

EVALUATION

- Objectives
- Factors considered when evaluating results
- Soil vapor results
- Structure sampling results
- Community outreach



Overall objective

To answer the following questions

- Subsurface vapors contaminated?
 - If so, nature and extent? Source(s)?
- Current and potential exposures?
- Actions needed to prevent or mitigate exposures and to remediate the source?



Keep in mind...

- Each site is unique
- Specific sampling objectives
- Soil vapor, sub-slab vapor, indoor air and outdoor air results are not evaluated in isolation
 - update conceptual site model as you go
- Expect surprises



Data quality

Verify that all QA/QC requirements have been met at the beginning



Factors considered when evaluating results

Nature and extent of contamination in all media

Factors affecting vapor migration & intrusion

Completed or proposed remedial actions

Sources of volatile chemicals



Factors considered when evaluating results

Background levels of volatile chemicals in air

Applicable standards, criteria and guidance values

Current and future land uses



Soil Vapor Results



Soil vapor results

- No applicable standards, criteria or guidance values
- Look at how concentrations vary spatially
- Typically used to guide structure sampling efforts
- Results may not be representative of concentrations beneath the slabs of near-by buildings



Examples of recommended actions

- No further sampling
- Additional sampling
- Structure sampling
- Address exposures
 - Example: undeveloped parcels



