FEEDBACK ON LONG-TERM INTEGRITY OF MULTI-LINEAR DRAINAGE GEOCOMPOSITES INSTALLED ON LANDFILL FINAL COVERS AFTER 10 AND 12 YEARS OF OPERATION

afitex · Texel GEOSYNTHETICS

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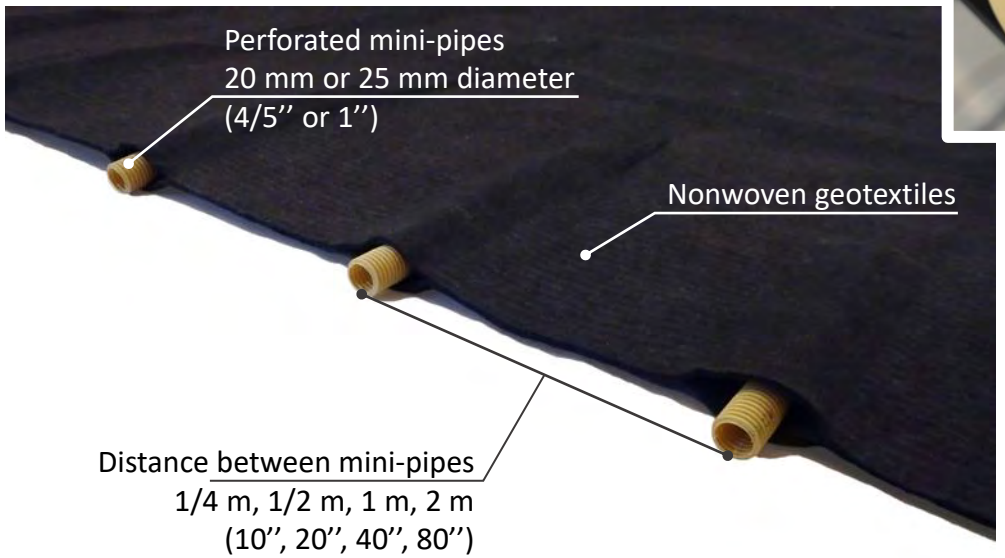
DRAINTUBE MULTI-LINEAR DRAINAGE GEOCOMPOSITES

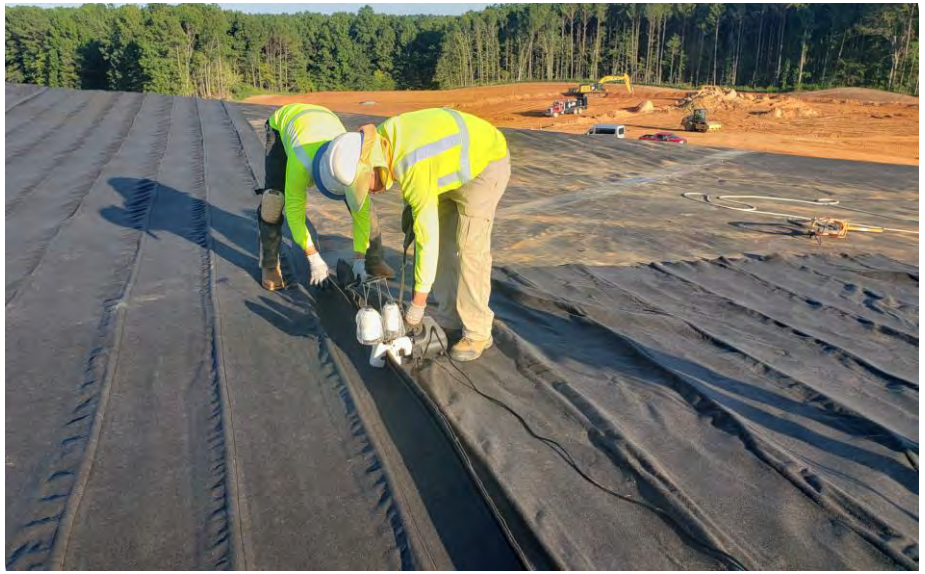
Drainage geocomposite with drainage conduits regularly spaced between two geotextiles

Drainage conduits:

- Perforated Polypropylene mini-pipes



DARINTUBE MULTI-LINEAR DRAINAGE GEOCOMPOSITES



LONG TERM IN-SITU PERFORMANCE OF DRAINAGE GEOCOMPOSITES

Long-term behavior of drainage geocomposites addressed by applying Reduction Factors (RFs) to the in-plane flow rate (or transmissivity)

