

Tadd Berger, M.Sc., P.Ag., EP, CSAP
tberger@phharcenv.com



The Use of a Passive Vapour Sampling Network to Survey Chlorinated Solvent Distribution at a Complex Site

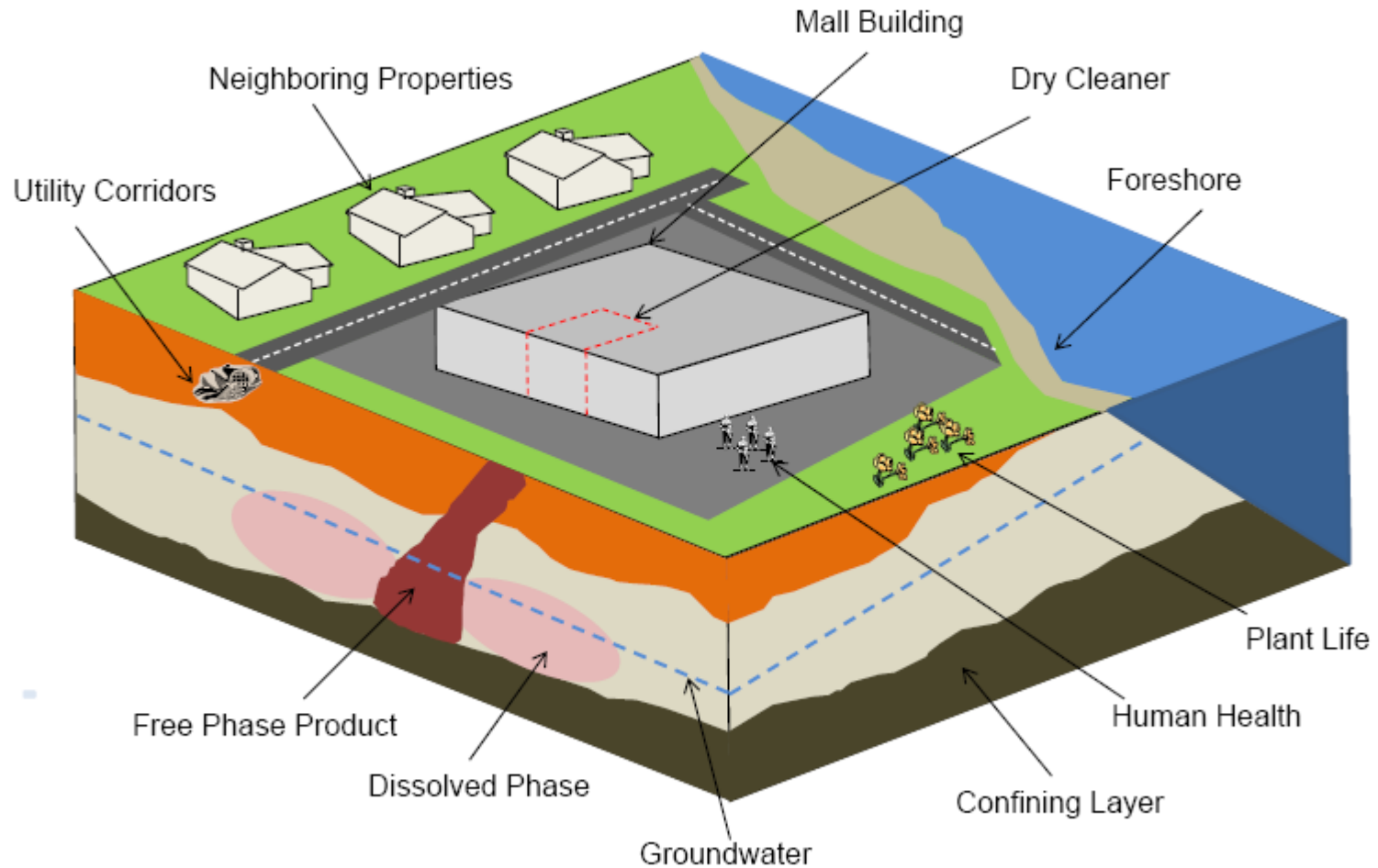
REMTECH
October 16 -18, 2013

phharcenv.com
Service. Integrity. Excellence.