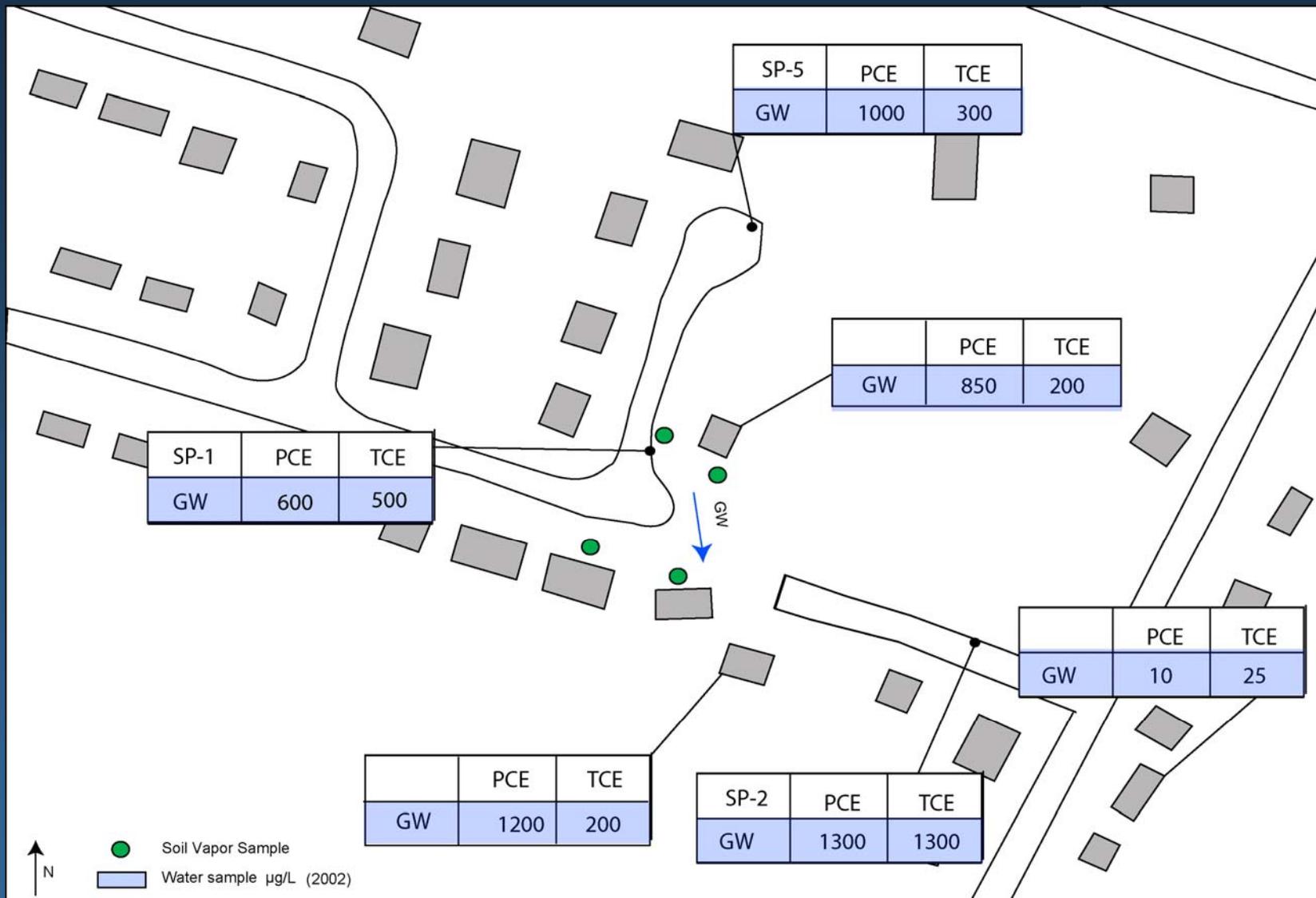
Example

Soil Vapor Results



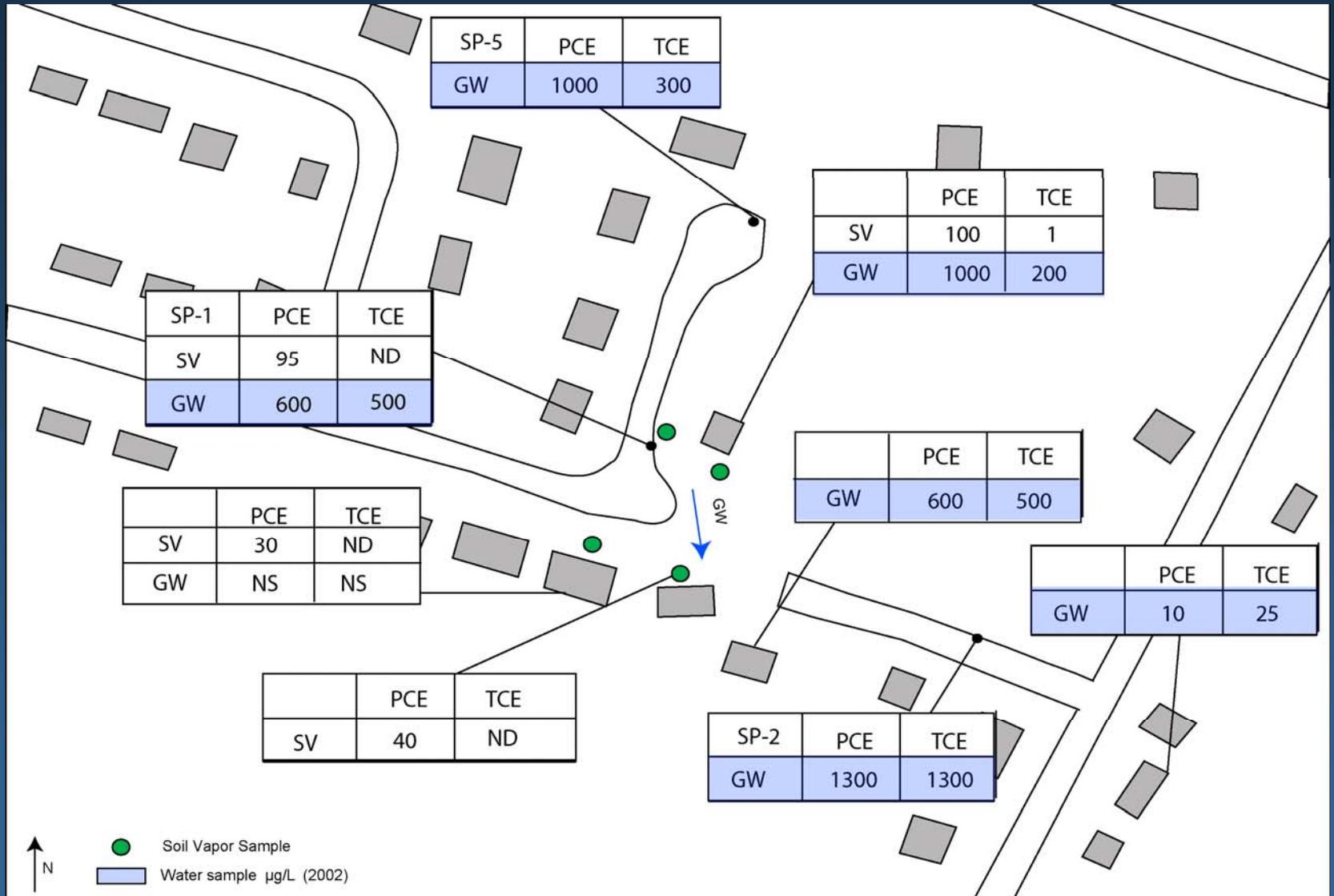
Example: Soil vapor results

SITE B



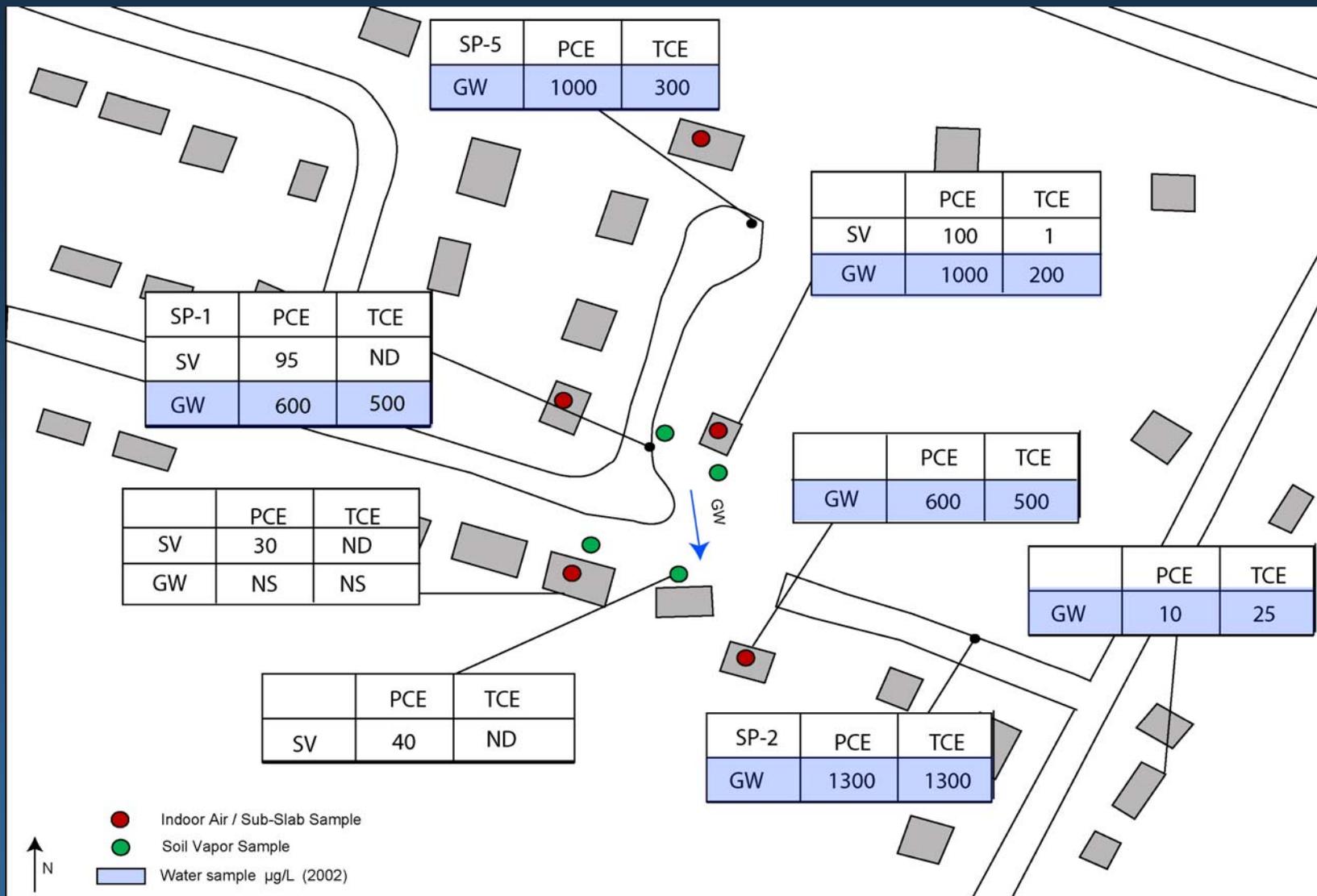
Example: Soil vapor results

SITE B



Example: Soil vapor results

SITE B



Example: Sample type and location

SITE A



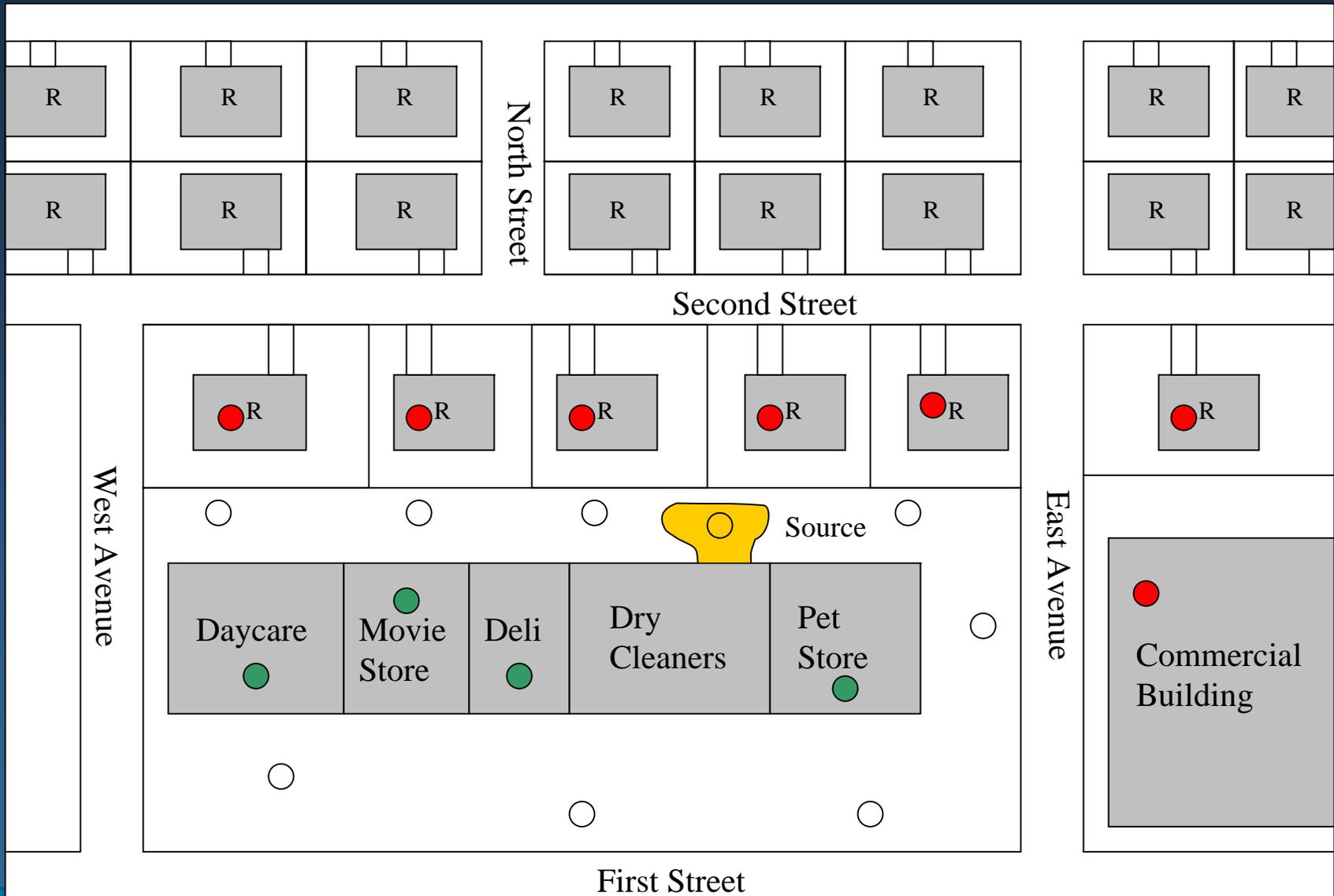
GW ↖

○ Soil Vapor

● Indoor Air / Sub-Slab

Example: Sample type and location

SITE A



GW ↗

○ Soil Vapor

● Indoor Air / Sub-Slab

Structure Sampling Results

- Sub-slab vapor
- Indoor air
- Outdoor air



Structure sampling results

- Typical background concentrations; NYSDOH's guidelines
- Identify sources of volatile chemicals in indoor air
- Comparison of indoor air, outdoor air and sub-slab vapor results
- Look at results on an area-wide basis and in conjunction with other considerations mentioned previously
- Look into results that are inconsistent with conceptual site model

Structure sampling results

NOTE

Understanding the source is crucial for selecting methods to address exposures

Examples of recommended actions

- No further action
- Identify sources
- Further assessment needed
- Additional sampling needed
