



How to Increase Landfill Gas Extraction Efficiency in Cover Systems

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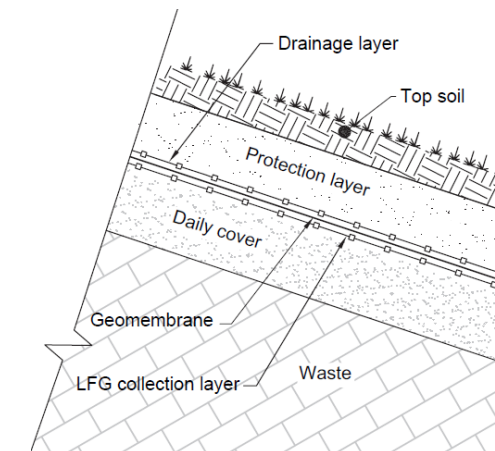
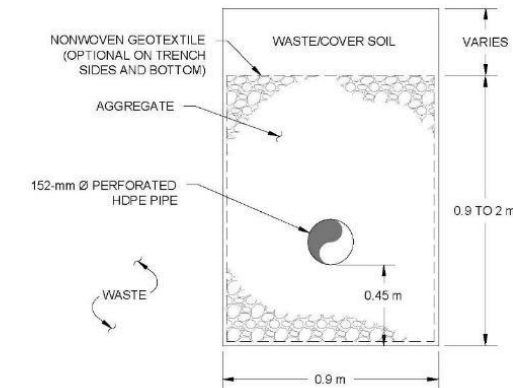
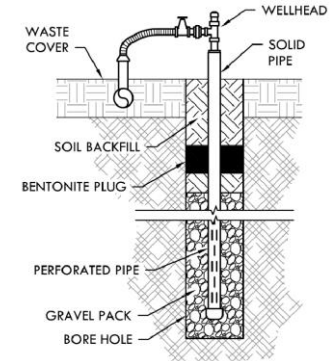
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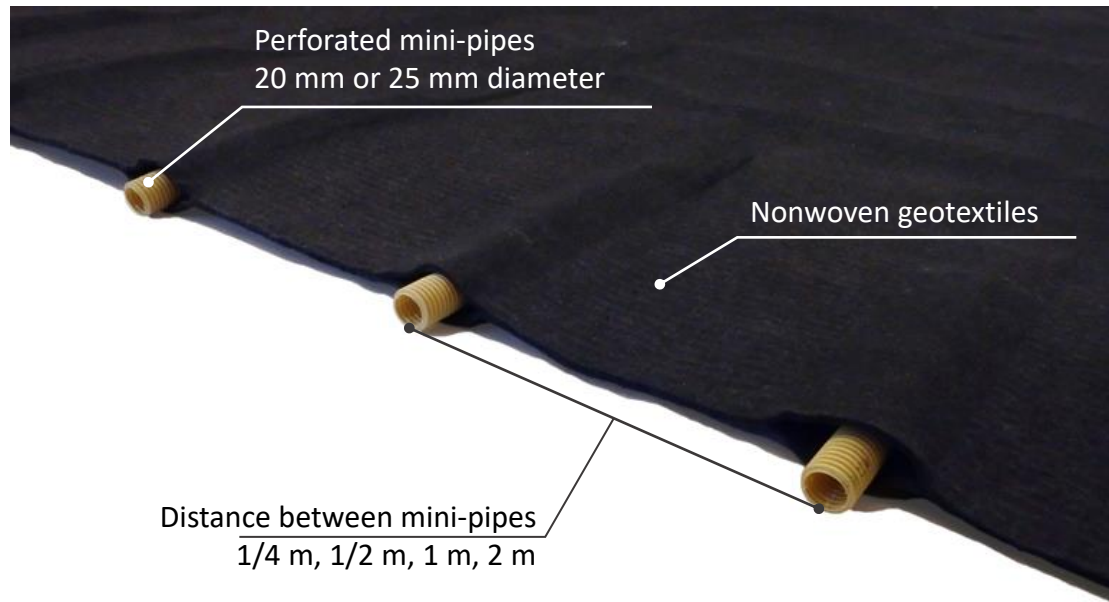
- Vertical wells
Typical distance between vertical wells 40m to 80m
- Horizontal collectors
Density, length and placement function of each site but can lead to kilometers of trenches into the waste
- Surface collection systems
For temporary cover, or as part of the final cover system





Multi Linear drainage geocomposite: DRAINTUBE®

- Drainage geocomposite with polypropylene perforated mini-pipes regularly spaced between two geotextiles layers



