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PFAS POLICY FOR SOIL AND GROUNDWATER IN FLANDERS (BELGIUM)

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INTRODUCTION

Before the crisis …

⇒ Exploratory measuring campaign on PFAS (2016 - 1018)

Inventory of risk activities

24 sites were selected; soil and groundwater were analyzed for **21 PFASs**

<u>Conclusions:</u>

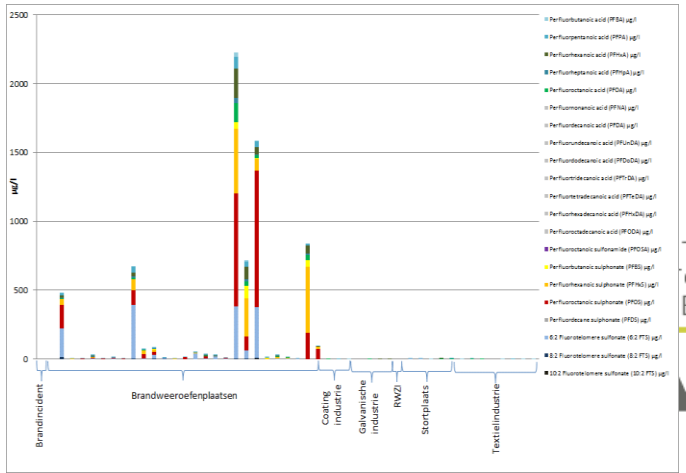
→ Especially on fire fighting training grounds soil & groundwater are contaminated with PFAS

→ PFAS must be included as a suspect substance in soil investigations

<u>These actions were started:</u>

- ✓ preventive actions in collaboration with fire services organizations
- ✓ development of trigger values for PFAS in soil & groundwater
- ✓ identification and inventory of PFAS contaminated sites
- ✓ development of guidelines for soil investigation

www: '*PFAS in soil and groundwater around risk activities in Flanders*'



Accelerated by the crisis !

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1 Inventory of PFAS contaminated sites

Inventory of PFAS contaminated sites

- In Flanders: inventory of land with risk activities ('GI')

- Use of fire extinguishing foam
  - Not included in 'GI'
  - **Call to local authorities (July 2021, first part) for inventory of**
    - Fire service training site
    - Fire service facilities (industry)
    - Fire extinguishing calamities
    - Military training areas and airports
    - Civil airports

→ Result: 826 locations (fire service training sites and calamities)

Inventory of PFAS contaminated sites

- PFAS processing industry

  Call (July 2021, second part) to local authorities for inventory of risk activities as determined in the study of 2018

  - Textile industry
  - Paper industry
  - Galvanic industry
  - …

  + inventories from OVAM

→ Result: more than 6.000 locations (screening and prioritisation is still going on - two consultants)

Investigation of fire services related sites

- In July 2021 OVAM started with the investigations
- By soil experts commissioned by OVAM (+/- 40 sites/month)
- 'Preliminary' soil investigations (according to a specific protocol):
  - → Focused on PFAS
  - → Limited sampling in source area
  - → Sampling at borders of source area (to estimate risks surroundings)
  - → Decision whether further soil investigations are needed
  - → Determine priority class (1-5)
  - → Determine 'no regret measures' by the Agency of Care and Health (AZG)

What after the preliminary soil investigation?

