

Sustainable management of contaminated sites

Introduction of conceptual site model 0.5

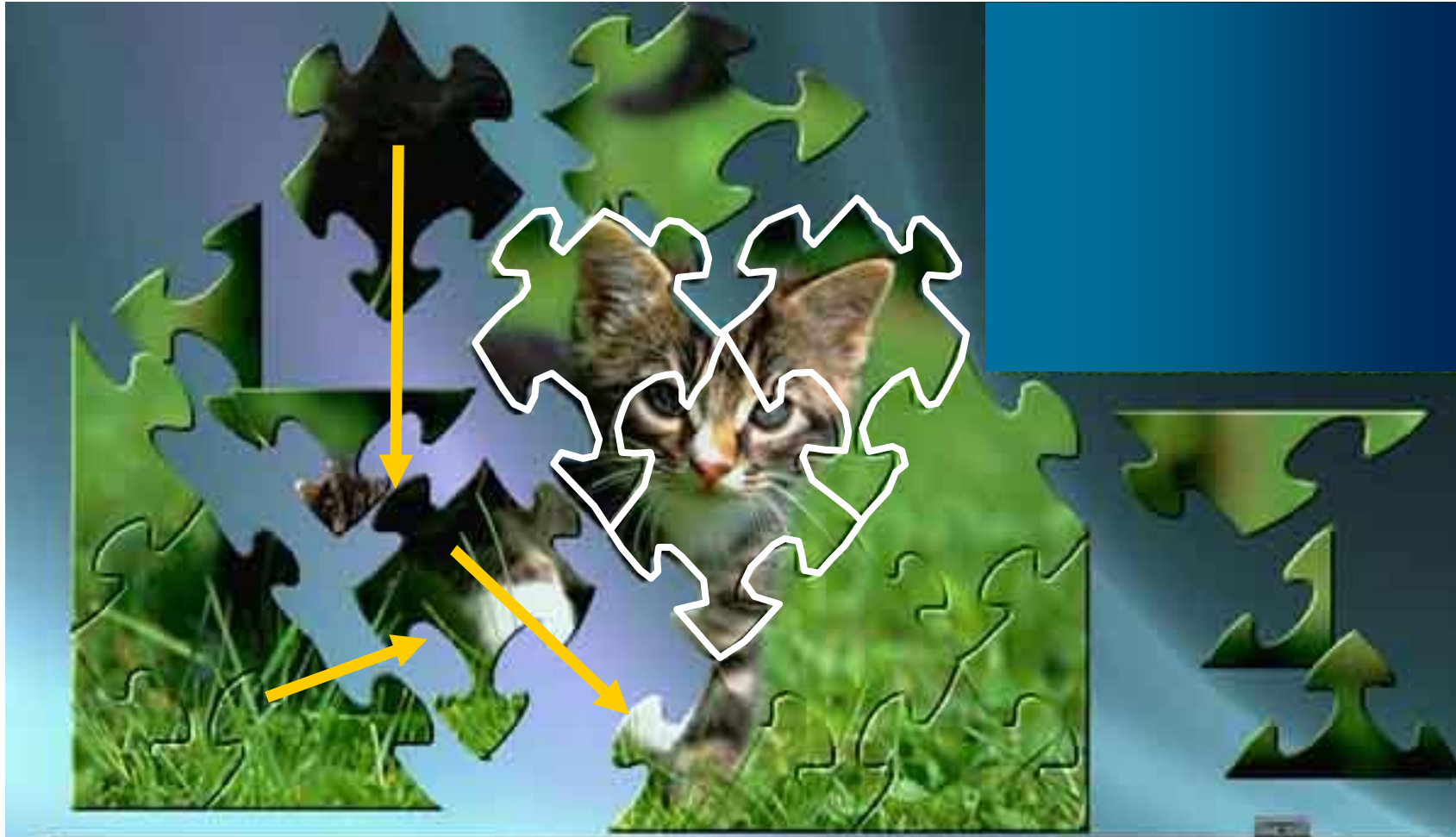
October 2021
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- What is complete Conceptual Model
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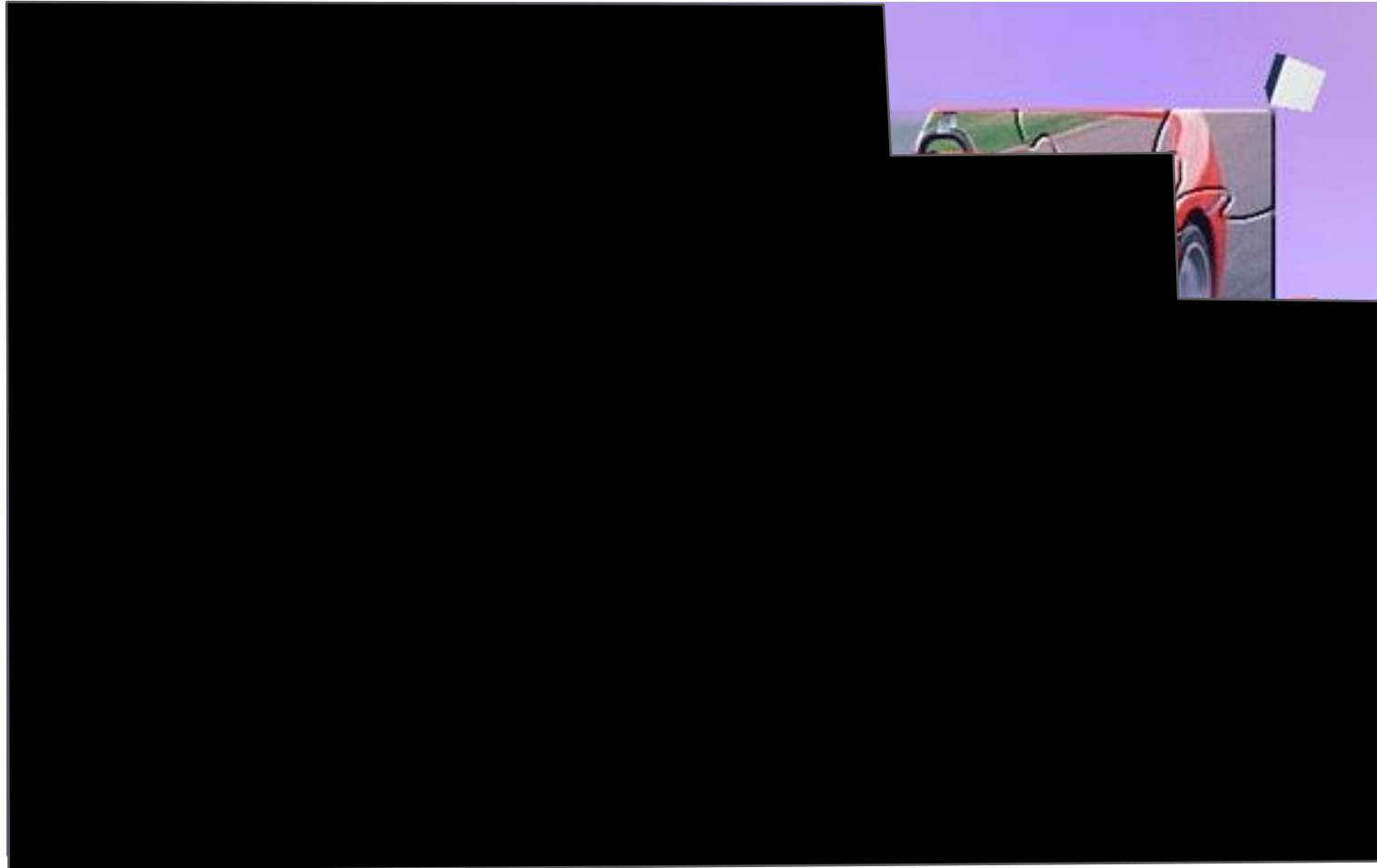
Initial Conceptual Model of a Cat