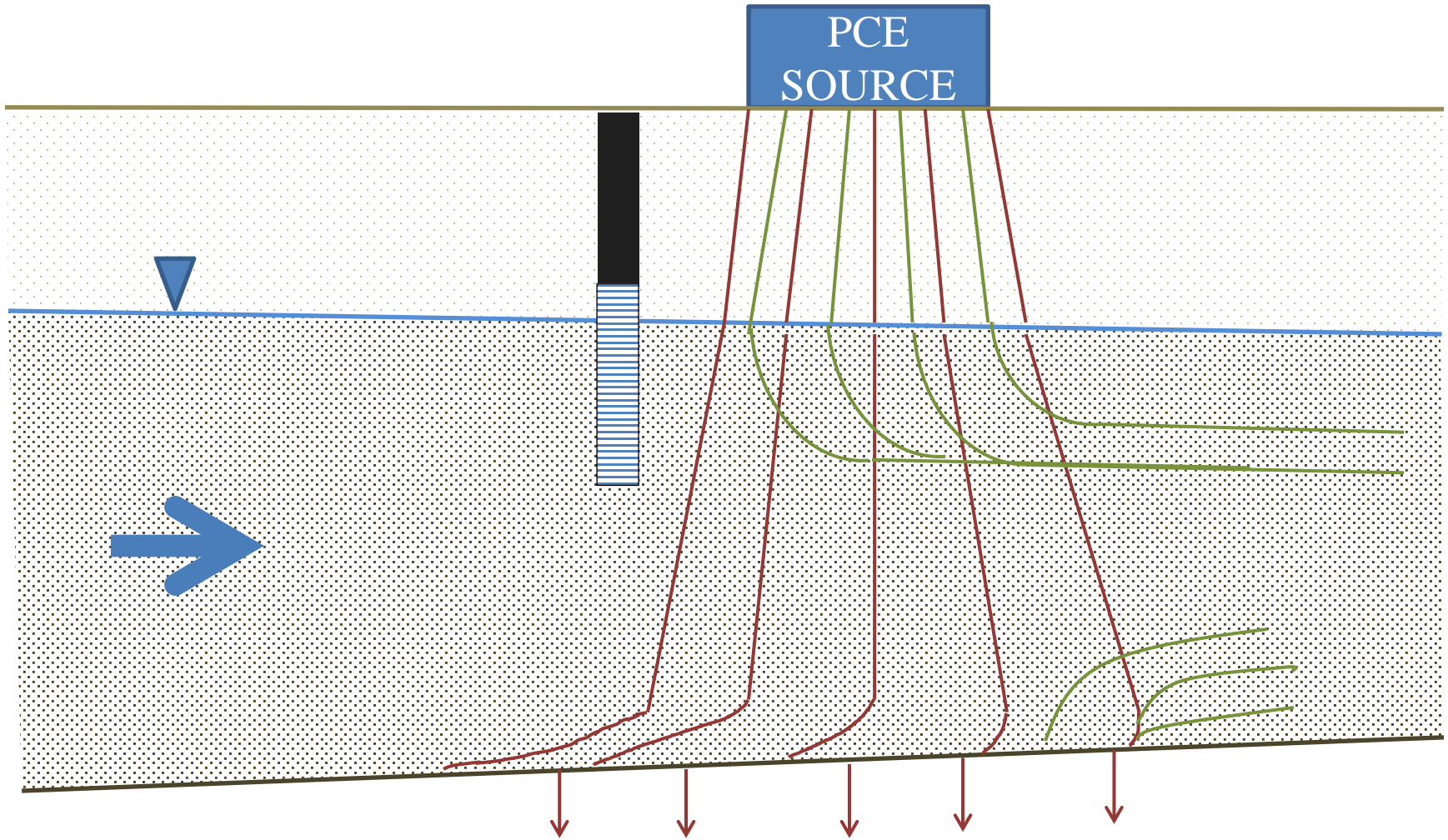
Problem Definition



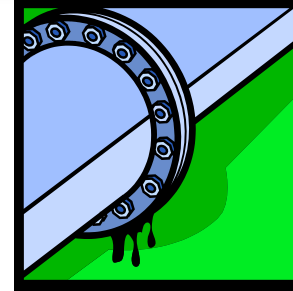
Conceptual Site Model

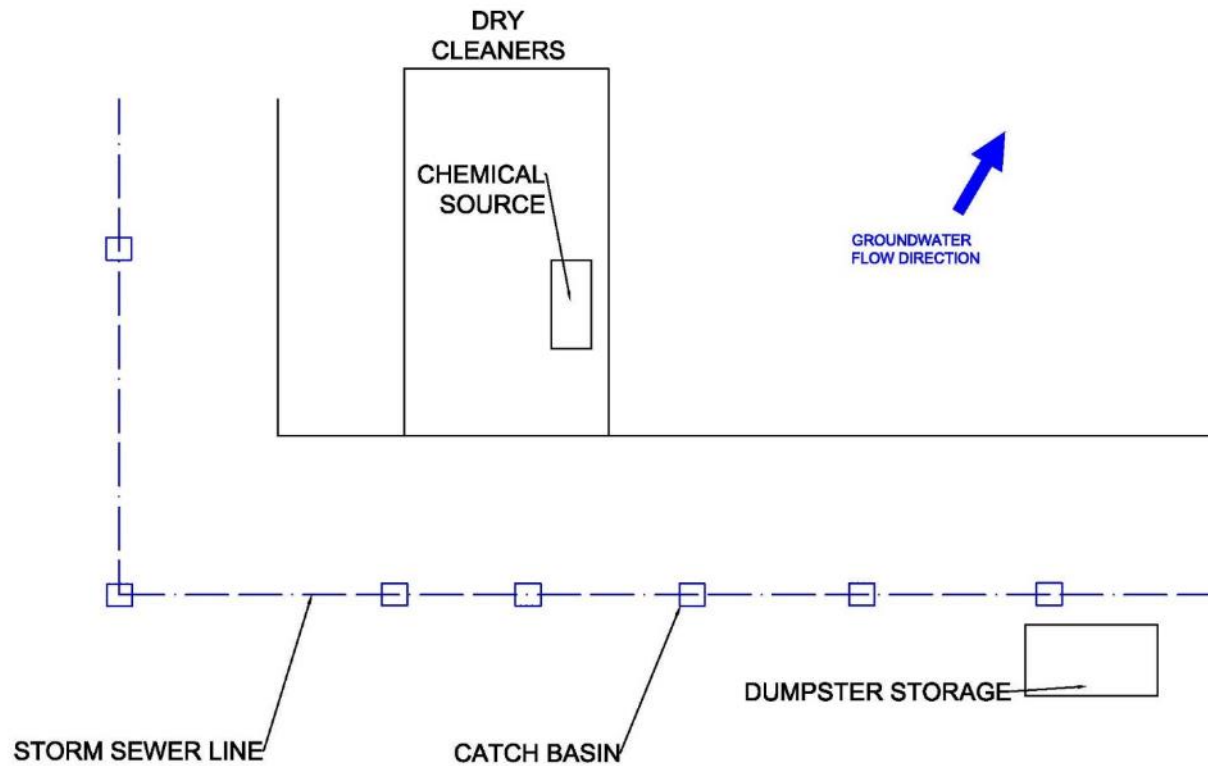


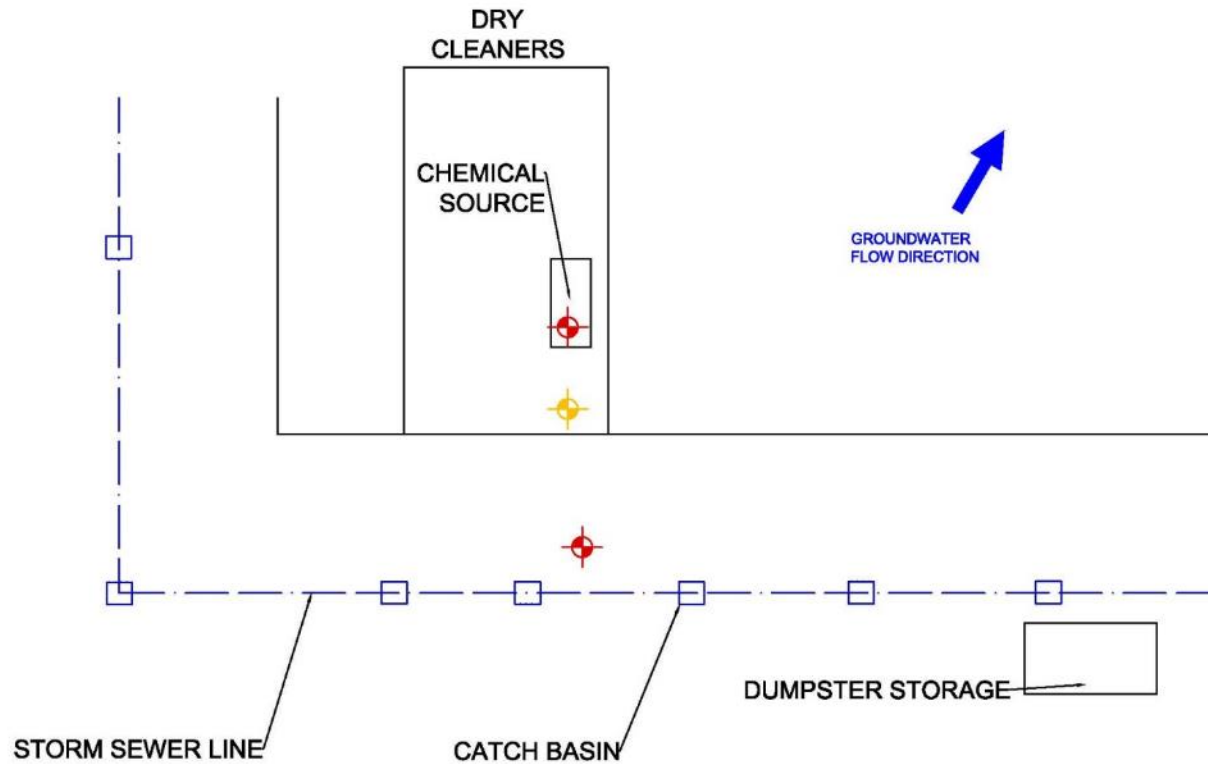
Migration

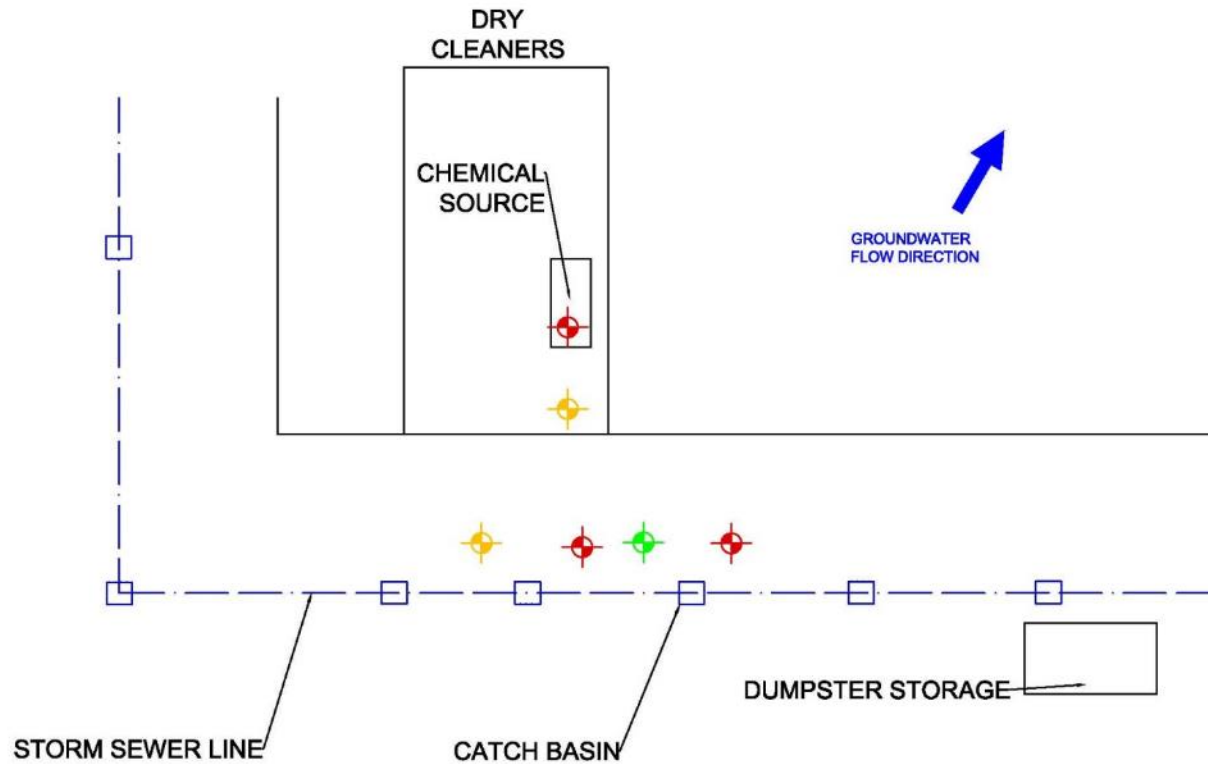