- Meeting OVAM/AZG

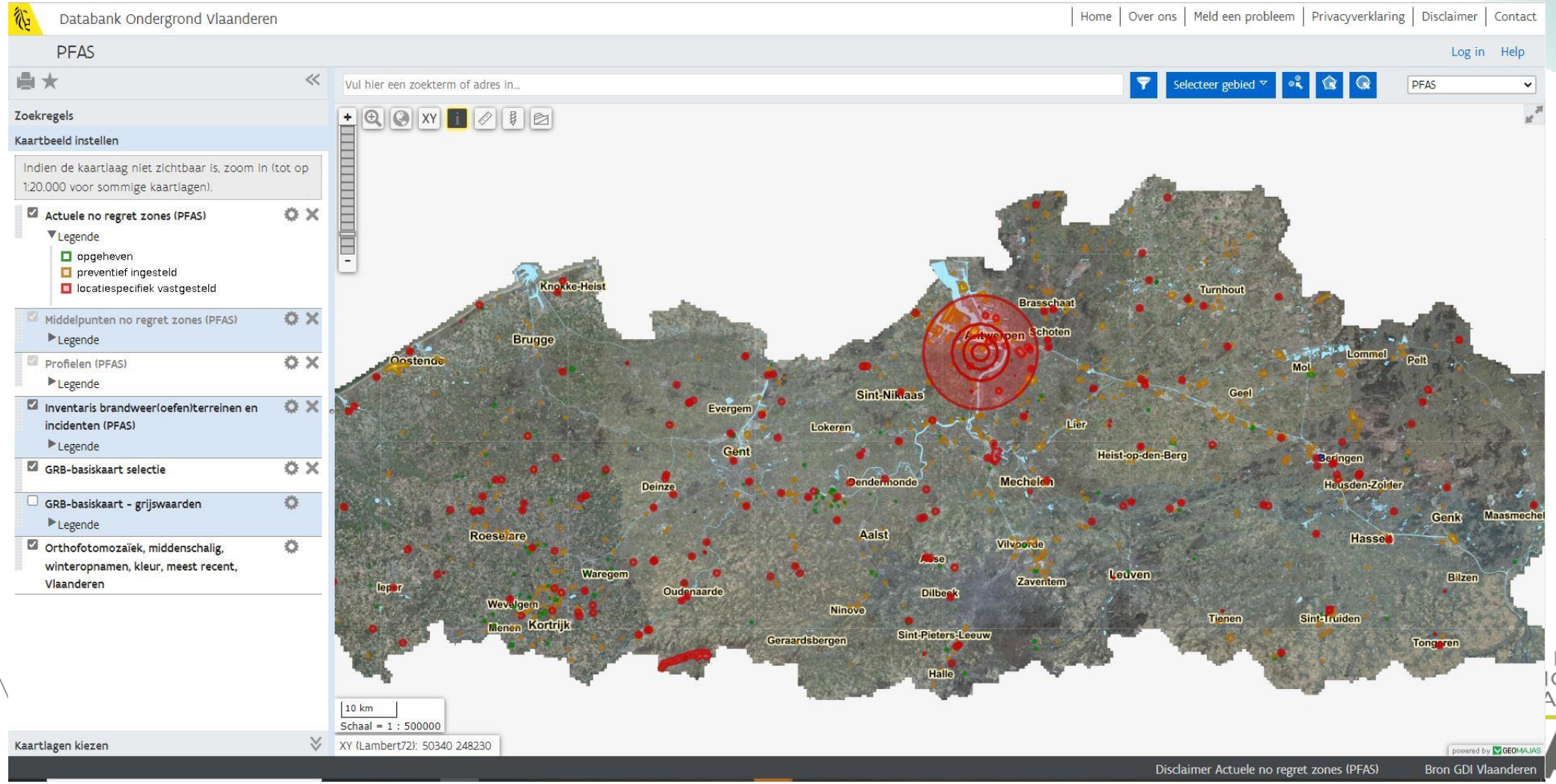
- Letter with offical request from OVAM to operator or owner (‘polluter pays’ principle)

  → descriptive soil investigation:

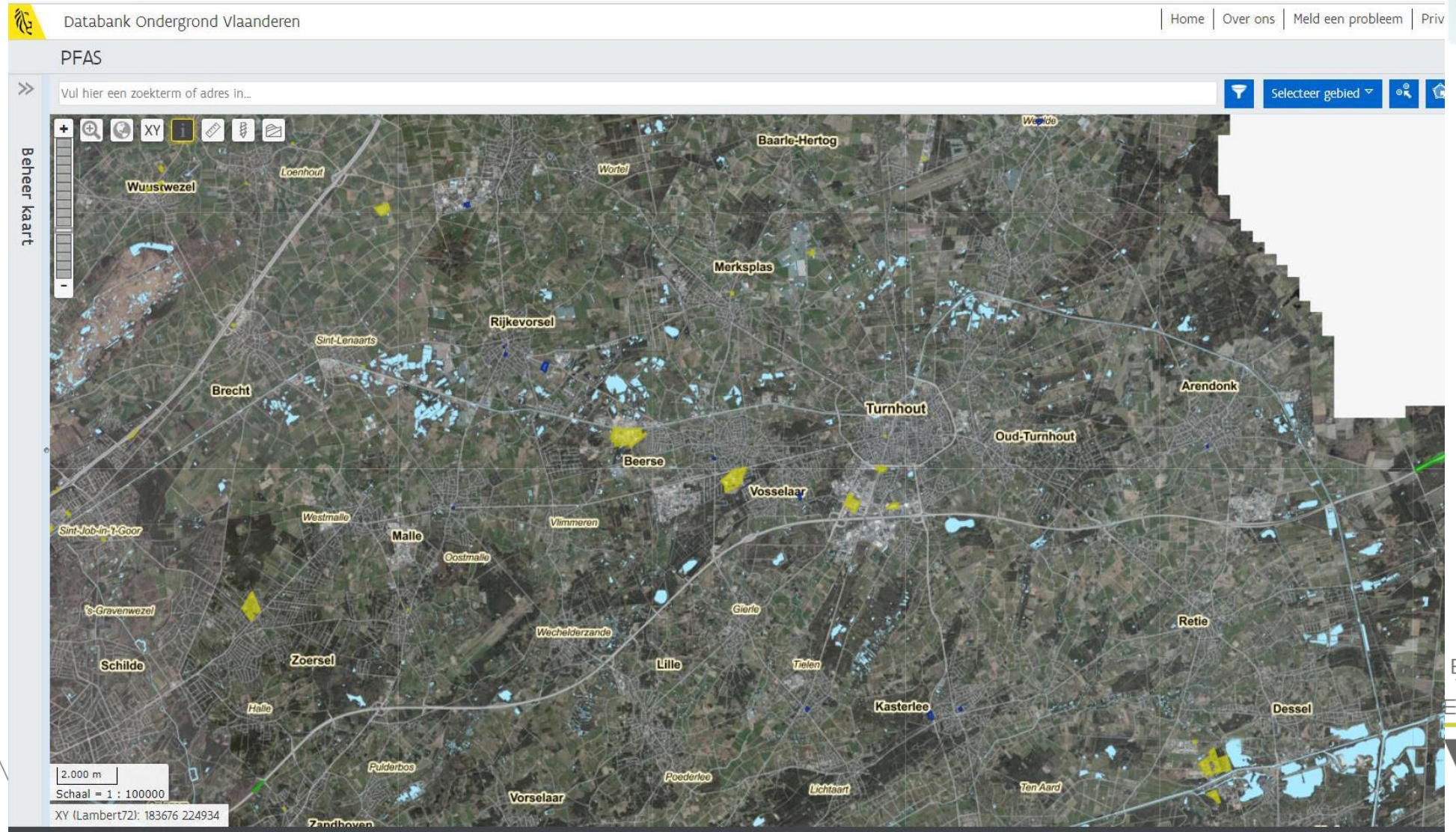
  - Investigation of the whole contamination
  - Determine the risks of the contamination

- Communication by AZG to the local authorities about the no regret measures

No regret measures – in database DOV



Preliminary soil investigations on fire services related sites – in database DOV



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Current state of affairs

- 826 fire fighting related sites inventoried
- on 619 sites preliminary investigations are started
- 97 sites appear to be not PFAS suspected
- 397 investigations are in completion phase
  of which 268 are finished (i.e. local communities informed)
- For 189 out of 268 finished preliminary investigations there is a need for further action: a descriptive soil investigation and possibly remediation

2
First results & insights – fire services related sites

Evaluation of results of the first preliminary soil investigation reports

- 68 reports were evaluated

Amount of reports	Soil analysed (59)	Groundwater analysed (55)
Further investigation needed	23 (39%)	47 (85%)
No further investigation needed	36 (61%)	8 (15%)

