STONE ENVIRONMENTAL

Historic Data Visualization for Contaminated Sites: in 3D and Online

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Contaminated sites

Residual contamination can exist at many types of sites.

- Industrial Manufacturing
- Military Facilities
- Former Landfills
- Dry Cleaners
- Many more

Contaminants of Concern

- Chlorinated Solvents
- Metals
- PCBs
- Emerging Contaminants

Understanding Contamination

Researchers need to create a “Conceptual Site Model”

- What was the source of contamination?
- What is there and how much?
- How deep/far has the contamination reached?
- What are the best ways to clean up?

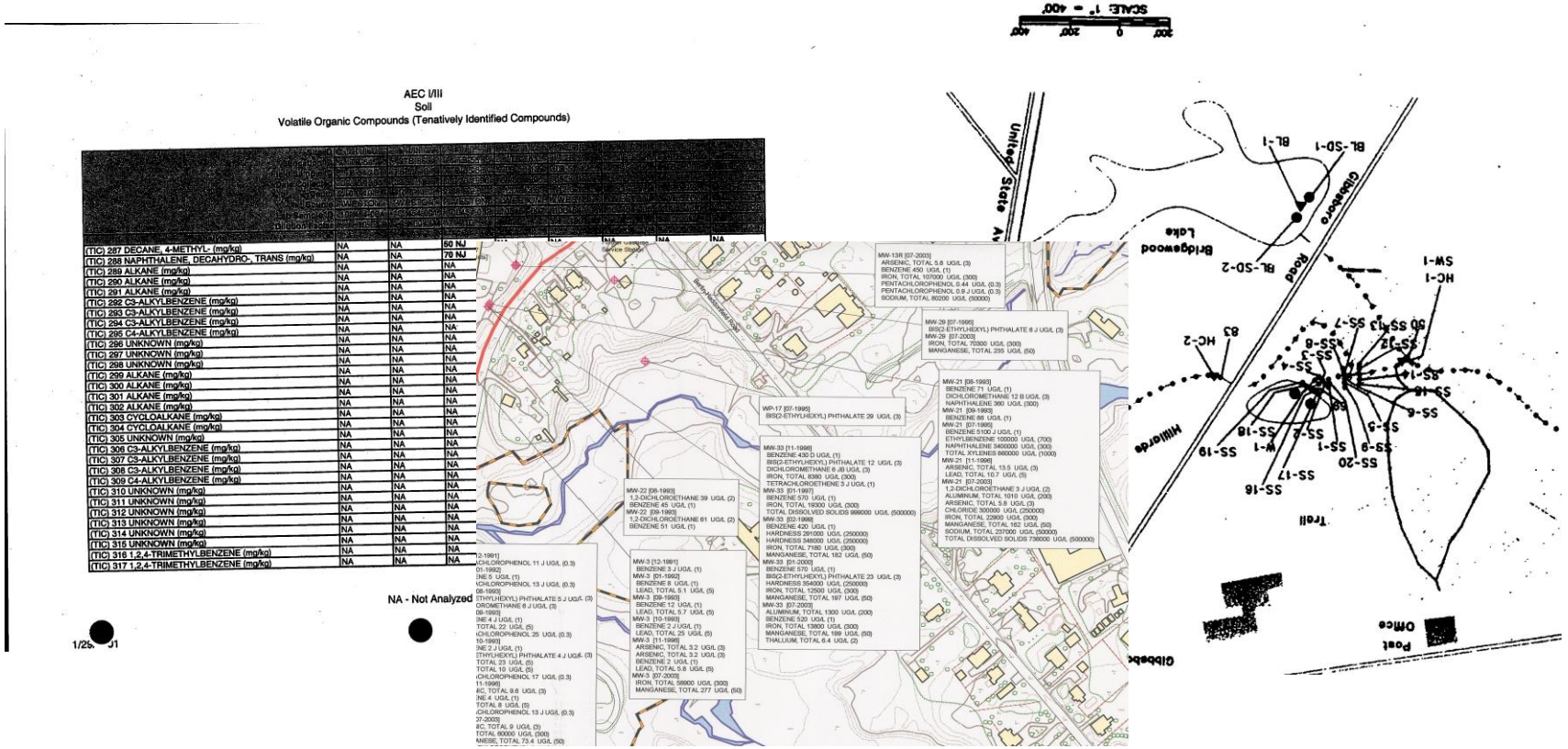
How do we study these sites?