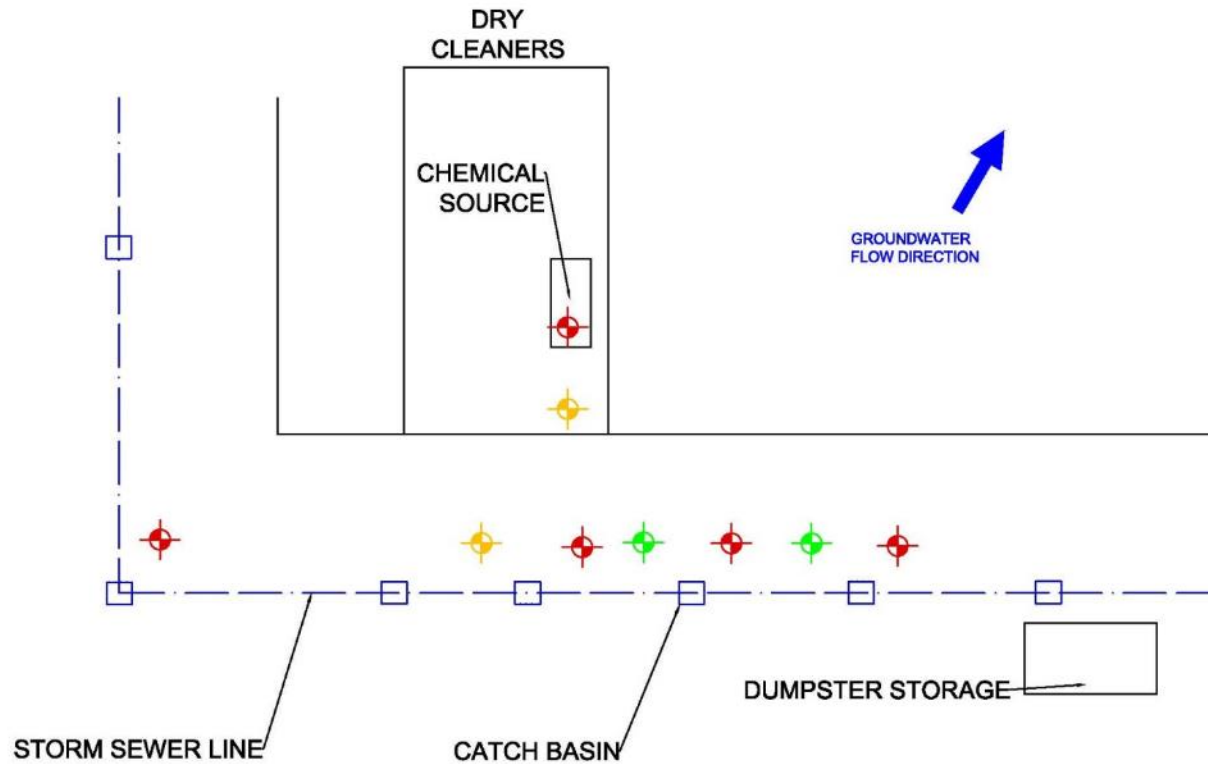
- Equipment using PCE
- Sanitary sewer lines (especially if broken)
- Floors (if used as mop water)/Drains
- Storm drains
- Back door
- Used filter/ waste storage location (inside or outside)
- ???