- Per site: max conc in soil and in groundwater for the different PFAS listed

Soil investigations (fire services related sites)

- Frequently found PFAS parameters
(in more than 25% of the cases max conc > target value)

Soil	Groundwater	Soil and groundwater
8:2 FTS	PFBA	PFOS
10:2 FTS	PFHxA	PFHxS
	PFHpA	6:2 FTS
	PFOA	PFPA
	PFPeS	
	PFBS	

- Focus for further research on risk assessment, setting of trigger values,

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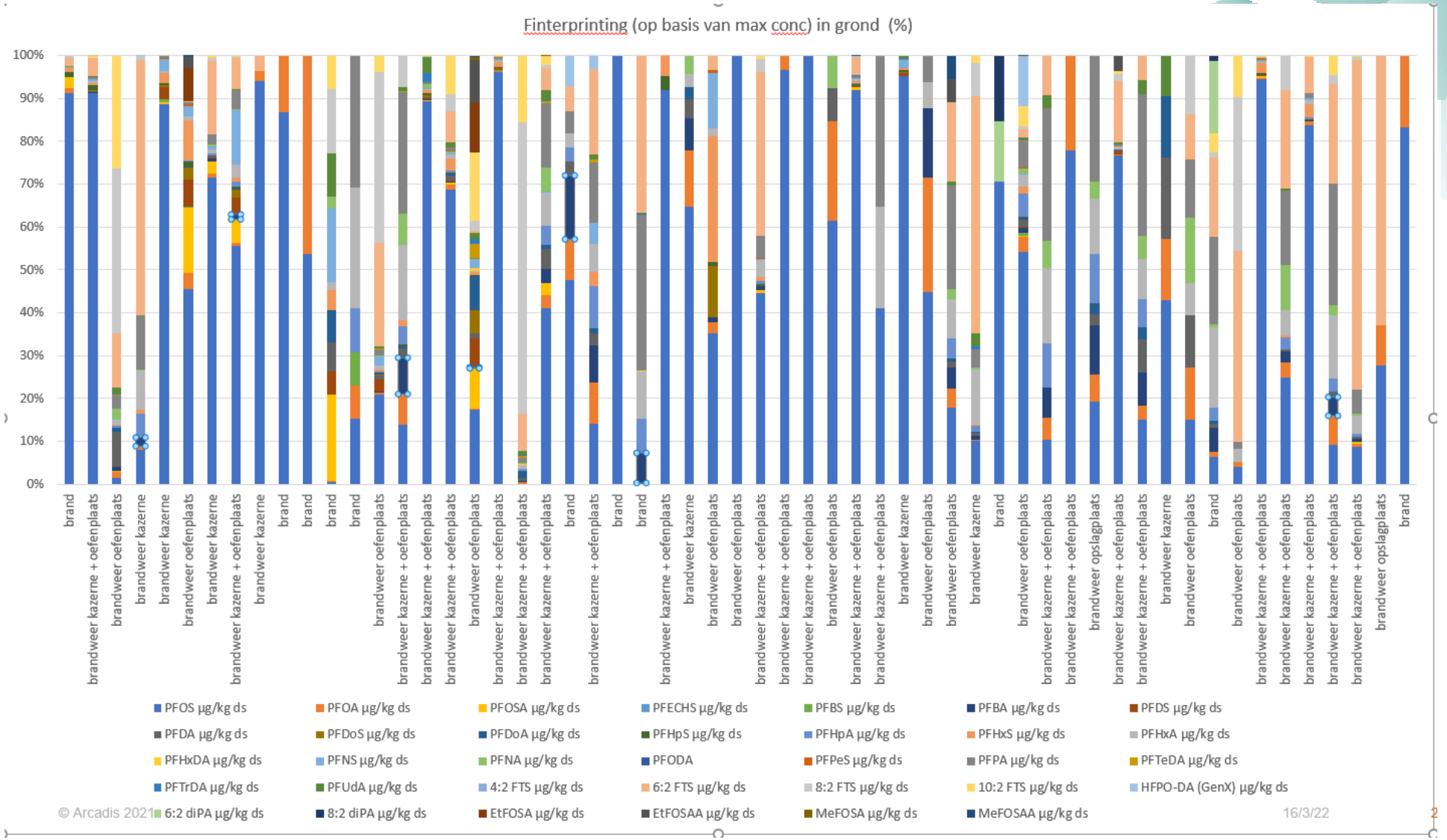
Soil investigations (fire services related sites)

