



REMTECH
Europe



GOLDER

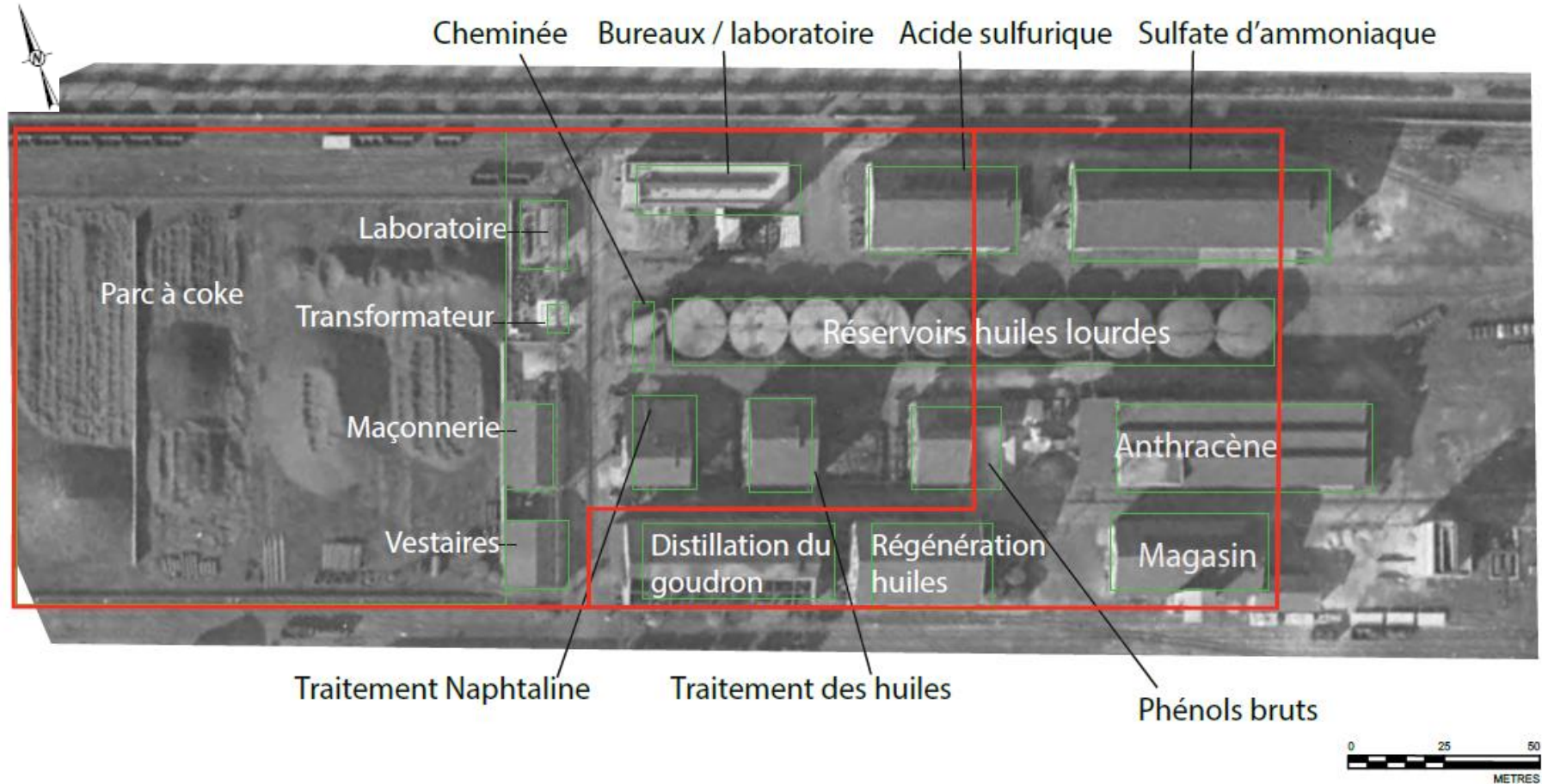
**Management of a
MGP for changing
from industrial to
tertiary use
distribution of
decontamination
thresholds according to
construction practices**

la Société E. C. F.