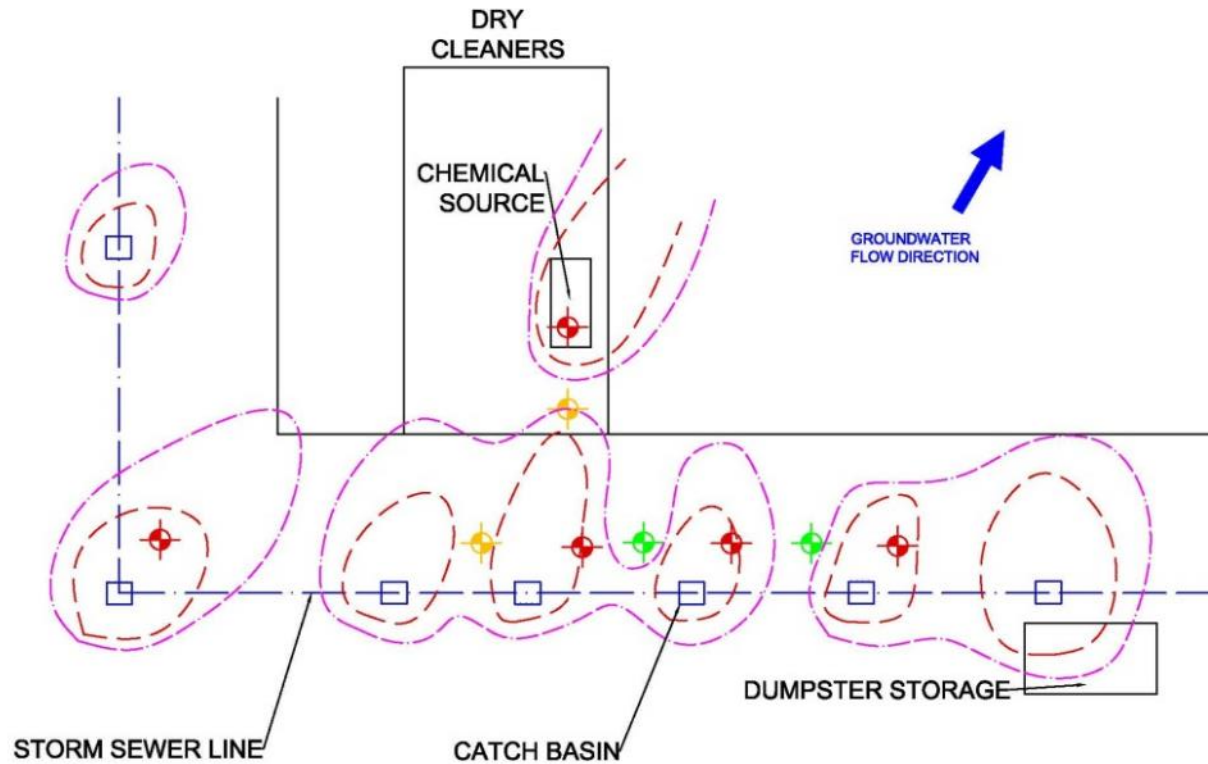


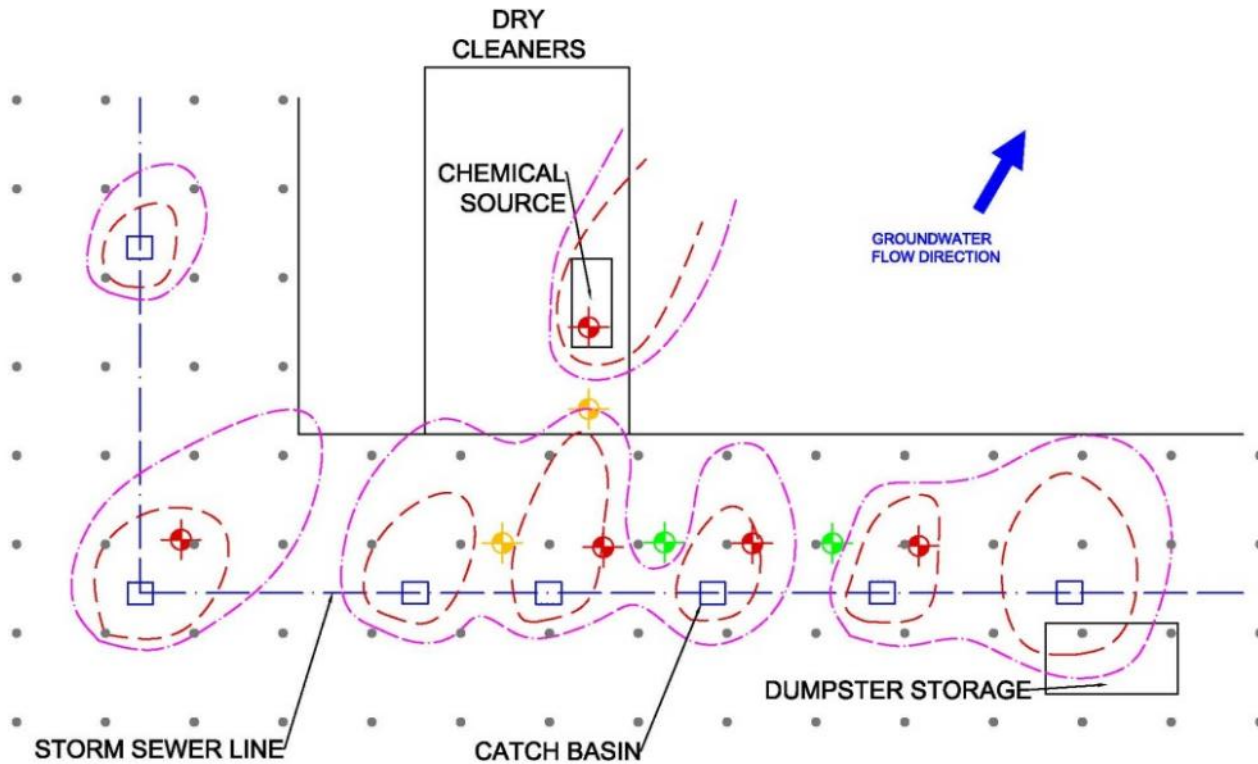








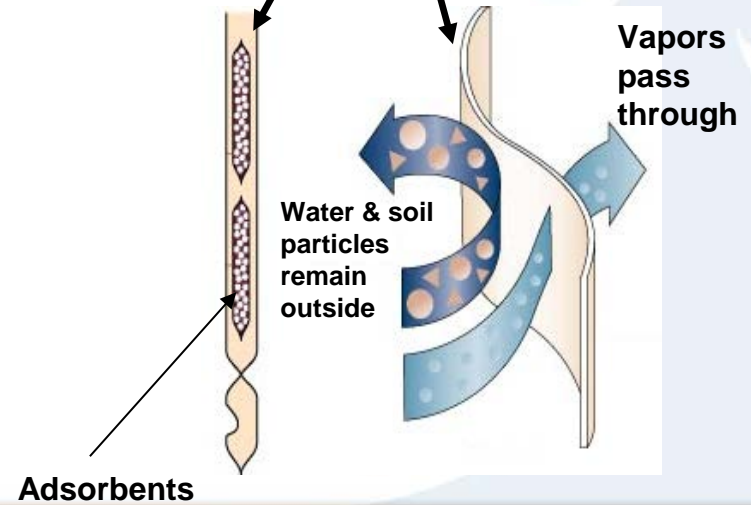
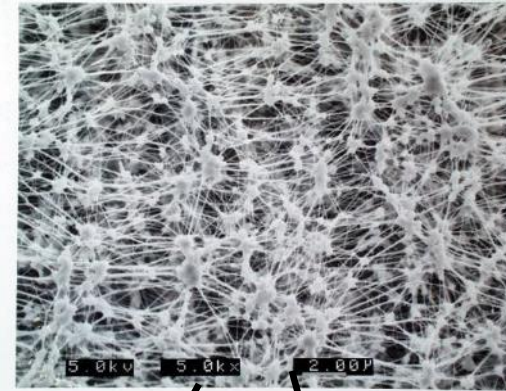