- Monitoring
- Mitigation

Tool: Decision matrices

- Provide minimum actions required
- 2 matrices developed; 3 compounds assigned
- Factors considered when developed include
 - health risks
 - NYSDOH's air guidelines
 - background concentrations in air
 - analytical capabilities
 - attenuation factors



Decision matrices

Soil Vapor/Indoor Air Matrix 1

WORKING DRAFT 02.23.05

SUBJECT TO CHANGE

| SUB-SLAB VAPOR CONCENTRATION of COMPOUND (mcg/m ³) | INDOOR AIR CONCENTRATION of COMPOUND (mcg/m ³) | | | |
|----------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| | < 0.25 | 0.25 to < 2.5 | 2.5 to < 5.0 | 5.0 and above |
| < 5 | 1. No further action | 2. Take reasonable and practical actions to identify source(s) and reduce exposures | 3. Take reasonable and practical actions to identify source(s) and reduce exposures — and — Monitor | 4. MITIGATE — or — Take reasonable and practical actions to identify source(s) and reduce exposures — and — Monitor |
| 5 to < 50 | 5. No further action | 6. Monitor | 7. Monitor | 8. MITIGATE |
| 50 to < 250 | 9. Monitor | 10. Monitor | 11. MITIGATE | 12. MITIGATE |
| 250 and above | 13. MITIGATE | 14. MITIGATE | 15. MITIGATE | 16. MITIGATE |