rise d'un avion

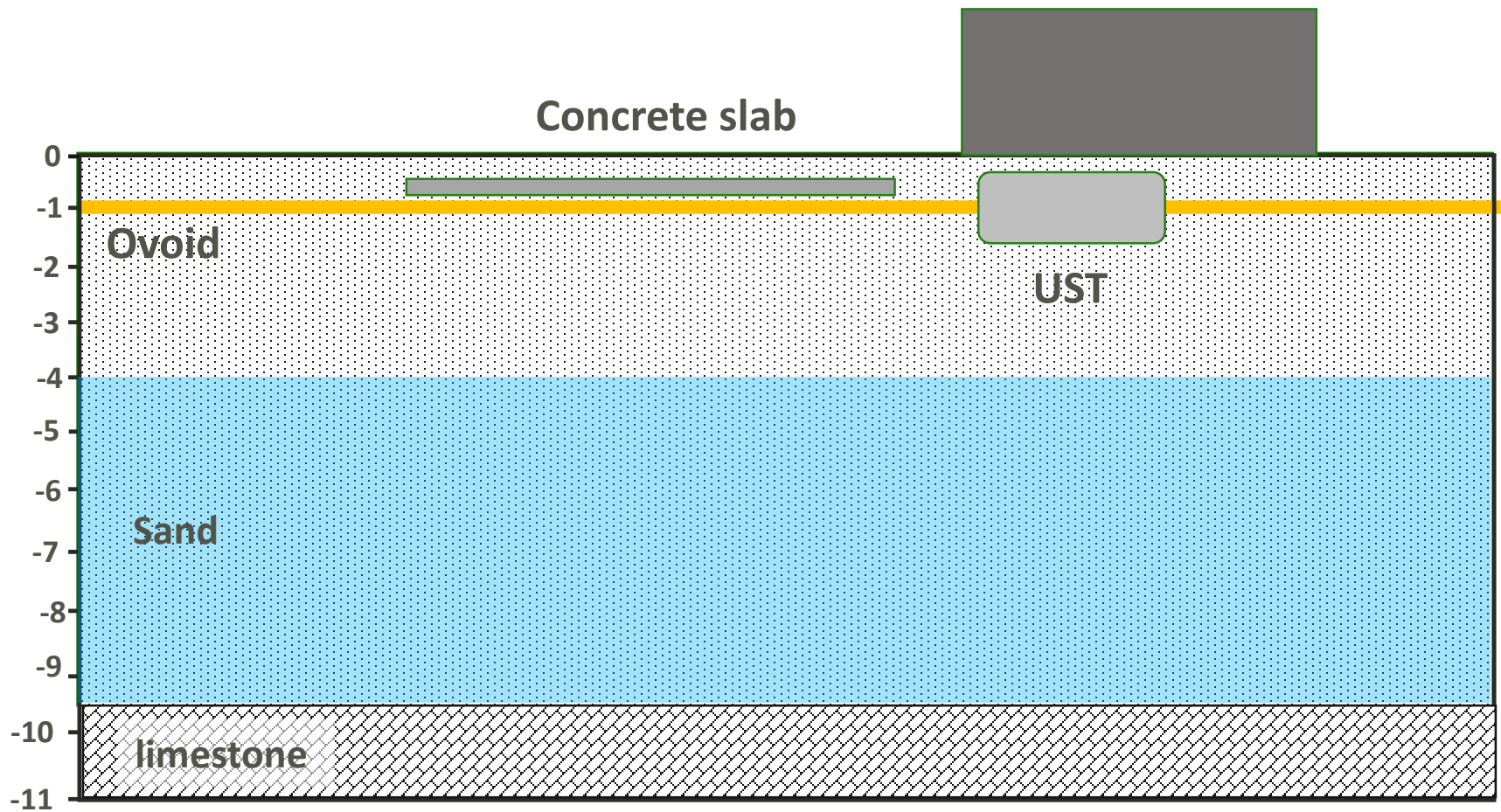
1- Historical / Environmental Context

1-1 SITE VIEW (1946) – INSTALLATION OF THE MGP



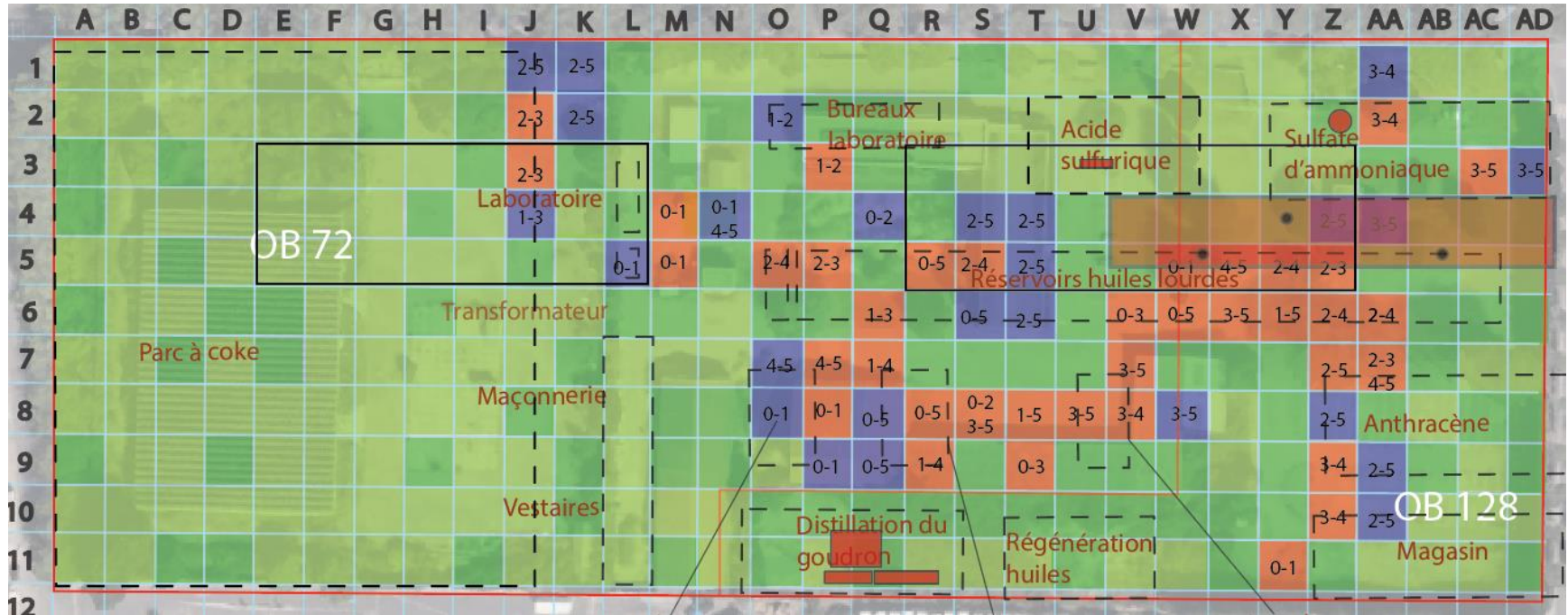
1- Historical / Environmental Context

1-3 GEOLOGY / HYDROGEOLOGY



1- Historical / Environmental Context