- Effect of pavement?

- High variability in PFAS compounds (fingerprinting)
  - → Old extinguishing foam: PFOS important
  - → New extinguishing foam: 10:2 FTS, 8:2 FTS en 6:2 FTS
  - → Before / after 2011 – difficult to distinguish

- Different composition in soil vs groundwater (complex leaching behaviour)



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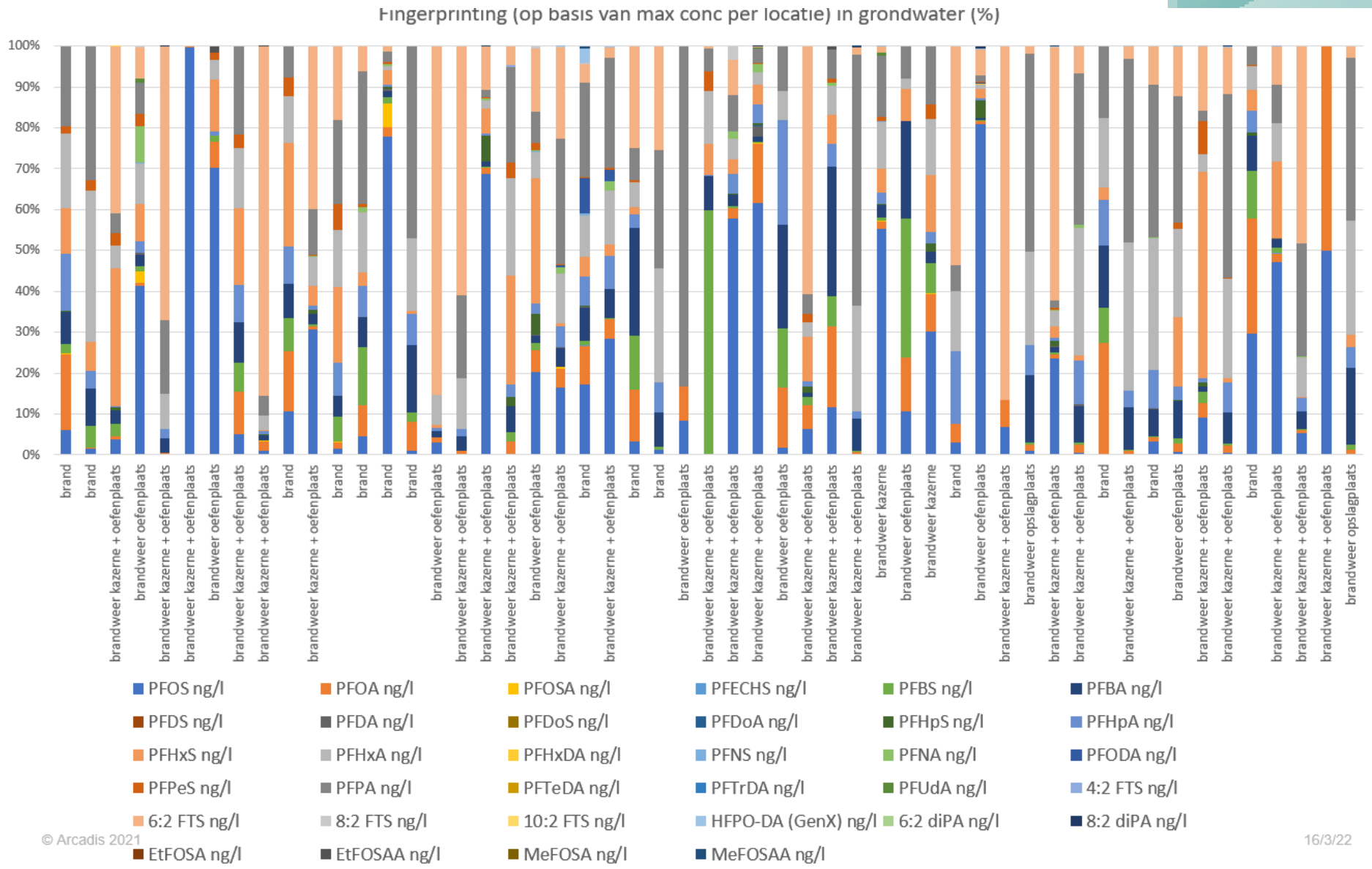