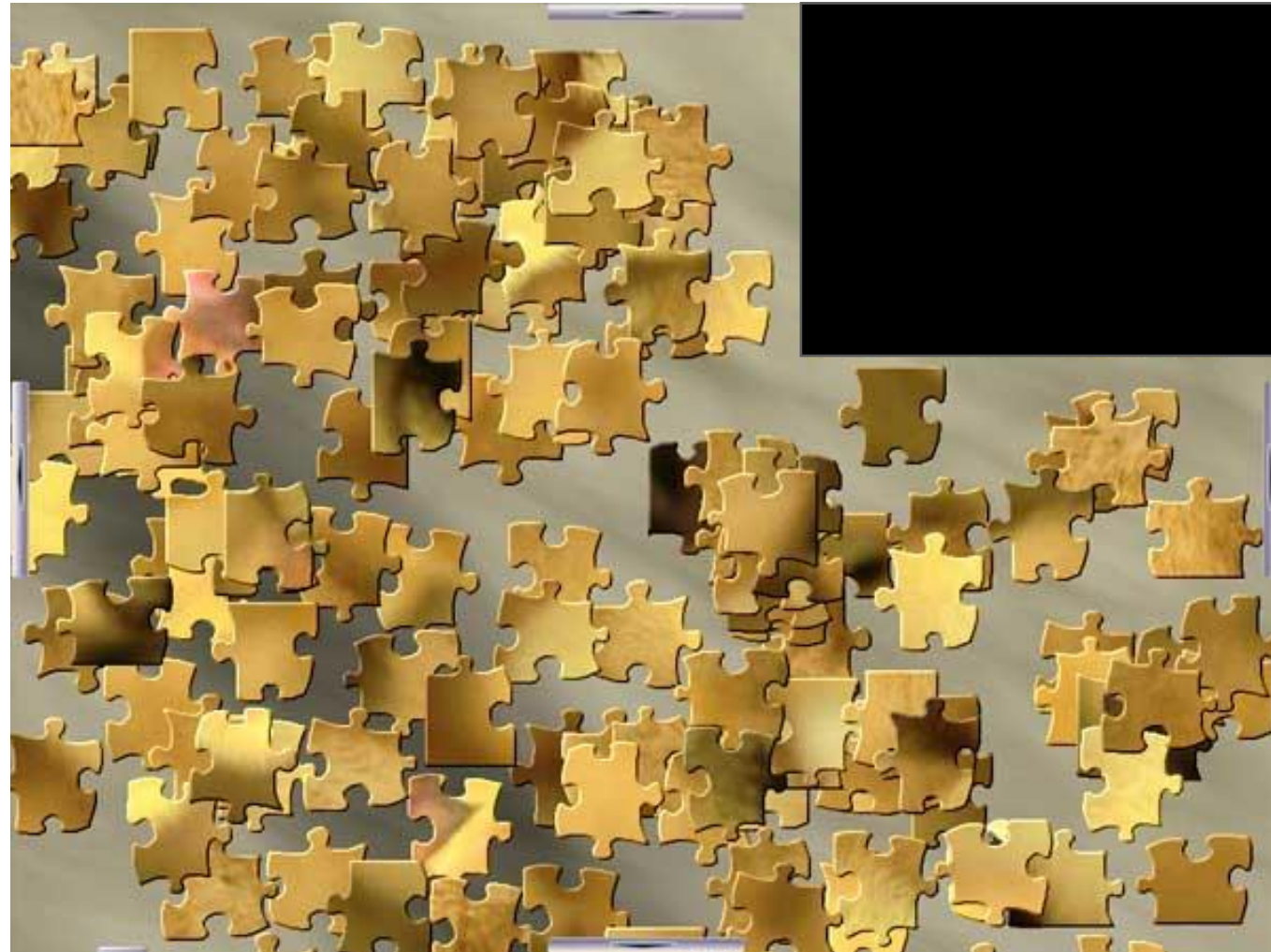
A complete Conceptual Cat Model



How much can you tell of this Initial Car Model?



How many pieces do you need to get the Concept



Conceptual Site Model (CSM)

Definition

- A model of the site that describes the distribution, release mechanisms, exposure pathways and migration routes and potential receptors of contaminants of concern
- ‘Visually oriented, comprehensible representation of what is already known about a site’

Goals/aims

- CSM organizes all available historical and current information and facilitates the identification of information gaps
- Tool to support decision making process by reducing and managing uncertainty
- Basis for optimized site-related decisions



CSM is visually oriented

Visually oriented

- People think in pictures
- One picture tells more than thousand words

But

- A CSM is not only a set of pictures from the contamination it is all the site data organized and presented in such a way that it easy to understand
- A model is not reality it is an approximation!

A CSM is essential to

- Design a good site investigation strategy
- To sustainable manage contaminated sites!



