E4. Modeling and Monitoring Approaches to Improve Remedy Design and Implementation

GROUP 2

Case Study: Use of Lines of Evidence to Identify Multiple Sources of a Chlorinated Solvents Plume

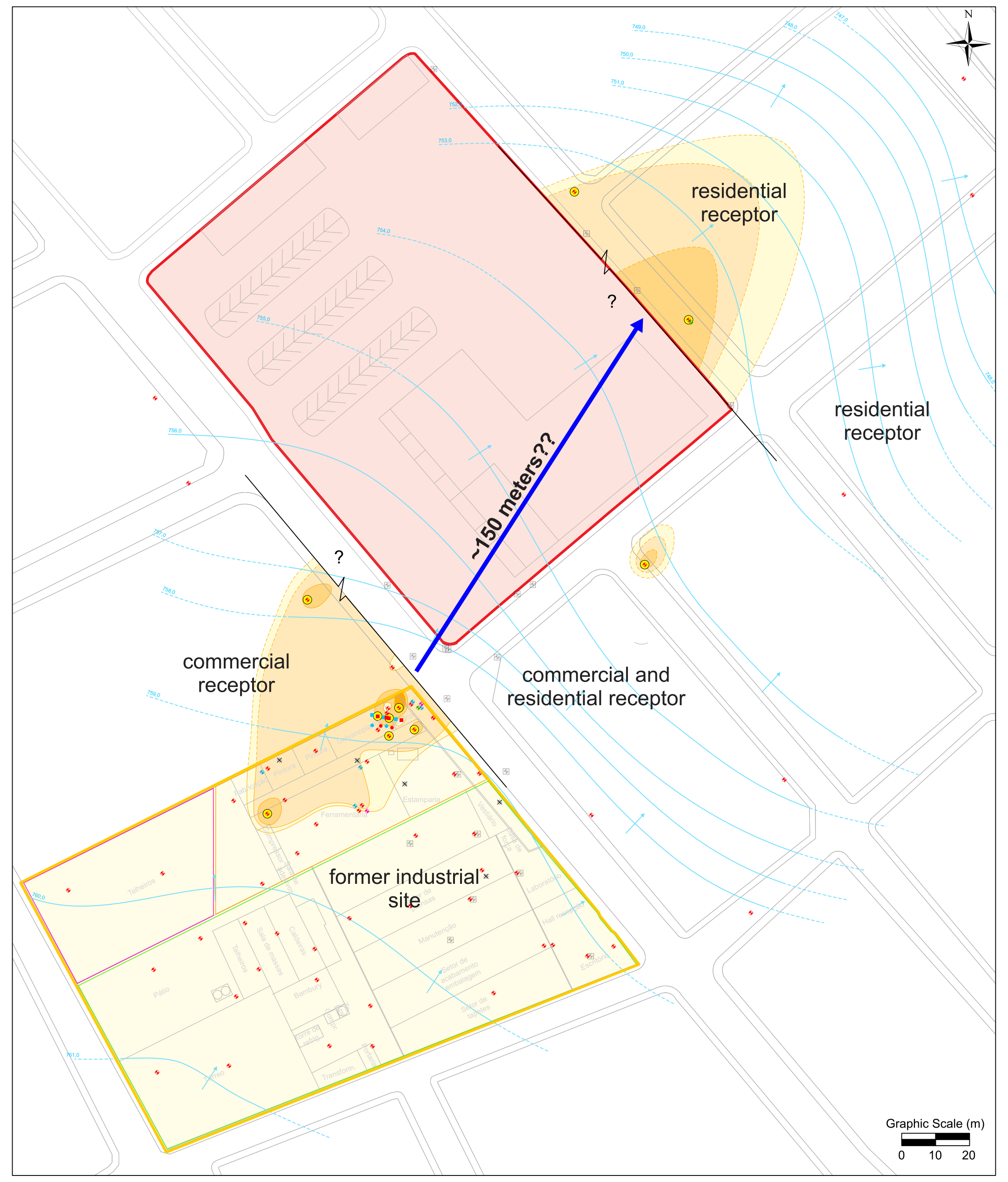
Filipe Biaggioni Quessada Gimenes (filipe.gimenes@geoklock.com.br), Maíra Rosa A. P. Scarance, Norbert Dieter Brandsch and Victor Vanin Sewaybricker(GEOKLOCK, São Paulo, SP, Brazil)

