Voorstelling PFAS-monitoringstechniek iFLUX sampling

– iFLUX

21-04-2022

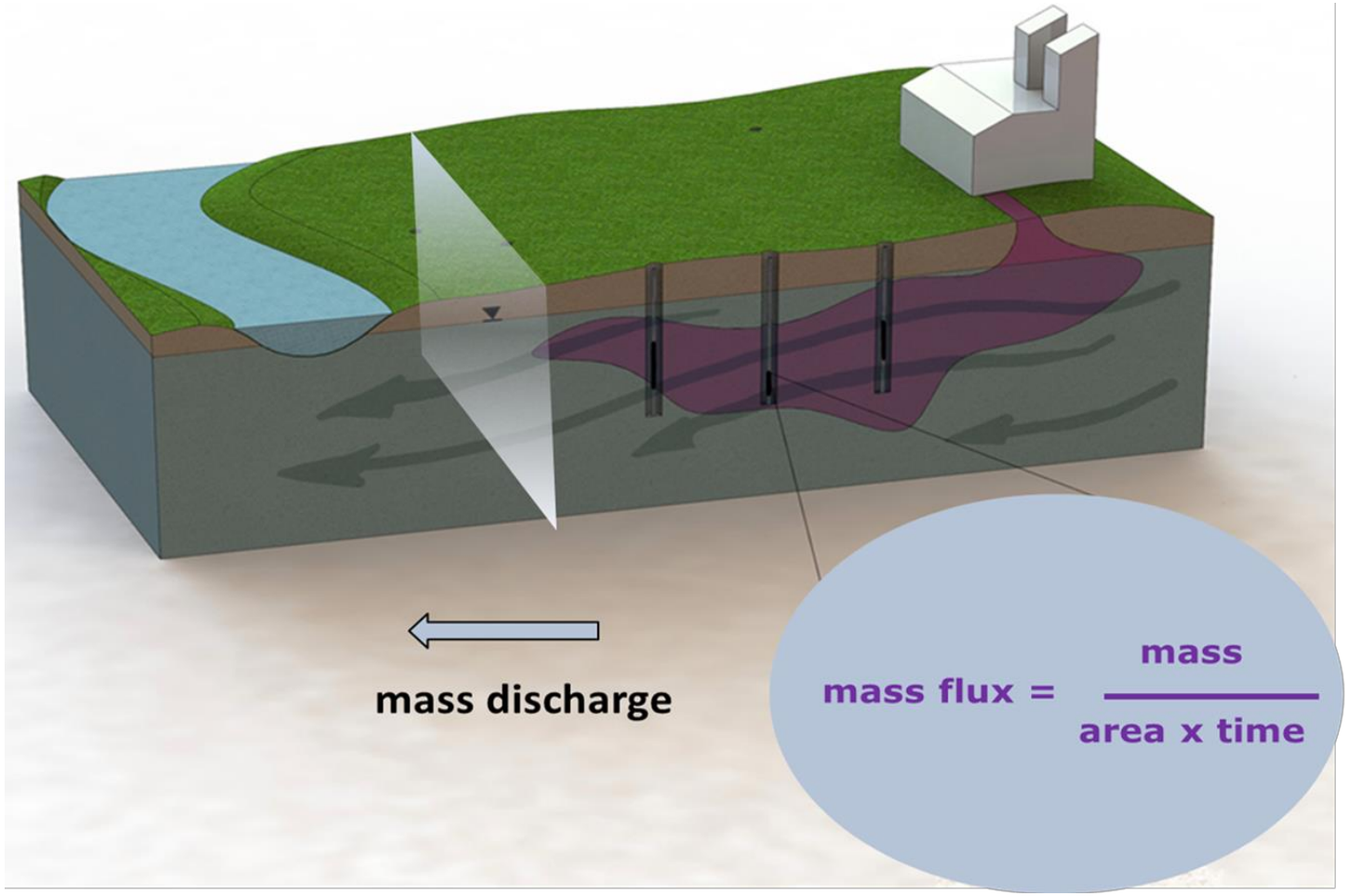
“Groundwater - Making the invisible visible”

Provide on-site groundwater monitoring
to reduce response times, anticipate pollution,
and prevent related risks.

