

## Introduction

Foothills Regional Landfill is looking to optimize its daily operations by managing leachate on-site, replacing the current disposal method of hauling leachate to a treatment facility via truck. The objective of the project was to evaluate different leachate treatment options and select the most feasible, cost effective, and sustainable design. The chosen solution incorporates 3 main processes:

1. Collection and treatment of leachate in an aerated lagoon
2. Distribution of leachate onto the soil of a forested area
3. Recirculation of additional leachate by an EcoMister

## TREAT

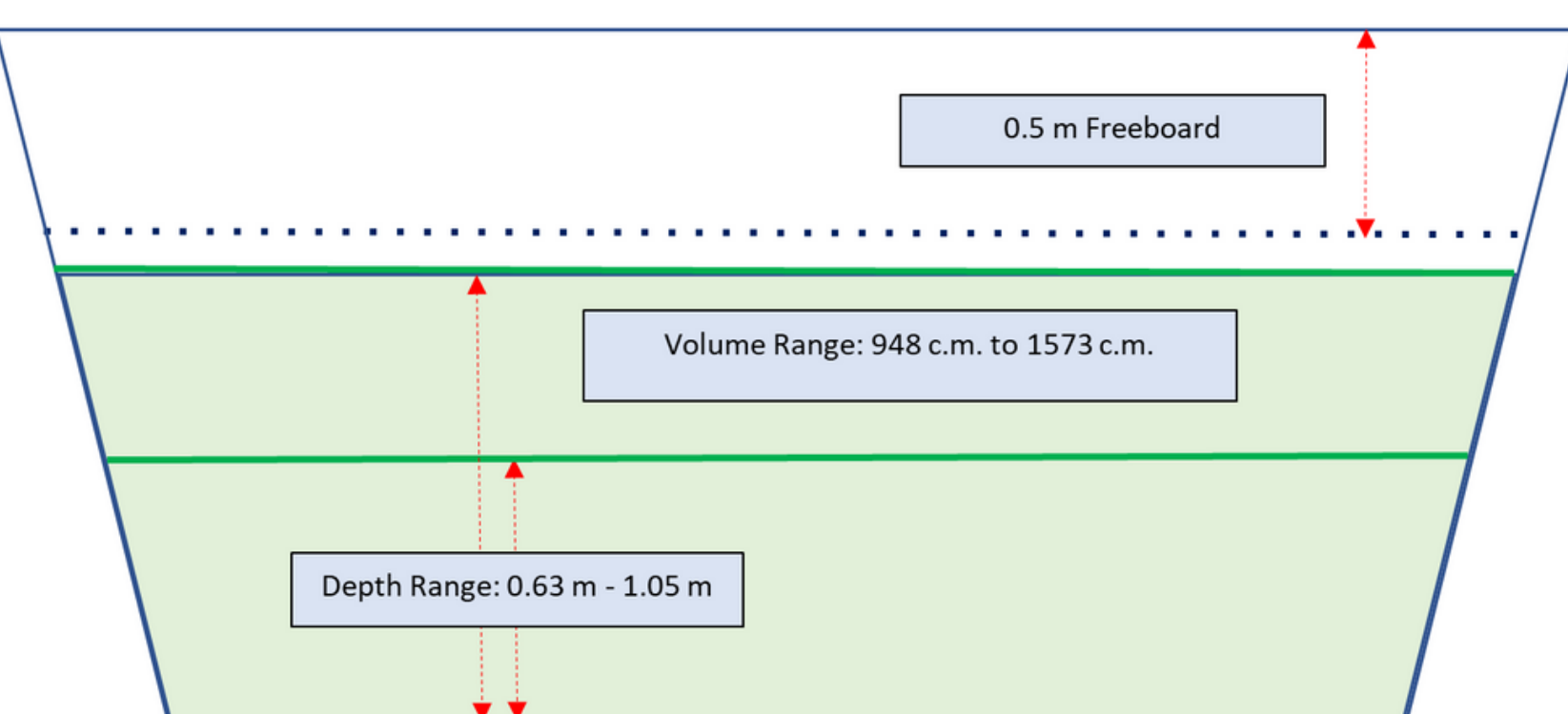
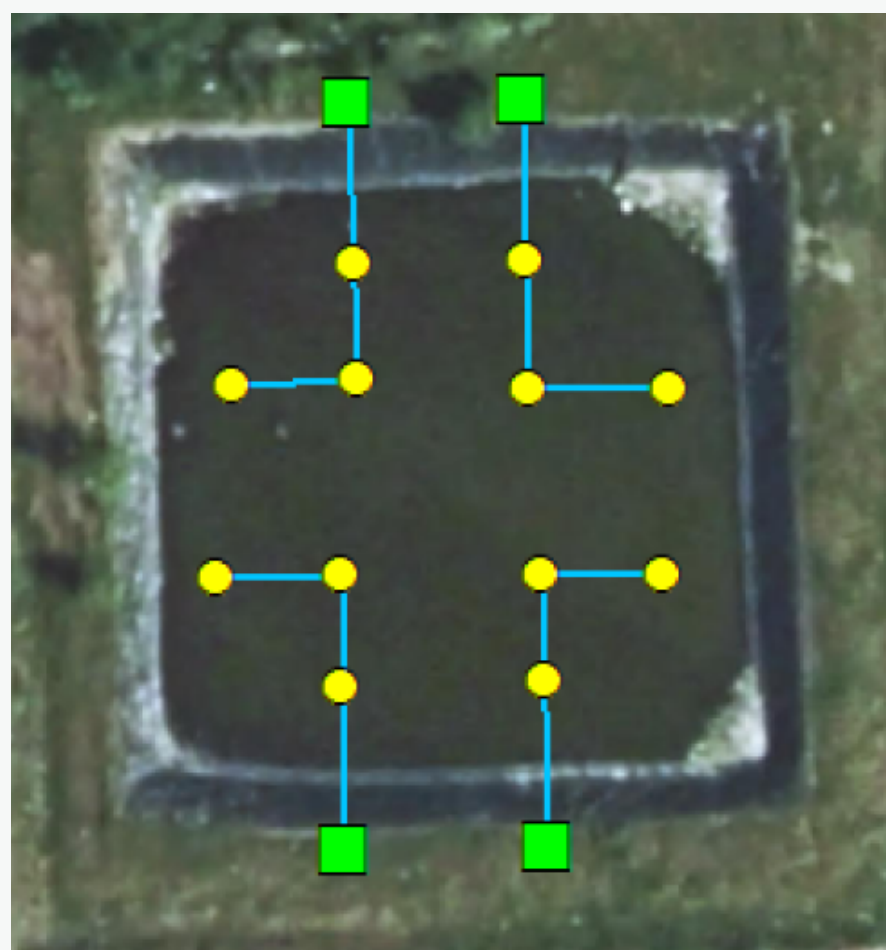
### What is an Aerated Leachate Lagoon?