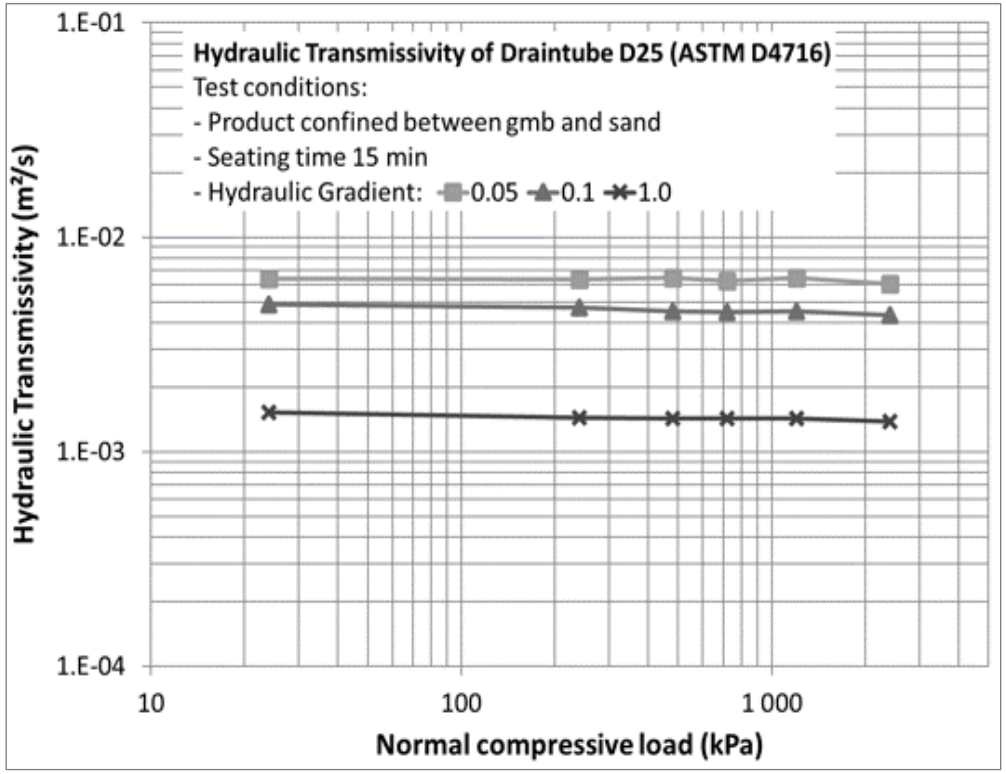
Recommended RFs for Multi-linear drainage geocomposites:

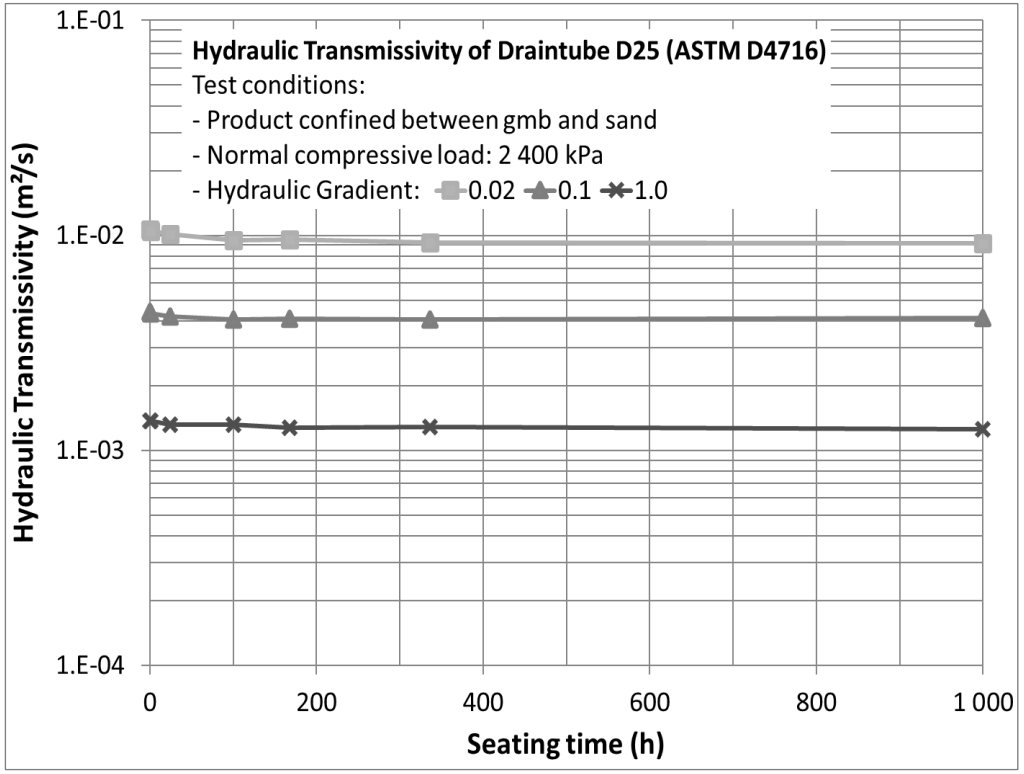
Applications	Requirements			
	RF_{GI}	RF_{CR}	RF_{CC}	RF_{BC}
Landfill Leachate Collection	1.0	1.0	1.5 to 2.0	1.0* to 1.3
Retaining Walls	1.0	1.0	1.1 to 1.5	1.0* to 1.2
Sport Fields	1.0	1.0	1.0 to 1.2	1.0* to 1.3
Landfill covers	1.0	1.0	1.0 to 1.2	1.0* to 3.5