Passive Vapour Samplers



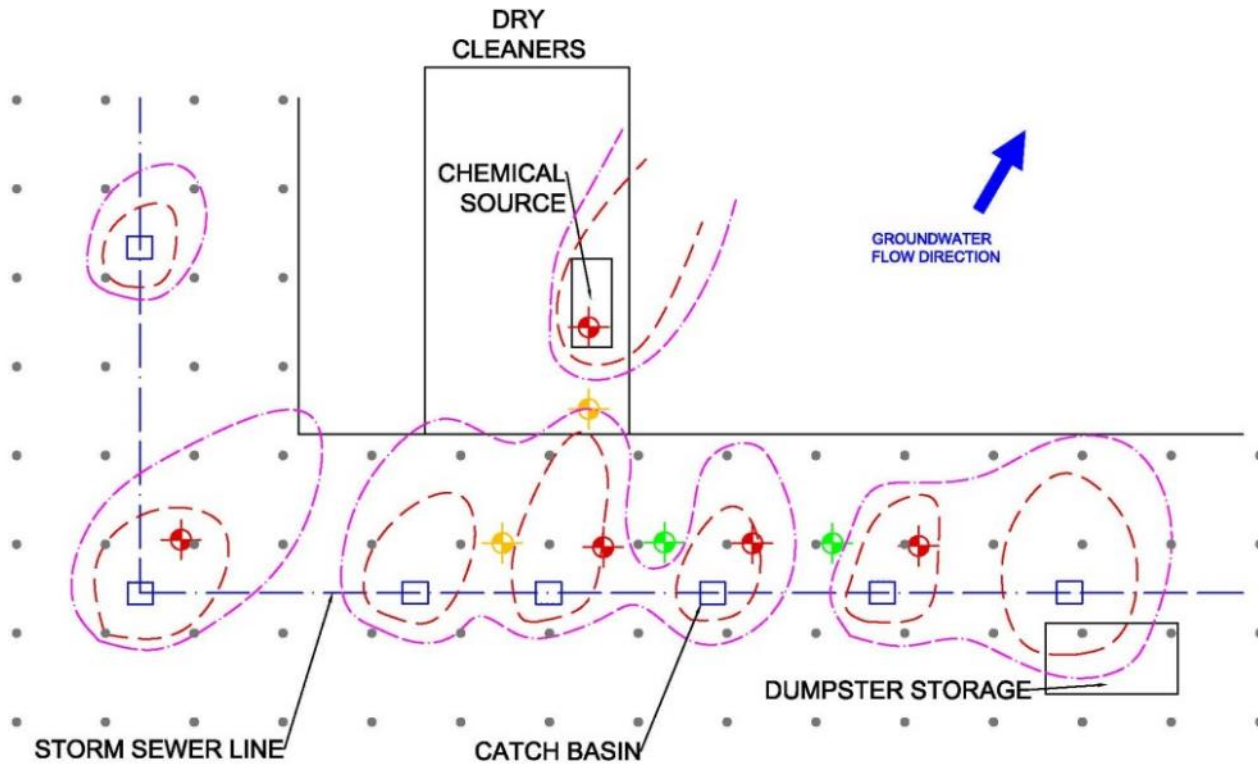
ePTFE® Membrane



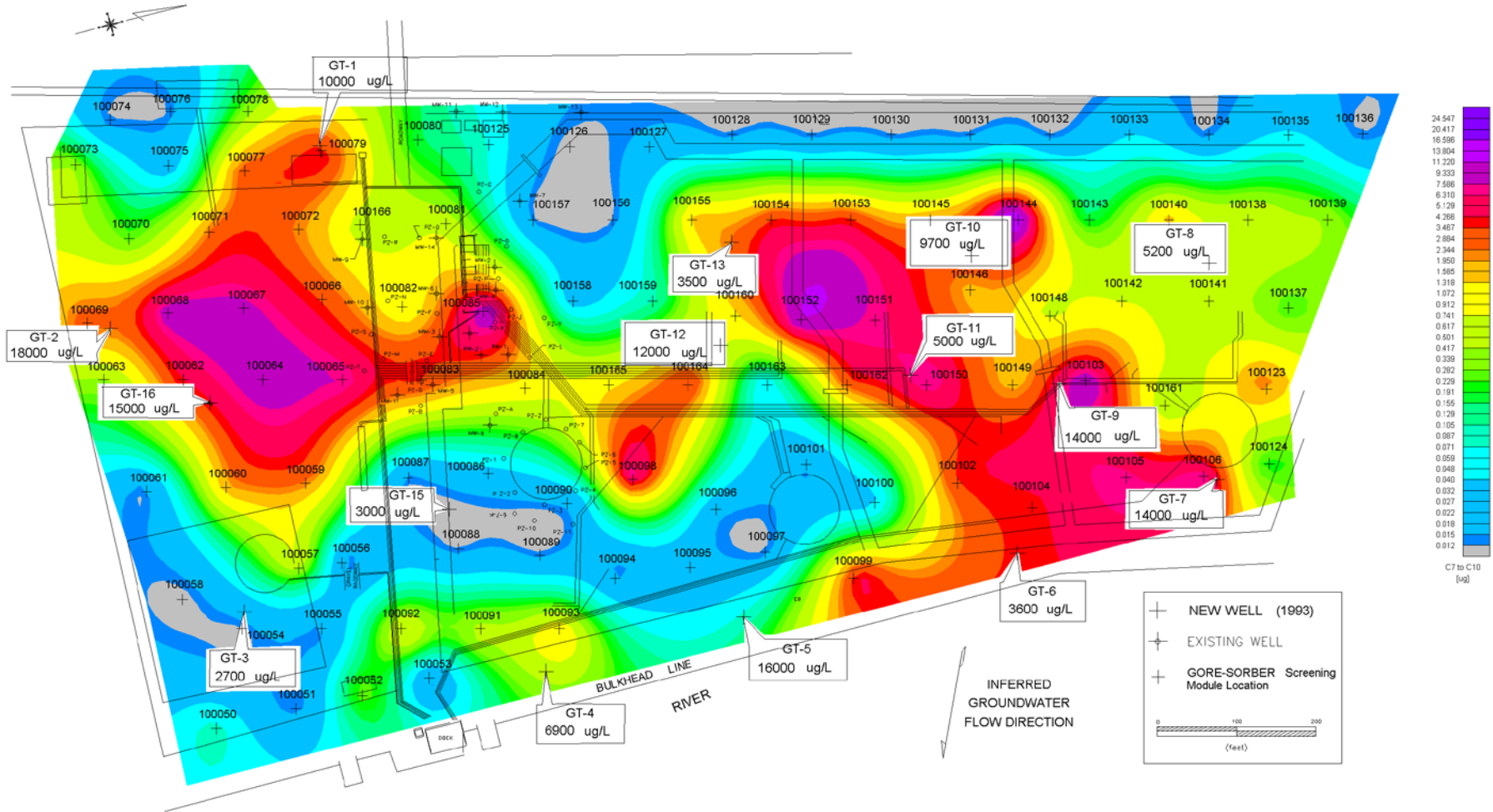
- Drill hole