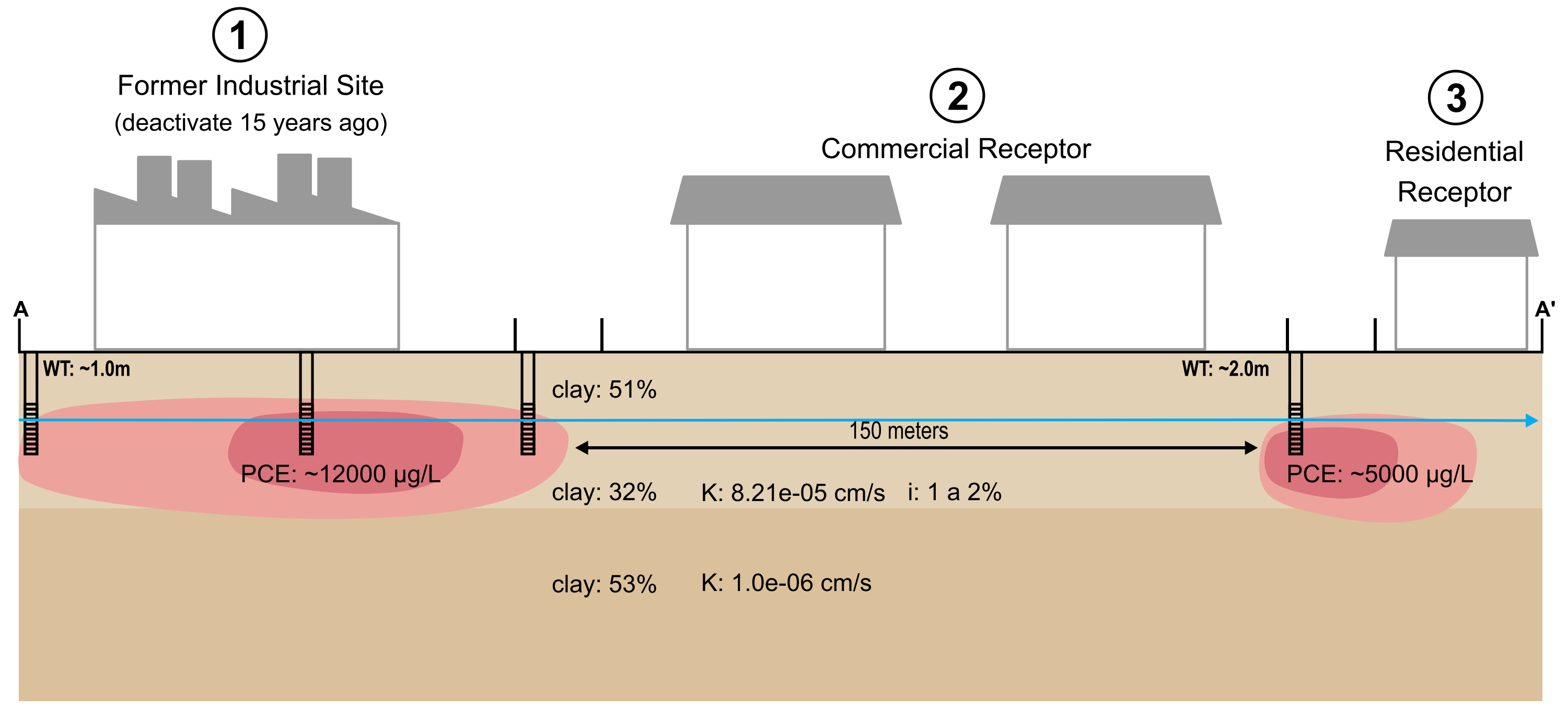
Background

- ☐ Study area: a former industrial unit, deactivated since 2003, where chlorinated solvents were stored and manipulated. Its neighborhood is a residential and commercial area.
- ☐ Conceptual site model: Investigation data pointed out the existence of a chlorinated solvents plume, which extended beyond the property boundaries.