1-4 SOIL QUALITY



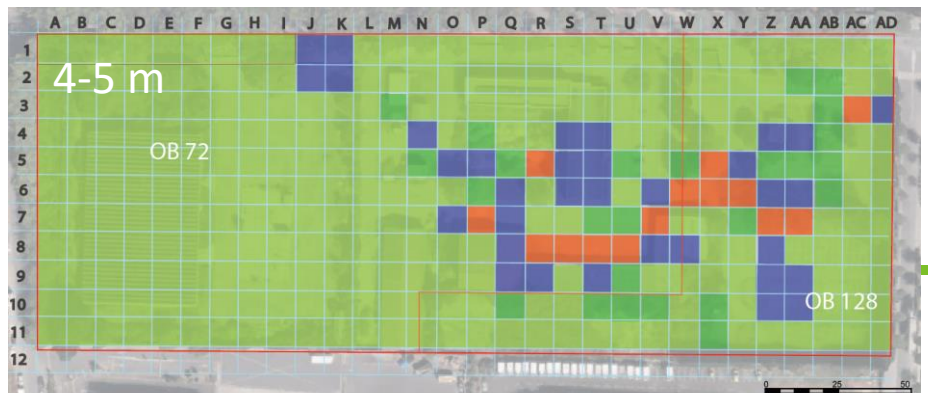
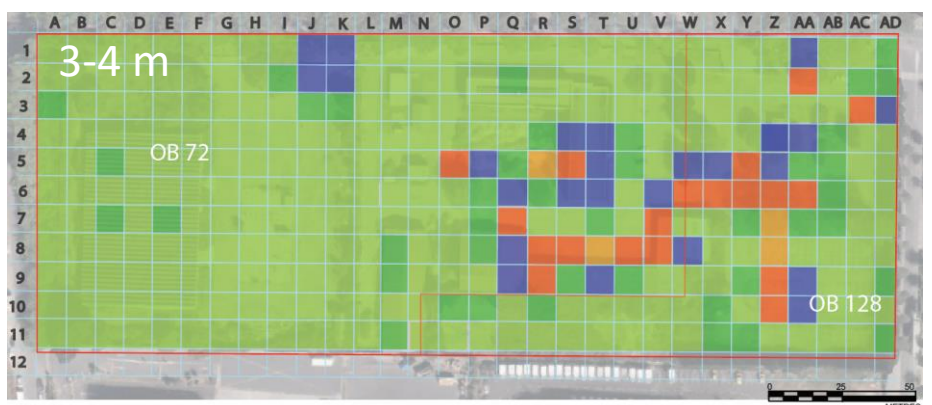
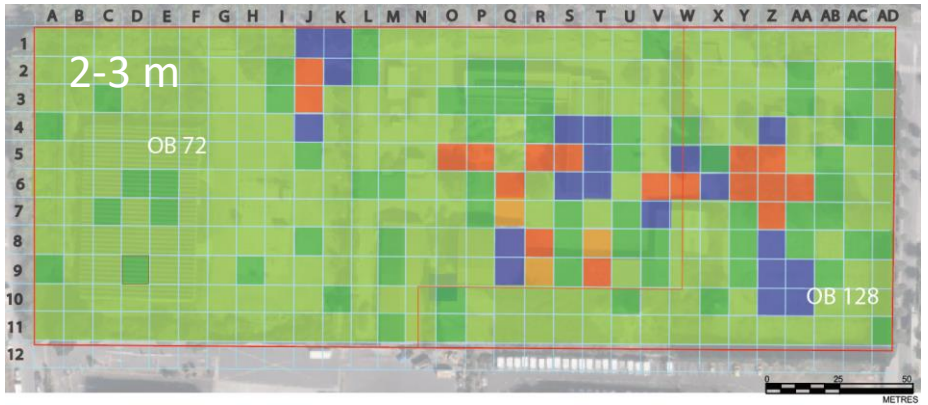
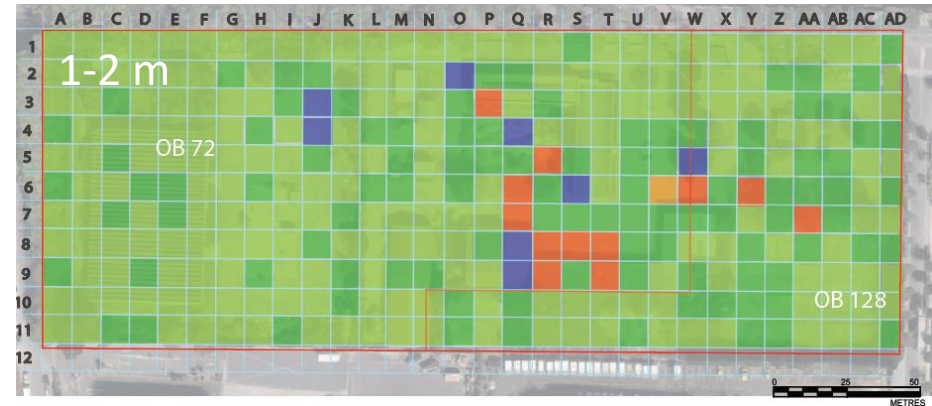
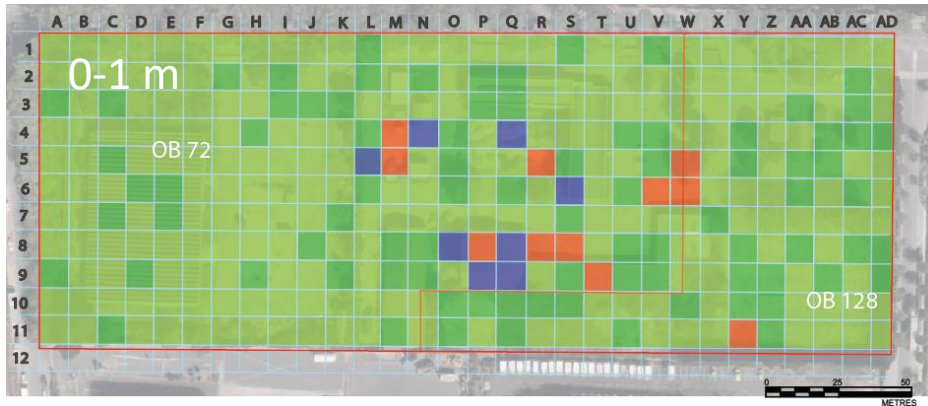
- Analyzed clean
- Analyzed impacted
- Supposed clean
- Uncertain