Stores and treats leachate by removing contaminants via three processes:

- Chemical: **Oxidation of contaminants**
- Biological
  - Aerobic bacteria
  - **Nitrosomonas** - **Nitrification** of ammonia
  - **Pseudomonas** - Break down organic material (hydrocarbons & VOC's) & treat heavy metals
- Physical: **Settlement** of contaminants to bottom of lagoon

### Aerated Leachate Lagoon Design

- 30 day HRT
- 0.5 m Freeboard
- **Ammonia** and **COD** determined as main contaminants of concern following laboratory testing of landfill's leachate
- **Peak leachate generation calculated over past 7 years**
- 689 L/min of air required to treat ammonia and COD
- Inoculate lagoon with nitrosomonas and pseudomonas



### Key Values

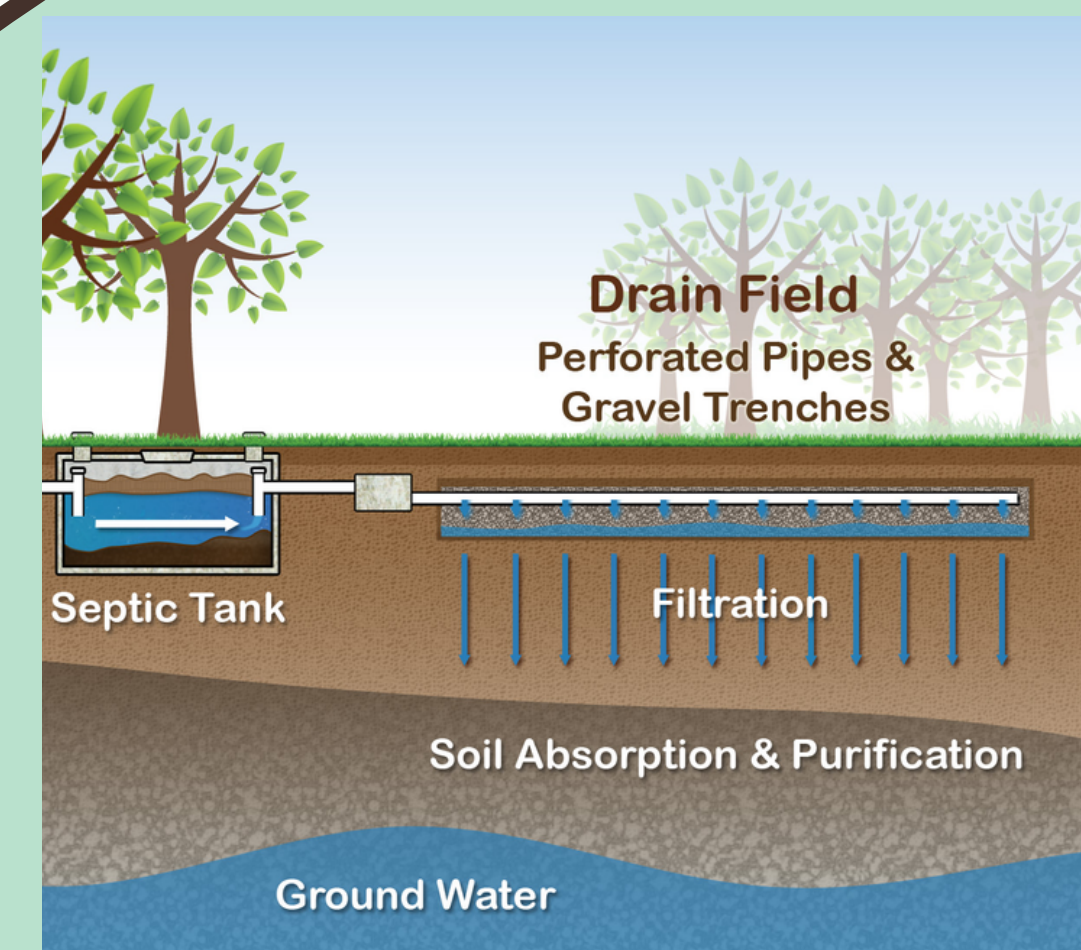
- **Operation Period: Year Round**
- Four 200L/min pumps
- Twelve diffusers
- Ideal Volume range: 948 m<sup>3</sup> to 1573 m<sup>3</sup>
- Ideal Depth range: 0.63 m to 1.05 m
- Pond returned to minimum volume after 30 days



## What is Leachate?

Rainfall water that has percolated through landfill waste and gathered contaminants