Conceptual Site Model input

The pieces of the puzzle

- Site history
- Site and surrounding geology and hydrology
- Soil type, structure and heterogeneity
- Contaminant(s) types and properties (Contaminants of Concern)
- Contaminant situation: load, location, state & extent
- Contaminants: fate, transport and migration
- Geochemistry and redox conditions
- Natural attenuation potential

The CSM should always reveal

- Source(s) of contamination
- Potential exposure pathways / Contaminant migration routes
- Potential receptors / exposure and uptake



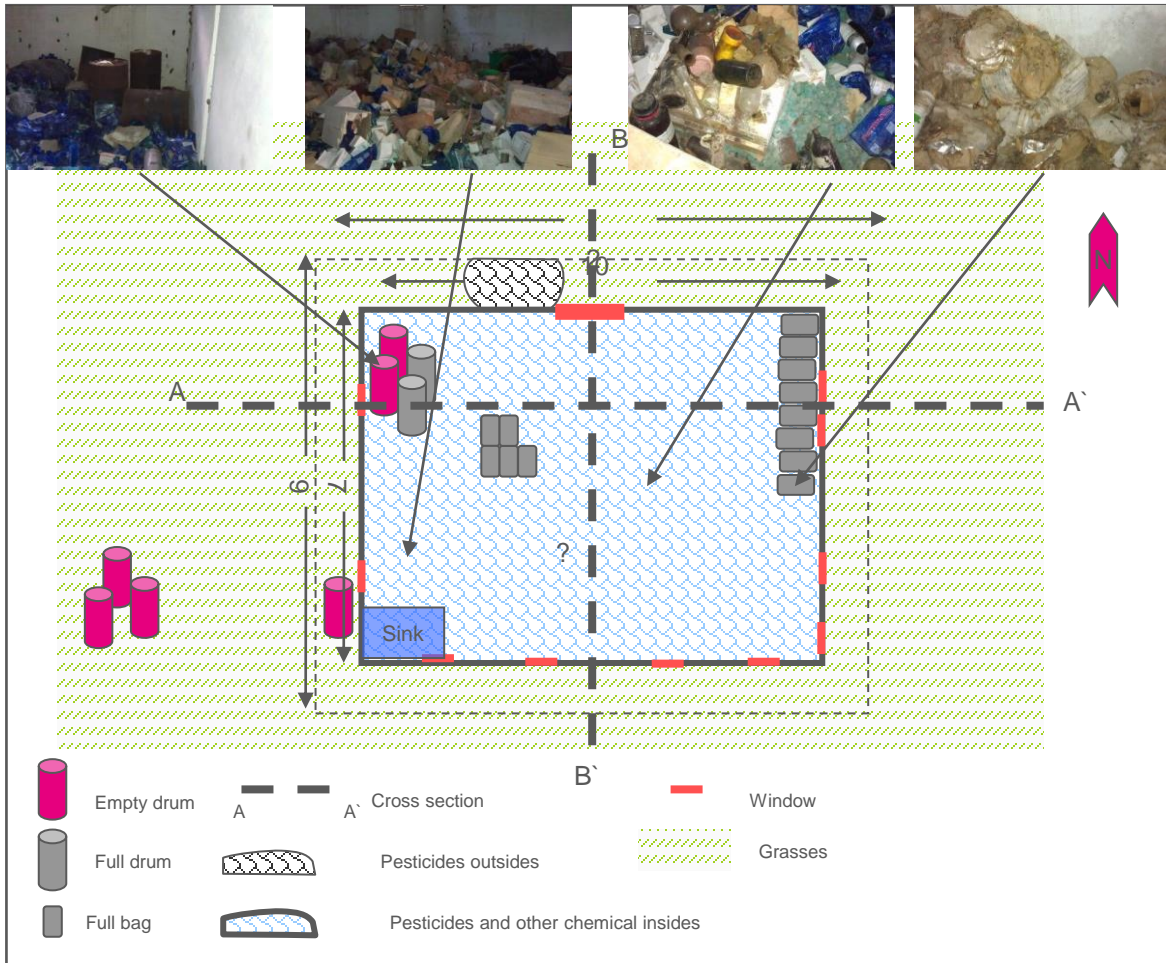
Conceptual Site Model team

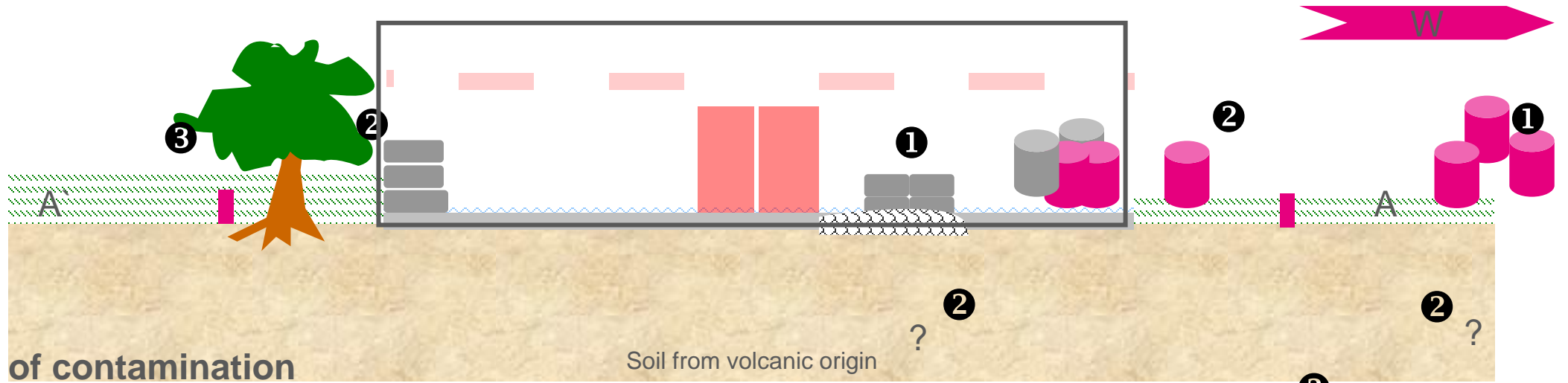
- Many different disciplines are needed
- It is teamwork
- Allow to work with a flexible workplan



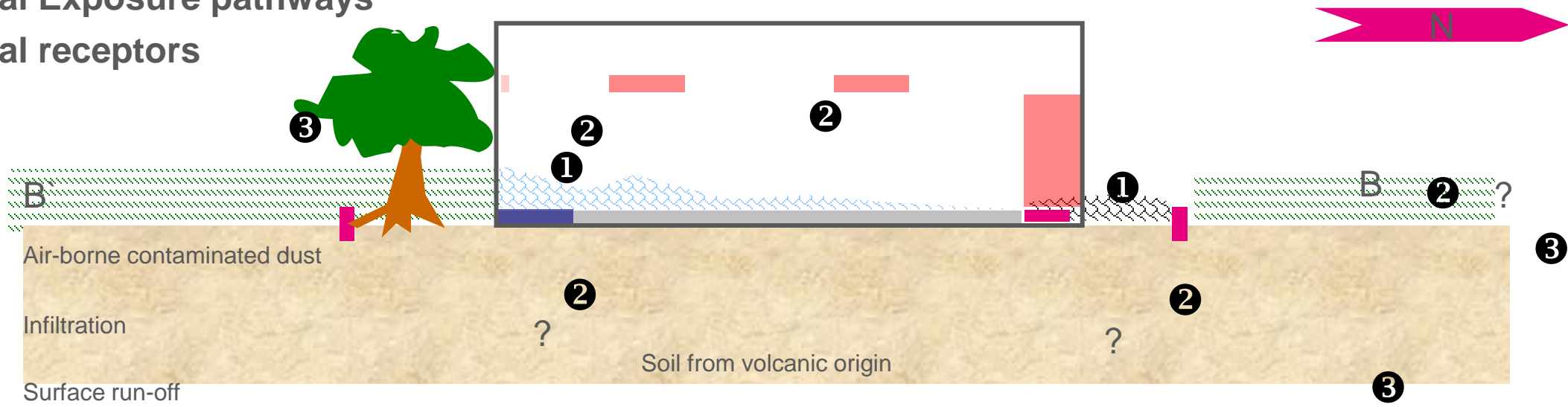
Initial Conceptual Site Model – Sao Tomé