* In cases when using DRAINTUBE ACB, which contains a non-leachable, silver-based biocide treatment

LONG TERM IN-SITU PERFORMANCE OF DRAINAGE GEOCOMPOSITES

Draintube Multi-linear drainage geocomposite not load sensitive when confined under a soil layer

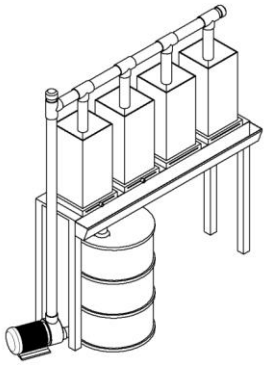


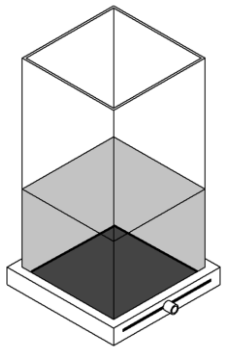


$$RF_{IN} = RF_{CR} = 1.0$$

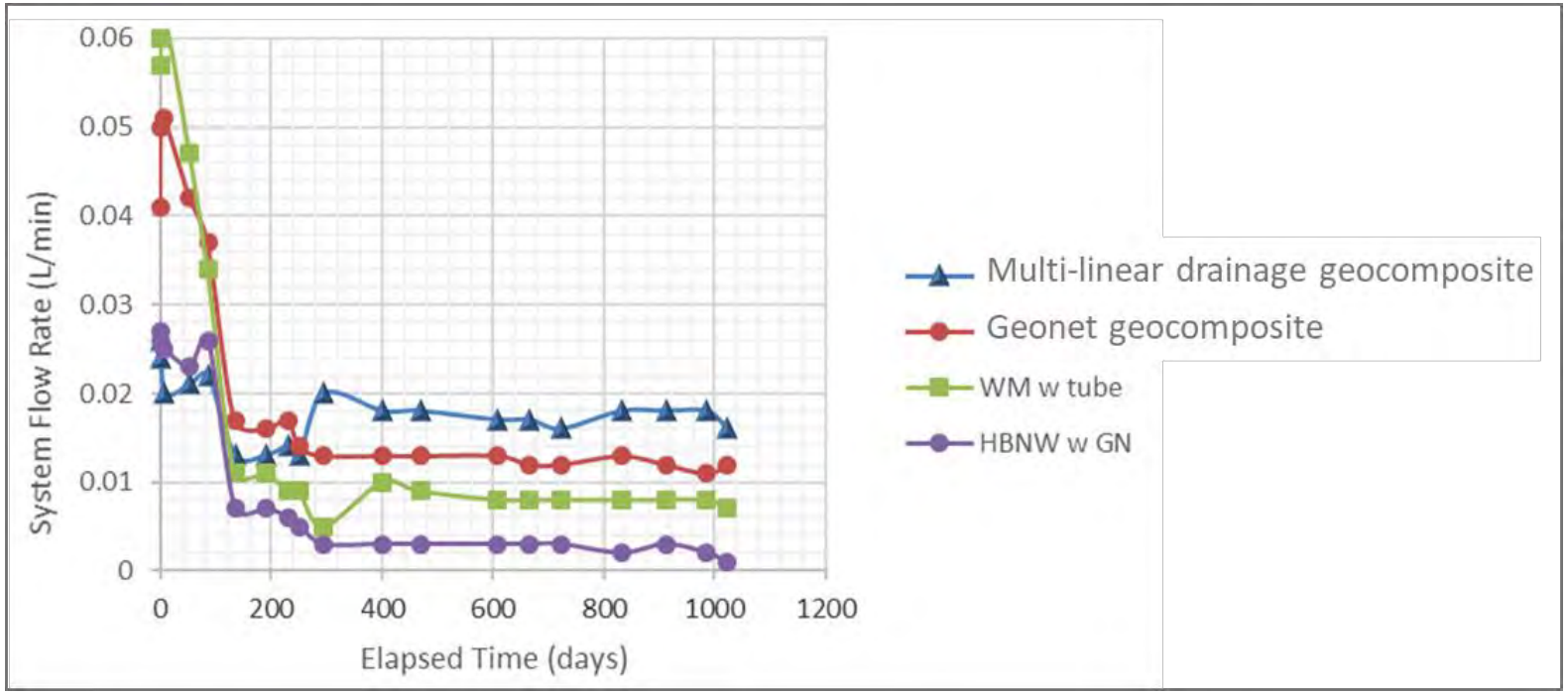
LONG TERM IN-SITU PERFORMANCE OF DRAINAGE GEOCOMPOSITES

The Multi-linear drainage geocomposite behaves in the same way as the geonet geocomposite with regard to leachate.





Field test study carried out in PA (USA), by the Geosynthetic Research Institute (GRI) over 3 years.



