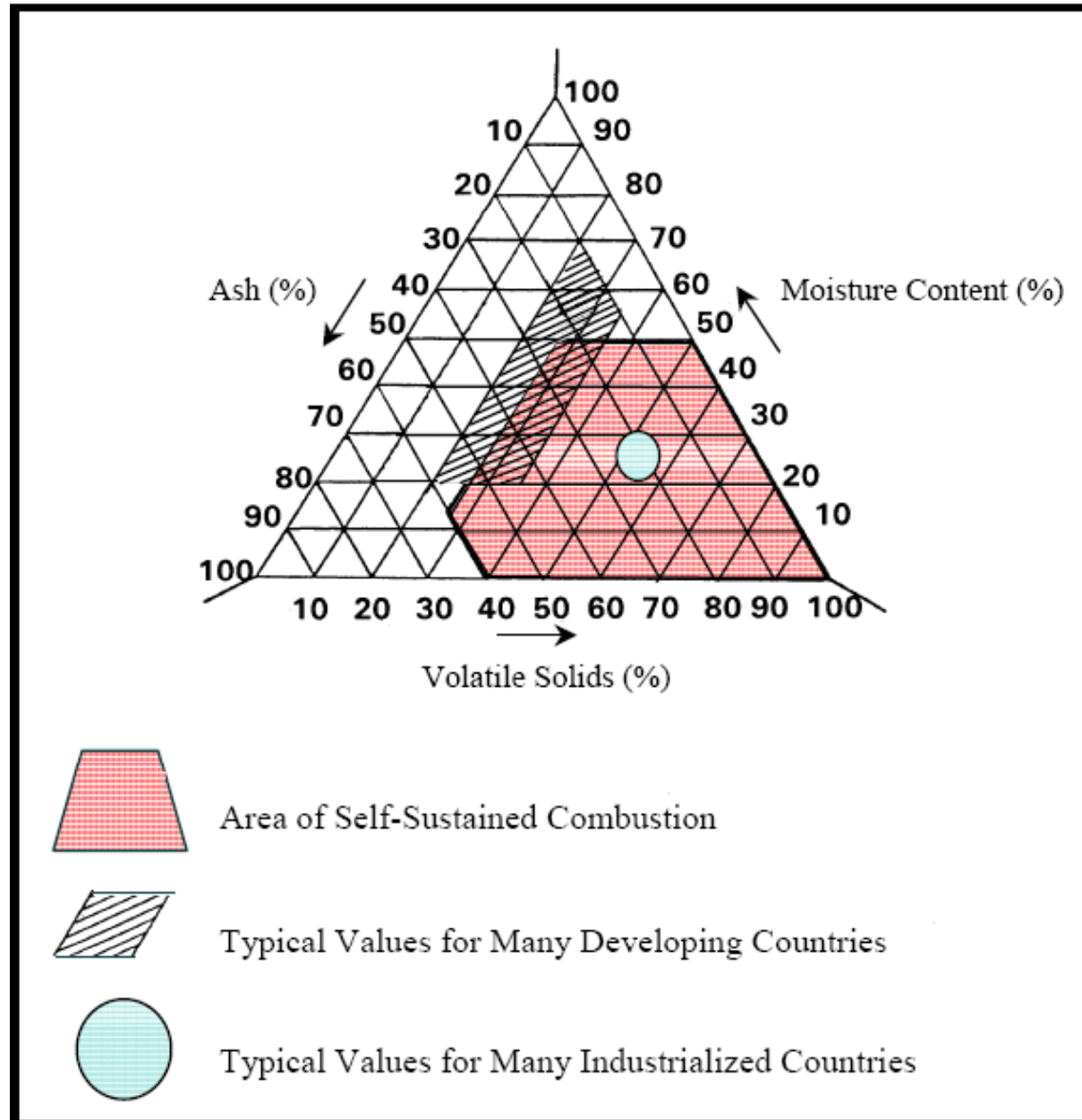
2. Biogas



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