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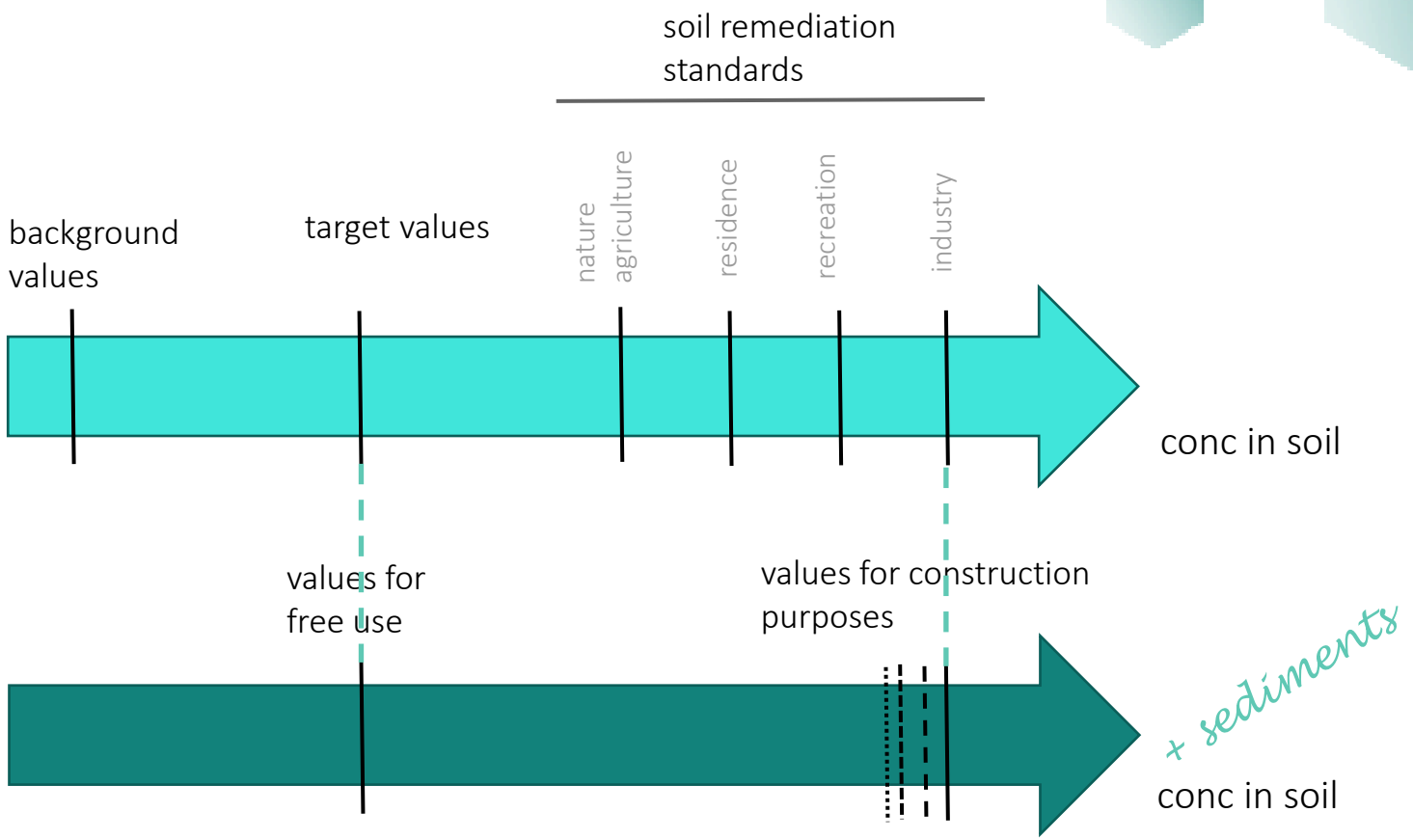
4
Trigger values for PFAS in soil and groundwater