- Drilling – soil borings and monitoring wells
- Testing soil, groundwater, air, concrete, many other substances
- Measuring groundwater flow
- Understanding the geology and hydrology of the site

The Problem: Scope and Scattered Data

Many contaminated sites across the country have been studied for decades, and have amassed huge amounts of historical analytical chemistry data.

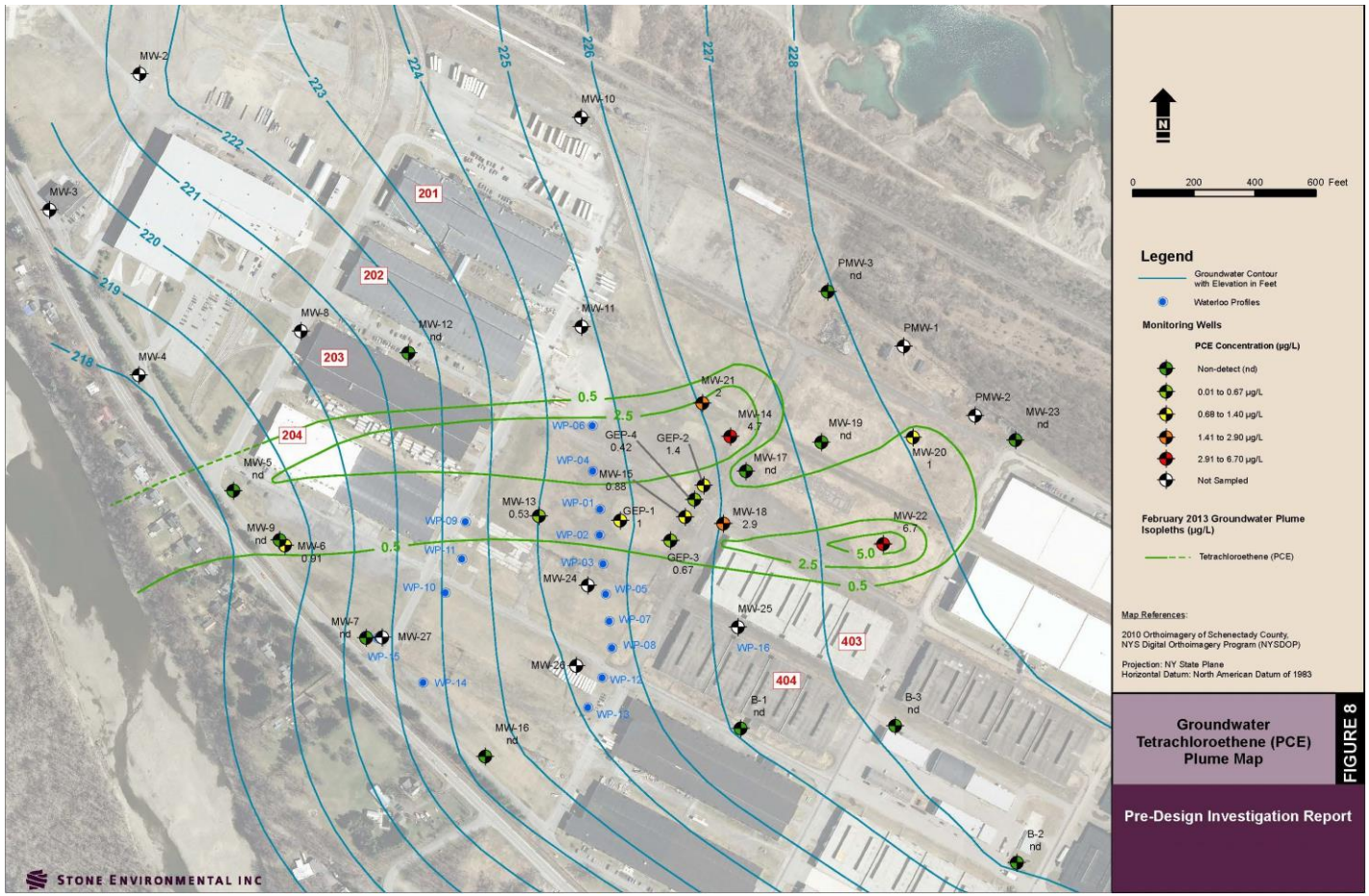
- Unfortunately, the data are often scattered over myriad reports, maps, formats
- Varying degrees of legibility and data completeness



The Problem: 2D Visualization of 3D Data

Underground contaminant plume are a 3D system

- Visualizing 3D data is inherently difficult in 2D
  - Stakeholders may not be used to interpreting 2D map data like contours, geologic maps, etc.