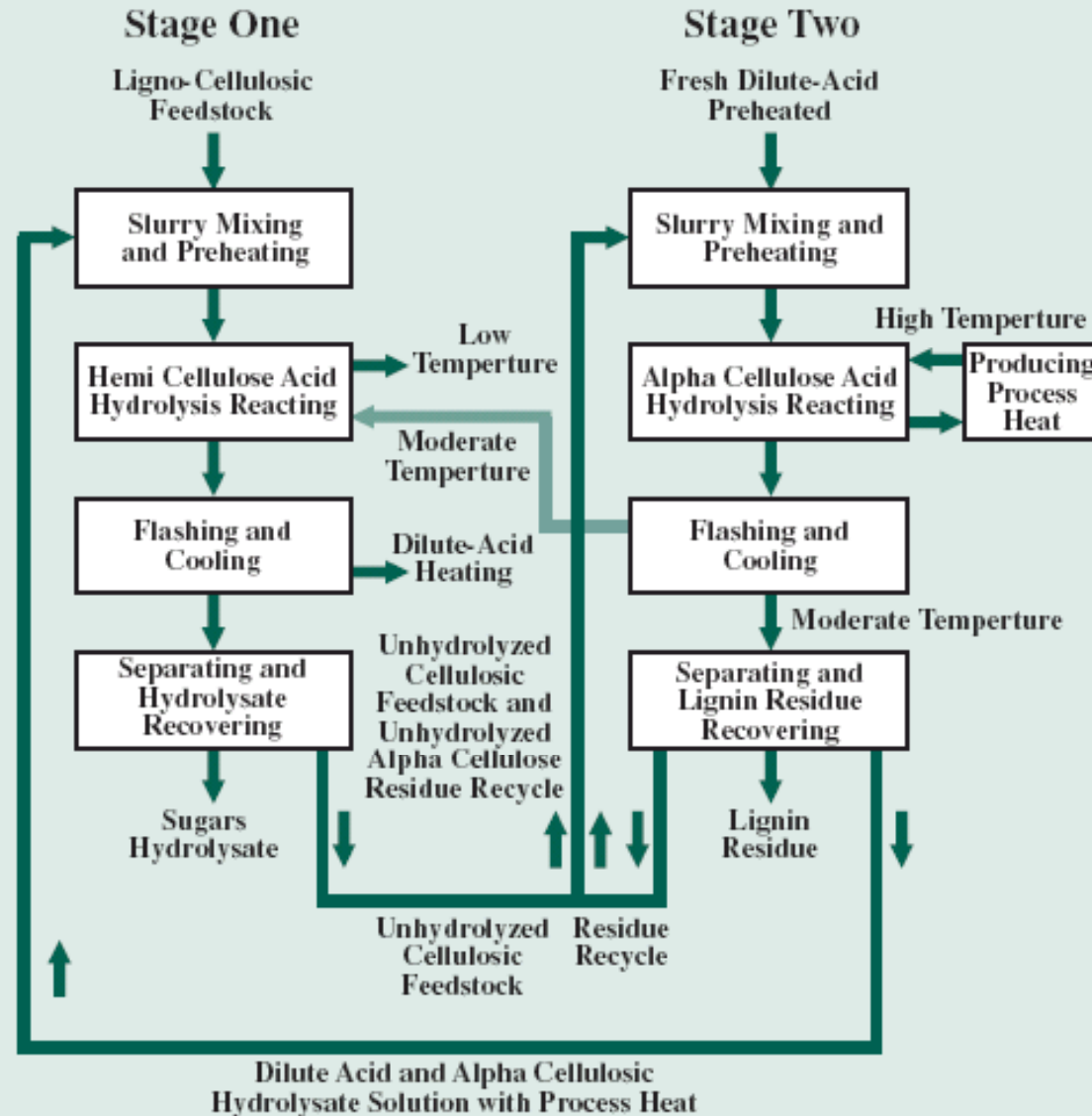
Thermal Treatment