## DISTRIBUTE

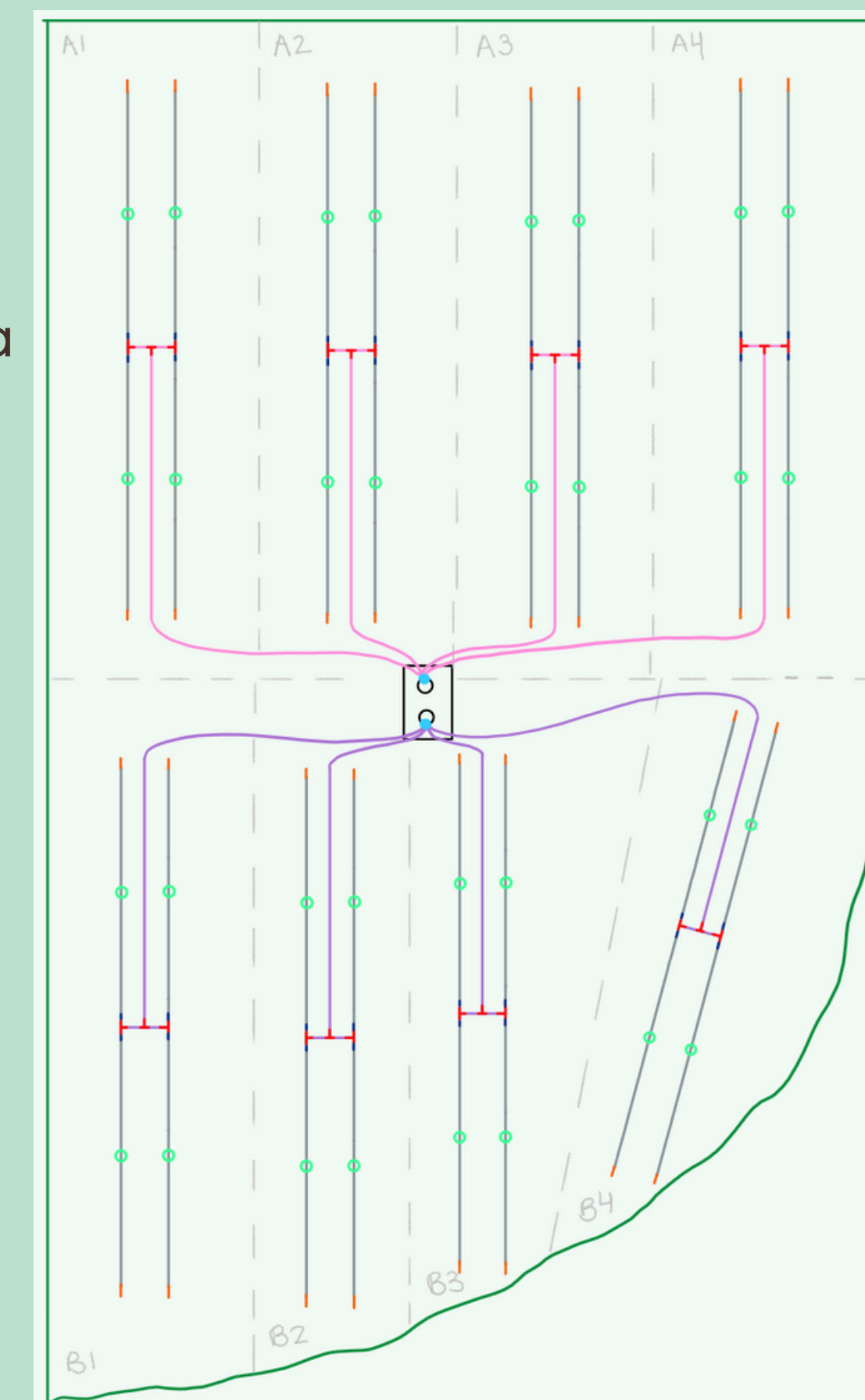