The chloroethenes were also identified around 150m away from the known source, and the concentrations were similar to the site hotspot (and above SSTLs for residential receptors).

Since the local groundwater flow velocity was expected to be fairly low (clayey soils), the existence of a source inside the commercial area could not be discarded.





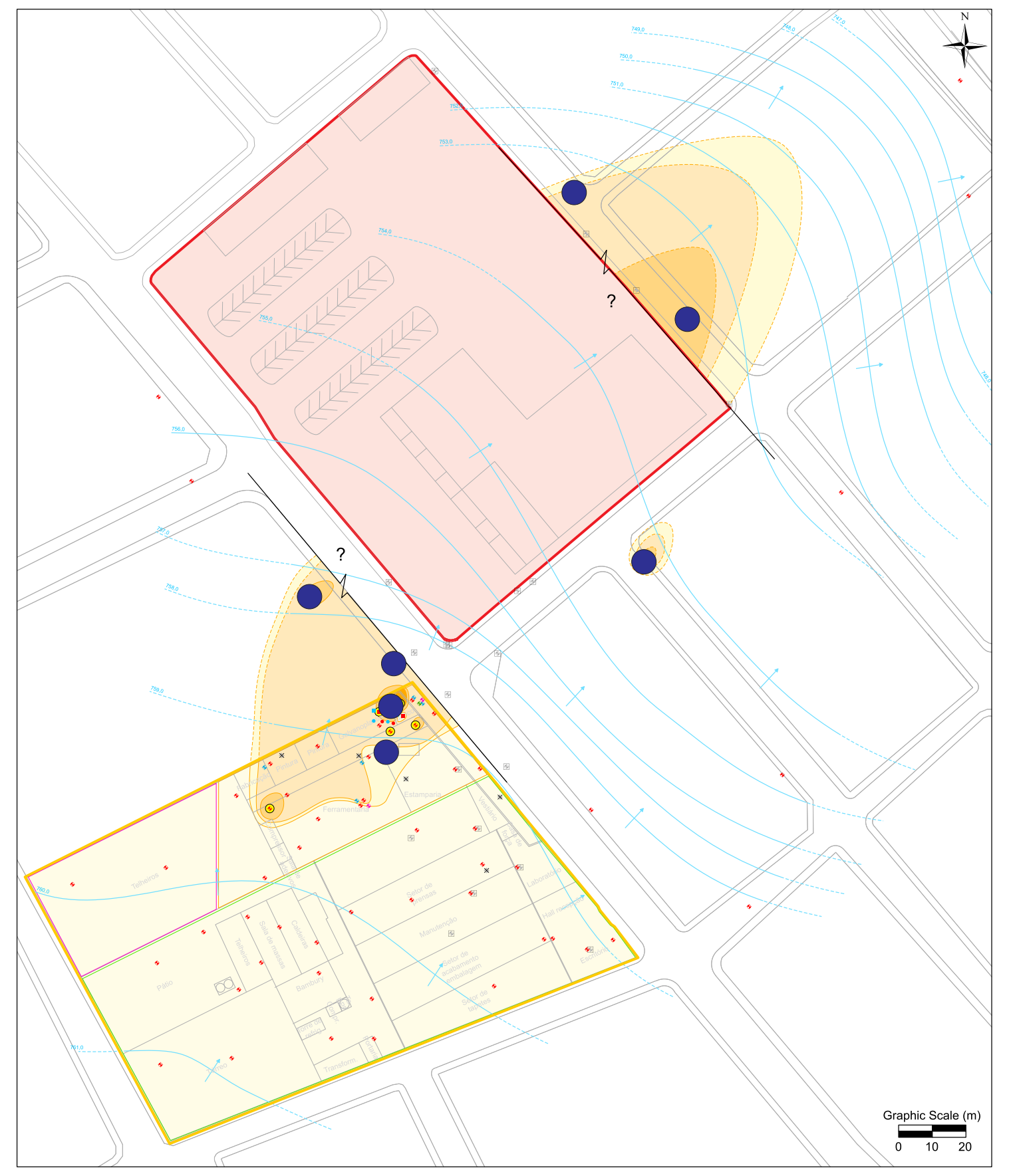
Objectives

This case study presents the use of lines of evidence to identify multiple sources of a chlorinated solvents plume.