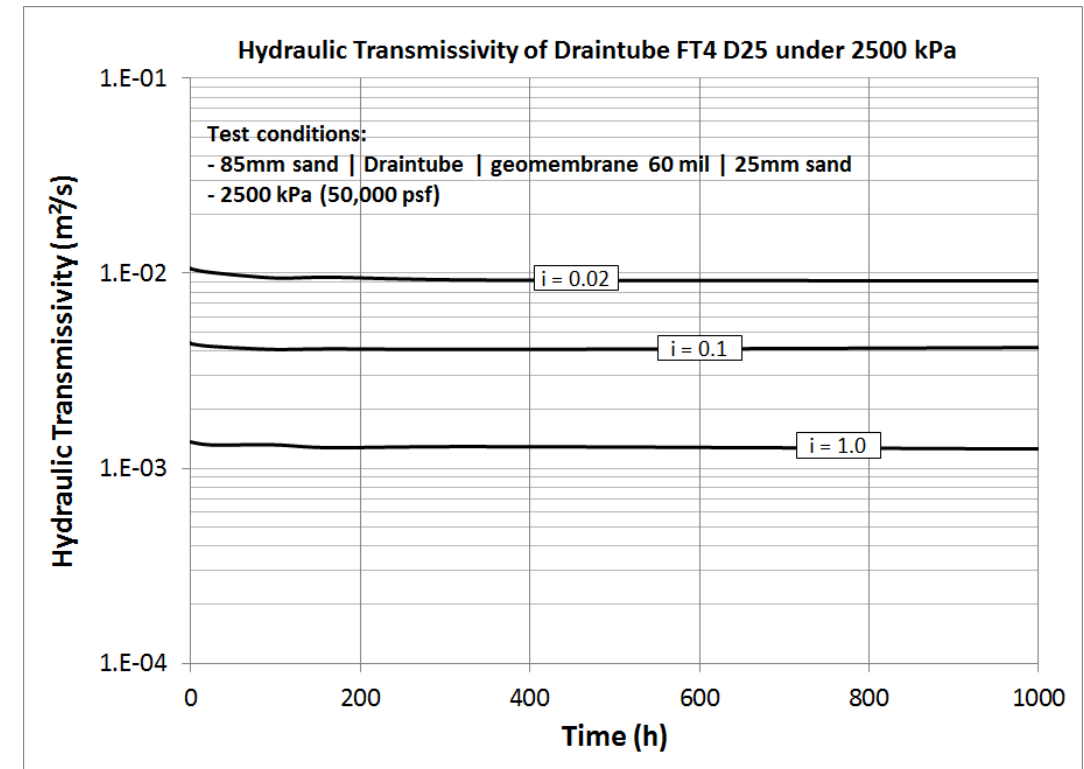
- Geotextiles layers from 100 g/m² to 1000 g/m²



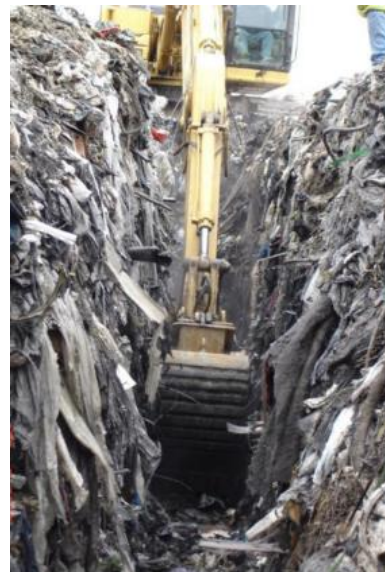
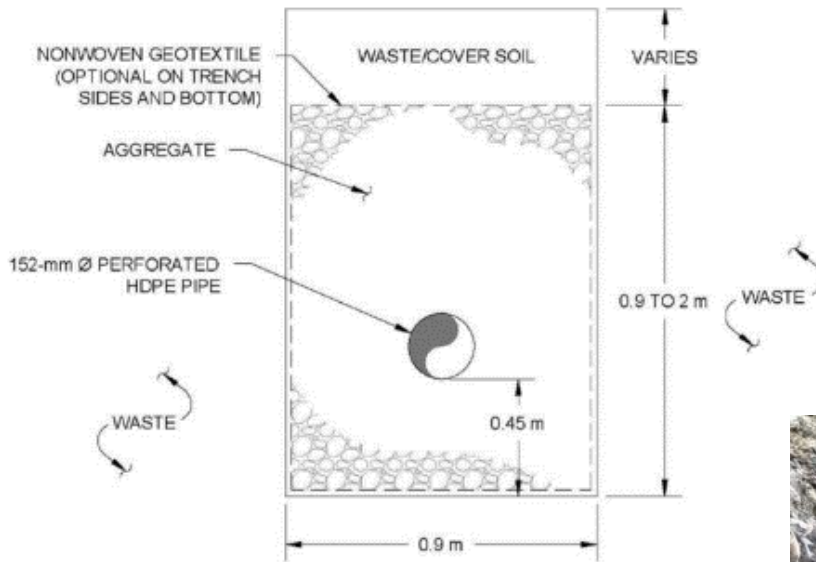


Multi Linear drainage geocomposite: DRAINTUBE®

- Mini-pipes with high compressive resistance
Pipe stiffness at 5% deflection (ASTM D2412) > 3 000 kPa
- Transmissivity up to $4 \times 10^{-3} \text{ m}^2/\text{s}$ ($i=0.1$, under 2,500 kPa)
- No creep, No geotextile intrusion
- Light and Flexible product
- No peel adhesion issue