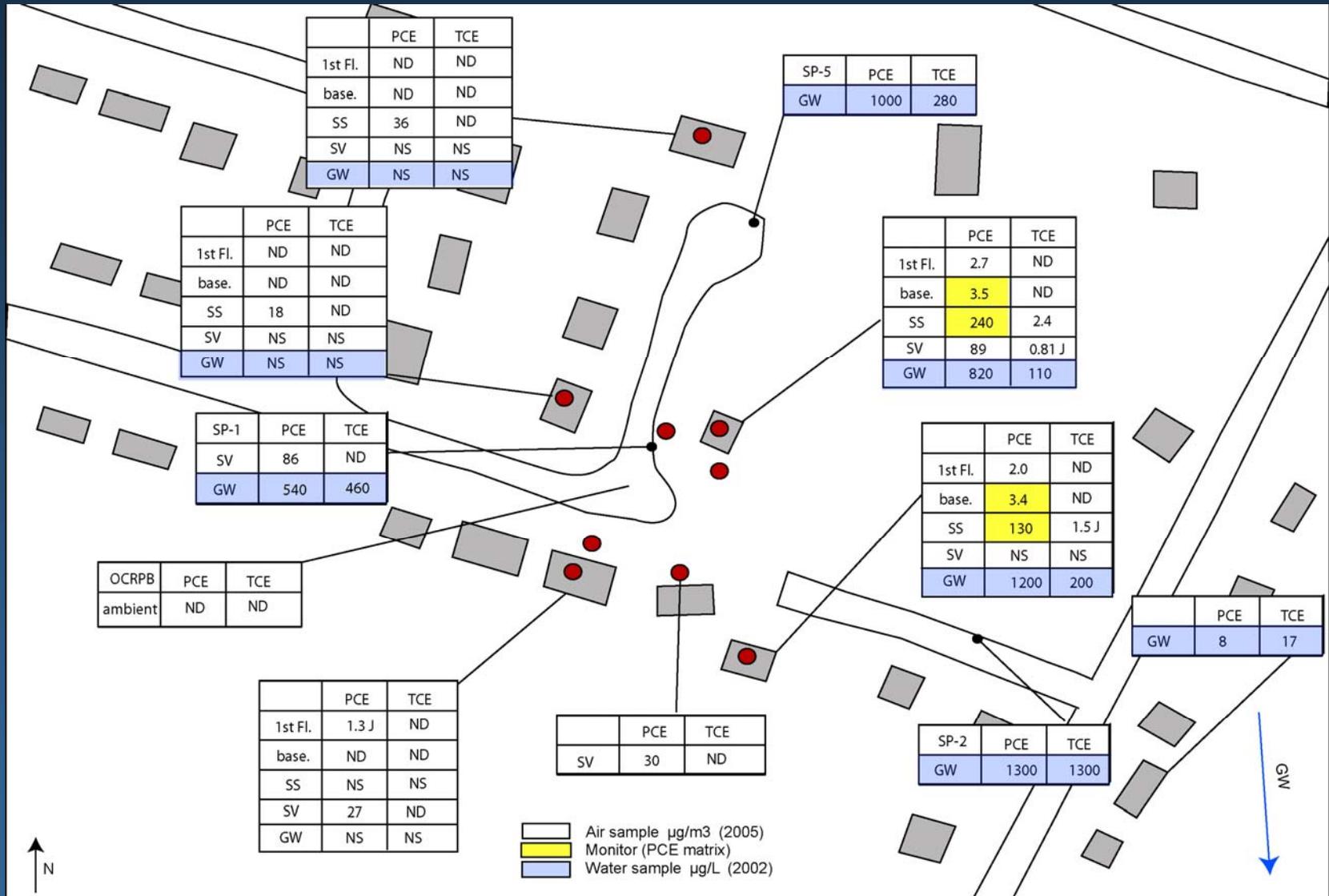
Example

Structure Sampling Results



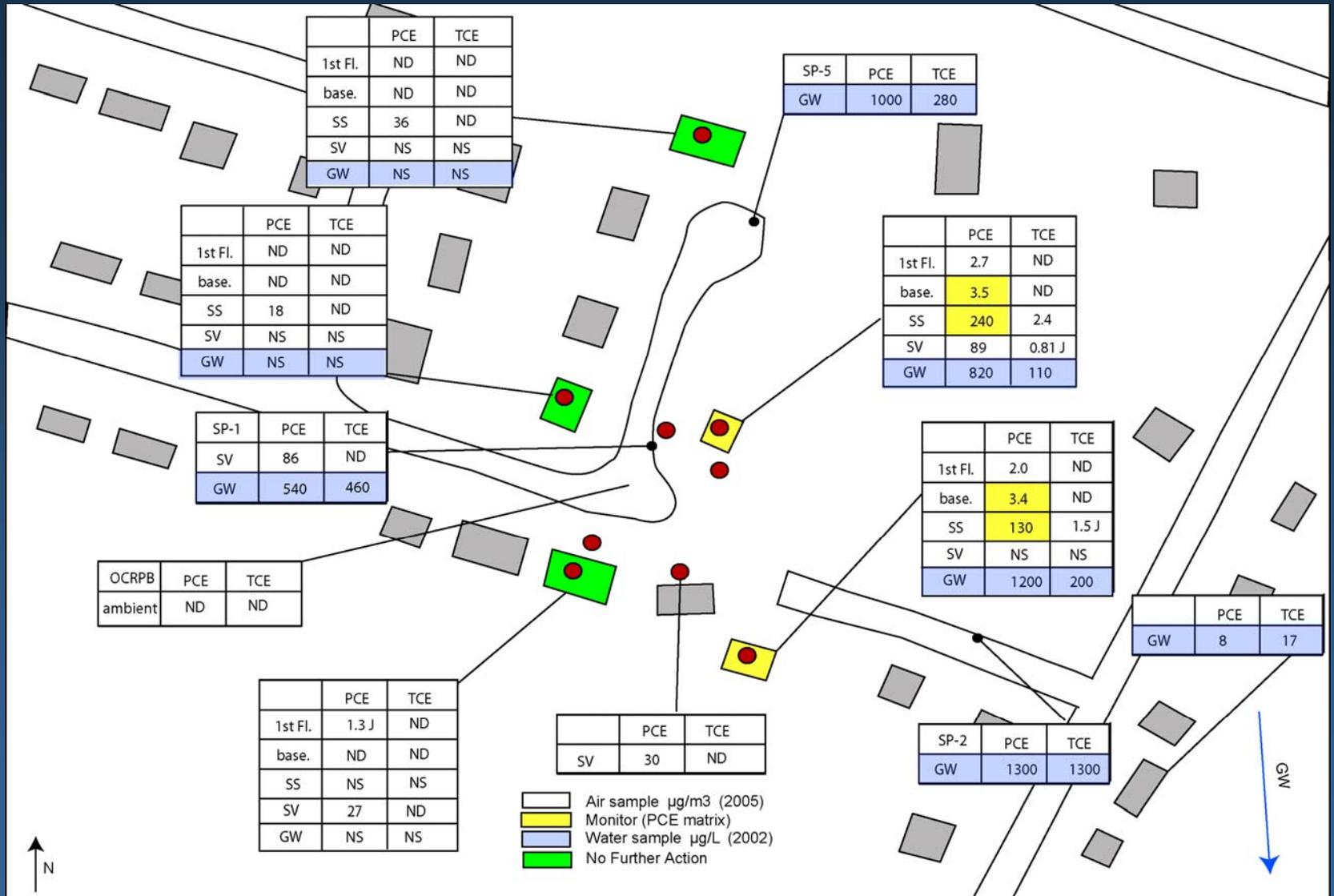
Example: Structure results

SITE B



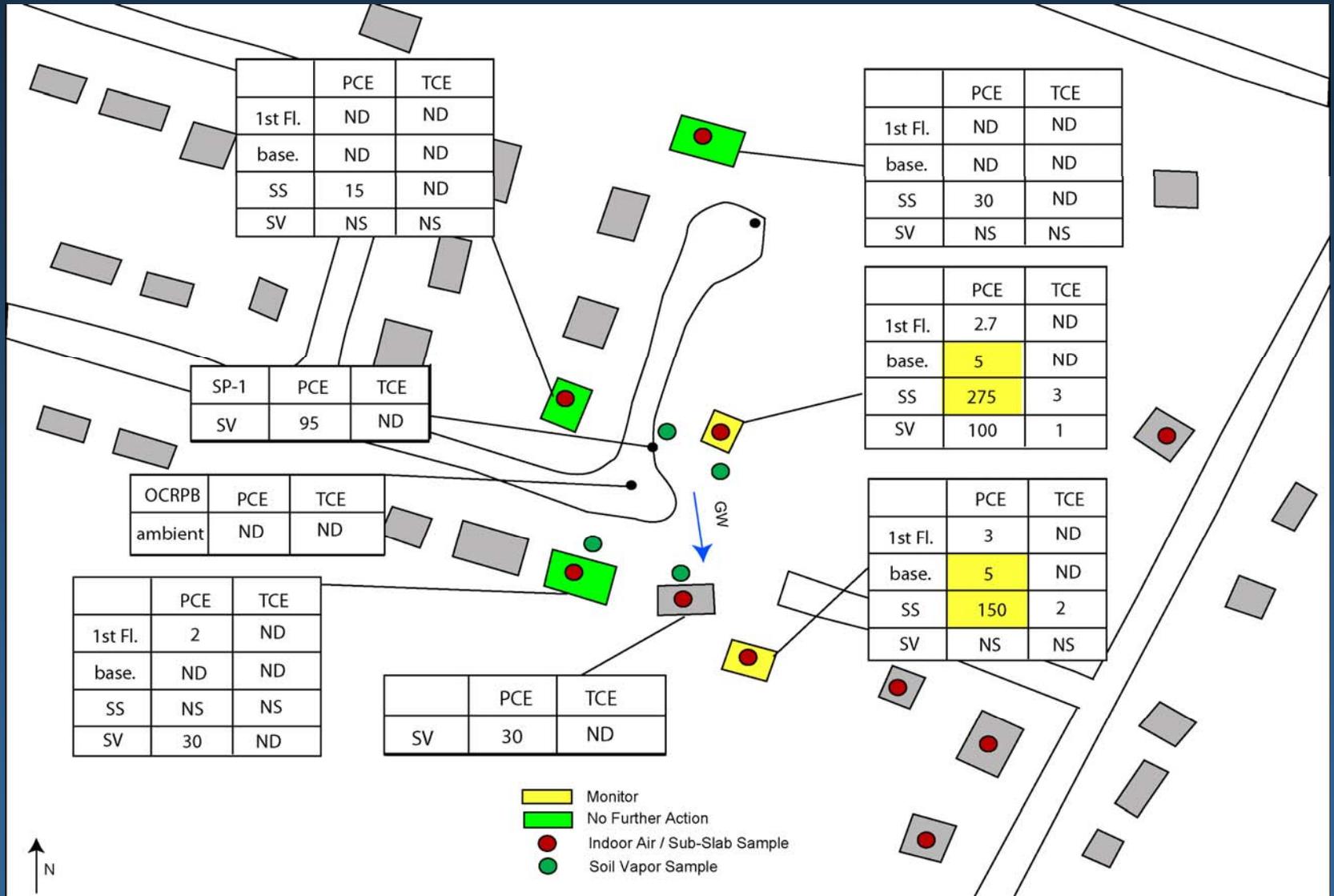
Example: Structure results

SITE B



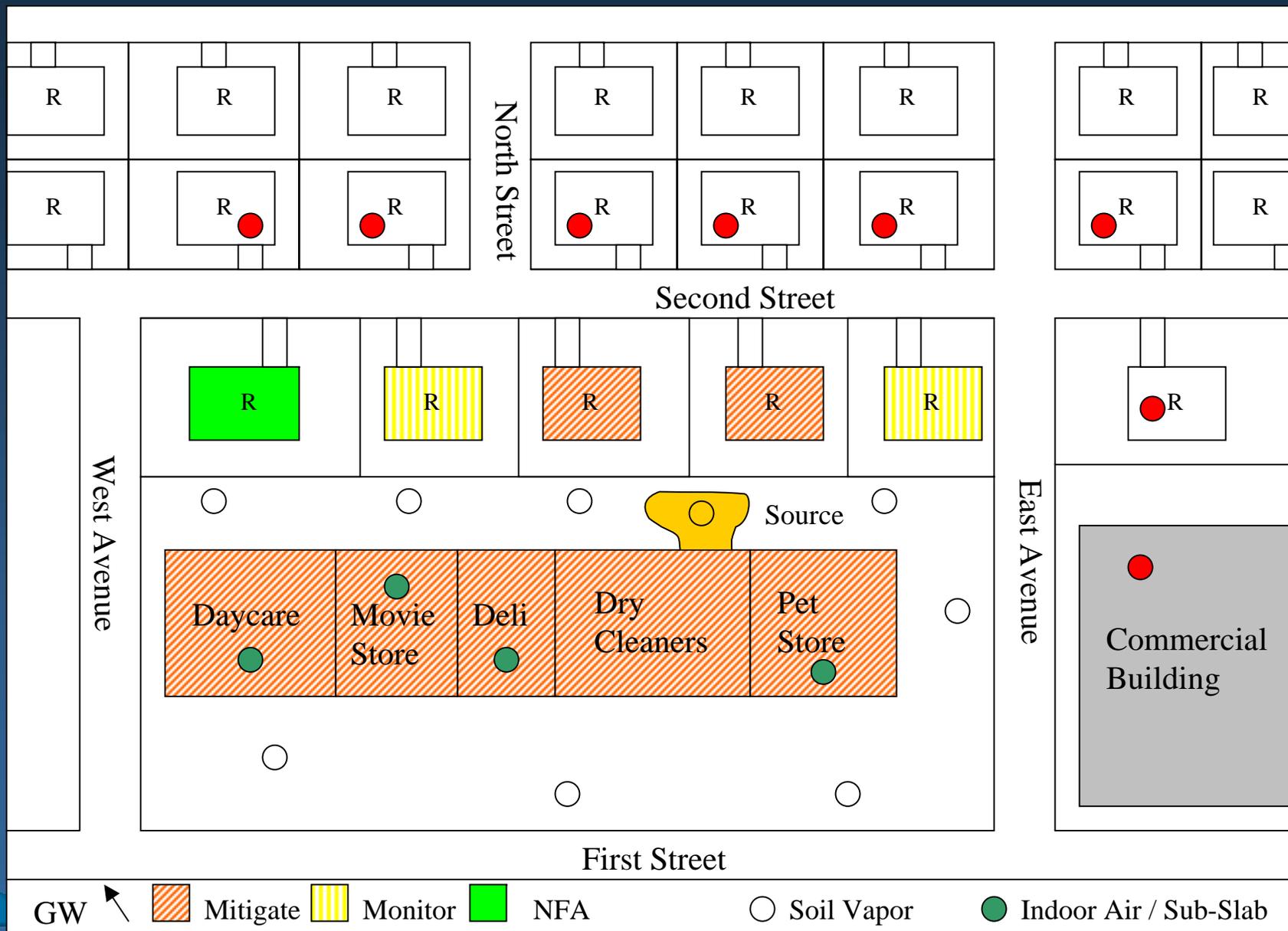
Example: Structure results

SITE B

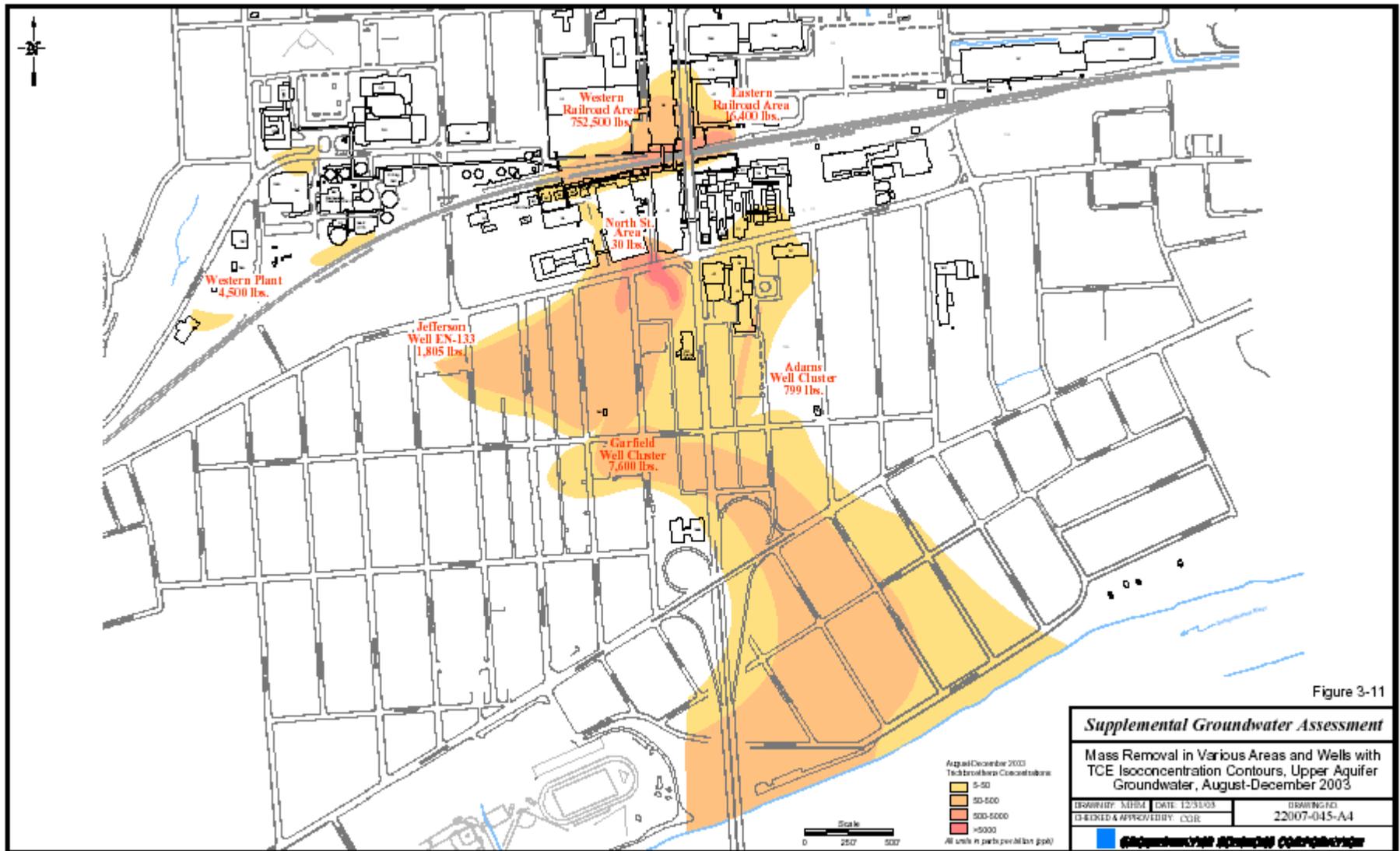


Example: Structure results

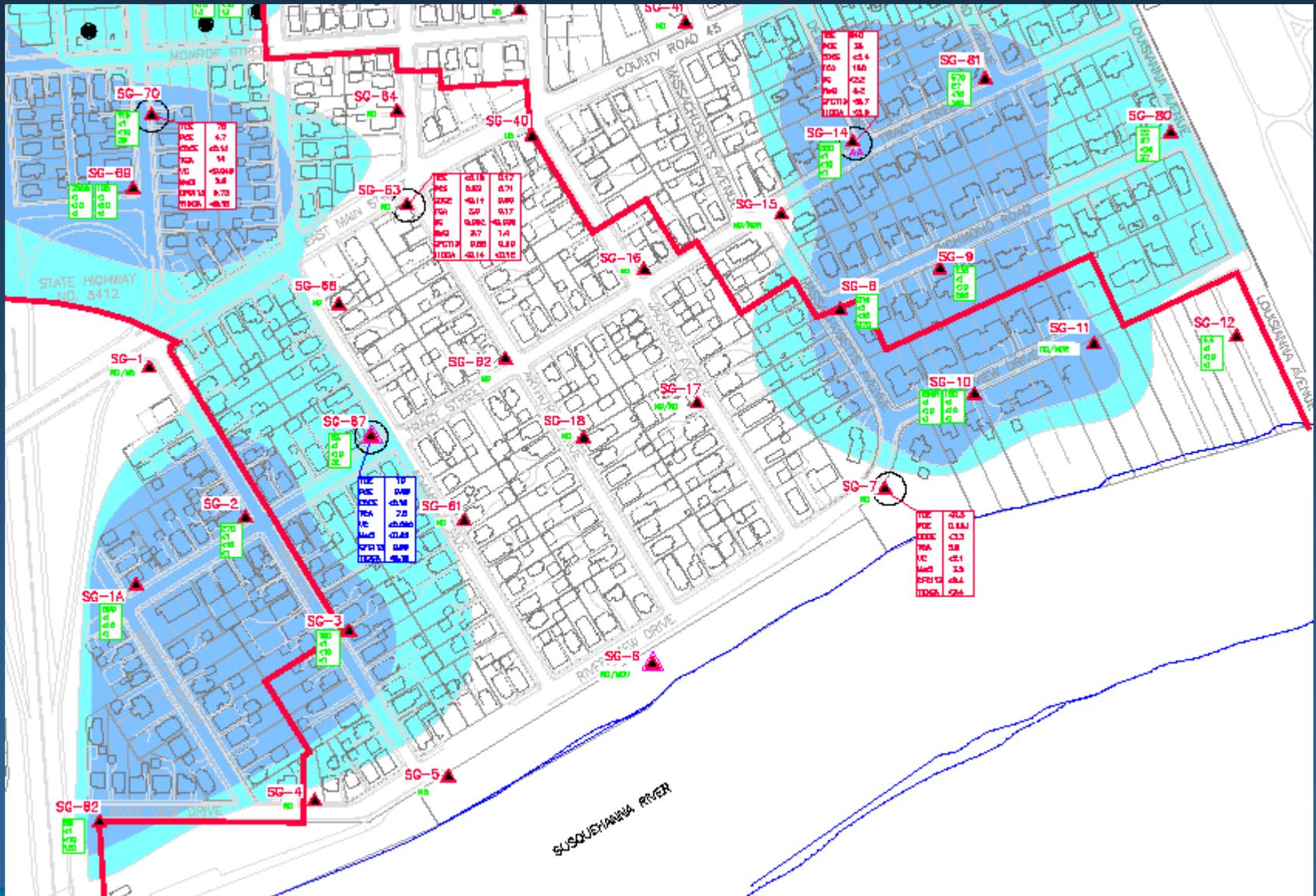
SITE A



Example: Expect surprises

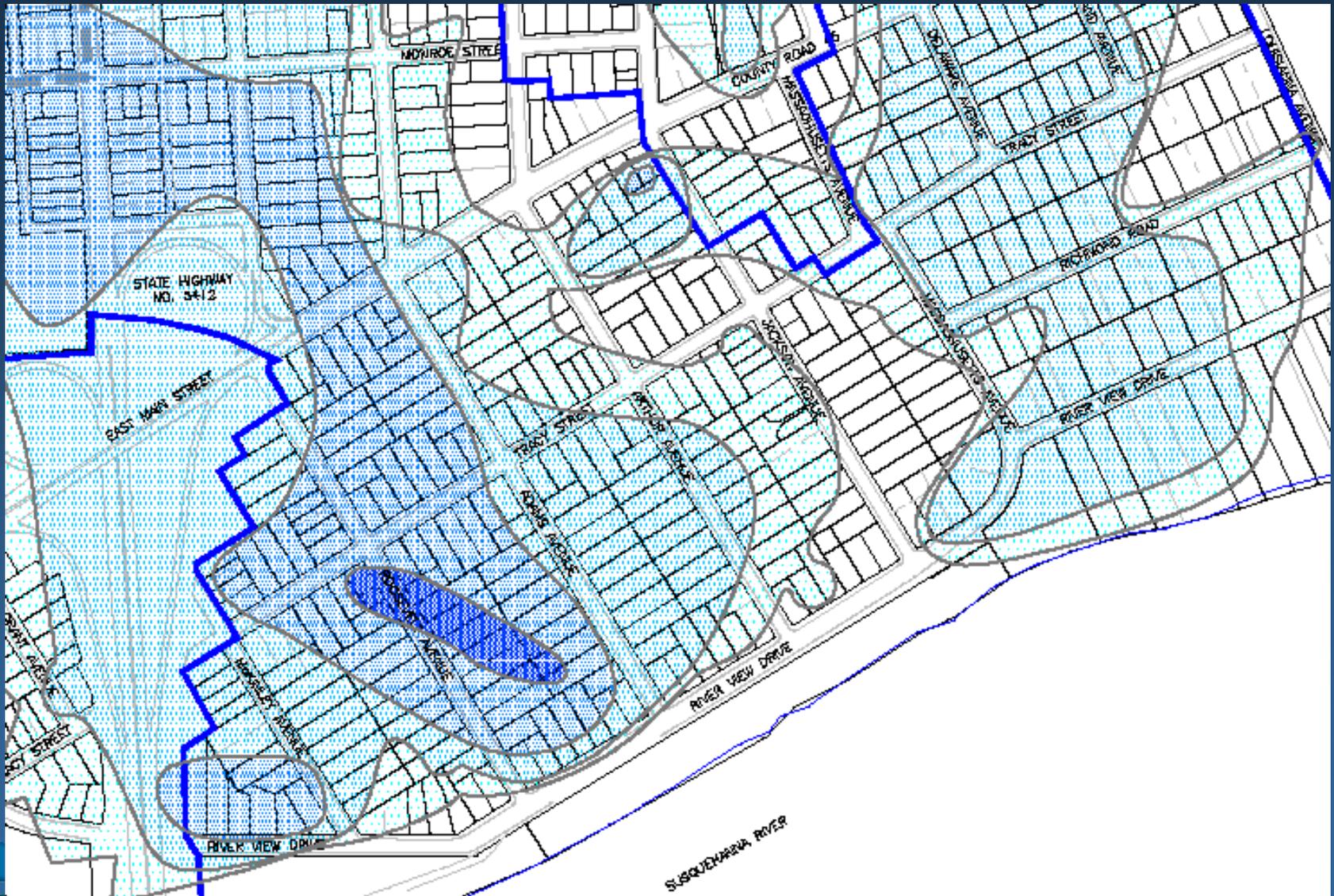


Example: Expect surprises