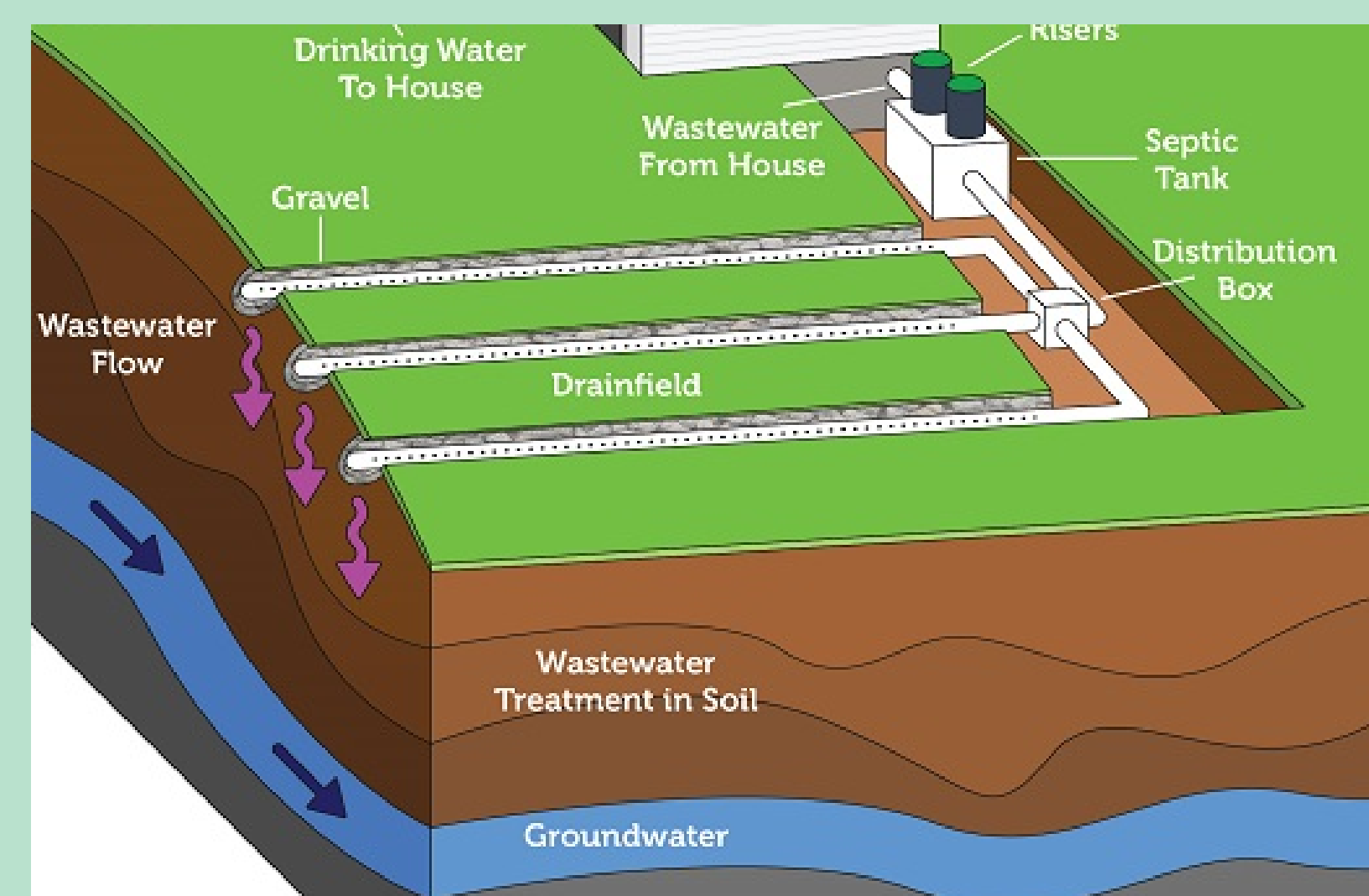