Overview of soil thresholds used in Flanders

soil

excavated soil



added to soil

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Soil remediation criteria for PFOS - soil

PFOS Land use type	I/II nature / agriculture	III residence	IV recreation	V industry
Human tox (µg/kg dm)	3,1	205	1.949	1.949
Ecotox (µg/kg dm)	3	18	110	9.100
Soil remediation value (µg/kg dm)	**3,8***	**3,8** / 18**	**110**	**110**

* adjusted for background value & target value

** for residential area with vegetable garden / free range chicken coop

- Applicable since April 19, 2022
- Temporary framework

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Soil remediation criteria for PFOA - soil

PFOA Land use type	I/II nature / agriculture	III residence	IV recreation	V industry
Human tox (µg/kg dm)	4,3	205	643	643
Ecotox (µg/kg dm)	7	89	1.100	50.000
Soil remediation value (µg/kg dm)	**4,3**	**4,3* / 89**	**643**	**643**

* for residential area with vegetable garden / free range chicken coop

- Applicable since April 19, 2022
- Temporary framework

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Soil remediation criterium - groundwater

Soil remediation criterium for groundwater is set at the European limit for drinking water:

0,1 µg/l for the sum of 20 PFAS (Drinking Water Directive) &
0,5 µg/l for the sum of all quantitative measurable PFAS

Applicable since April 19, 2022 - temporary framework

Background values, target values / values for free use of excavated soil

	Background values (µg/kg dm)	Target value / free use of excavated soil (µg/kg dm)
PFOS	1,5	3
PFOA	1,0	3
Sum PFAS (quantitative measurable)		8

For the **use in construction purposes** less strict criteria can be applied, on the responsibility of the soil expert.

Applicable since April 19, 2022 - temporary framework

Implementation in legislation

- A demand for more legal certainty from stakeholders
  → implementation in legal documents

- EFSA's recommended daily intake of PFAS translated into food criteria

→ new update of the framework by VITO:

Soil remediation criteria Land use type	I/II nature / agriculture	III residence	IV recreation	V industry
PFOS (µg/kg dm)	3,8*	4,9	110	268
PFOA (µg/kg dm)	2,5*	7,9	632	303

* adjusted for background value & target value

Implementation in legislation

- For excavated soils / soil materials: target value / free use

	Background values (µg/kg dm)	Target value / free use of excavated soil (µg/kg dm)
PFOS	1,5	3
PFOA	1,0	2
Sum PFAS (quantitative measurable)		8

+ quality test for underwater applications & applications in drinking water protection zones

- For use in construction purposes: → decision tree & methodology based on leaching - max. conc = highest SRV

Decision process is ongoing, not yet final!

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What’s next?

Outlook towards the future

Ongoing actions and research activities

- Leaching of PFAS from soil to groundwater: experiments + modelling
- Diffuse presence of PFAS in groundwater in Flanders
- Development of methods for dealing with the sum of PFAS in action frameworks
- Characterisation of PFAS in soil & groundwater on sites with different risk activities, using non target methods
- Measurement of PFAS in house dust & contribution to exposure
- International knowledge exchange: EmConSoil, …

Thank you for your attention

OVAM
Public Waste agency of Flanders

www.ovam.be

EmConSoil:
www.ovamenglish.be/emconsoil