We bring to market the next generation of groundwater monitoring solutions.
IFLUX’s passive sampling and real-time sensing technology can explore the dynamics of pollution flow underground over certain periods of time.

iFLUX

Groundwater & mass flux concept



= Concentration
x Darcy velocity
= C x q

https://www.itrcweb.org/GuidanceDocuments/MASSFLUX1.pdf

iFLUX Passive sampling

80+ projects in 13 countries across EU towards cost-efficient site remediation

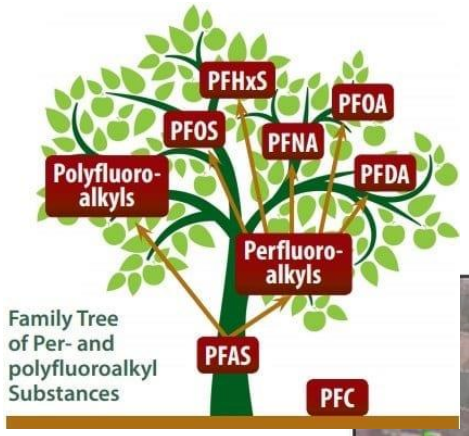
Patented and validated

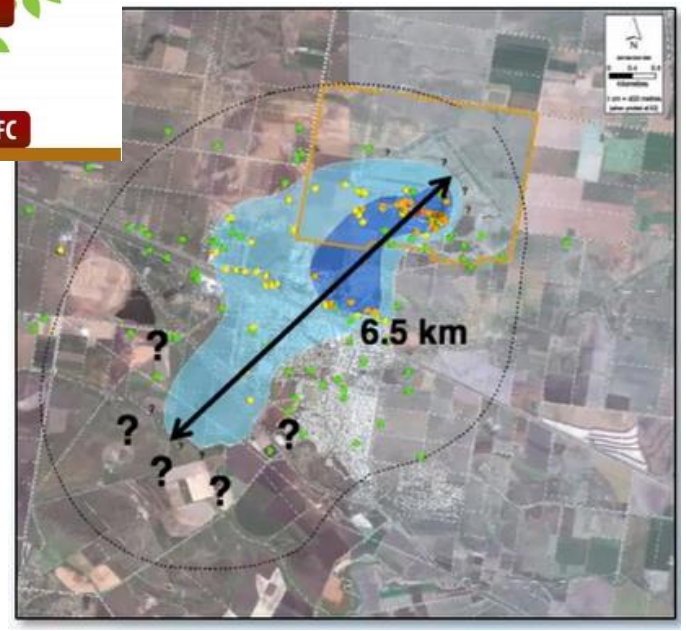
Captures 90% of all pollution types

Accurate measurement of mass flux and direction of spreading

Potential remediation cost reduction up to 30%

PFAS in groundwater

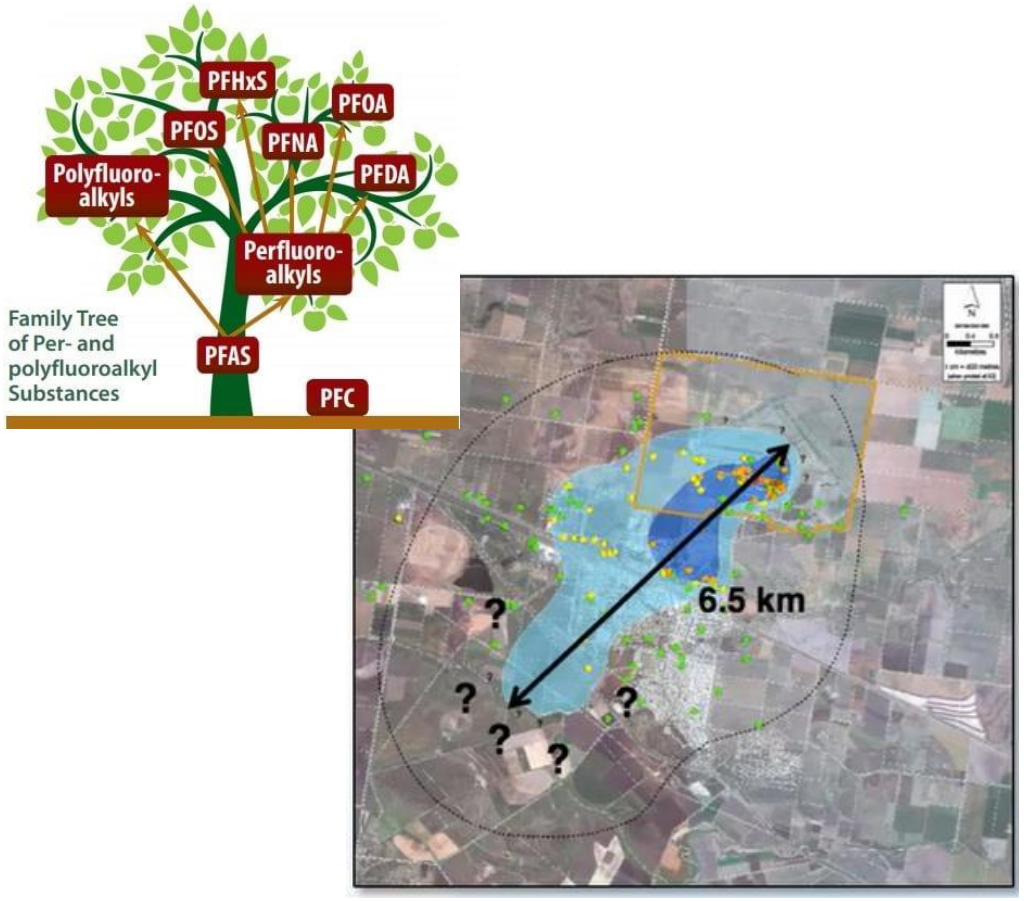




The difficulties

- Often encountered as large, dilute plumes:
  - >1 mile in length
  - 75% of plume is < 10 µg/L
- Extremely recalcitrant compounds
  - they stay for ever
  - difficult to remediate
- Very mobile, low retardation
- Low clean-up criteria: combined 0.07 µg/L
- Analytical issues

PFAS in groundwater



Why flux measurement?

- Often encountered as large, dilute plumes:
  - >1 mile in length
  - 75% of plume is < 10 µg/L
- Extremely recalcitrant compounds
  - they stay for ever
  - difficult to remediate

Measure mobility

- Very mobile, low retardation
- Low clean-up criteria: combined 0.07 µg/L

Measure accumulation over time

- Analytical issues

PFAS in groundwater

- Cartridge PFAS
- Sorbent Cyclopure®
- Cartridge size: 50mm

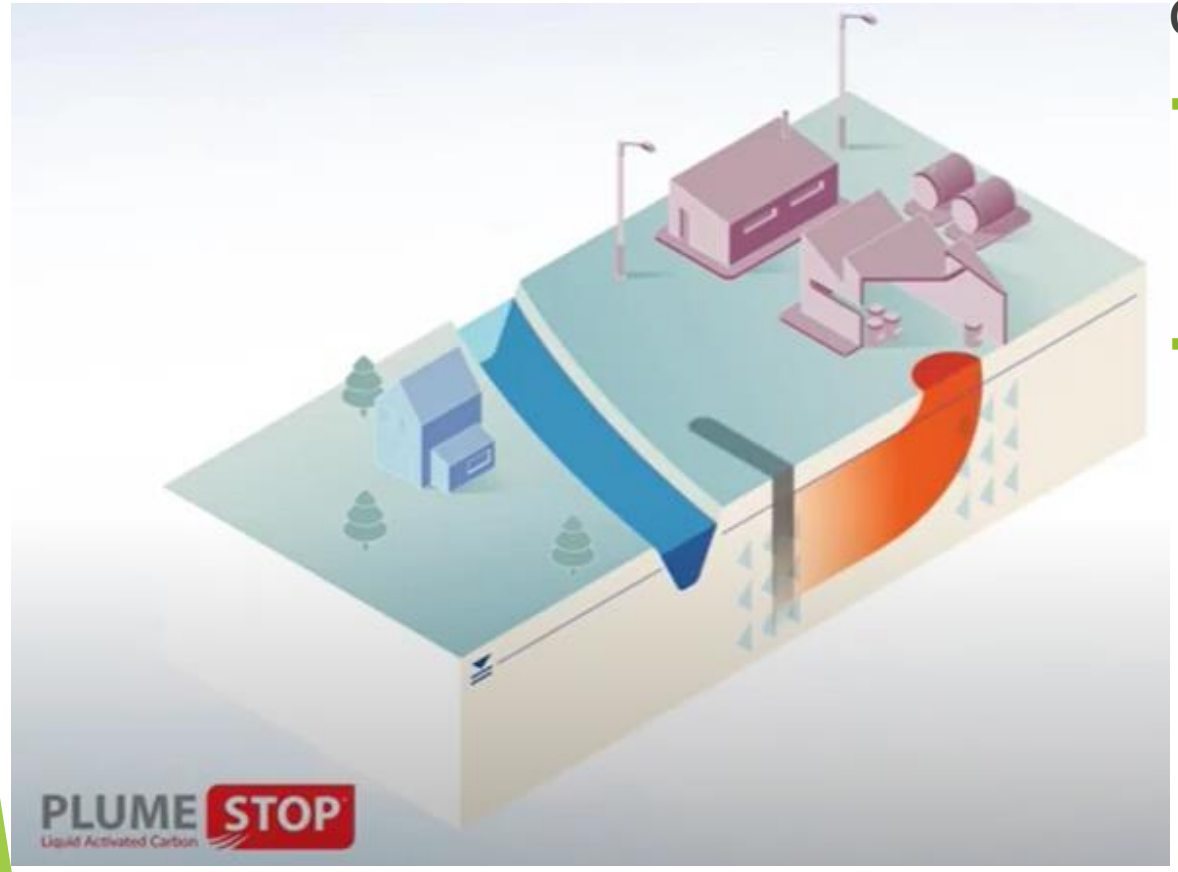
  → well 63/51 mm
- Mass flux in µg/m²/dag
- Detection Limit flux :
  - 10 µg/kg sorbent
  - 5-10 µg/m²/day
  - 5-80 ng/L