LONG TERM IN-SITU PERFORMANCE OF DRAINAGE GEOCOMPOSITES

Importance of laboratory tests and on-site feedback to increase knowledge and confidence in a solution.

Further investigations on Draintube Multi-linear drainage geocomposite:

- 2 exhumations and analyses made on 2 different sites after 10 and 12 years of use.
- Accelerated aging program to address a 100-year service life of the product

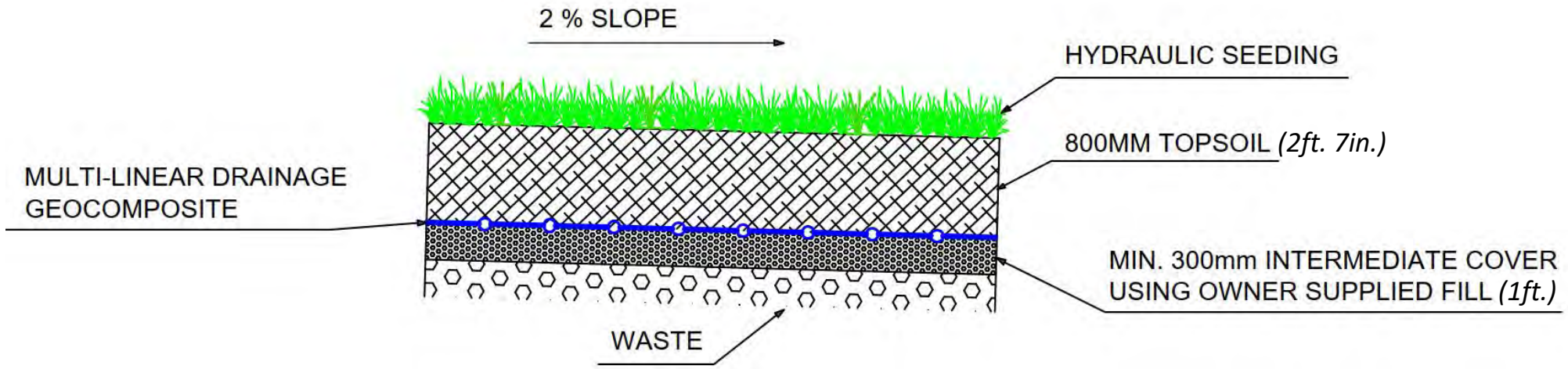
LAPOUYADE LANDFILL, FRANCE

Veolia, www.isdnd-lapouyade.fr

LAPOUYADE LANDFILL, FRANCE

- Non-hazardous waste Landfill open in 1996
- Operator: Veolia
- Landfill footprint:105 Ha (260 acres)
- Treatment capacity: 430,000 Metric Tons per year

Final cover in 2004



LAPOUYADE LANDFILL, FRANCE

Installation of the multi-linear drainage geocomposite in 2004

LAPOUYADE LANDFILL, FRANCE

Exhumation of the multi-linear drainage geocomposite in 2014 (10 years of use)