Example: Expect Surprises

Sub-slab and soil vapor predicted concentrations



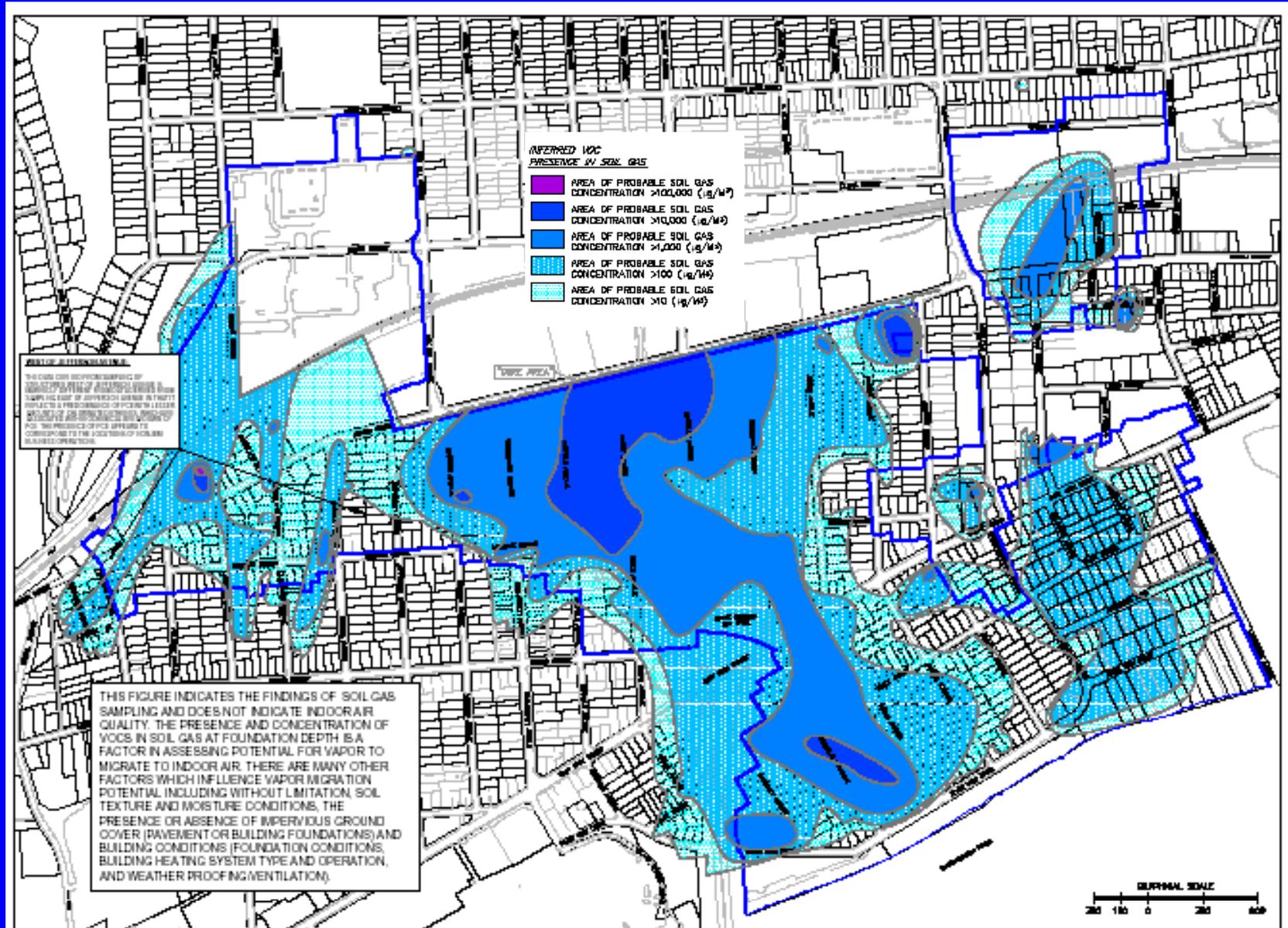
Example: Expect surprises

Lessons learned

- even when you think you have adequately characterized the groundwater, expect surprises
- if done properly, soil vapor surveys are useful tools for confirming and expanding on information derived from groundwater data

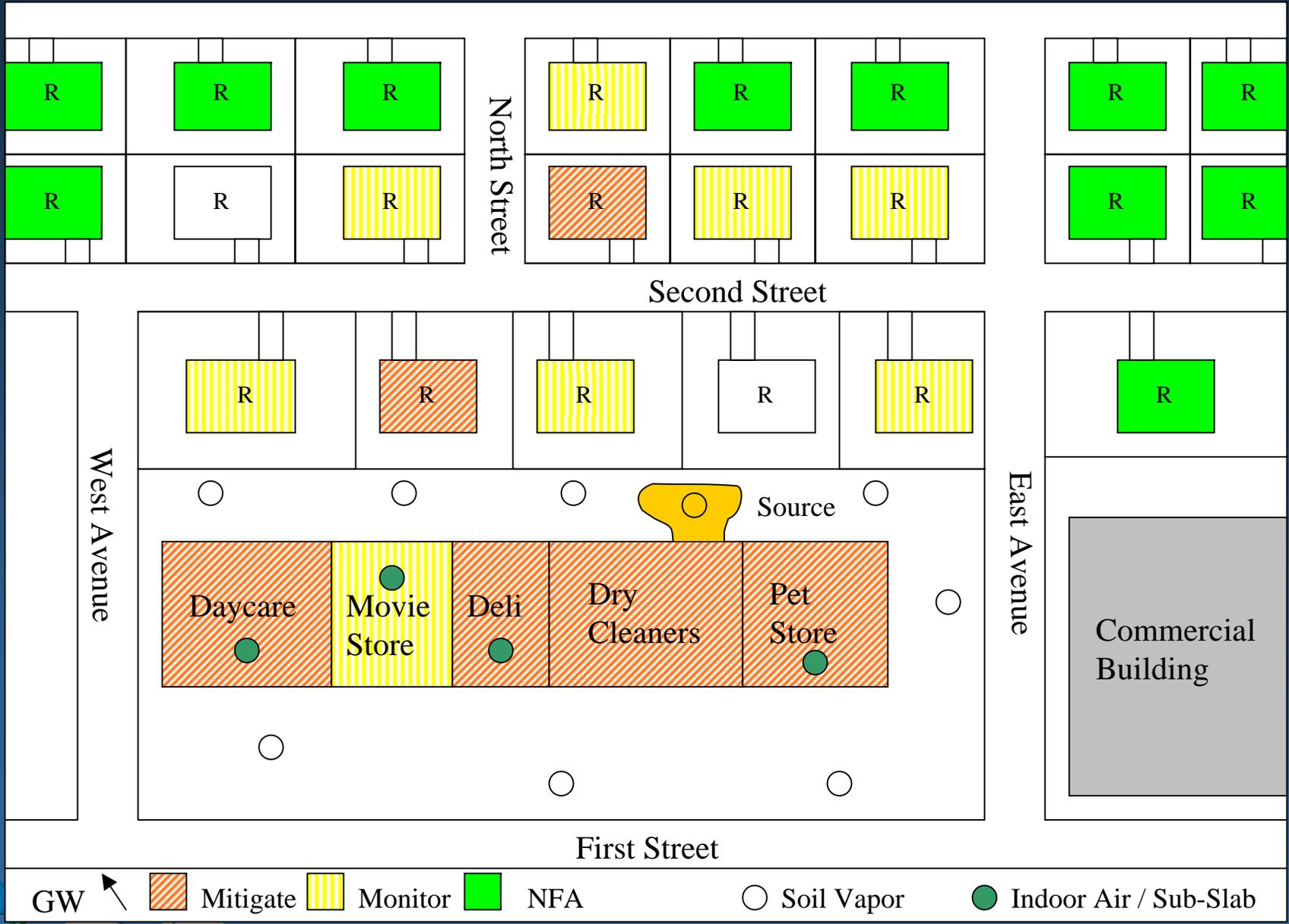


Example: Endicott — Multiple sources



Example: Results pattern

SITE A



Implementing Monitoring and Mitigation Actions