CYCLOPURE
MAKING WATER SAFE

SGS

PFAS
Perfluorohexanoic acid (PFHxA)
Perfluoroheptanoic acid (PFHpA)
Perfluorooctanoic acid (PFOA)
Perfluorononanoic acid (PFNA)
Perfluorodecanoic acid (PFDA)
Perfluoroundecanoic acid (PFUdA)
Perfluorododecanoic acid (PFDoA)
Perfluorobutanesulfonic acid (PFBS)
Perfluorohexanesulfonic acid (PFHxS)
Perfluorooctanesulfonic acid (PFOS)
Perfluorooctanesulfonamide (PFOSA)

Case: PFAS - fire brigade training ground



Objectives :

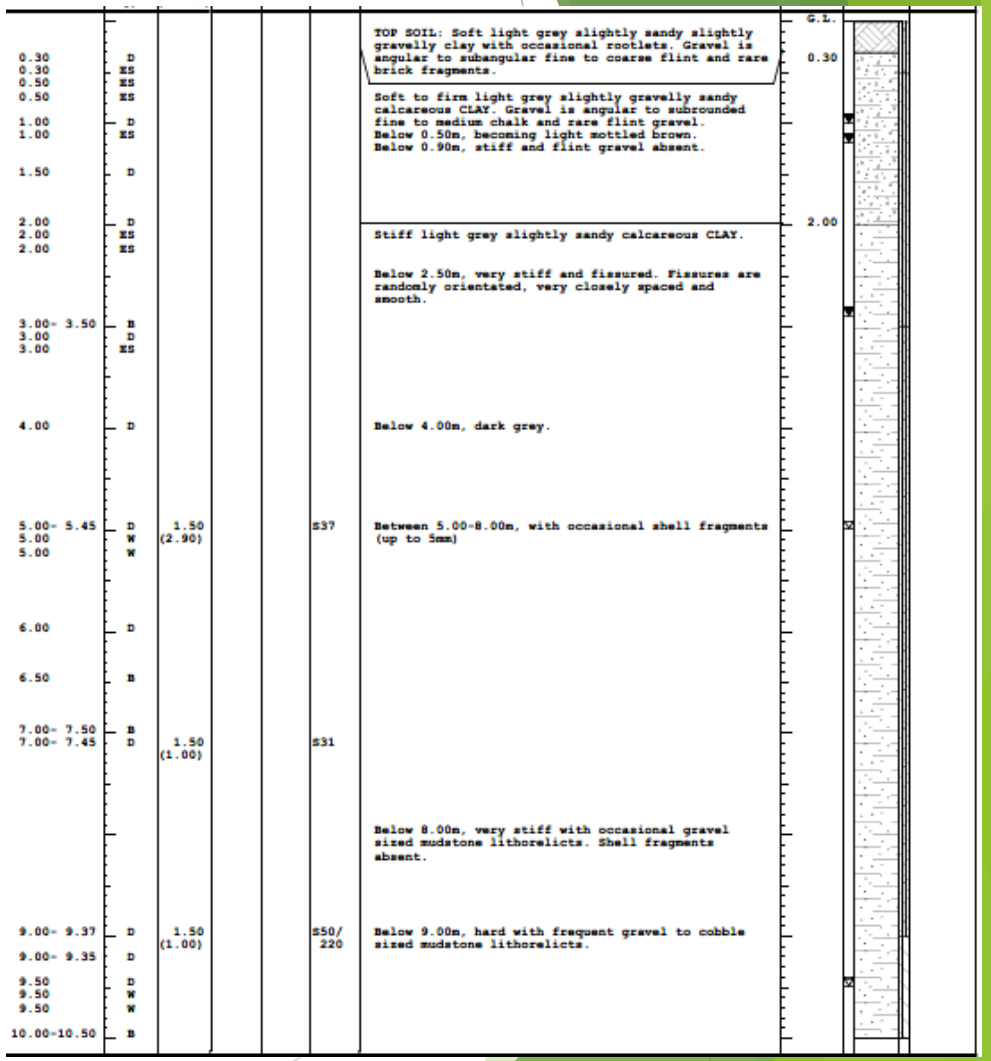
- Perform iFLUX measurements
  - to design active barrier
  - To follow-up efficiency of active barrier
- Single barrier
  - To limit plume expansion
  - Focussed injection on high flux zones