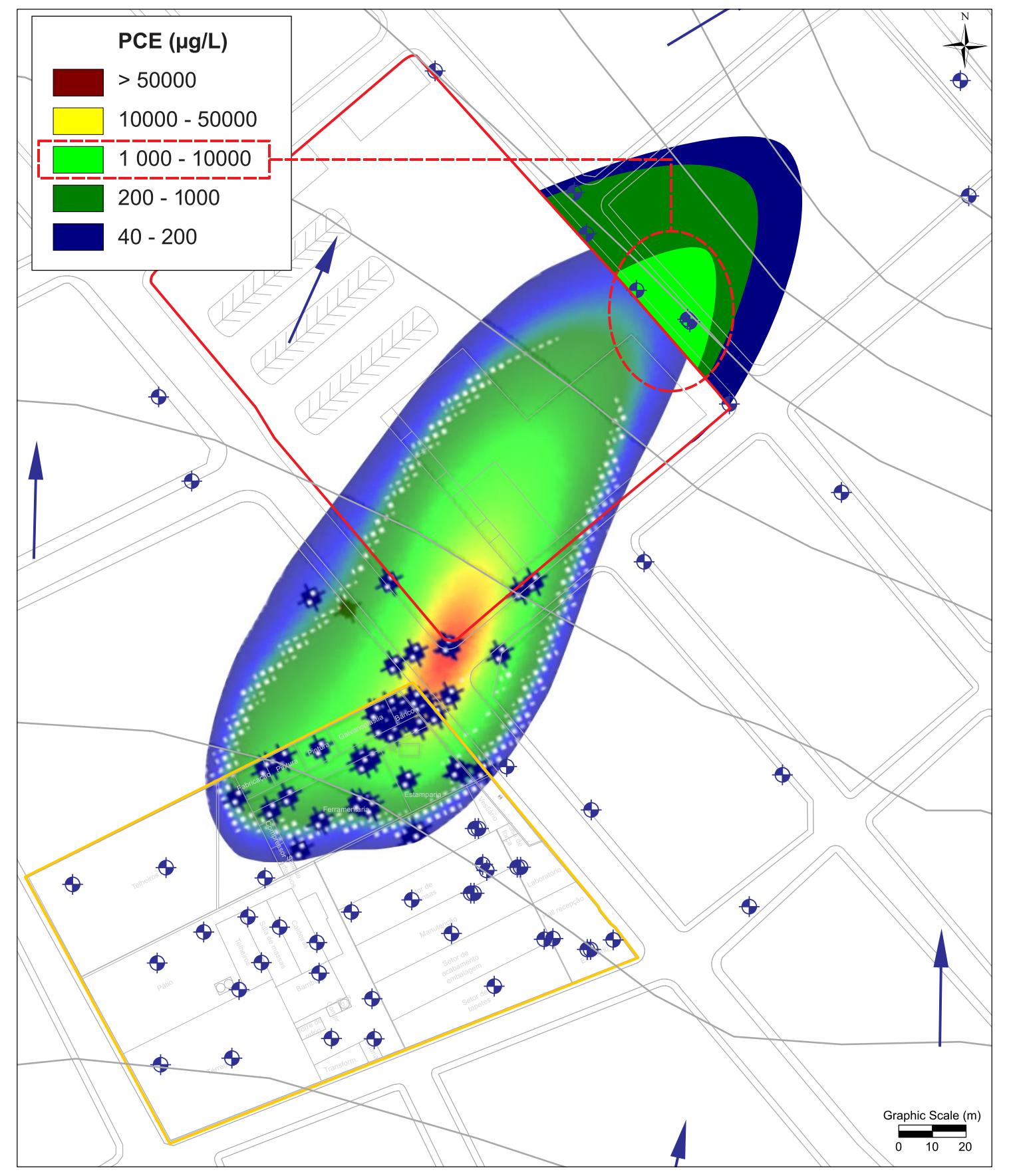
Results: The forensic lines of evidence proved that it was necessary to investigate the commercial facility. While the mathematical modelling indicated that it was unlikely that the known source could have generated the concentrations identified at 150m downstream, the isotopic study showed a higher degradation degree in the hotspot area in comparison to the downstream border. That was considered a strong evidence of the existence of an additional source inside the commercial area. That evidence was later confirmed through a traditional investigation approach.