Chemical Treatment

HYDROLYSIS PROCESS SCHEMATIC





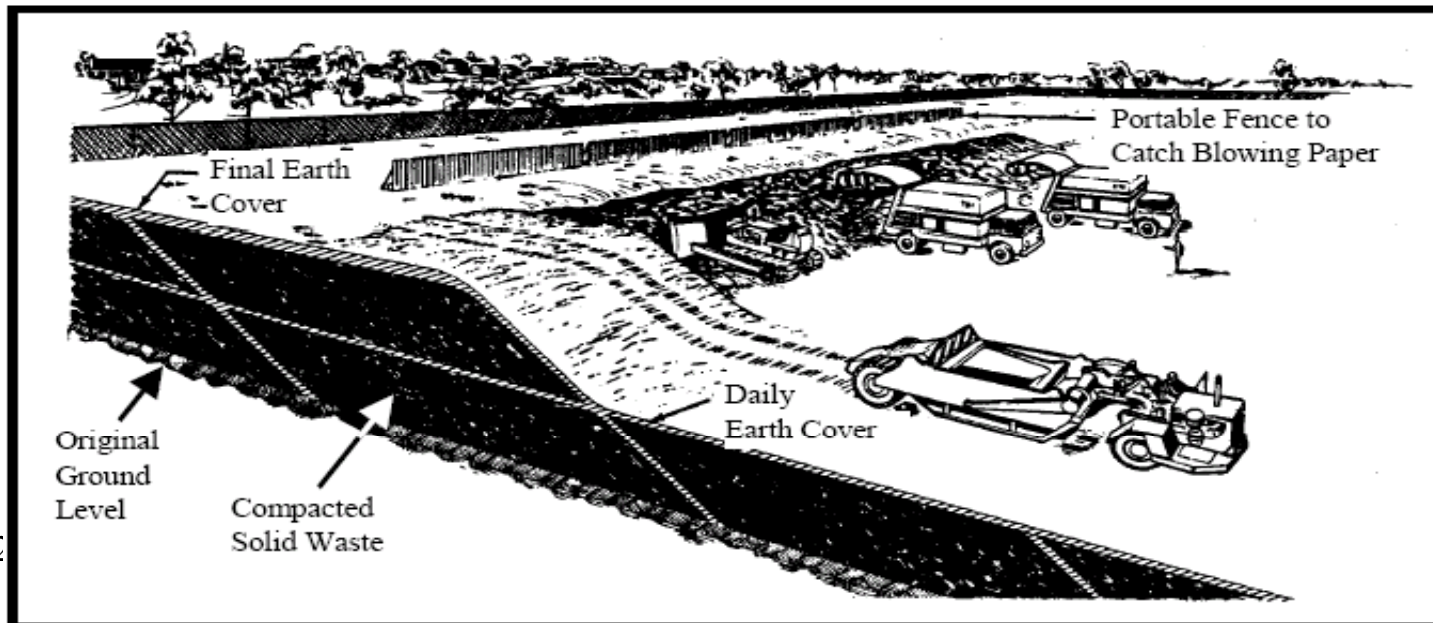
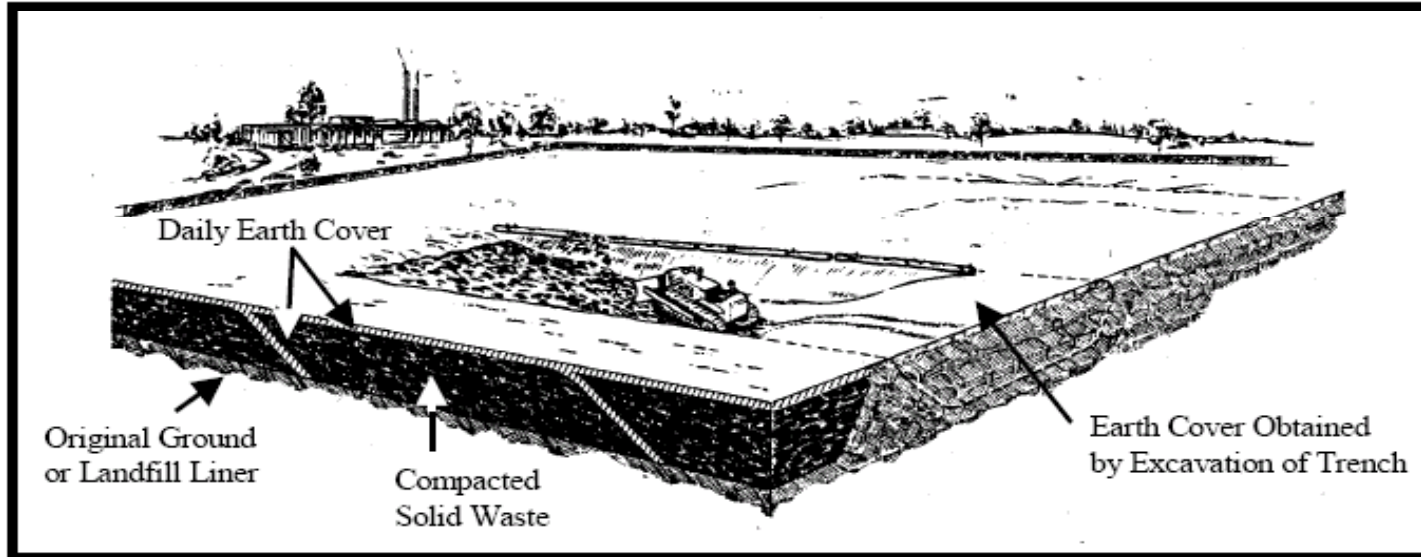
Disposal