Impacted if

- > 1000 mg/kg Naphtalène
- > **2000 mg/kg HAP16**
- > 5000 mg/kg TPH

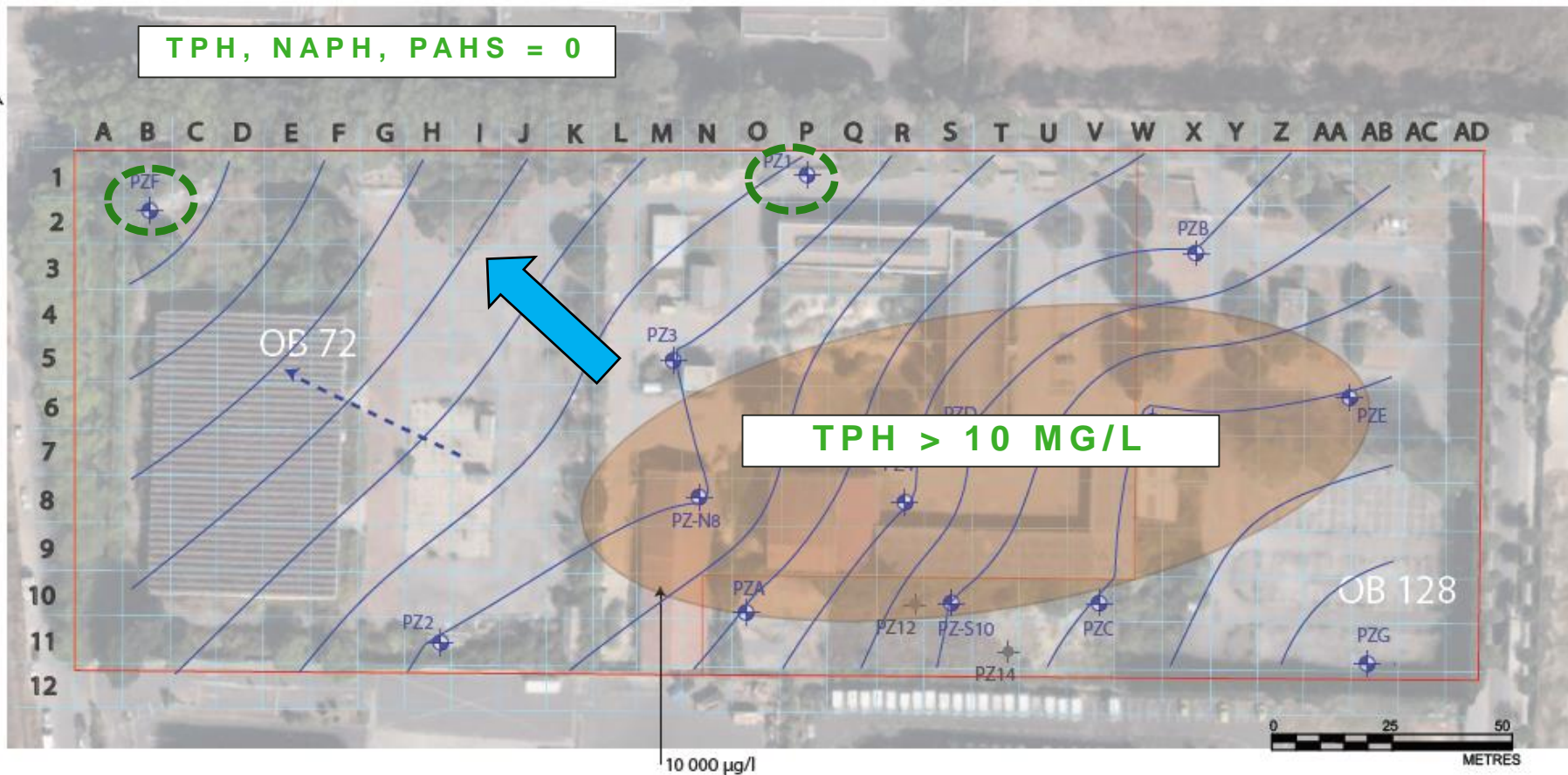
1- Historical / Environmental Context

1-5 VERTICAL DISTRIBUTION OF IMPACTED SOIL (VADOSE)