- Tie sampler to string and string to cork



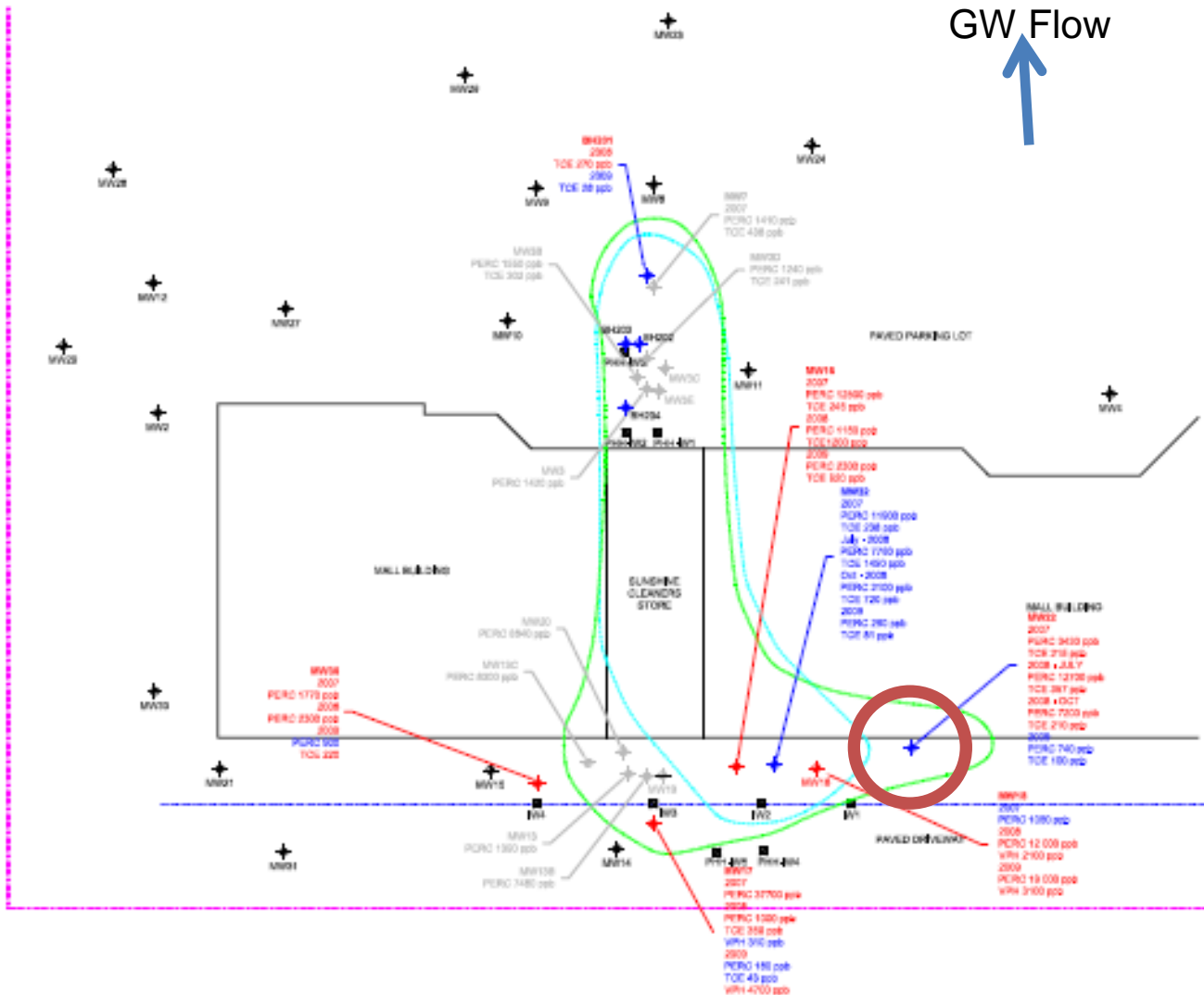
- Place sampler in hole
- Collect samplers and submit to laboratory