The Solution: Historic Data Compilation and Visualization

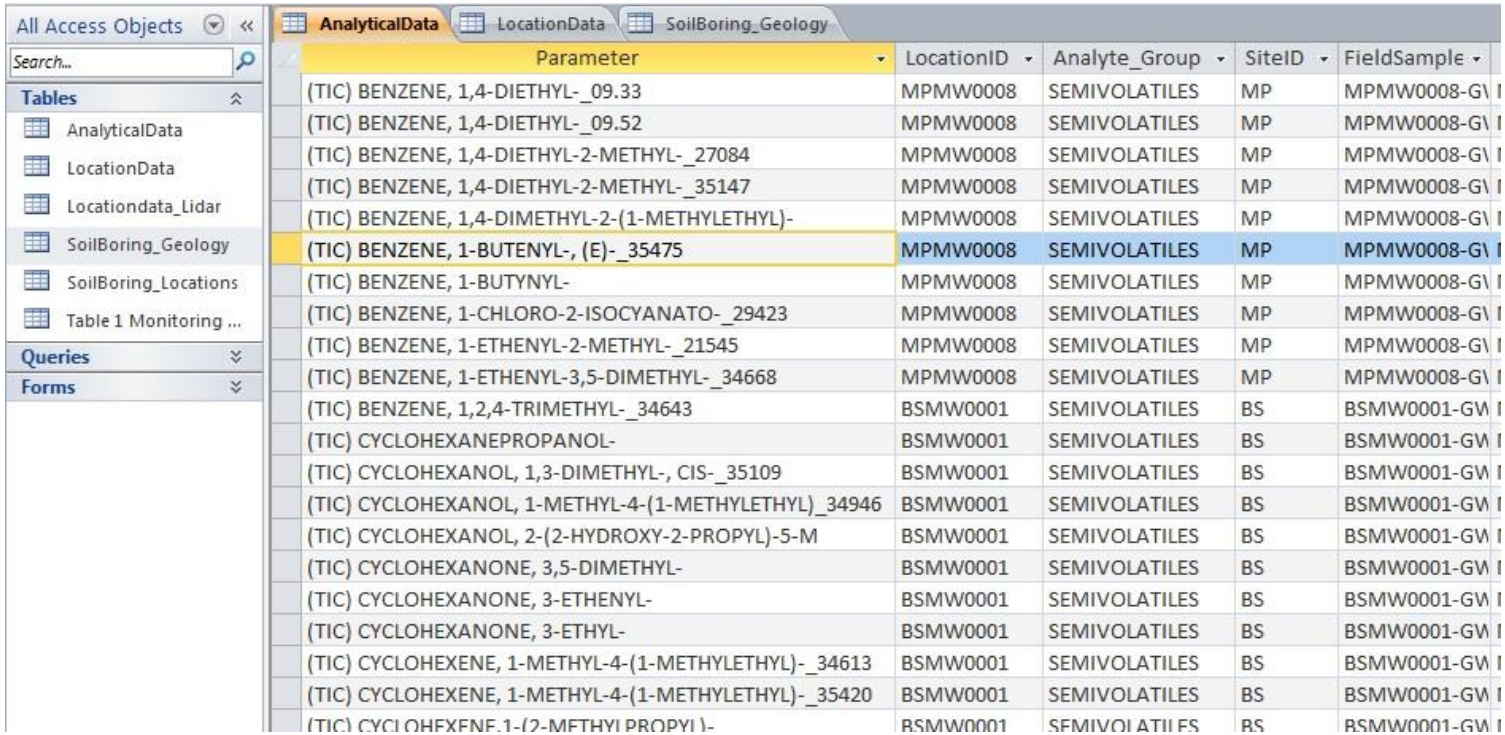
Go from a stack of old reports to a 3D model!

- Step 1: Data compilation
  - Identify and import all sources of data into a project database
  - Python, MS Access, ArcGIS
- Step 2: Geospatial Analysis
  - Analyze data and form a conceptual site model
  - ArcGIS, Earth Volumetric Studio (EVS)
- Step 3: Data Visualization
  - Display data in 3D, in maps, or online
  - ArcGIS, ArcGIS Online, EVS

Historical Data Compilation

Stone combs through all historical documents and organizes the data into a single database.