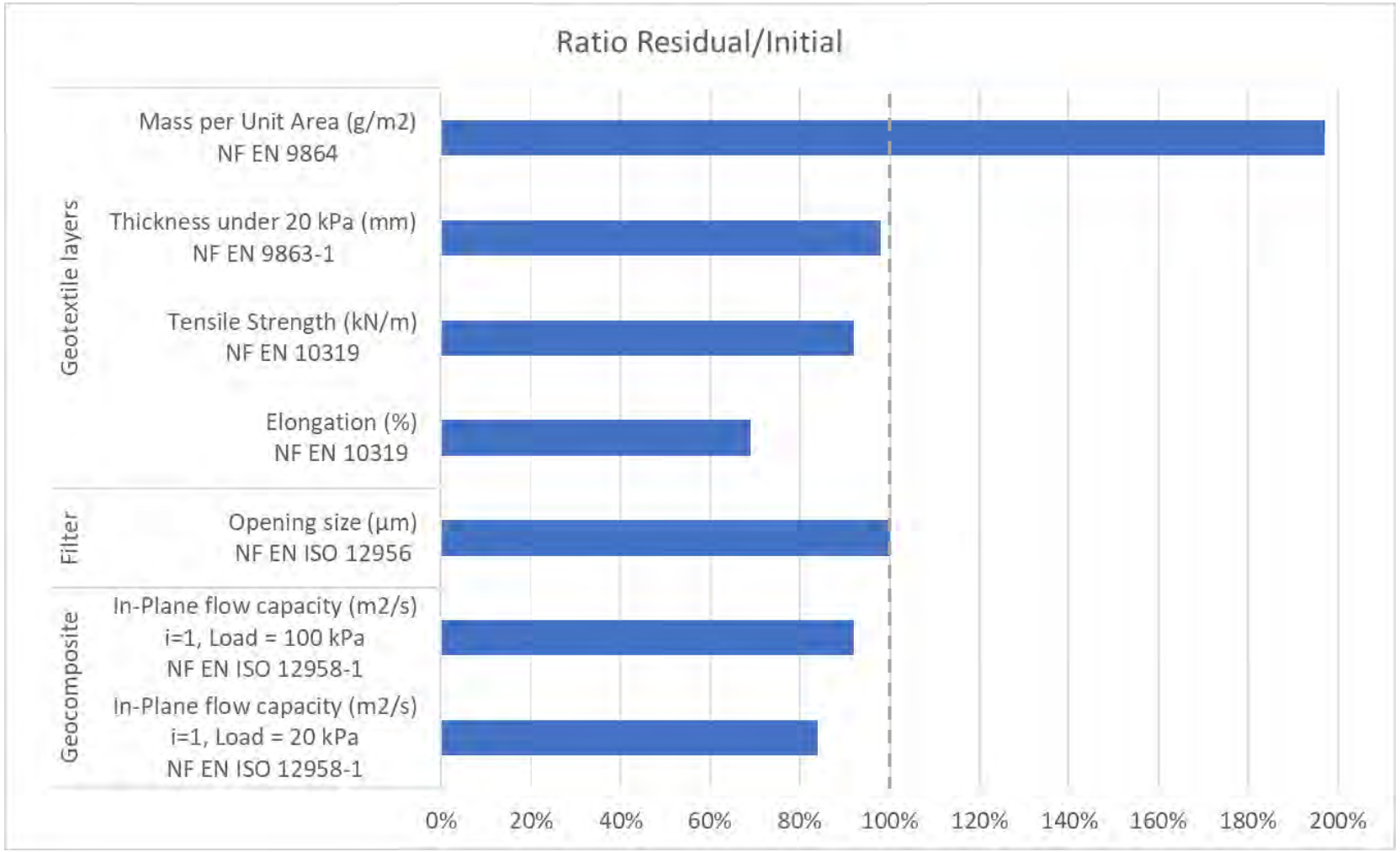
LAPOUYADE LANDFILL, FRANCE

Field observations:

- No area of clogging (despite the sand-clay nature of the top-soil)
- Clean surface of the bottom geotextile layer (as well as the underlying clay layer)
- Clean area of the lateral overlap between two rolls

LAPOUYADE LANDFILL, FRANCE

Comparative testing in the laboratory (2004 sample vs. 2014 sample)