Example: ICSM POP Pesticides stockpile

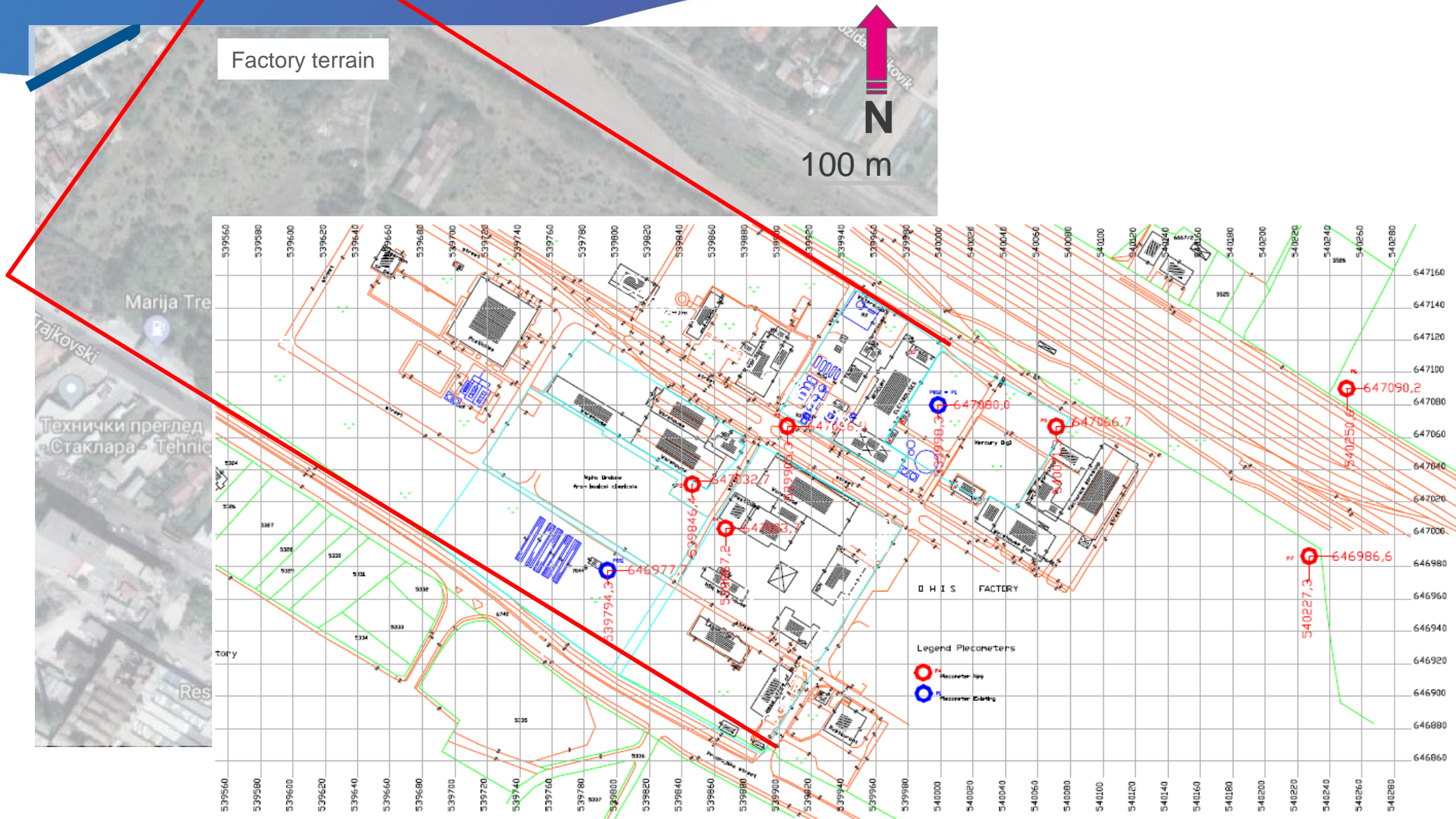




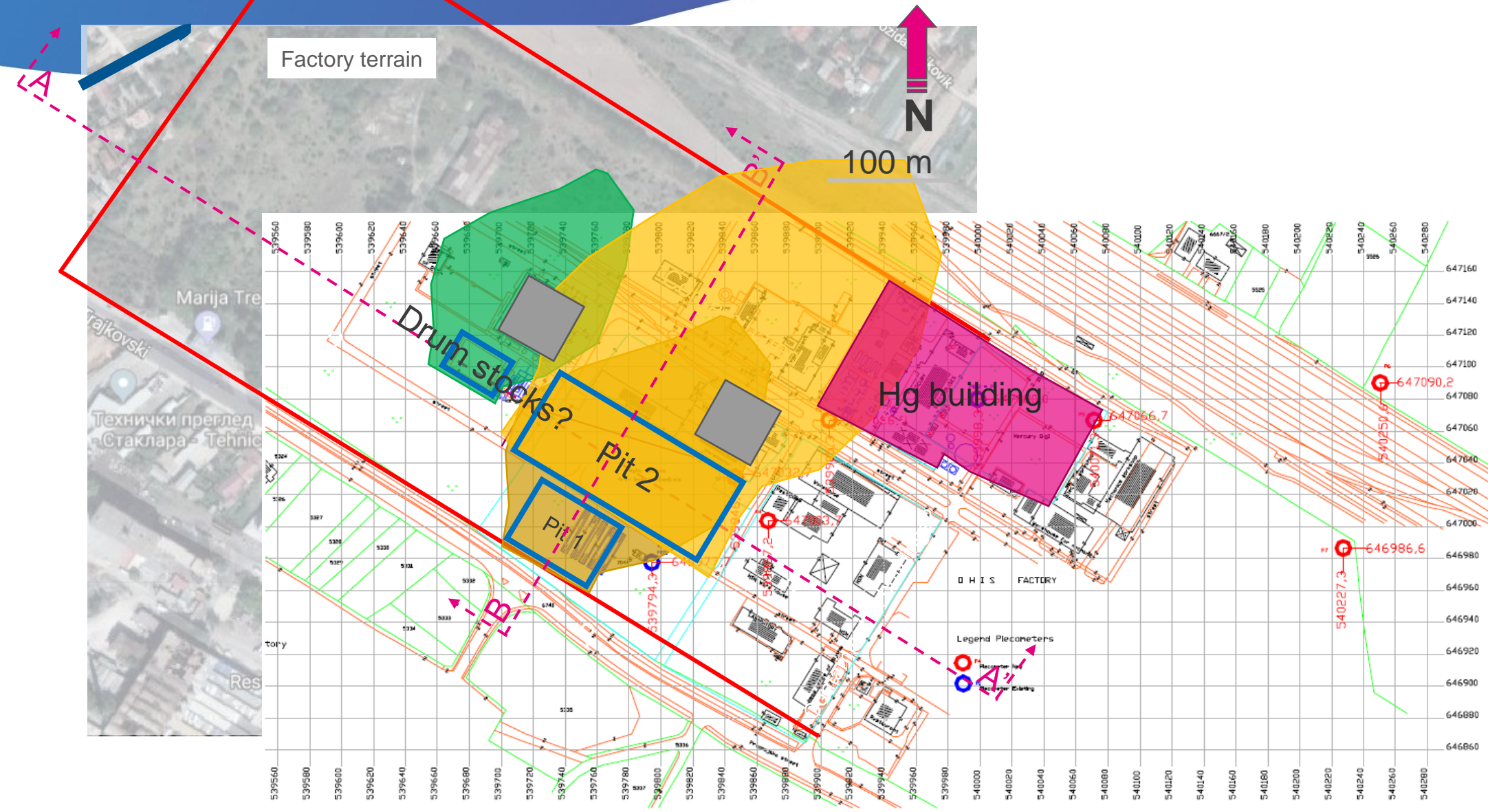
- ① Source of contamination
- ② Potential Exposure pathways
- ③ Potential receptors