Lesson Learned: The adopted approach, combining multiple lines of evidence, provided a more realistic and comprehensive conceptual site model.

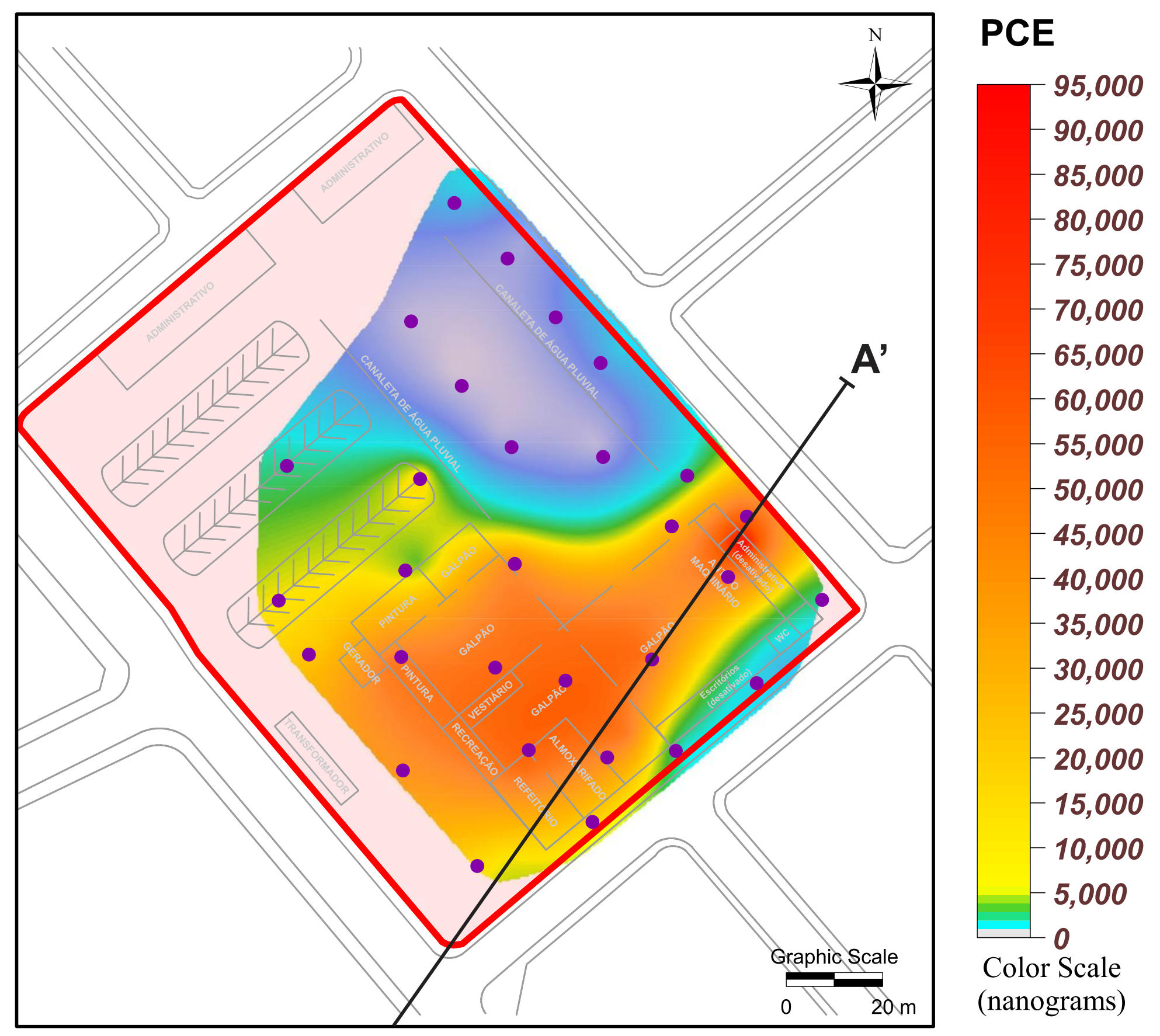
EVIDENCE 1: Isotope Analysis (CSIA)