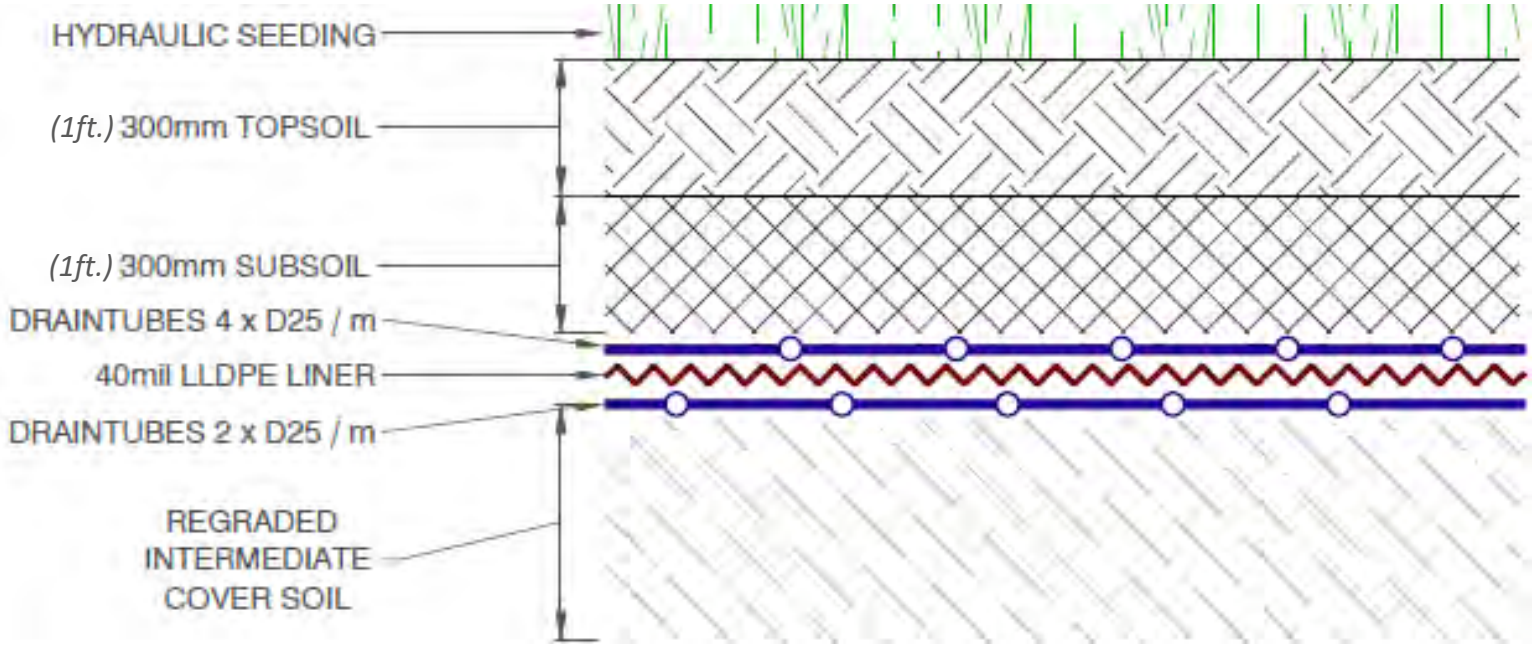


VANCOUVER LANDFILL, CANADA

VANCOUVER LANDFILL, CANADA

- Non-hazardous waste Landfill open in 1996
- Operator: Metro Vancouver
- Landfill footprint: 225 ha (556 acres)
- Treatment capacity: 750,000 Metric Tons per year

Final cover in 2012



VANCOUVER LANDFILL, CANADA

Installation of the multi-linear drainage geocomposite

VANCOUVER LANDFILL, CANADA

Exhumation of the multi-linear drainage geocomposite in 2024 (12 years of use)

VANCOUVER LANDFILL, CANADA

Field observations:

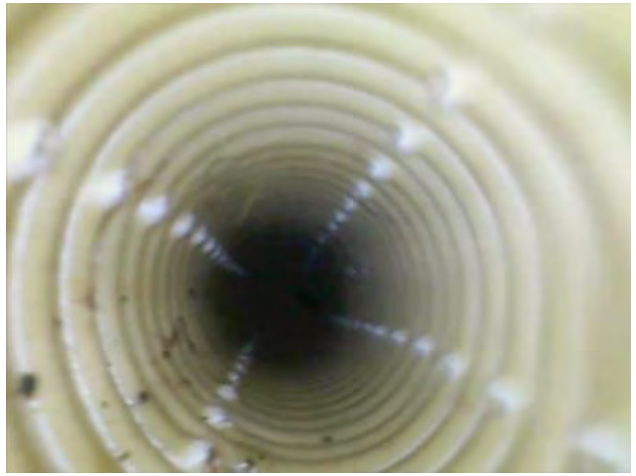
- No area of clogging
- Roots in the geotextile layers, not in the mini-pipes
- Geomembrane clean and not punctured

VANCOUVER LANDFILL, CANADA

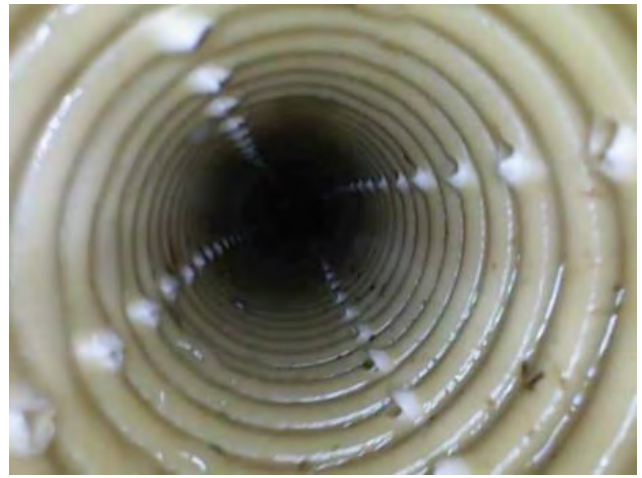
Inspection of the mini-pipes with endoscopic camera