Horizontal LFG collection



VS

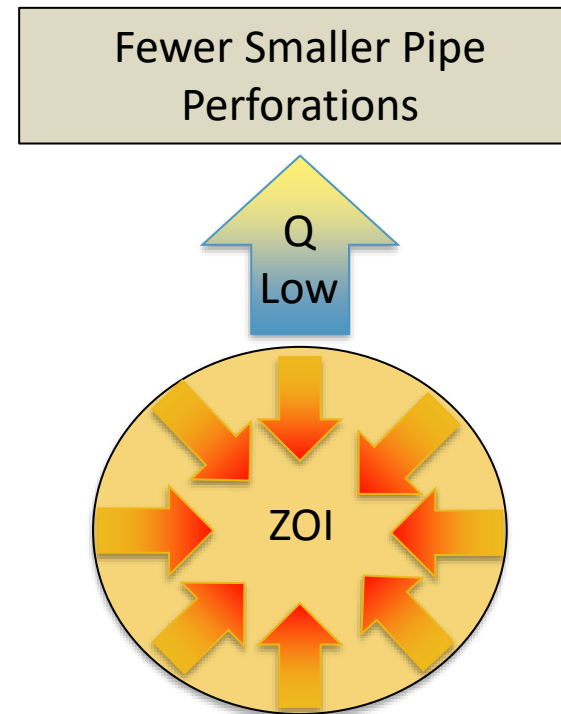
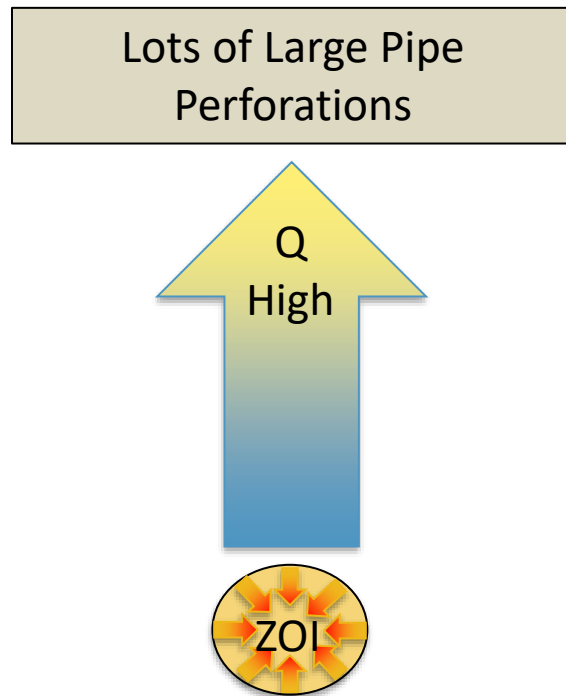




Pipe Perforations

vs

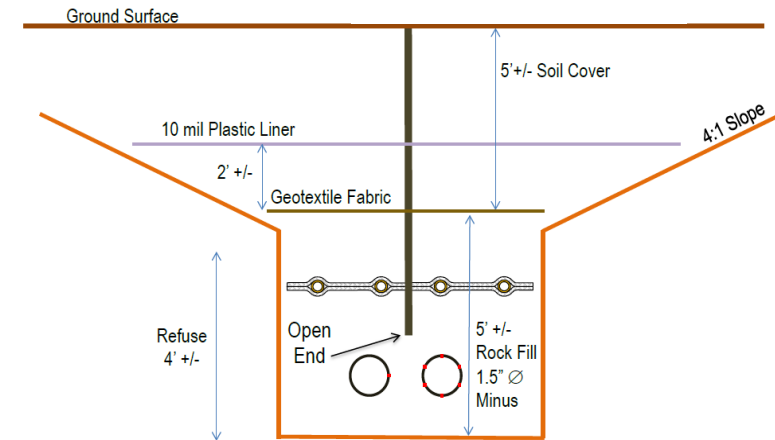
Landfill Gas Flow (Q) & Vacuum Zone of Influence(ZOI)



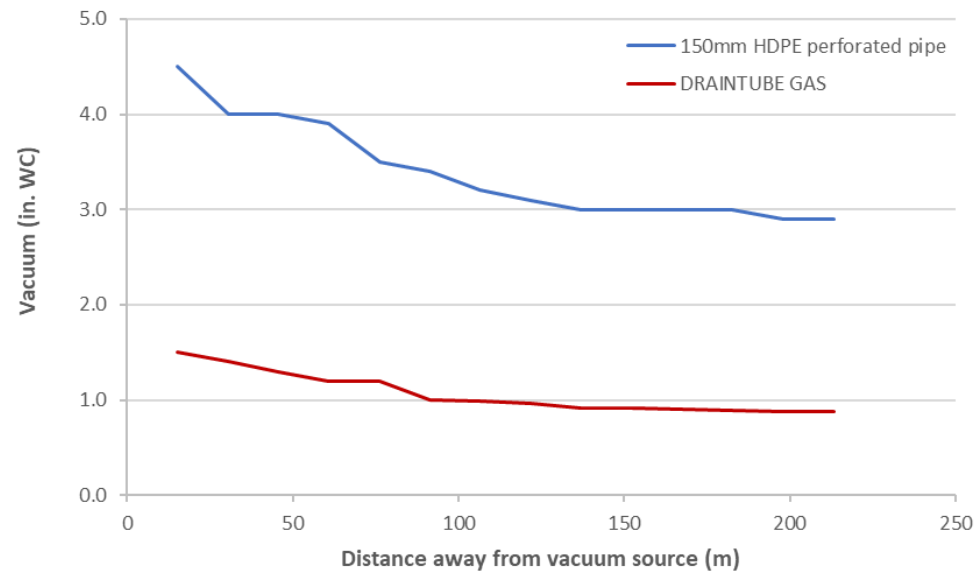


Performance test (King County, WA)

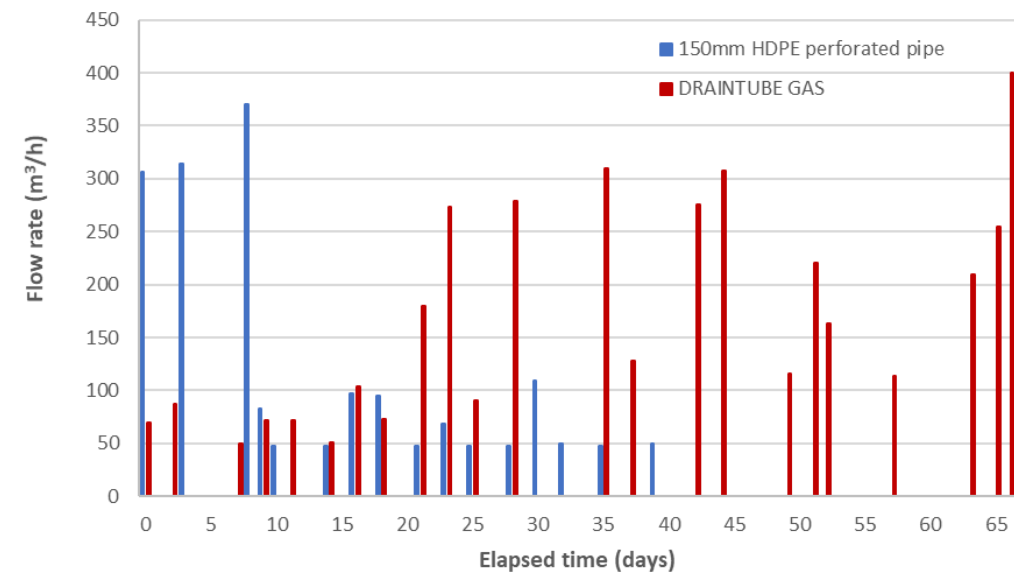
- 215 lm trench
- Conventional 150mm diameter perforated HDPE pipe
- DRAINTUBE GAS