EVIDENCE 2: Groundwater Modeling

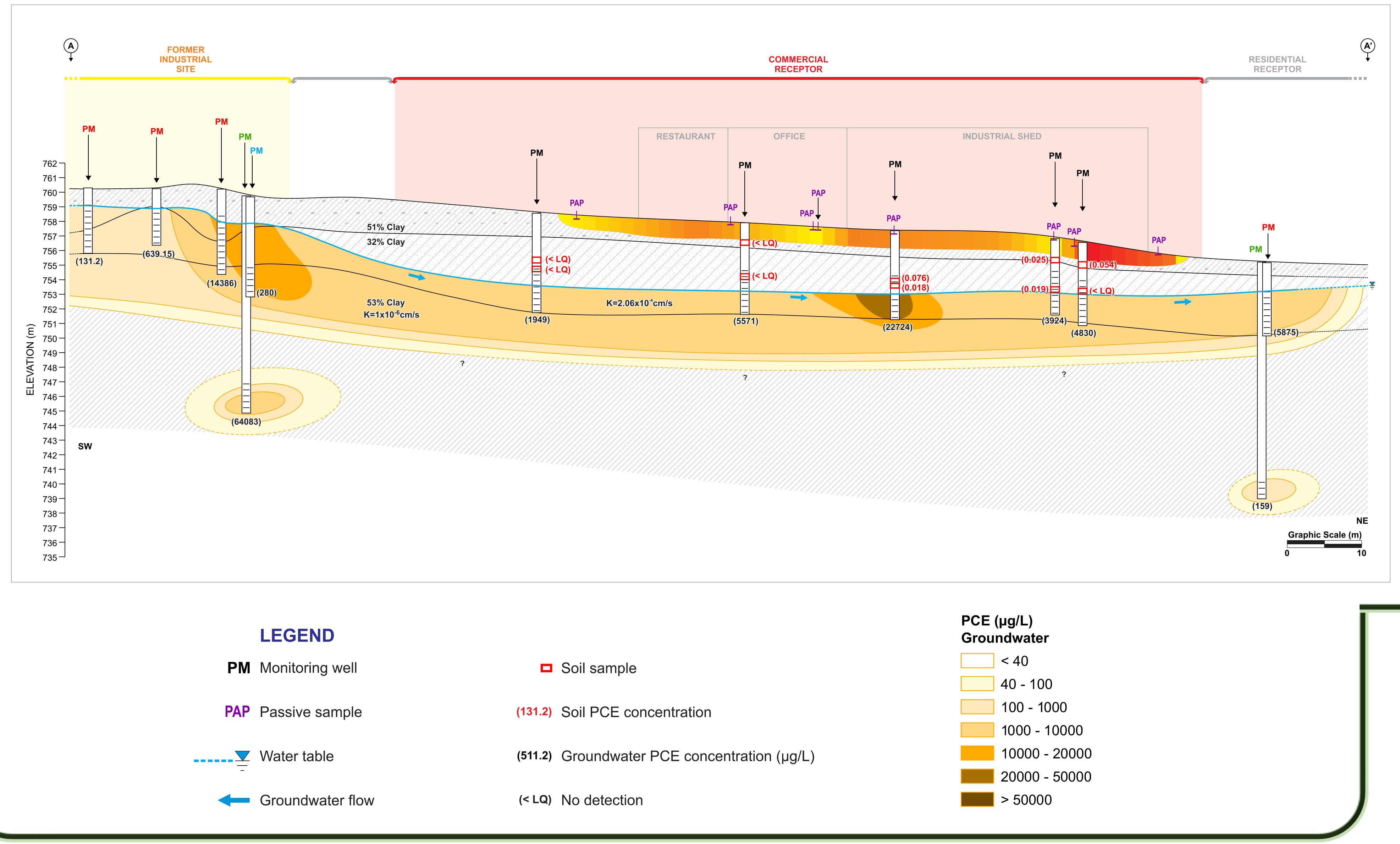


EVIDENCE 3: Passive Samplers

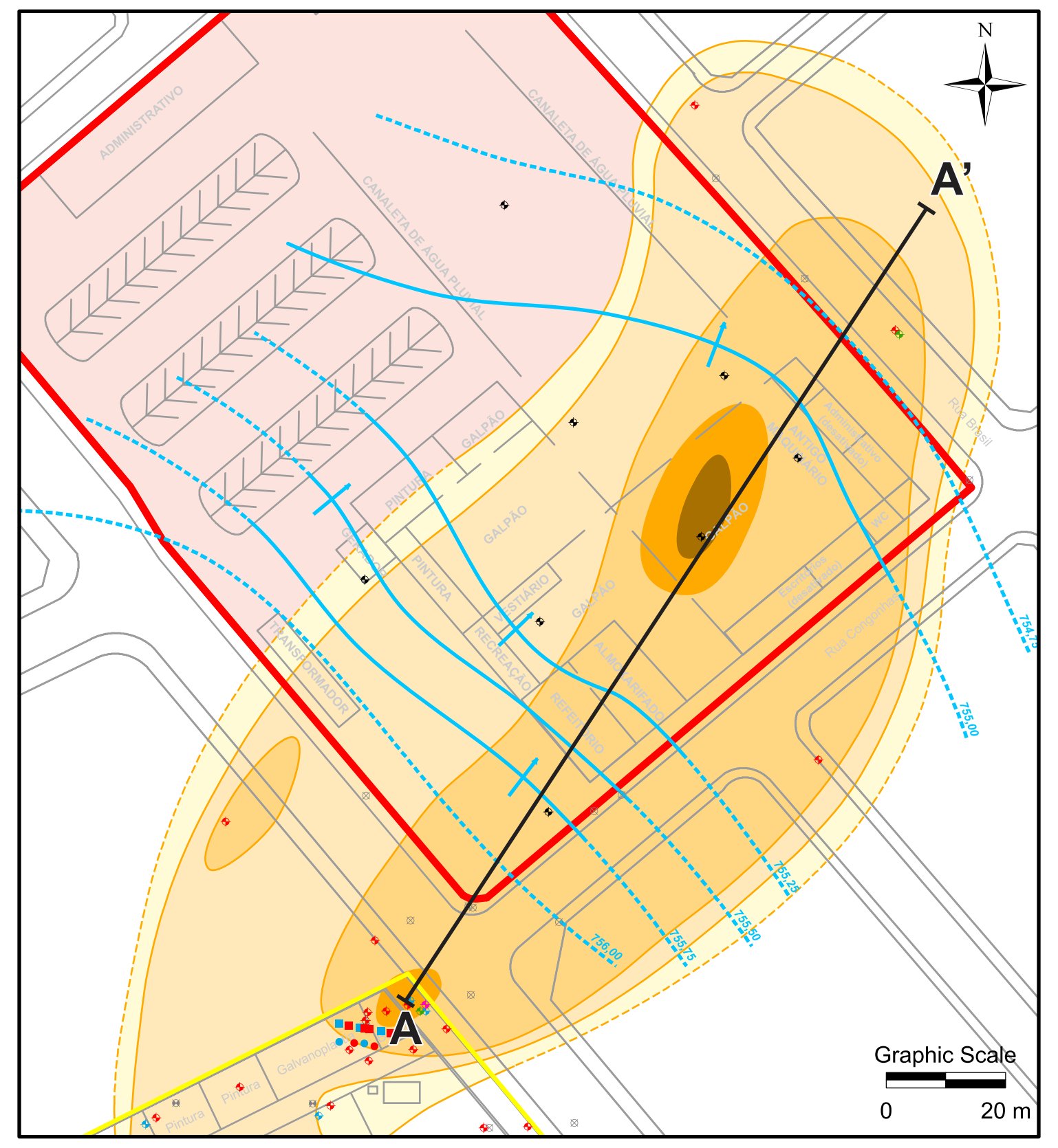


Results: Possible new source areas of contamination within the commercial facility.

Conceptual Site Model (CSM)



EVIDENCE 4: Soil and Water Investigation



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