- no deformation
- no root intrusion
- No debris accumulation

Up-grade

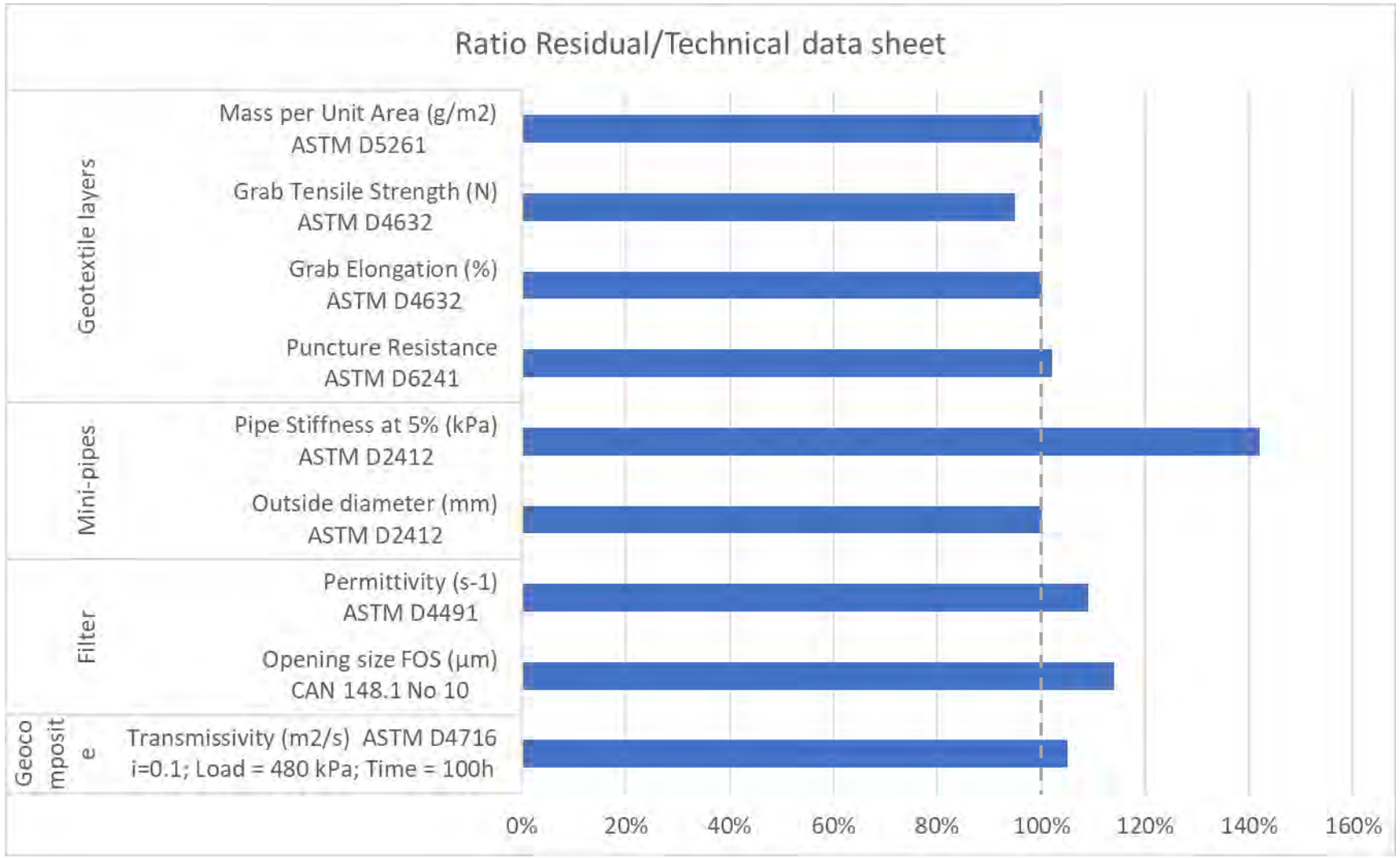


Down-grade



VANCOUVER LANDFILL, CANADA

Comparative testing in the laboratory (2012 TDS vs. 2024 sample)



100-YEAR AGING LABORATORY TESTS

Accelerated aging program to simulate a **100-year use of the DRAINTUBE** multi-linear drainage geocomposite on a final cover.

ISO 13438: Screening test method for determining the resistance of geotextiles and geotextile-related products to oxidation

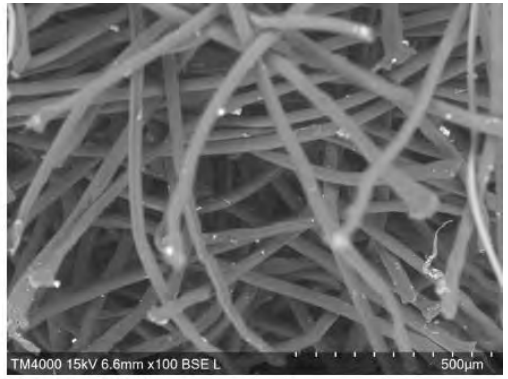
Test specimens in water at 80 °C for 28 days before being exposed at 100 °C in oven for 112 days (100-yrs service life)

Require Tensile strength after aging > 50% to pass

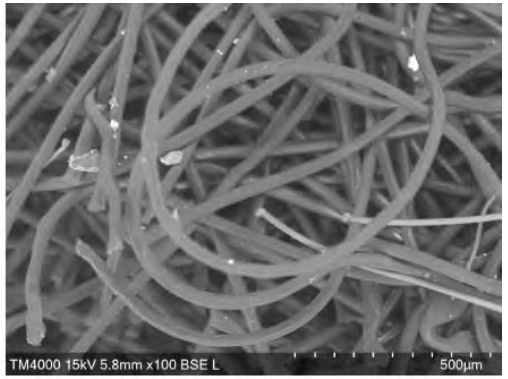
100-YEAR AGING LABORATORY TESTS

Accelerated aging program to simulate a **100-year use of the DRAINTUBE** multi-linear drainage geocomposite on a final cover.

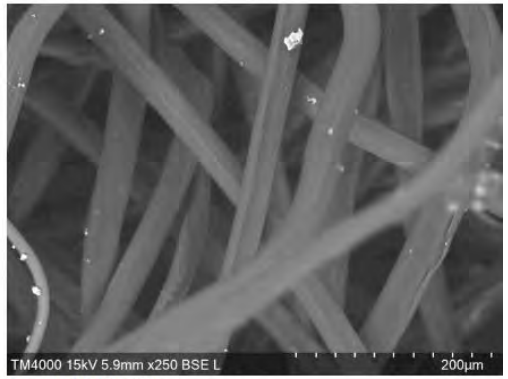
Electronic microscopy, before and after aging



Nappe;100X magnification (Initial).