### What is an At-Grade System?

- **Pressure-driven** system that **distributes** fluid through a perforated pipe
- Effluent discharges at regular intervals called **doses** through the pipe onto the ground,
- The effluent is then **absorbed** by the soil

### At-Grade Distribution System Design

- Collect treated leachate from the aerated lagoon and store in underground effluent tank
- Pump leachate from tank and distribute through a forested area located in the North-West corner of the site. (59,201 ft<sup>2</sup>)
- 32 doses each day into 8 different zones via a zone valve
- 1 inch perforated lateral pipes deposit leachate onto soil for absorption



### Key Values

- Total Treated Area - 6,240.00 ft<sup>2</sup>
- Total Treatment Capacity - 3,931.20 gallons per day
- Doses per day - 32 doses
- System Flow Rate - 29.92 gallons per minute
- Tank Holding Capacity - 10,000 gallons
- Pump - 115 V, 0.5 hp

## RECIRCULATE

### What is an EcoMister?

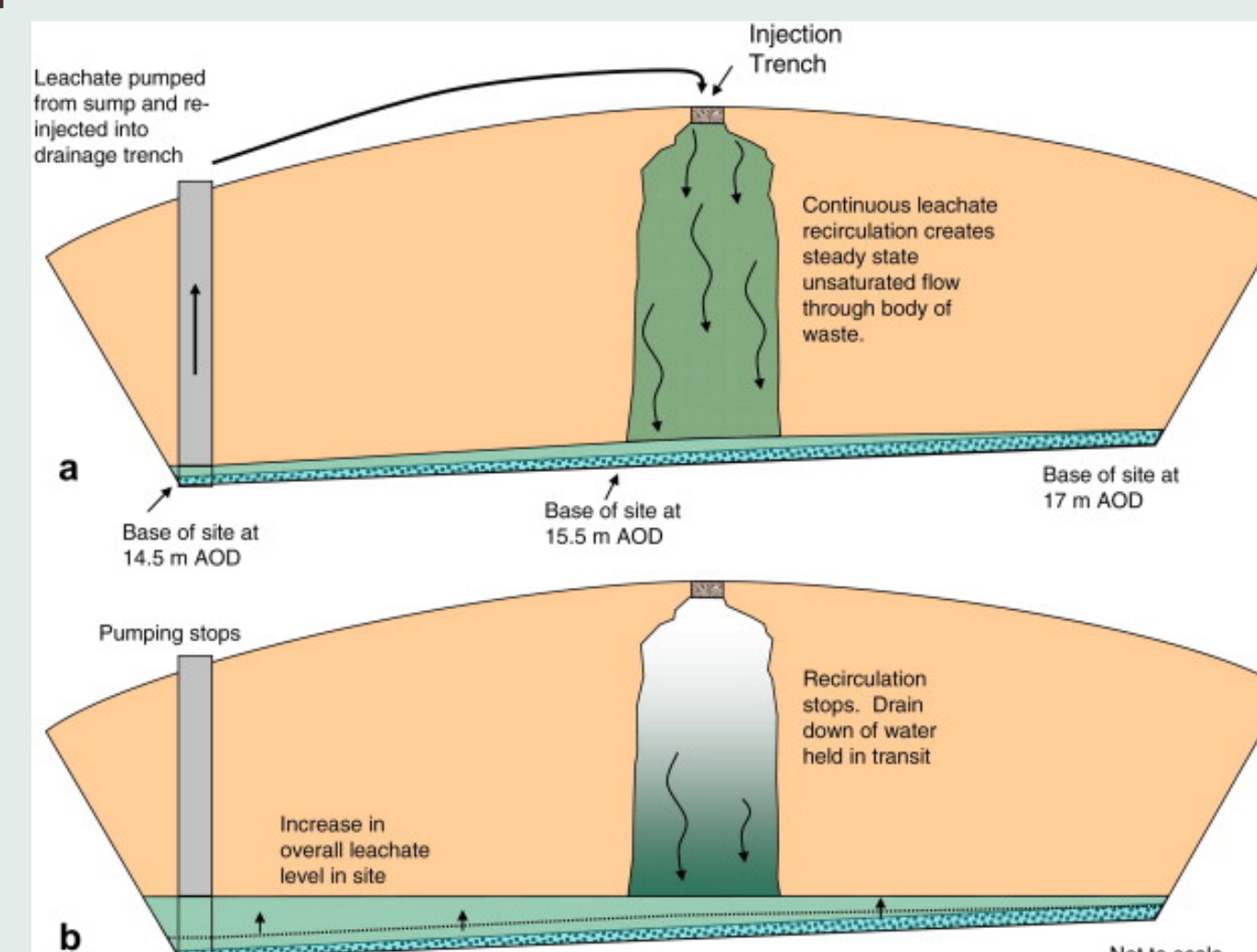
- Leachate disposal device designed to pump leachate through a **high-pressure mister**
- Leachate **evaporates** into the air or is **recirculated** into a cell.
- Can be **easily moved** to different site locations as needed.
- Features an **automated control** system that can detect **wind direction and speed**, automatically shutting down the machine for safe operation



### EcoMister Design

EcoMister HD30:

- A mobile unit that can be easily moved to different areas in the landfill.
- Utilizes existing landfill resources: a 3-phase generator as well as a pump truck for leachate supply



### Key Values

- Operation Period: March-October
- Power Supply: 3-phase 575v
- Run Time: 40 Hours/week
- Maximum Evaporation: 44m<sup>3</sup>/Day, 10,780m<sup>3</sup>/Year
- HD30 Spray Plume: 180ft (55m)
- Maintenance: Nozzle Replacement \$1640 (Biannually), Fan Bearing Replacement \$331 (5-10 Years)



## Conclusion

Solution	Cost	Treatment Capacity
Current	\$126,000 / year	6833 m <sup>3</sup> / year
1	\$12,150	9432 m <sup>3</sup> / year
2	\$88,068	6523 m <sup>3</sup> / year
3	\$109,200	10,780 m <sup>3</sup> / year

**100%** of leachate managed & costs saved in less than **2** years