1- Historical / Environmental Context

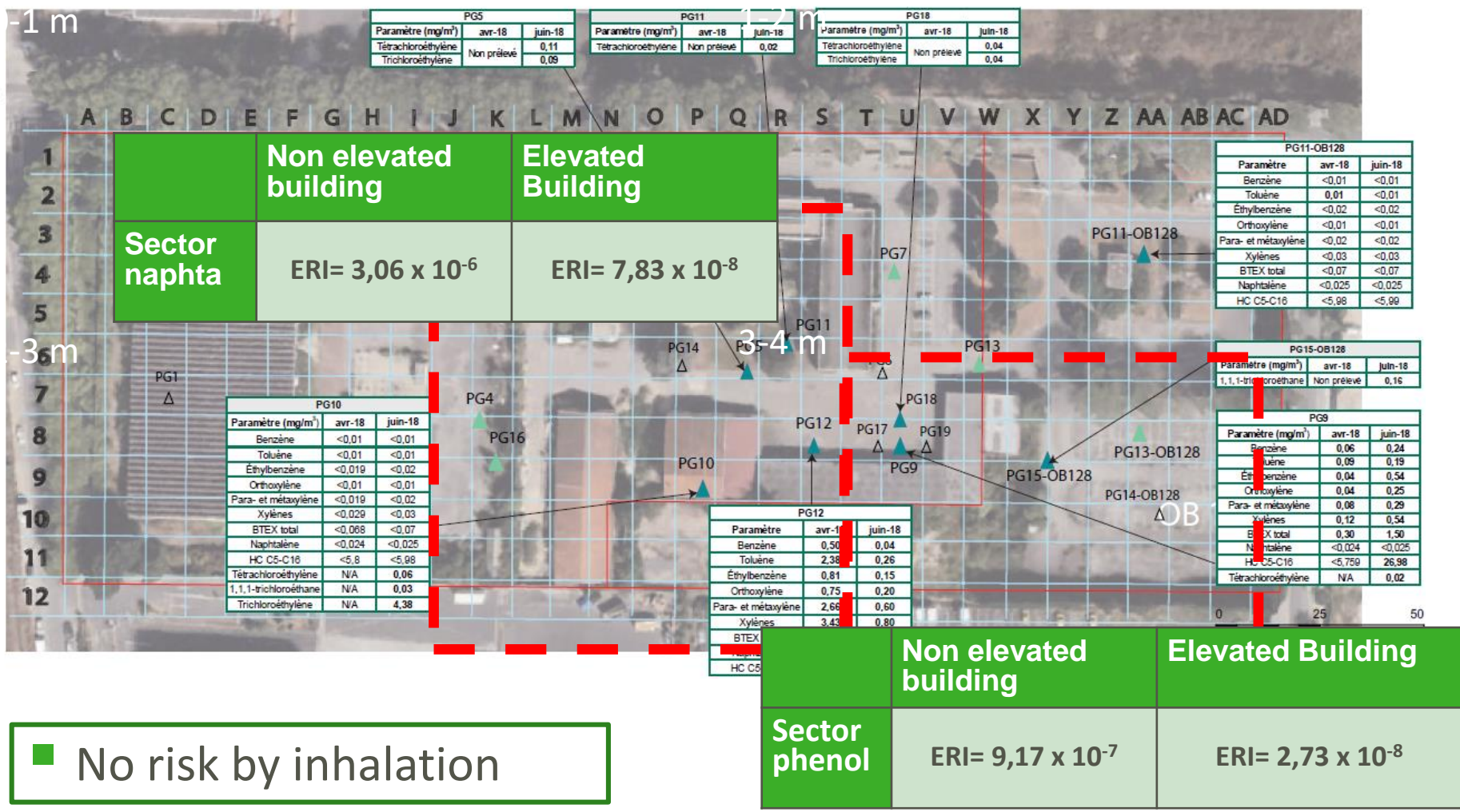
1-5 GROUNDWATER QUALITY



■ No migration via groundwater

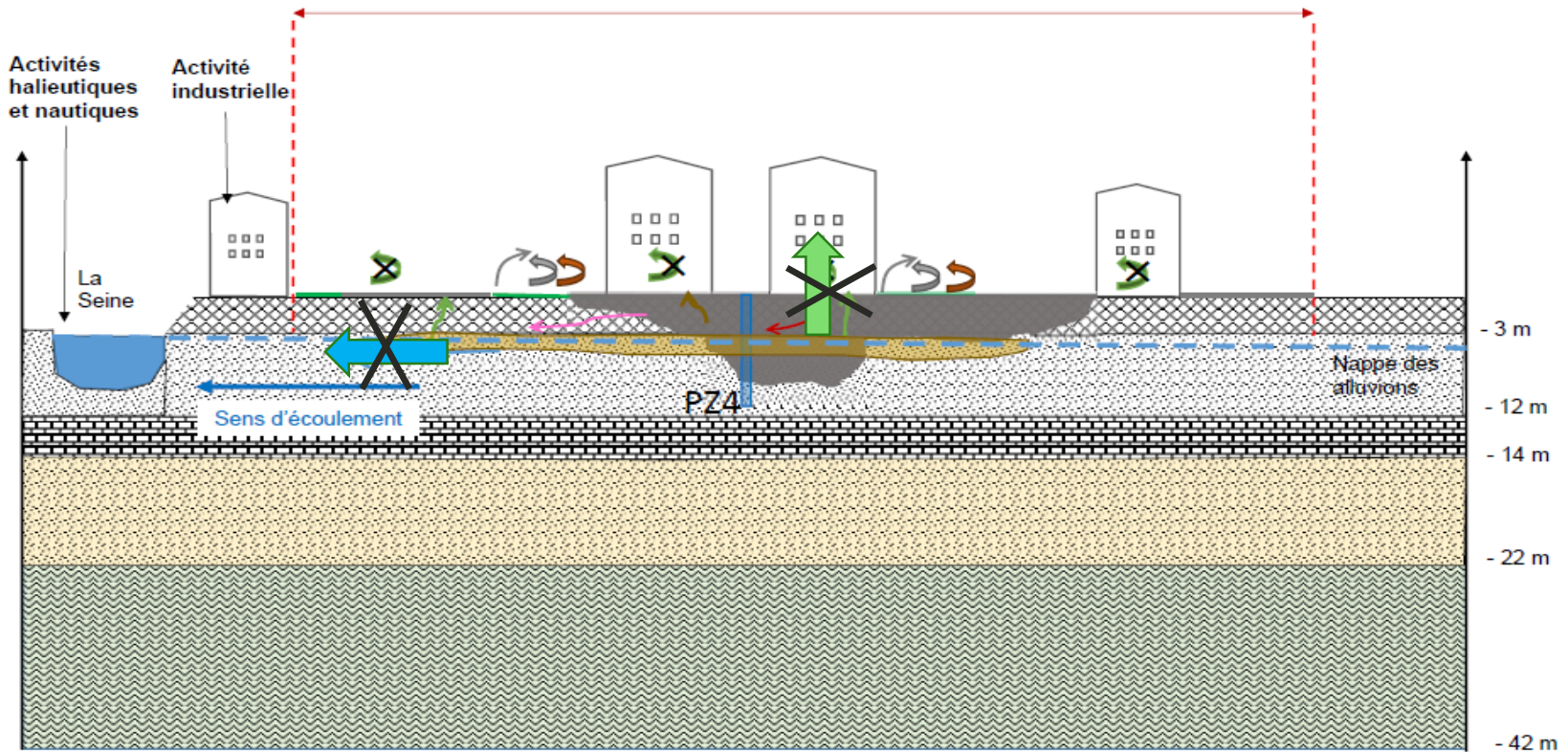
2- Conceptual model and HHRA

2-1 VAPOR INTRUSION AND RISK BY INHALATION



2- Conceptual model and HHRR

2-2 VAPOR INTRUSION AND RISK BY INHALATION



Légende	Hydrogéologie	Source
Géologie	Niveau piézométrique	1 : Sols : HAP 16, naphthalène, hydrocarbures C10-C40, BTEX