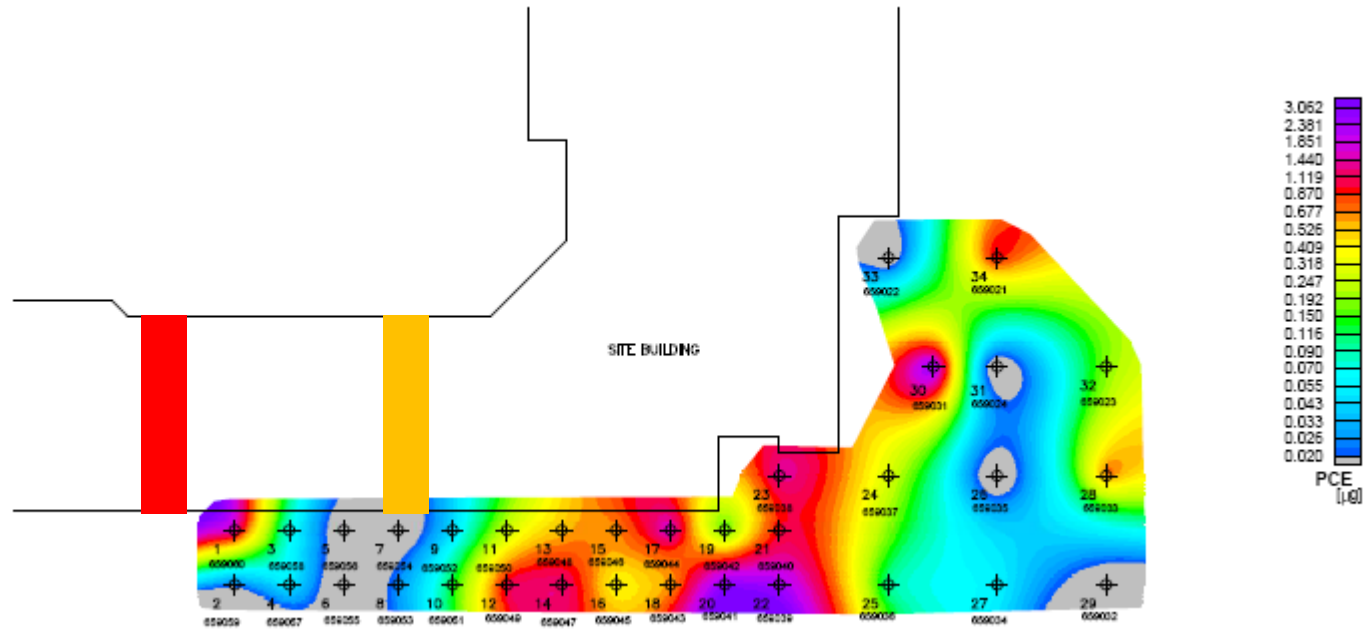
Example of Output



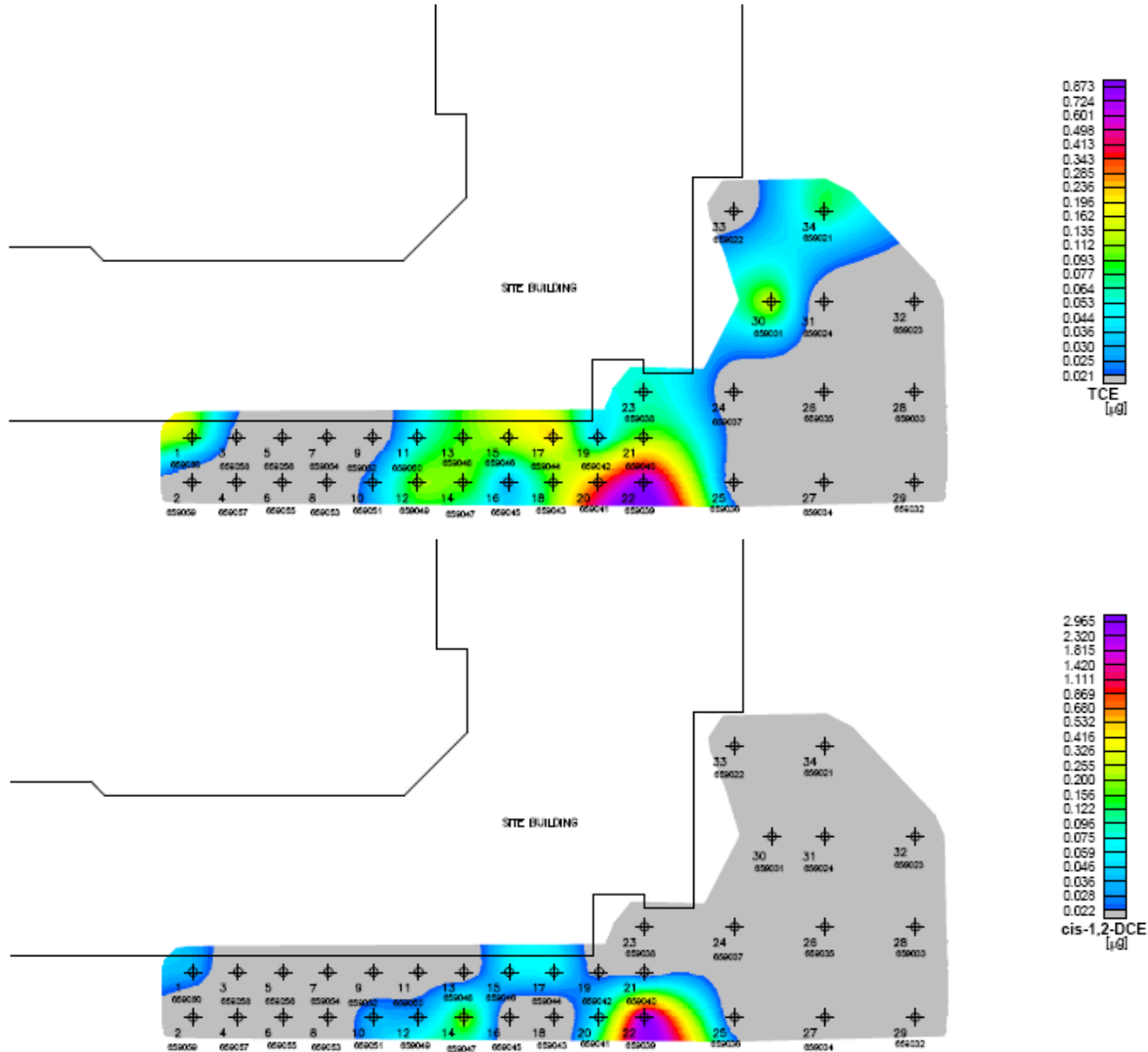
Case Study



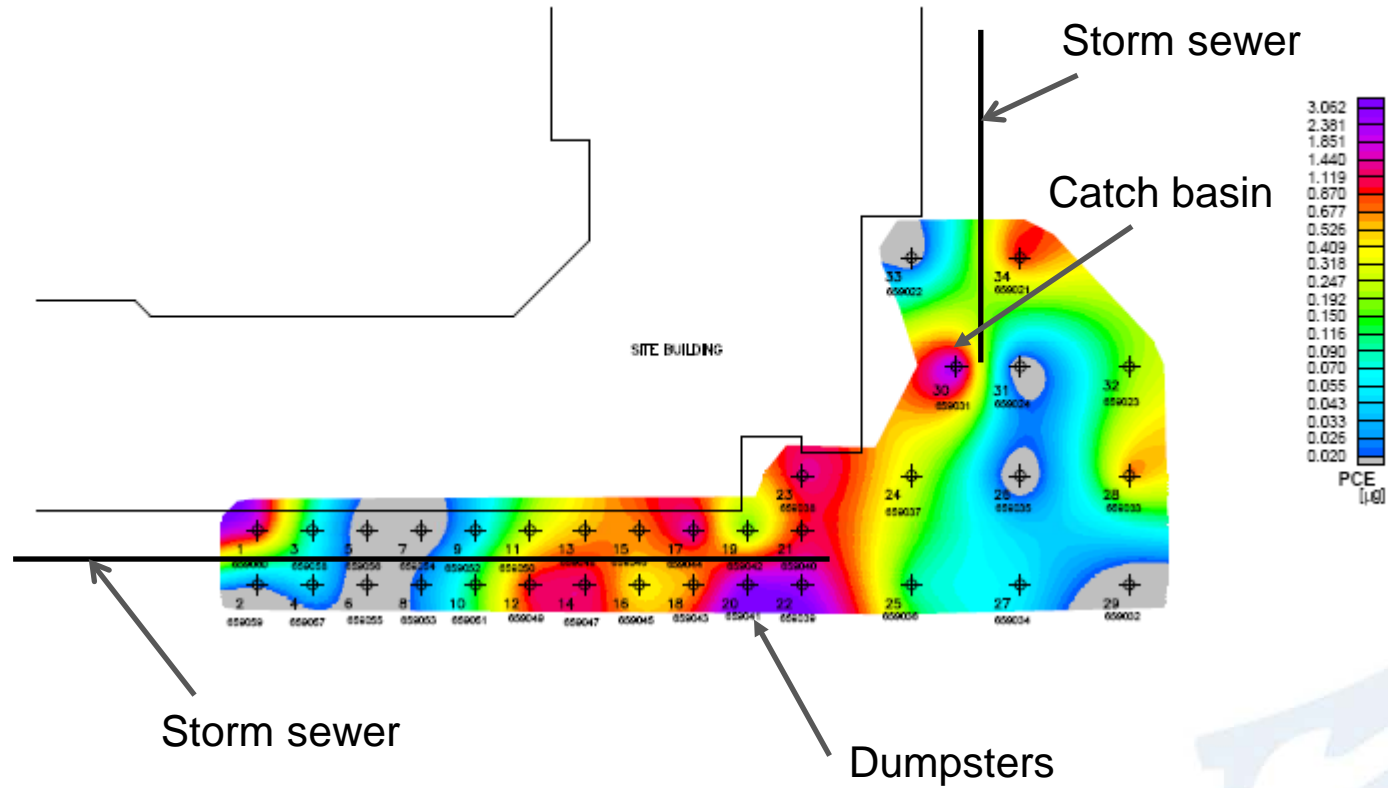
PCE RESULTS



TCE AND DCE RESULTS

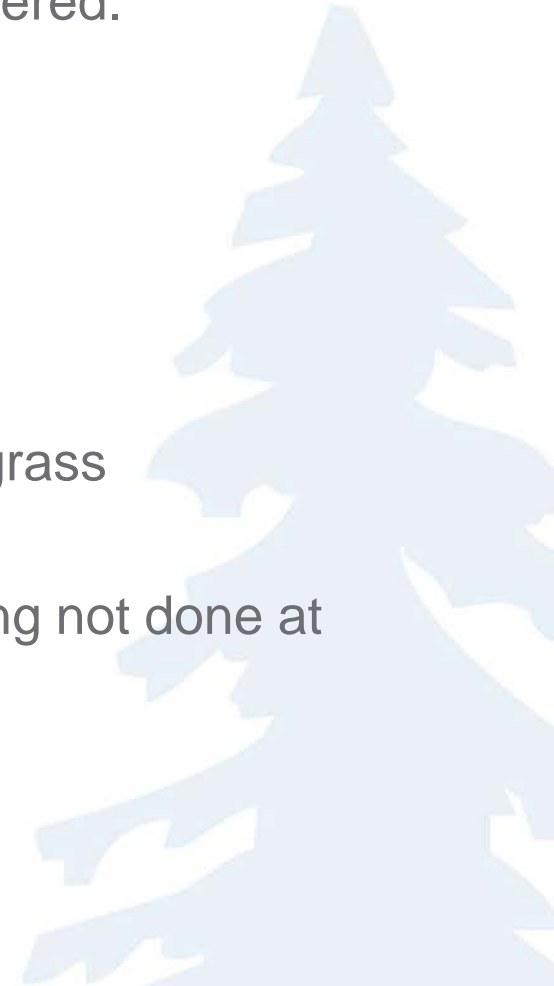


Source Identification



The tool uses vapour migration, thus factors effecting vapour migration that are not consistent across the Site must be considered.

- Changes in lithology (sand verse clay)
- Changes in soil saturation
- Changes in groundcover – Building vs asphalt vs grass
- Temporal changes in weather (especially if sampling not done at same time)



- Provides critical information to allow the surgical placement of standard investigative tools
- Inexpensive to install a large grid
- Accessibility is rarely an issue
- Easy to hide indoors
- Provides a large holistic view of the Site
- Can assess other volatiles at the same time



Bonus Features



Screening Method
Units: micrograms, µg
Vinyl chloride**
Methyl tert-Butyl Ether
BTEX (summed)
Benzene
Toluene