Examples of approaches taken in NYS

Structure-by-structure basis

Block-by-block basis

Example:
“blanket mitigation”

Sub-slab concentration basis

Example:
if $> 5\text{mcg}/\text{m}^3$ TCE in sub-slab, then
mitigate



Examples of approaches taken in NYS

Soil vapor concentration basis

Example:

delineate soil vapor to non-detectable levels of TCE, then mitigate all above soil vapor plume

NOTE

All actions taken are protective of public health

Community outreach

Timeframes involved

Results and what they mean

- results letters, public meetings, availability sessions, telephone calls, etc

Proposed actions

- results letters, public meetings, availability sessions, telephone calls, etc.



Community outreach

Individual property owners and tenants, as well as general community

Fact sheets available...

- ALL in packet + site-specific ones



Lessons learned

Data processing/management plans

- will vary with sampling effort
- time-sensitive decisions -- easy visualization
- who gets what materials and when?

Building questionnaires and product inventories

- important to get as early as possible
- missing information? adequate? consistent?



Lessons learned

Analytical data

- reporting limits being met?
- preliminary data or validated data
- validation process and qualifications

NOTE

Communication and teamwork are key

Conclusions

- Many factors are taken into account when evaluating soil vapor intrusion
- A phased iterative approach is taken to address the overall objective
- Current and potential exposures need to be addressed
- Expect to find additional sources
- Expect surprises



OPEN DISCUSSION