- Standardized formats (chemical names, etc)
- Searchable
- Exhaustive – All the data is in one place!



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(TIC) BENZENE, 1,4-DIETHYL-2-METHYL-_35147	MPMW0008	SEMIVOLATILES	MP	MPMW0008-GW
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(TIC) CYCLOHEXANONE, 3-ETHENYL-	BSMW0001	SEMIVOLATILES	BS	BSMW0001-GW
(TIC) CYCLOHEXANONE, 3-ETHYL-	BSMW0001	SEMIVOLATILES	BS	BSMW0001-GW
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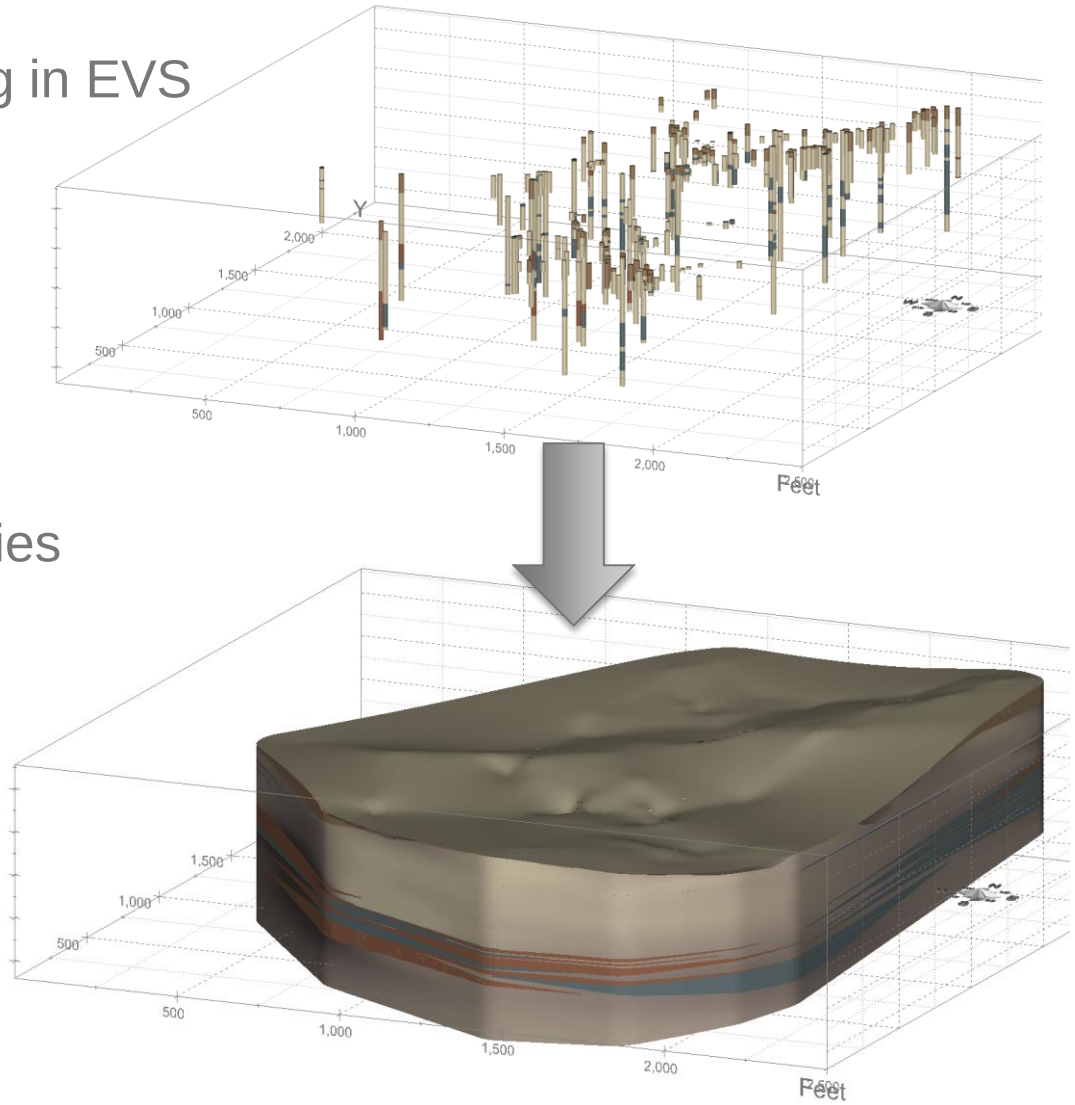
(TIC) CYCLOHEXENE,1-(2-METHYLPROPYL)-	BSMW0001	SEMIVOLATILES	BS	BSMW0001-GW