Vacuum dissipation
for the same LFG collection efficiency (300 m³/h)



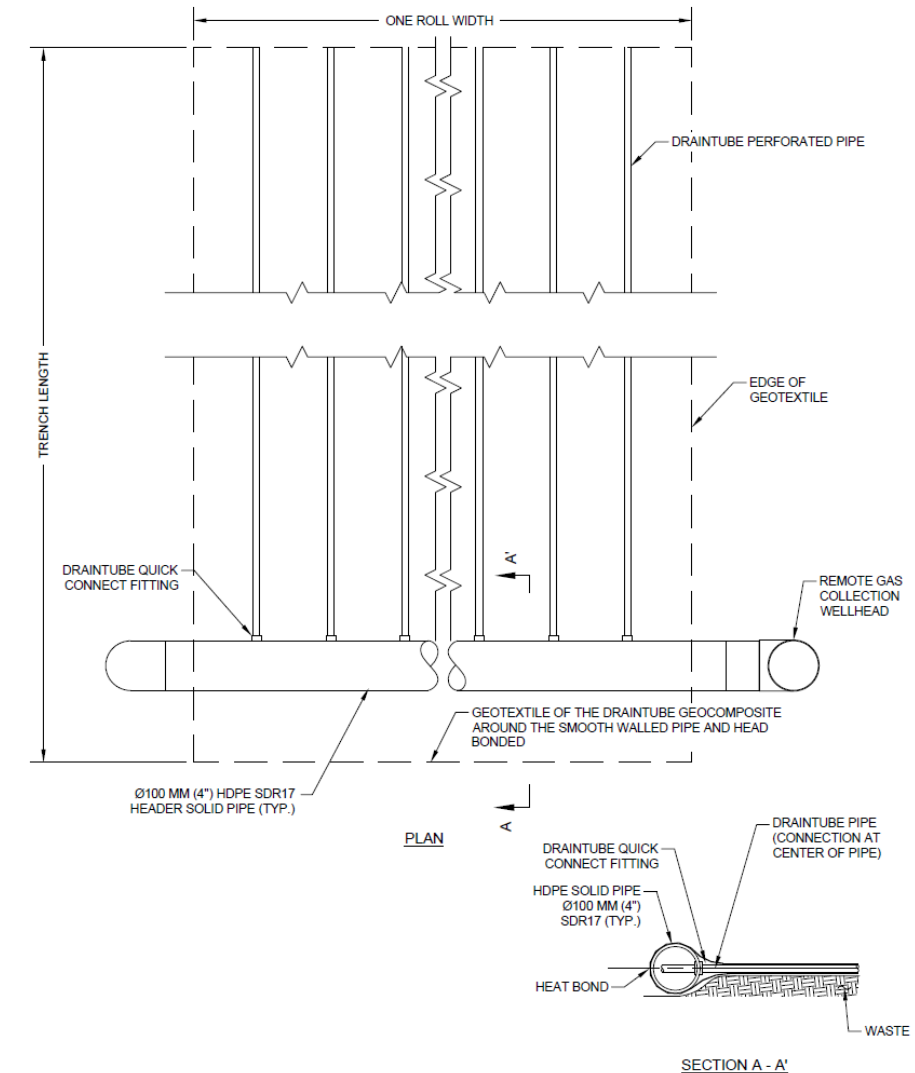
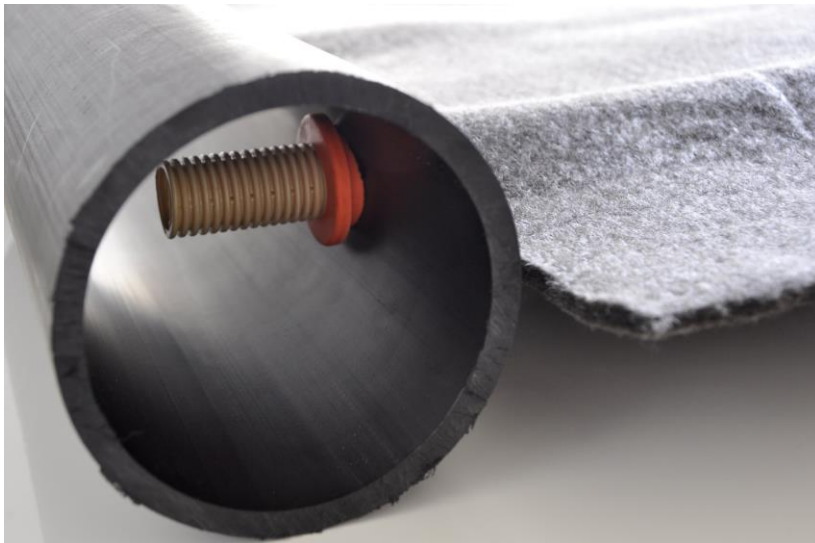
LFG collection flow rate