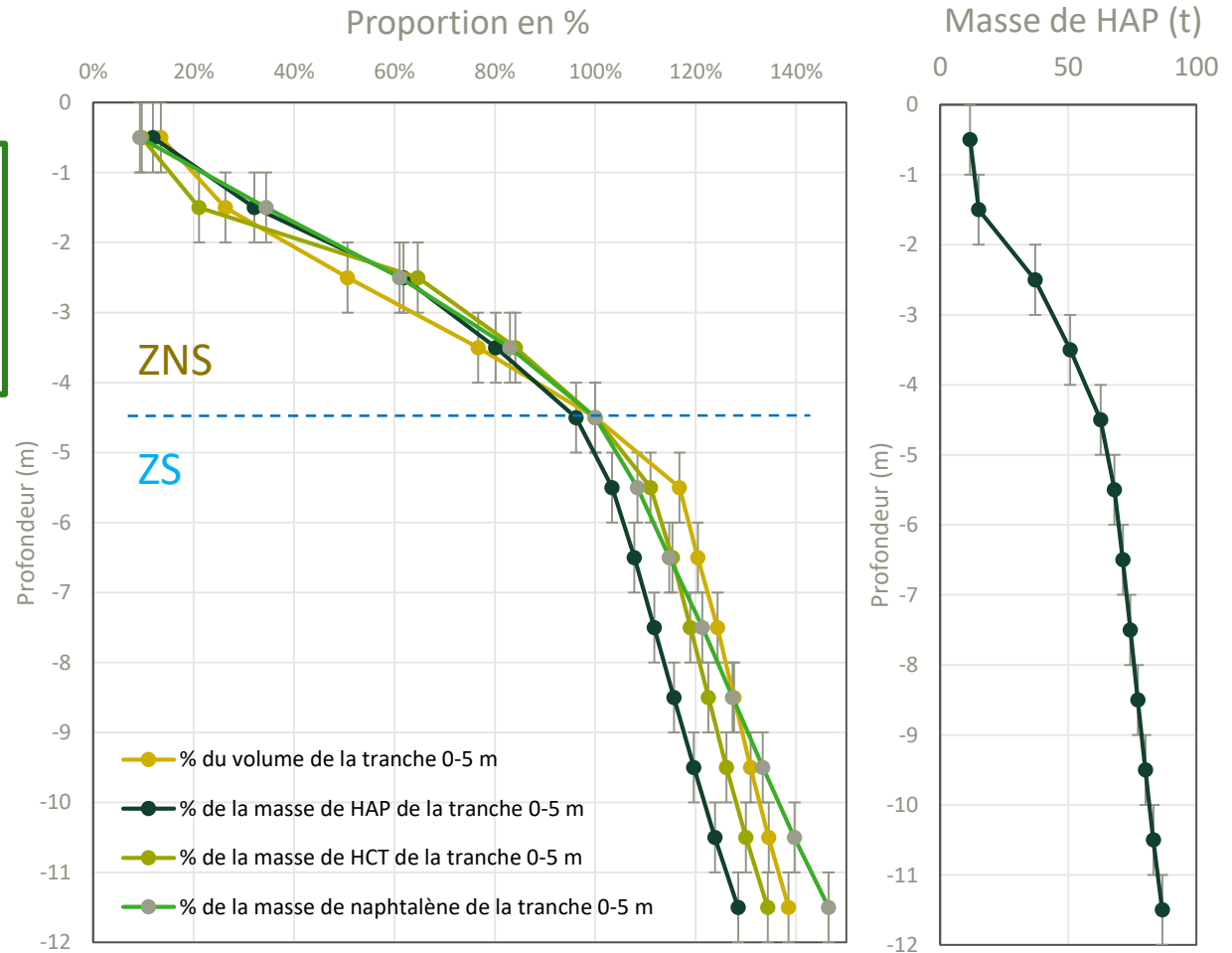
50 m

- No risk for human health
- No risk of transfer towards a sensitive environment
- ➡ Pareto approach for definition of threshold