→ **Amount** liquid activated carbon

→ **Injection depth** – preferential pathways

Case: PFAS - fire brigade training ground

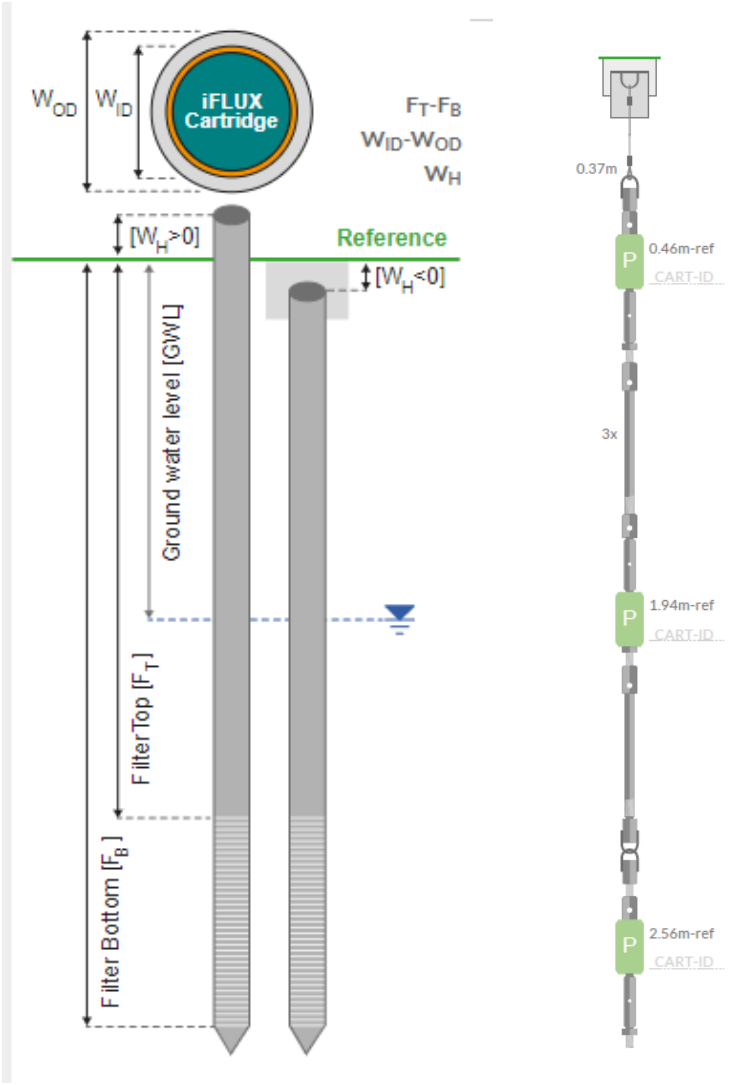
- Heterogenous layered soil
  - sandy to gravely
  - calcereous clay, occasionally shells
  - mudstone layer below
- PFAS plume
  - delineation based on concentration
  - 10 meter depth
  - Prevent horizontal spreading by liquid activated carbon



Concentrations upstream from barrier (ng/l)