Connection kit – Quick Connect

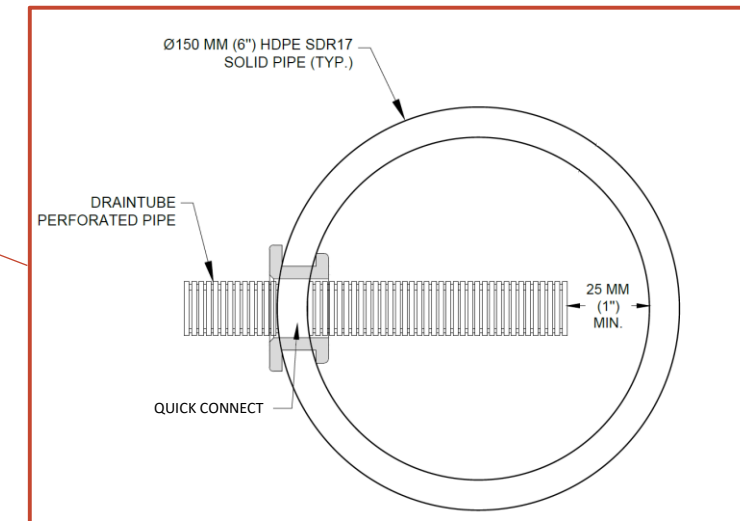
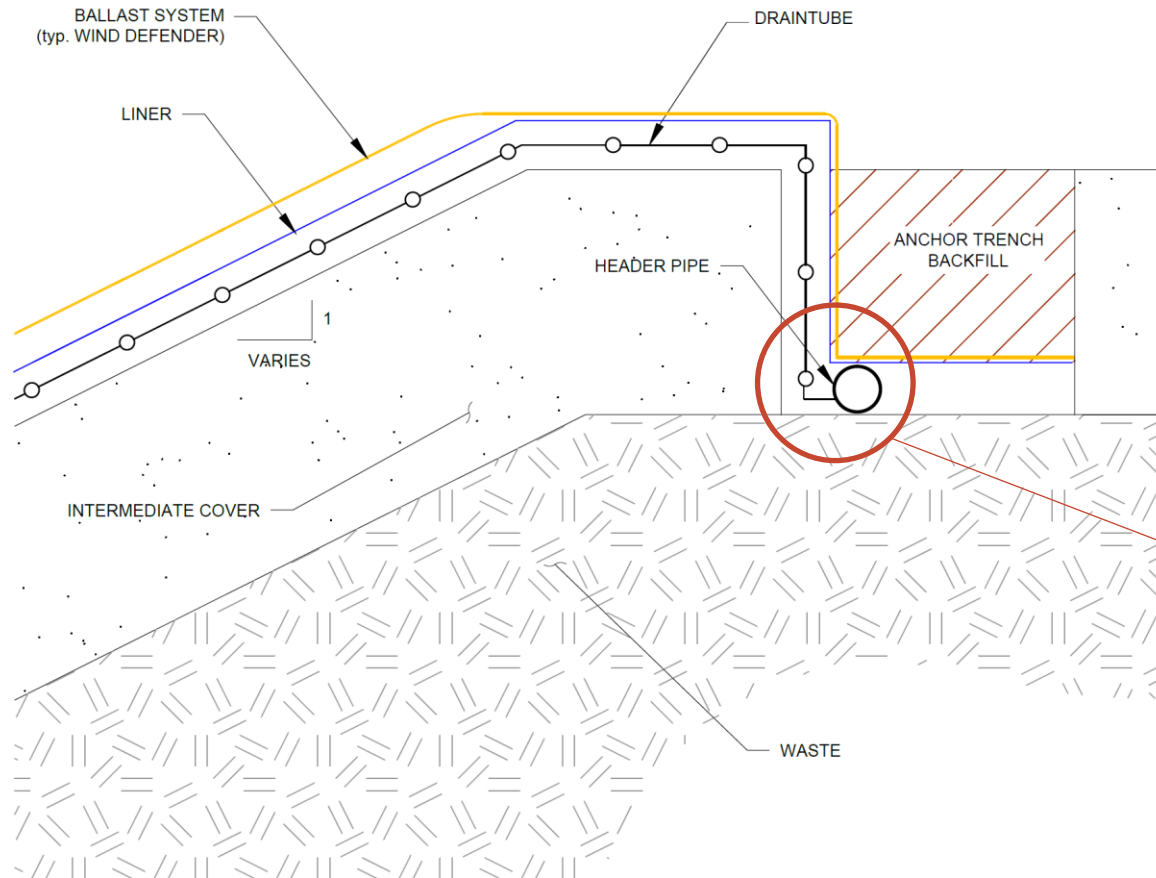
- Reduction of the head losses between the geocomposite and the header pipe
- Flexible mechanical connection (in case of differential settlements)