3- Treshold for hotspot

3-1 CONTAMINANTS REPARTITION

■ 80% of the masse of PAHs is in vadose zone

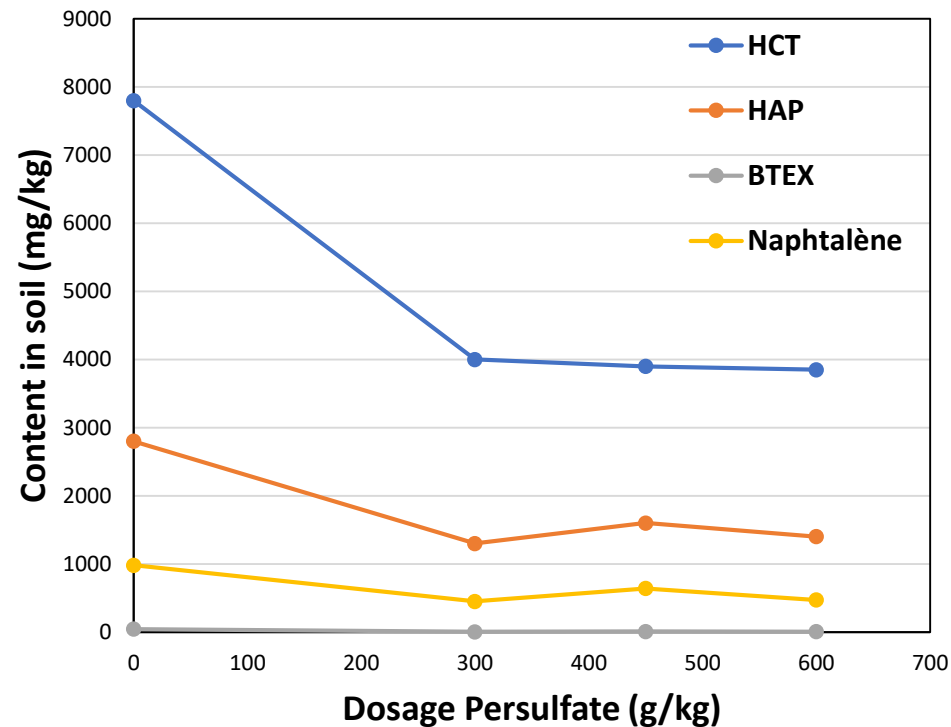


3- Treshold for hotspot

3-2 CONTAMINANTS REPARTITION

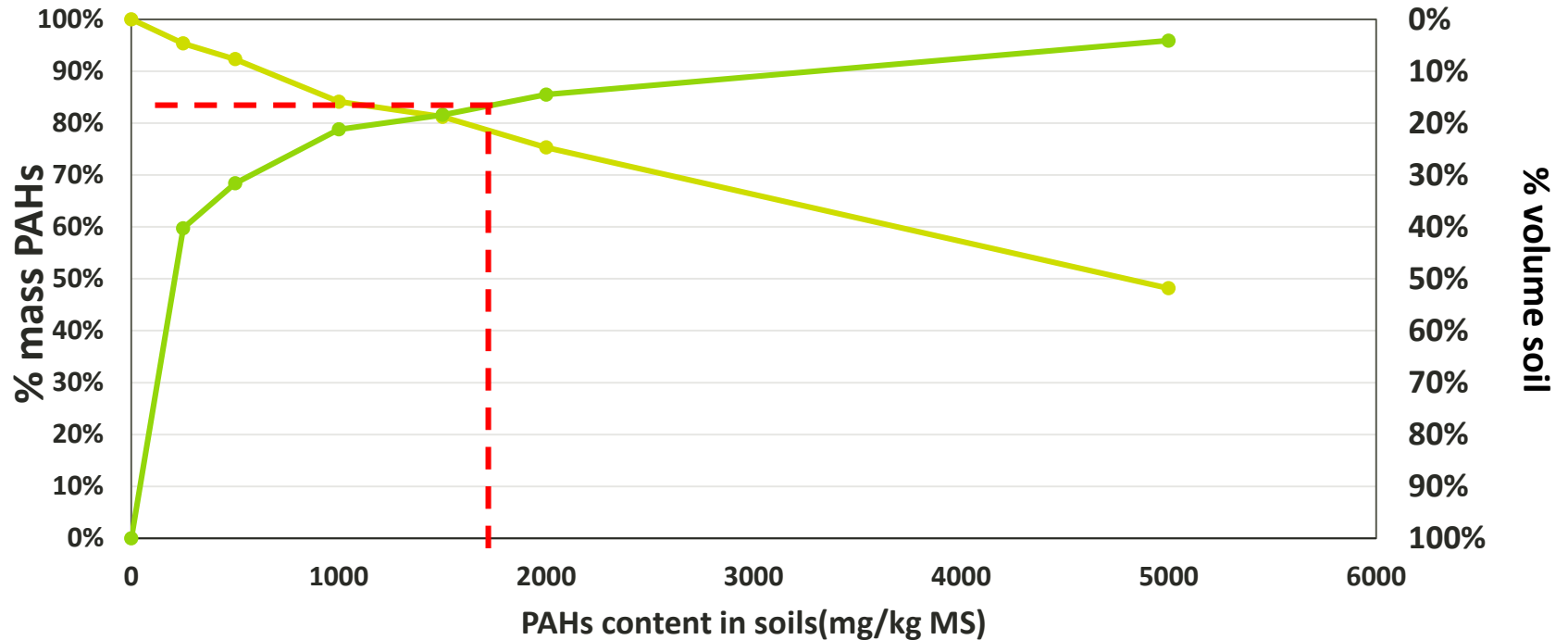
- PAHs in saturated zone are very recalcitrant to treatment
- French sanitary authority reject oxydation treatment because of proximity with drinking water well

➡ CONCENTRATION OF REMEDIATION EFFORT ON VADOSE ZONE (0-5 m)



3- Treshold for hotspot

3-3 CONTAMINANTS REPARTITION



- PARETO approach on 0-5 m soils
- A threshold of **2000 mg/kg** allows to remove 80% of the PAHs mass present in 20% of the volume of impacted soil

3- Treshold for hotspot

3-3 THRESHOLD BASED ON FEEDBACK

- Based on feedback on that type of site/contaminants, a more conservative threshold is proposed on naphthalene to prevent on issue with vapor intrusion post-excavation below the building
 - 0-3 m : 250 mg/kg
 - 3-5 m : 500 mg/kg
 - >5m : 750 mg/kg

3- Treshold for hotspot

3-2 VOLUME OF SOILS TO MANAGE

- Naphtalène : **1 000 mg/kg MS** (81 % mass decrease)
- HAP16 : **2 000 mg/kg MS** (80 % mass decrease)
- HC C10C40 : **5 000 mg/kg MS** (76% mass decrease)

Depth (m)	POLLUTED	INCERTAIN	100% certain + 30% incertain
	(m ³)	(m ³)	(m ³)
0-1	1300	1200	1700
1-2	1500	1200	1900
2-3	2500	2600	3400
3-4	2700	3100	3700
TOTAL VADOSE	8 000	8 100	10700
4-5	2100	4200	3500
TOTAL First meter of saturated zone	2100	4 200	3500
TOTAL	10 100	12 300	14200