1. Open dump
2. Open burning
3. Landfill
4. Sanitary landfill
5. MBT
6. Controlled landfill for hazardous waste

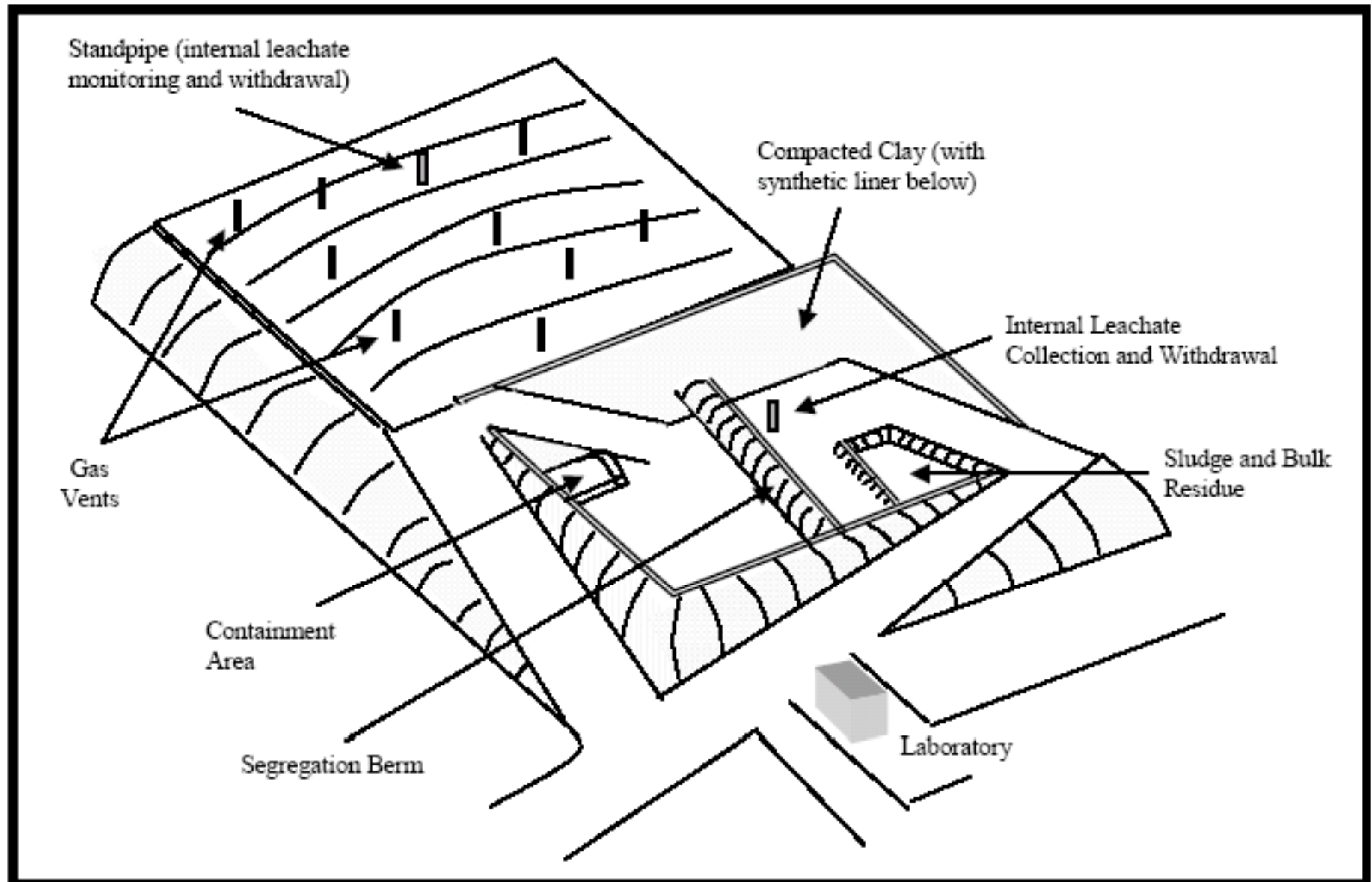


Sanitary Landfill





Controlled Landfill





MBT



In response to the new EU Directives, asking for diversion of biodegradable waste from landfills, and also as an alternative to incineration, some European countries have started introducing this technology. This is also known as “Mechanical biological Pre-Treatment,” or “Biological and Mechanical Treatment (BMT)” was originally developed as a way of treating residual municipal waste after source segregation. This process is basically a combination of waste preparation and separation, recovery of two or more waste streams for further utilization or landfill and stabilization of the bio-degradable fraction.



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Thank You...

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