Nappe;100X magnification (After aging).

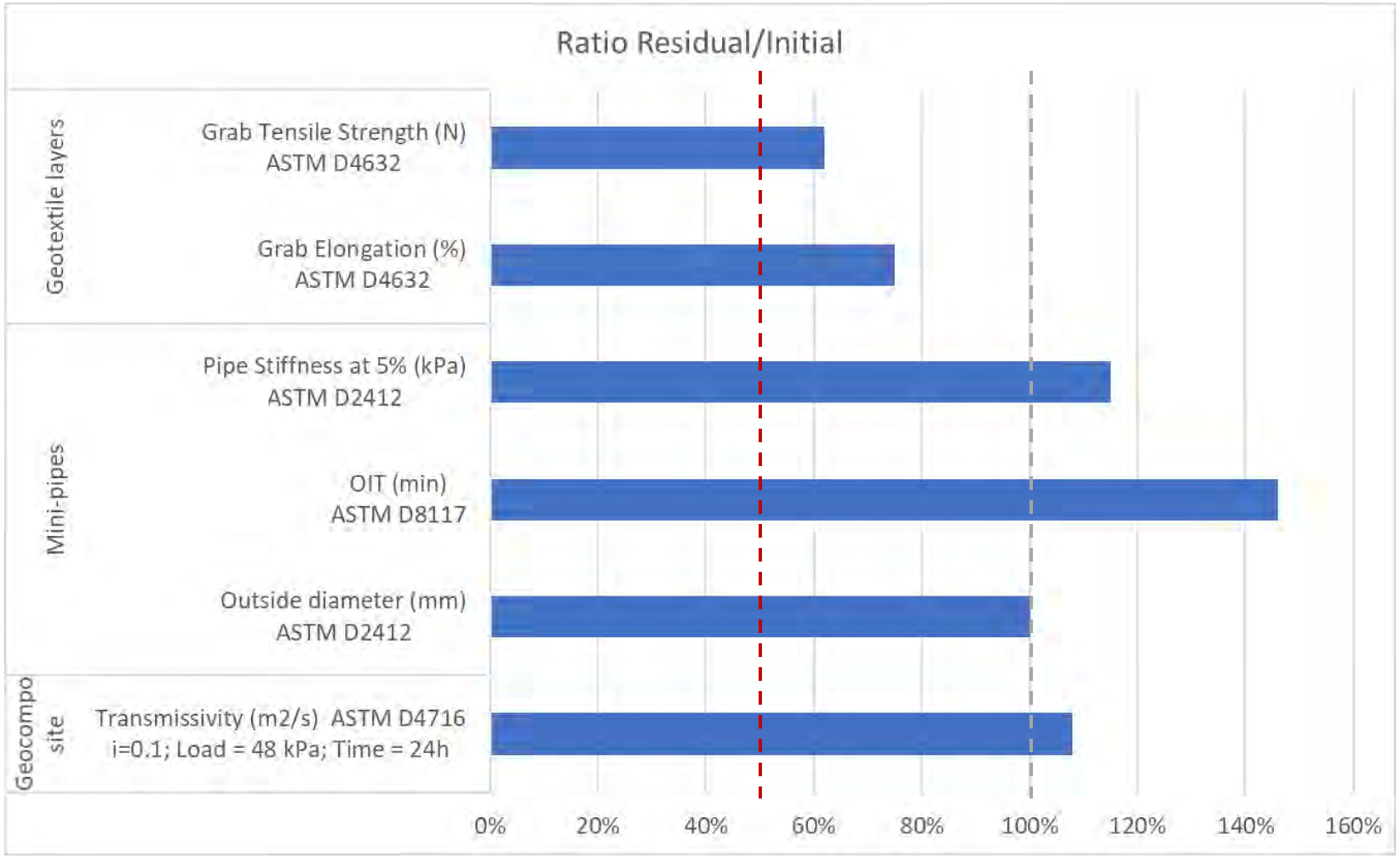


Nappe; 250X magnification (Initial).

Nappe; 250X magnification (After aging).

100-YEAR AGING LABORATORY TESTS

Accelerated aging program to simulate a **100-year use of the DRAINTUBE** multi-linear drainage geocomposite on a final cover



CONCLUSIONS

The exhumation and analysis of multi-linear drainage geocomposites after 10 and 12 years confirm their long-term performance in landfill final covers.
Key findings include:

- No clogging or significant degradation.
- High retention of mechanical and hydraulic properties.
- Resistance to root intrusion and to chemical clogging.

100-year aging laboratory tests confirm the stability of the product and more specifically, the consistency of its drainage capacity over time.

These results, together with laboratory tests and research programs regularly carried out on the product for over 30 years, reinforce the relevance of Multi-linear drainage geocomposites Draintube as a reliable solution for drainage applications.

THANK YOU !

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