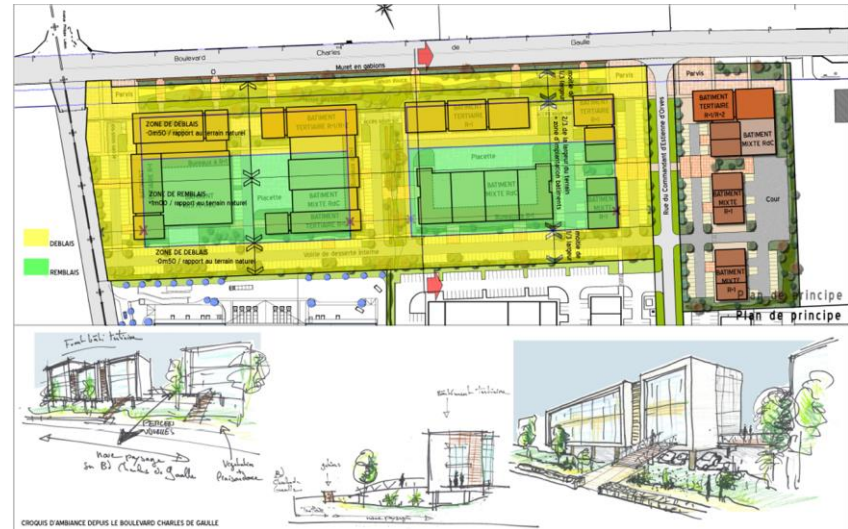
3- Treshold for hotspot

3-3 SOLUTIONS OF MANAGEMENT

CRITERIA	Scenario 1 EVACUATION	Scénario 2 ON SITE SOIL HEATING
EFFICIENCY	Tgood , no residual content Score : +5	Rsik of residual content Score : +2
Place needed	Limited constraints Score : +5	Needs much place on site Score : +1
HSE	Classical Score : +3	Classical + high voltage or gas
Environmental balance	Moyen, flotte de camion importante (+ de 800) Score : +0	Moyen mais traitement des terres sans déplacement Score : +1
Time	12 to 18 month Score : +2	18 to 24 months Score : +0
Cost	175 à 230 €/t Score : +0	125 à 200 €/t Score : +3
TOTAL	+15	+8

4- Development project

4-1 DEVELOPMENT PLAN



- How to optimize interaction between remediation and development work?

The third party device!

The real estate developer take the responsibility of the environmental passive and can work on remediation and development at the same time

4- Development project

4-1 DEVELOPMENT PLAN

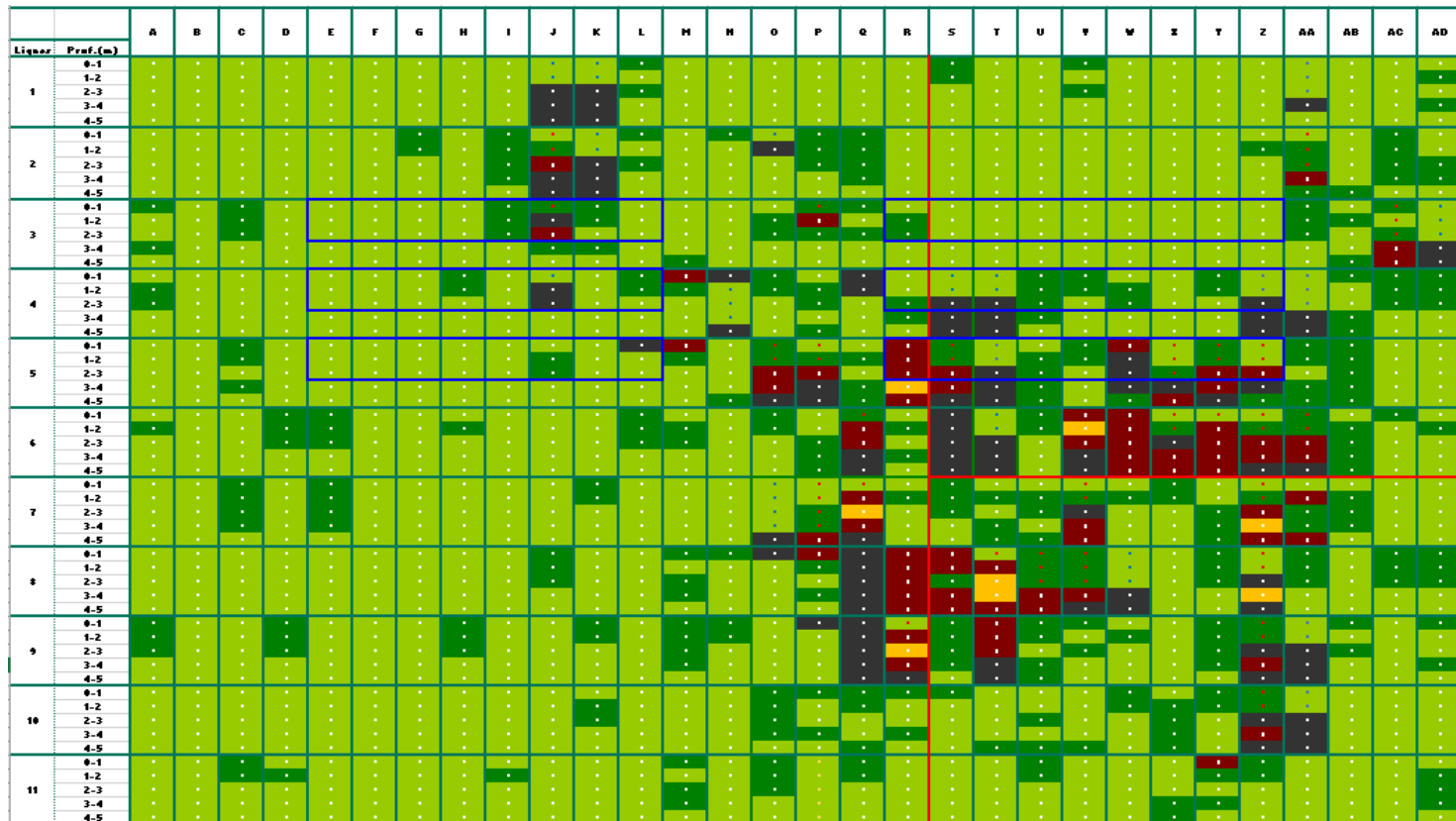


CONCRETELY

The parking are located at place with big excavations

The naphtalène threshold below building on backfill is 500 mg/kg

4- Development projet



Finally, a phasing of the remediation work is proposed to allow the developer to begin the construction work

REMTECH Europe

Thank you