Surface collection system

- Temporary cover

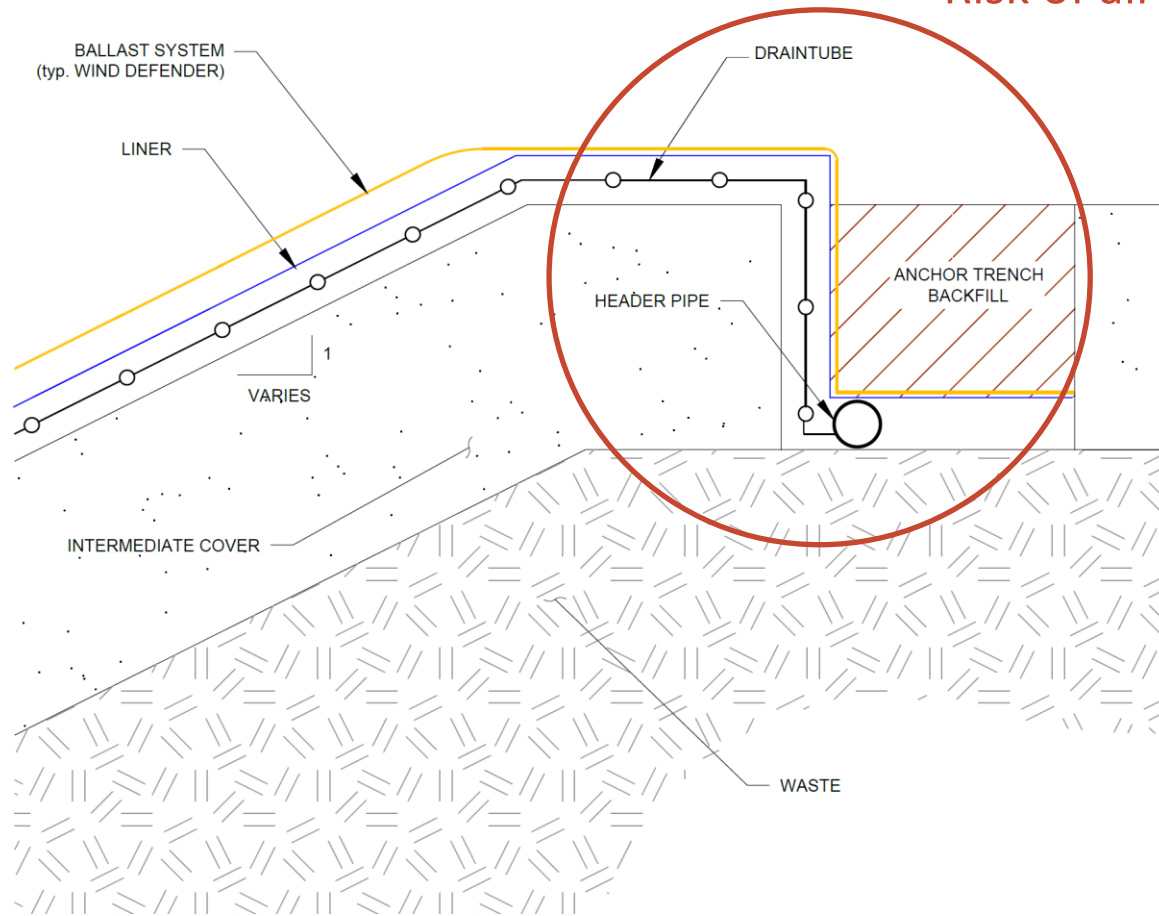




Surface collection system

- Temporary cover