Initial Conceptual Site Model Site layout map



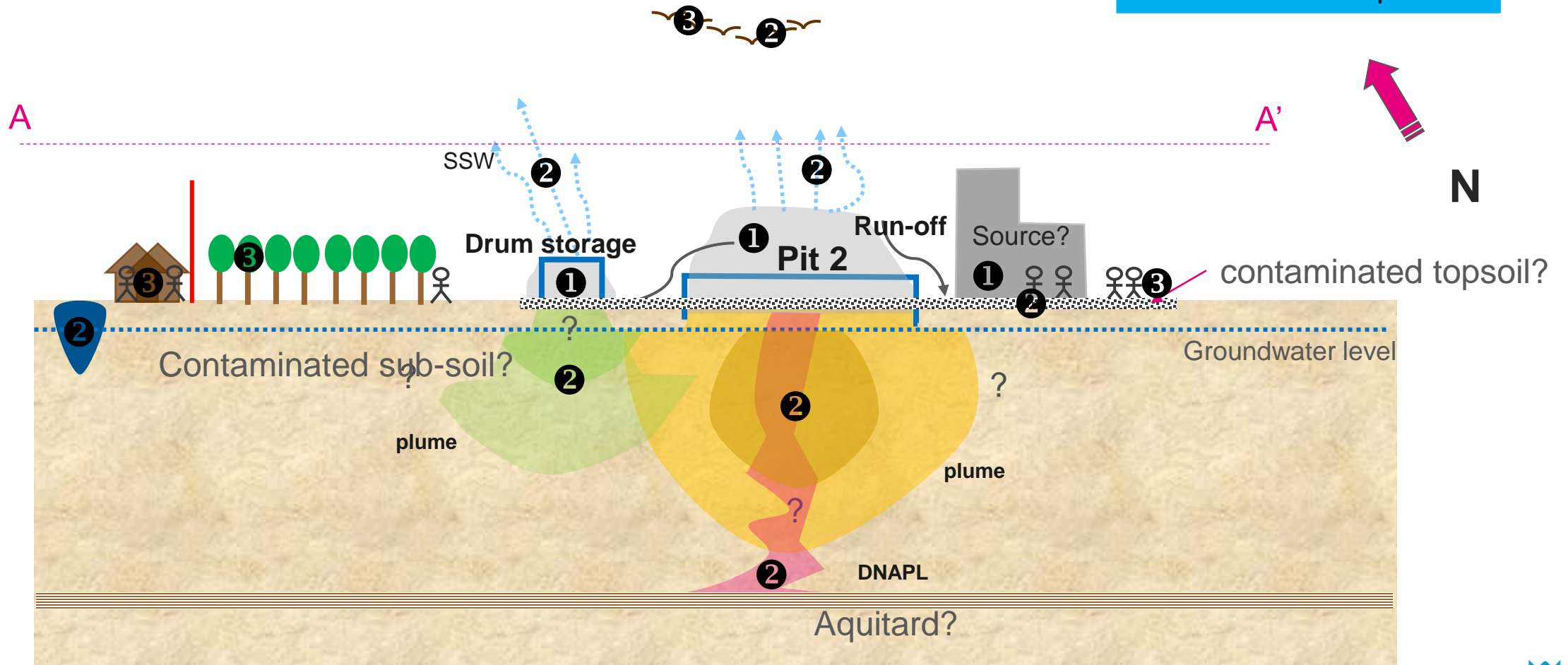
Initial Conceptual Site Model Site layout map



Initial Conceptual Site Model

Representative cross section of the site (1)