Ethylbenzene
m,p-xylene
o-xylene
Octane
Undecane
Tridecane
Pentadecane
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
Naphthalene
2-Methylnaphthalene
Fluorene
Acenaphthene
Acenaphthylene
trans-1,2-Dichloroethene
cis-1,2-Dichloroethene
Trichloroethene
Tetrachloroethene
1,1-Dichloroethene**
1,1-Dichloroethane
1,2-Dichloroethane
1,1,2-Trichloroethane
1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,1,2-Tetrachloroethane
Chloroform
Carbon tetrachloride
Chlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
TPH†
GRPH†† optional ¹
DRPH† optional ¹

PCBs
Monochlorobiphenyl
Dichlorobiphenyl
Trichlorobiphenyl
Tetrachlorobiphenyl
Pentachlorobiphenyl

PAHs
Phenanthrene
Anthracene
Fluoranthene
Pyrene

Pesticides
Alpha BHC
Beta BHC
Gamma BHC
Delta BHC
Heptachlor
Aldrin
Heptachlor epoxide
Endosulfan I
4,4' DDE
Dieldrin
Endrin
4,4'-DDD
Endosulfan II
Endrin Aldehyde
4,4' DDT
Endosulfan Sulfate
Endrin Ketone
Methoxychlor

Acknowledgments



Tadd Berger, M.Sc., P.Ag., EP, CSAP

tberger@phharcenv.com

604-238-2938