Risk of air intrusion into the LFG collection network

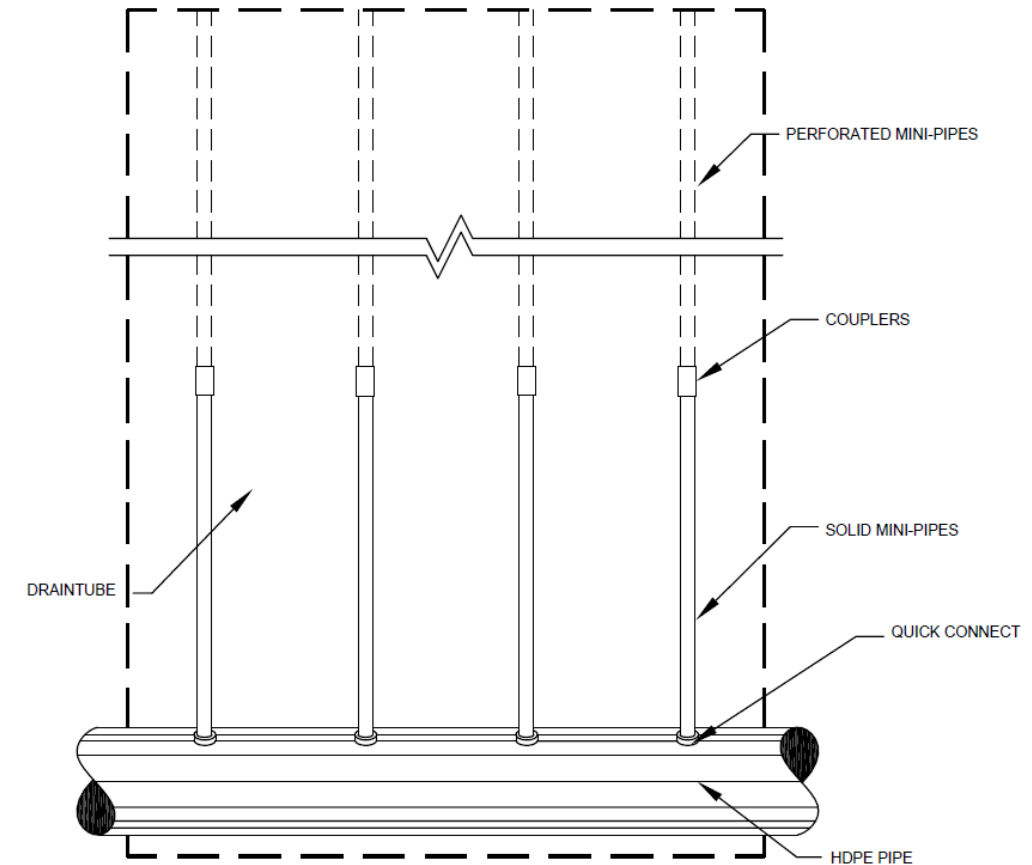
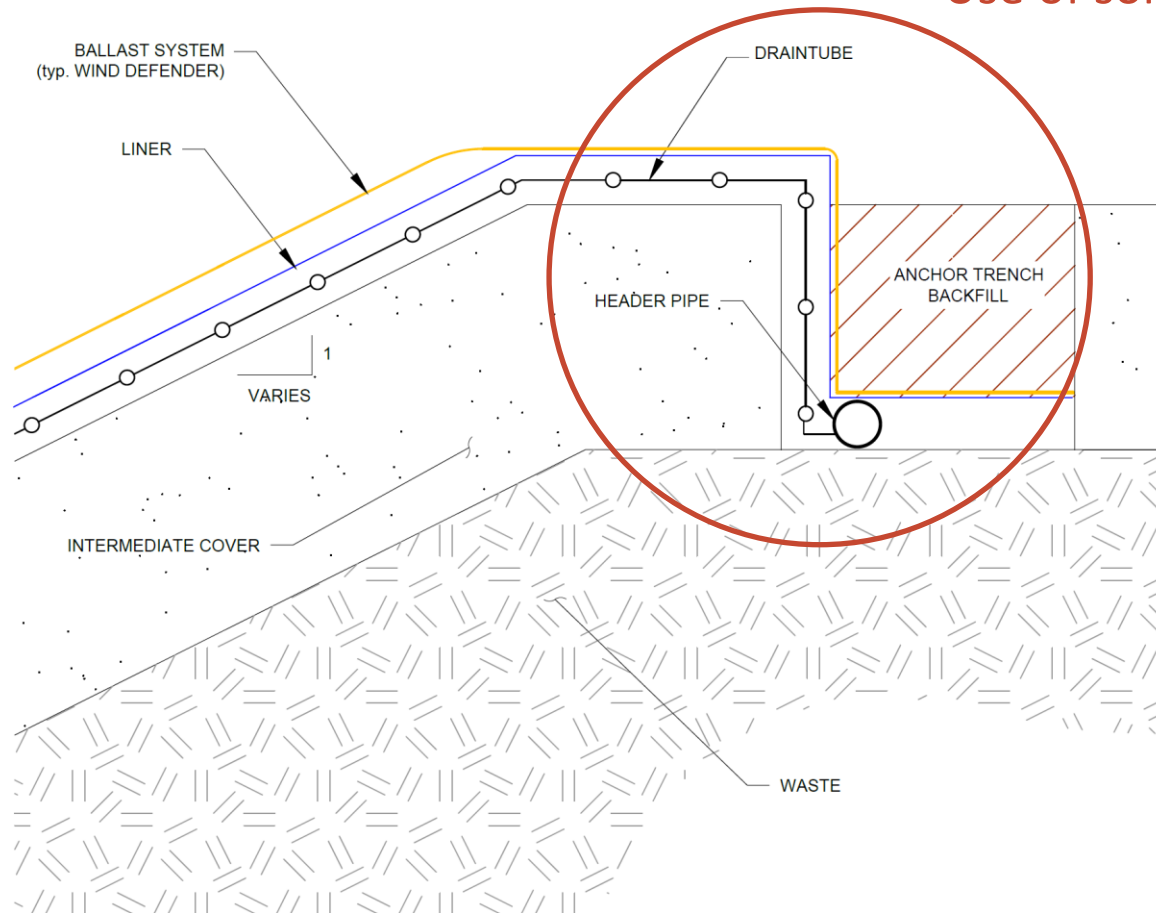