- ① Potential source
- ② Potential pathway
- ③ Potential receptor

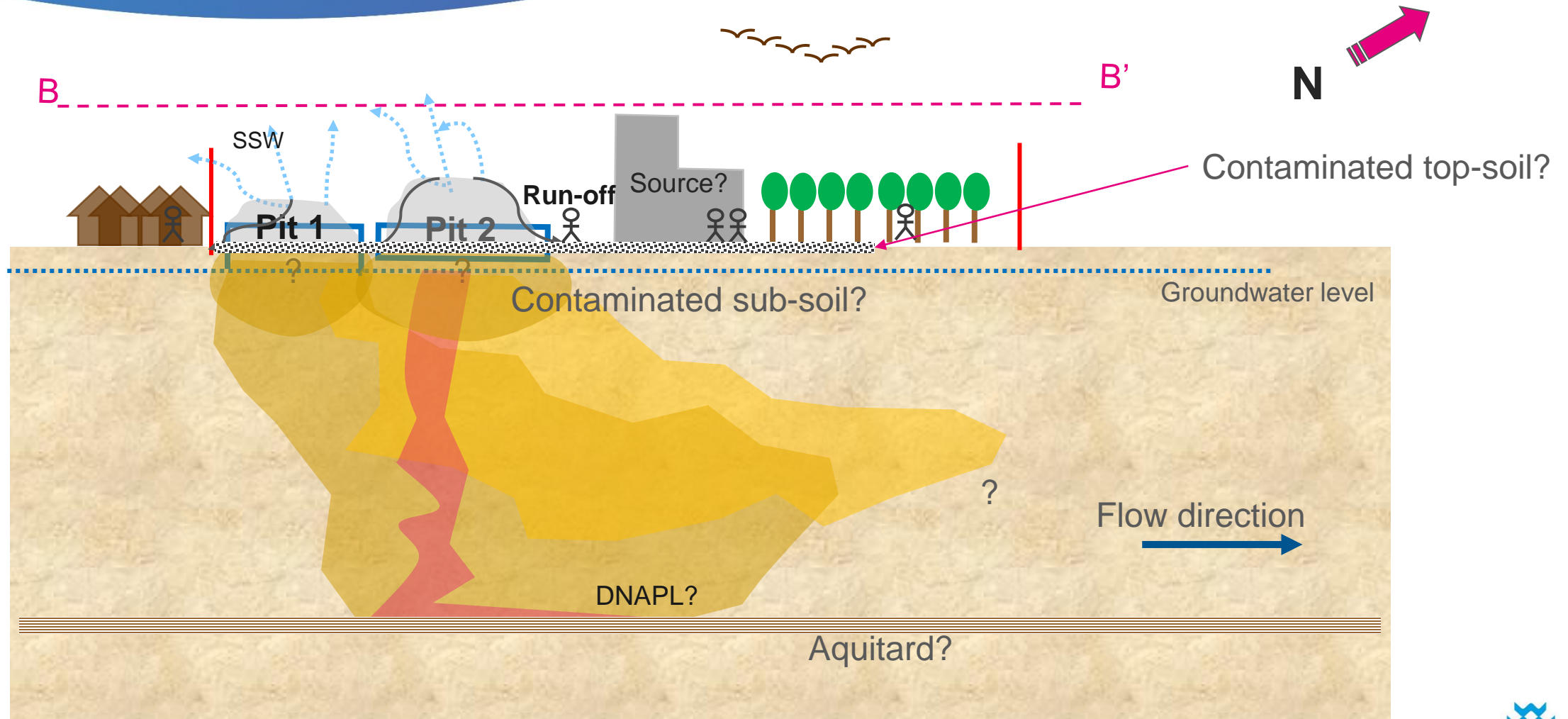


Not at scale



Initial Conceptual Site Model

Representative cross section of the site (2)



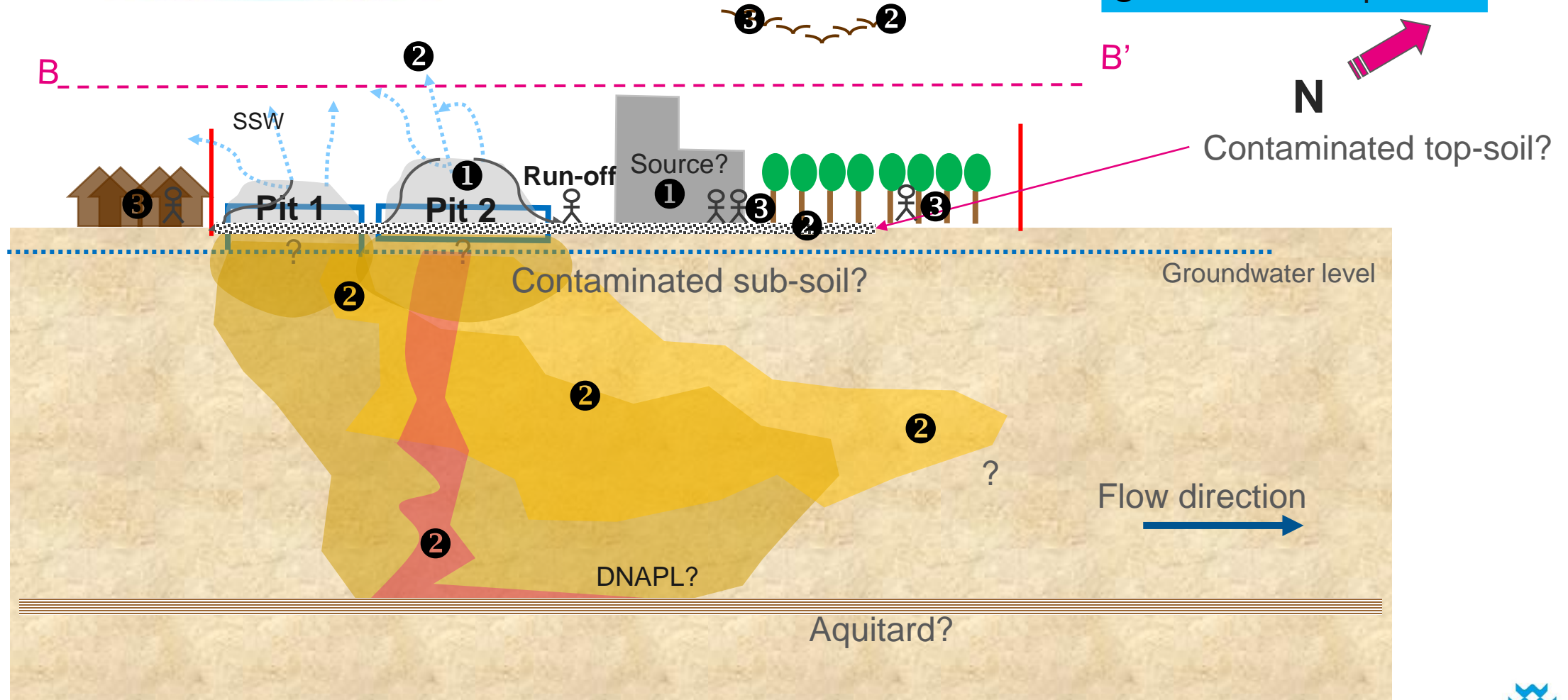
Note at scale



Initial Conceptual Site Model

Representative cross section of the site (2)