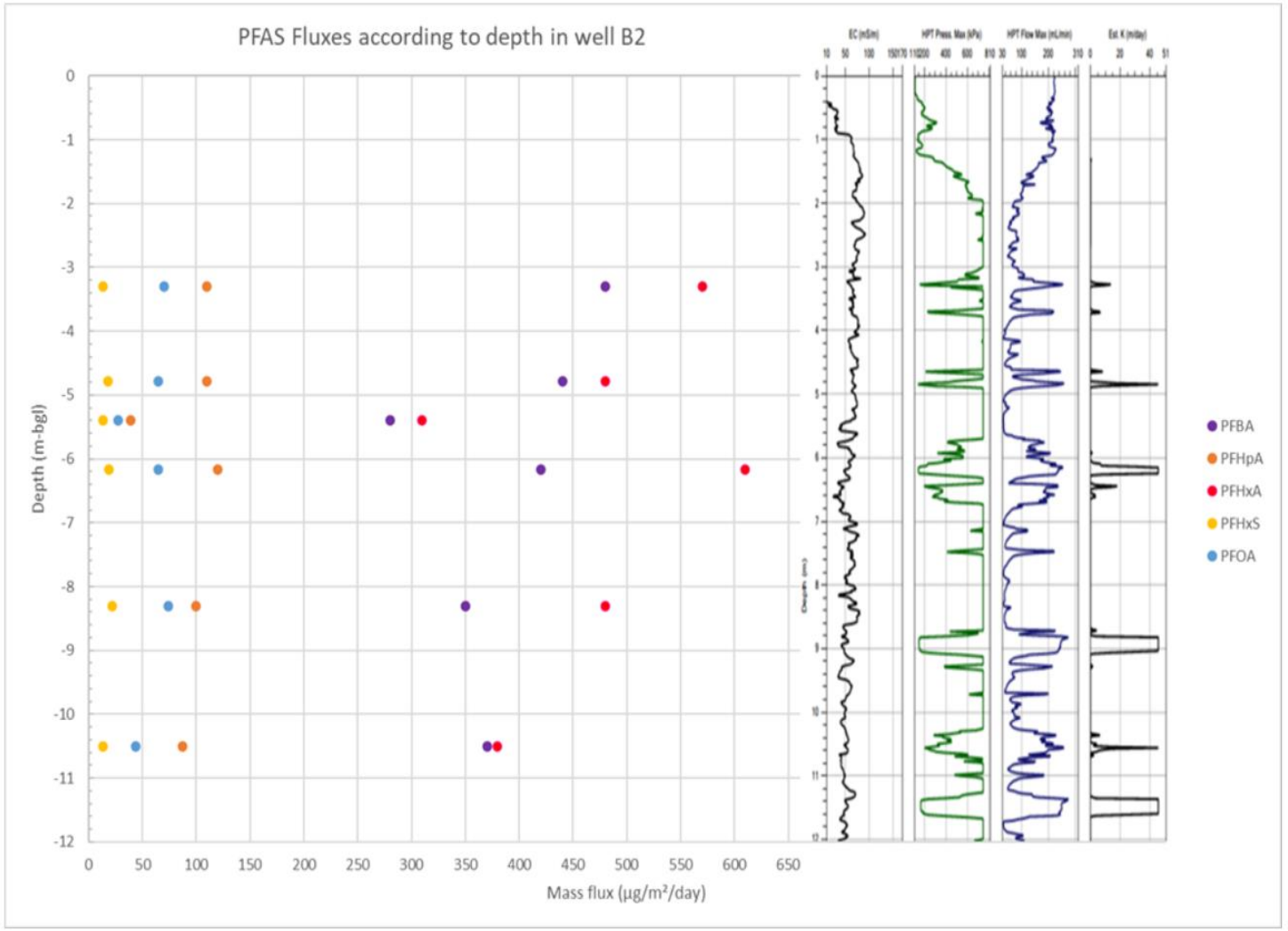
filter depth (mbgl)	PFBA	PFDA	PFDoDA	PFHpA	PFHxA	FHxS	PFNA	PFOA	PFOS	PFOSA	PFPA	PFUnDA
undeep	1500	<1	<1	600	3000	70	10	300	10	<2	300	<1
deep	800	<1	<1	600	2500	70	10	200	10	<2	2500	<1

Case: PFAS - fire brigade training ground



PFAS : design of plume barrier

- **Mass flux**
  - Low and high conductivity
  - 6 depths
- **Evaluation**
  - High K - High flux
  - Low K – Low flux
  - Depending on parameter and concentration
- **Results**
  - Save up to 30 % of liquid activated carbon
  - Follow up barrier in layers with high flux



Bedankt! Vragen?

Galileilaan 15, 2845 Niel, Antwerp
Belgium

+32 3 443 05 31

+32 499 53 92 91

[redacted]@ifluxsampling.com

www.ifluxsampling.com