Surface collection system

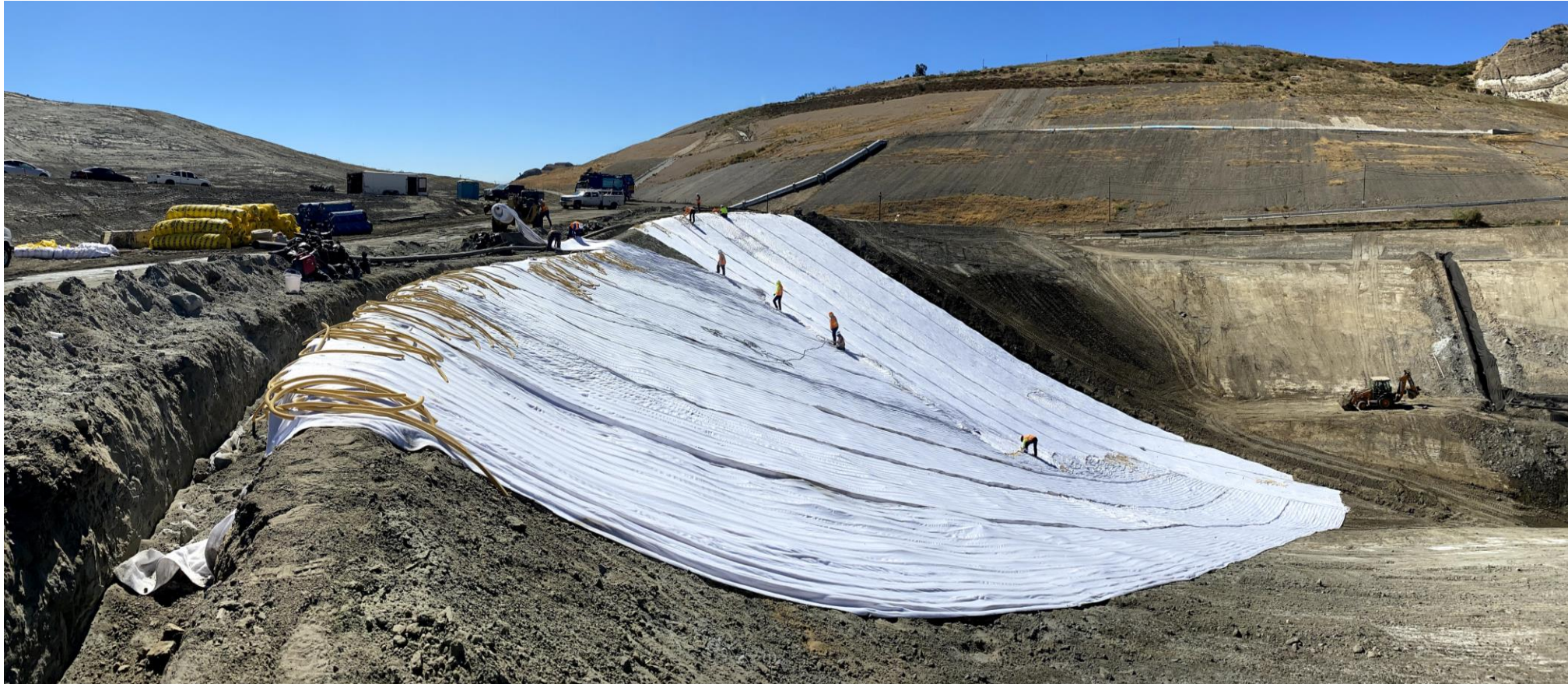
- Temporary cover

Use of solid mini-pipes near the top of the slope



Surface collection system

- Temporary cover





Surface collection system

- Temporary cover

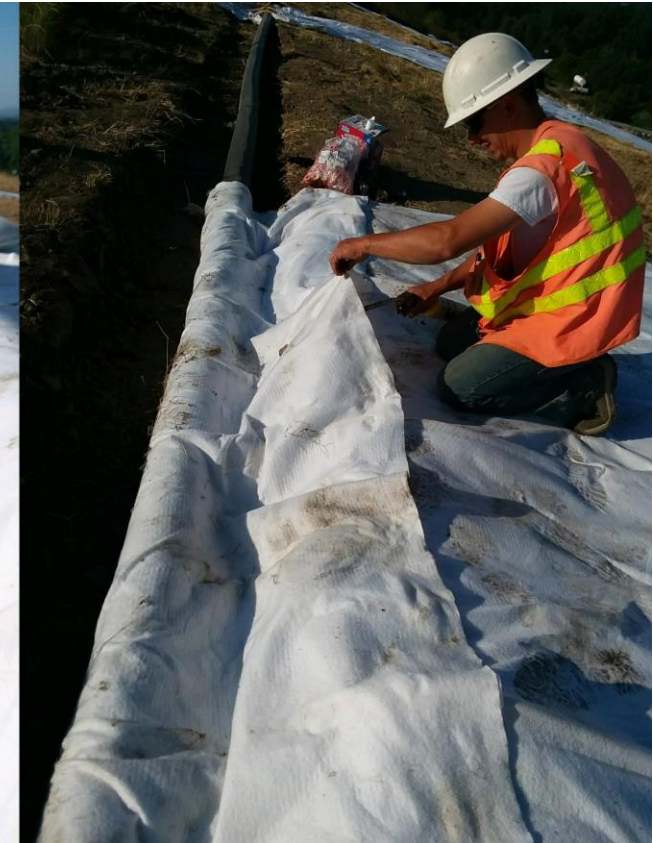
Solid mini-pipes





Surface collection system

- Temporary cover (strips of DRAINTUBE)





Surface collection system

- Temporary cover (strips of DRAINTUBE)





Surface collection system

- Final cover



LFG collection
and
mechanical protection of the liner

Surface collection system

- Final cover

Connection to the header pipe (Quick Connect system or traditional collector trench)





Surface collection system

- Final cover

Less head losses with the uses of Quick Connect connections

Reduction of the number of perforations into the header pipe with the use of T-Connect system





Surface collection system

- Final cover





DRAINTUBE geocomposite Design tool

- LYMPHEA software

The screenshot displays the LYMPHEA software interface. On the left is a dark sidebar with the following menu items: **LYMPHEA**, **Dashboard**, **ADVANCED APPLICATIONS** (Free application, Drainage Geocomposite, Granular drainage layer), **MANAGEMENT** (User manager, Site/Client manager, Company Manager), and **NOTIFICATION CENTER** (Notification manager, Send notifications). The main area features a search bar and a central 'CHOOSE A DRAINAGE APPLICATION' button. Surrounding this central button are ten application options: Leachate collection system, Subslab depressurization system, LFG collection system, Underliner venting layer, Water drainage under embankment, Drainage behind MSE wall, Subslab water drainage system, Cover drainage system, Underliner drainage system, and Sub-soil drainage layer. On the right, there are two green buttons: 'Site/Client' and 'Project'. Below these are dropdown menus for 'Site/Client' (selected: Afitex-Textel) and 'Project' (selected: Initiale). Further down, there are text fields for 'Country - Canada' and 'State/Province', and a 'Comments' field with the text 'Le projet initial du site/client.'. At the bottom right of this section is a 'Project applications' button. The footer of the interface shows '© 2021 - Afitex' and a 'Contact us' link.



Carbone footprint (ADEME)

- GHG emissions comparison

Reduction of CO₂ emissions by 75% with the use of DRAINTUBE for horizontal LFG collection.

Application	Description		Emission (eq.CO ₂)	Emission reduction
Horizontal LFG collection	Traditional solution	0.9 m x 2 m trench with gravel material + 150mm collector pipe	79 kg CO ₂ / lm	75 %
	Geocomposite solution	DRAINTUBE Geocomposite only	18 kg CO ₂ / lm	



- DRAINTUBE geocomposite for LFG collection
 - Horizontal LFG collection
 - Surface collection system
- Long term performance
 - High drainage capacity even under high loads
 - No creep in compression
- Connection tools
 - Quick Connects to mechanically connect the product to the header pipe
 - Reduction of the Head losses
- Design tool
 - LYMPHEA software
- Greenhouse gas emissions savings





Questions are welcome



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