- ① Potential source
- ② Potential pathway
- ③ Potential receptor

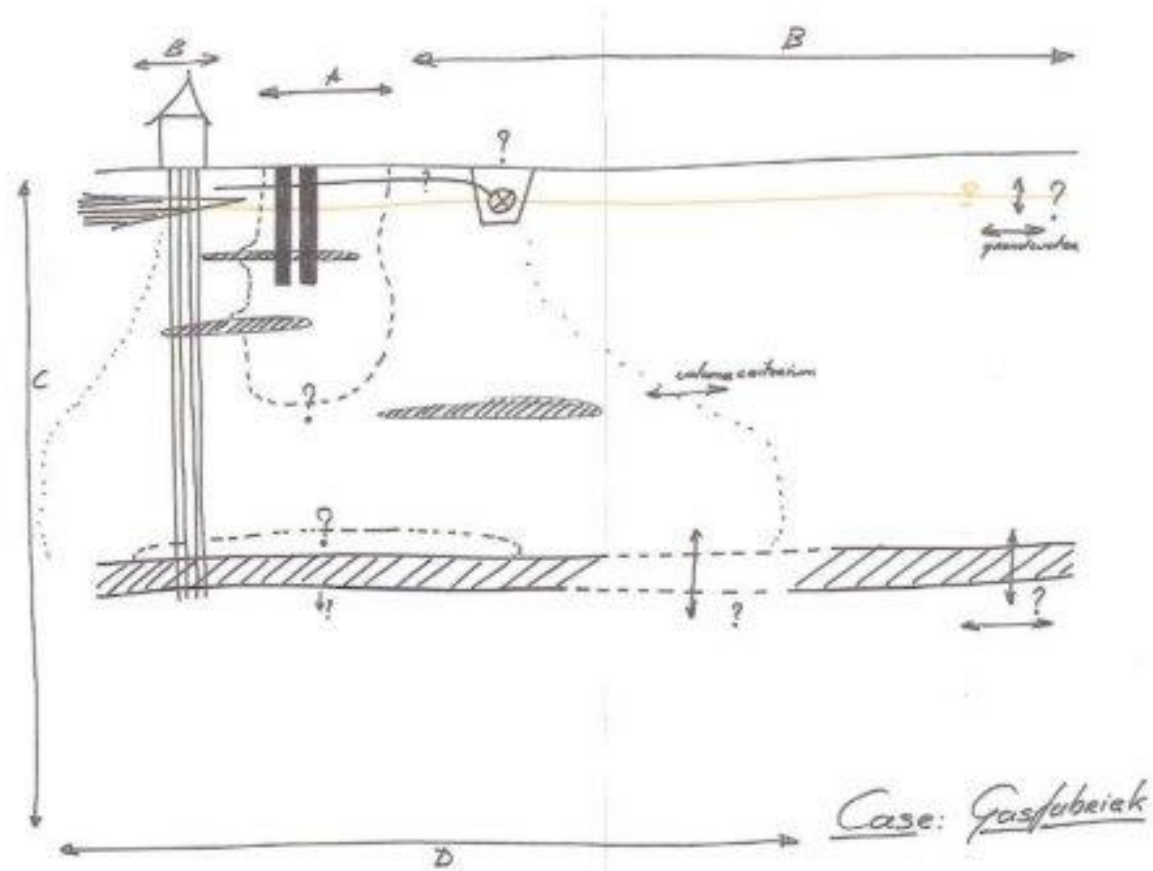


Note at scale



Initial Conceptual Site Model

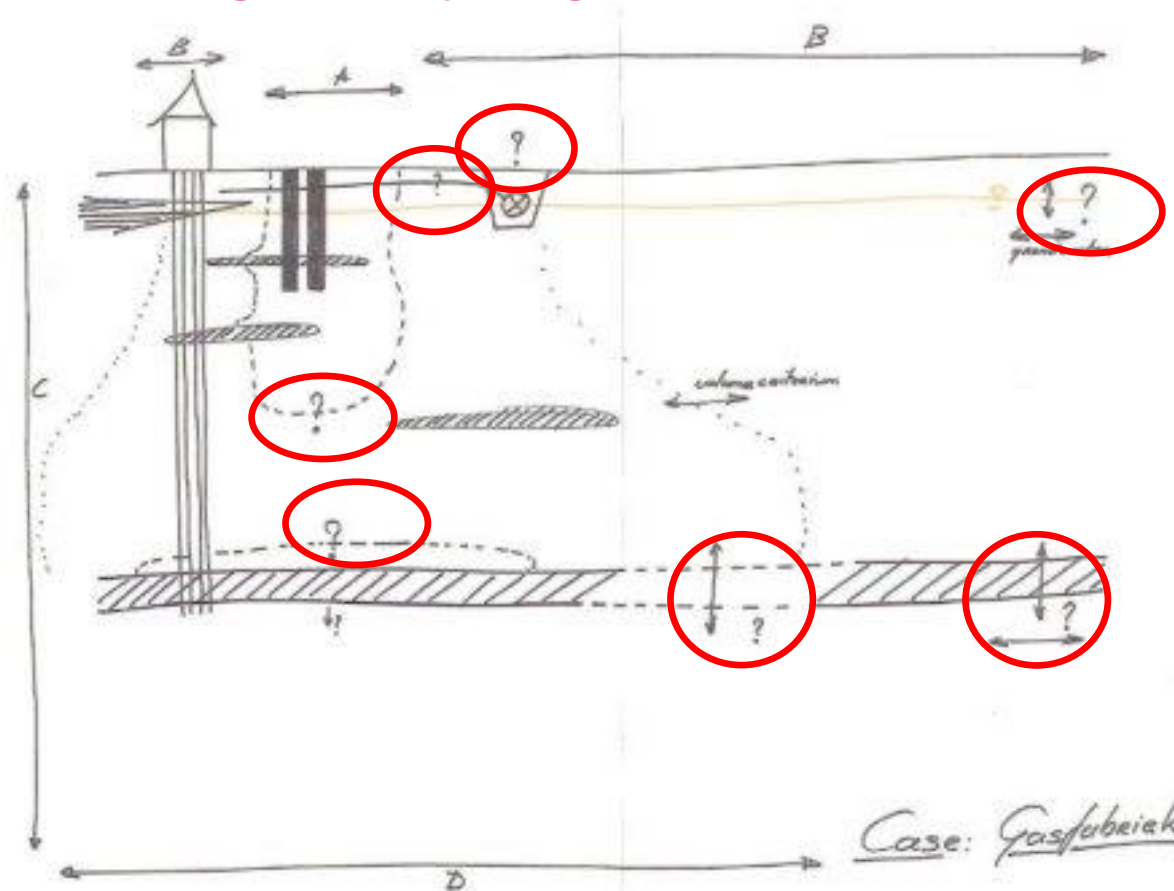
Example: ICSM Initial CSM gasworks site



Initial Conceptual Site Model and Gap analysis

? Gap in the understanding of the situation

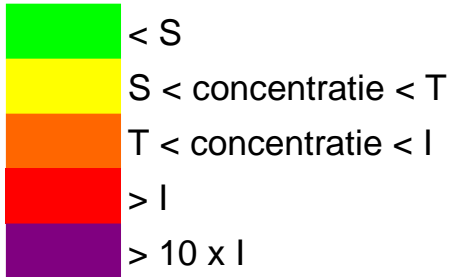
Example: ICSM Initial & gap analysis gasworks site



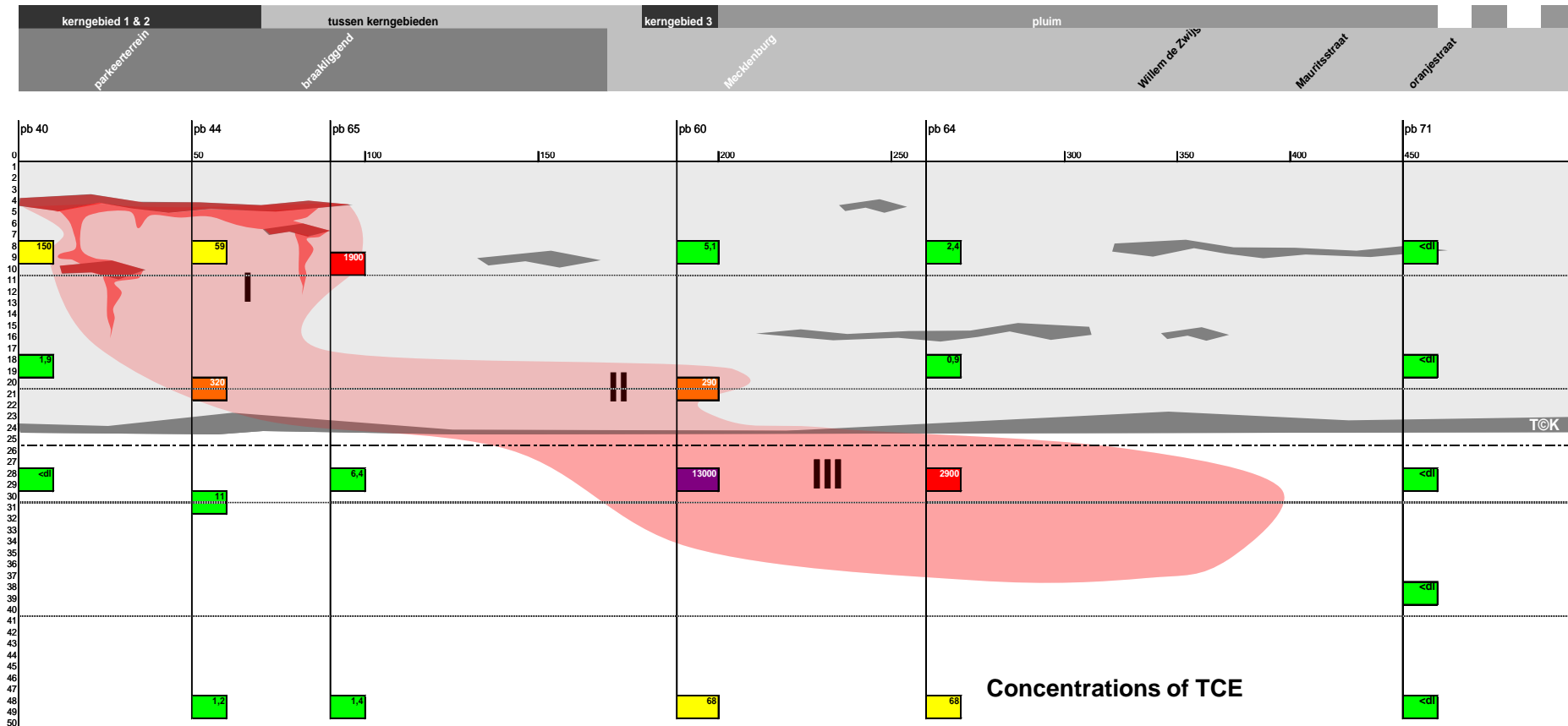
Example CSM

Contamination delineated, basis for further investigation/remediation assessment

Legenda



TCE = Trichloroethene
(a dry cleaning solvent)



CSM in all Phases of the sustainable management of contaminated sites

Dynamic: continuous refinement of CSM

- Phase 1 Initial CSM → Preliminary site assessment –desktop study
- Phase 2 Detailed CSM → Site assessment – detailed survey
- Phase 3 Completed CSM → Remediation assessment - design site cleanup
- Phase 4 Change of CSM → Remediation management - cleanup management
- Phase 5 Update CSM → Monitoring and aftercare – sampling and sample analyses

The CSM is crucial in all phases of the sustainable management of contaminated sites



Initial, completed & updated CSM

PHASE 1 initial site assessment
 Site visit
 Desktop study
 Reconnaissance survey

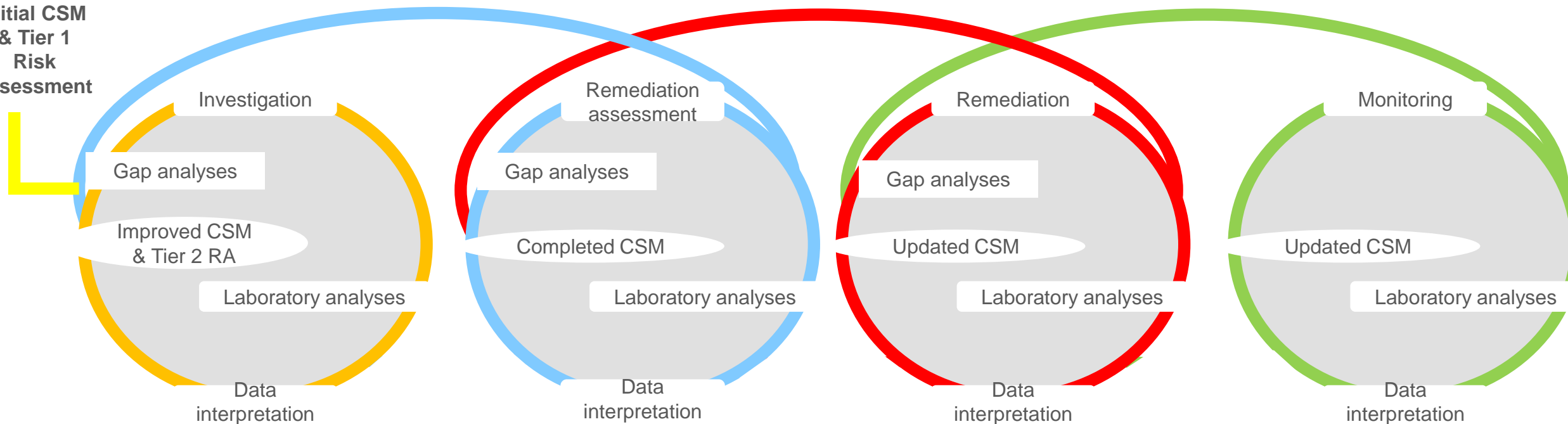
PHASE 3 Site remediation assessment

PHASE 5 Site monitoring and aftercare

PHASE 2 Site assessment

PHASE 4 Site remediation management

Initial CSM
 & Tier 1
 Risk
 assessment



Summary

We use in the sustainable management of contaminated sites:

- Initial CSM or ICSM which is made with available data
- Updated CSM which is made with the information of the ICM and additional data from site surveys
- Completed CSM providing all needed information to assess the remediation

The most important aspects of CSM

- Various information and disciplines involved
- Visually oriented tool to support decision making process
- Crucial in all phases of sustainable management of contaminated sites
- Dynamic and continuous refinement / evolving is crucial



Thank you!

Contact



Questions?