Geospatial Analysis

Stone combines datasets into a cohesive conceptual framework

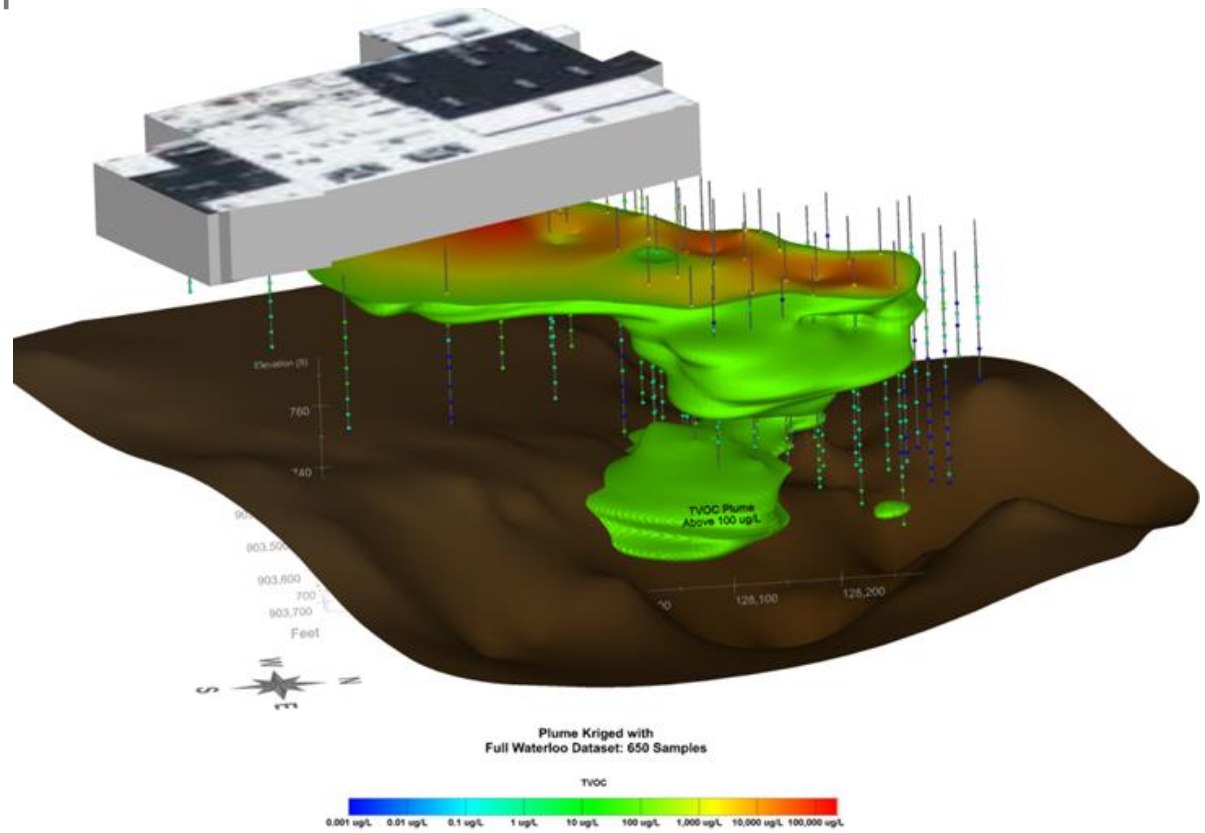
- Mapping in ArcGIS
- 3D kriging and geologic modeling in EVS
- Create a conceptual site model
  - Hydrology
  - Geology
  - Contaminant Pathways
  - Identify data gaps
  - Recommend clean up strategies



Historical Data Visualization

Stone visualizes highly complex and detailed sites in intuitive and data-rich formats

- Visually compare contaminant concentrations with geology, hydrology, etc.
  - 3D visualization with Earth Volumetric Studio
  - Interactive, shareable maps with ArcGIS online
  - Interpretation

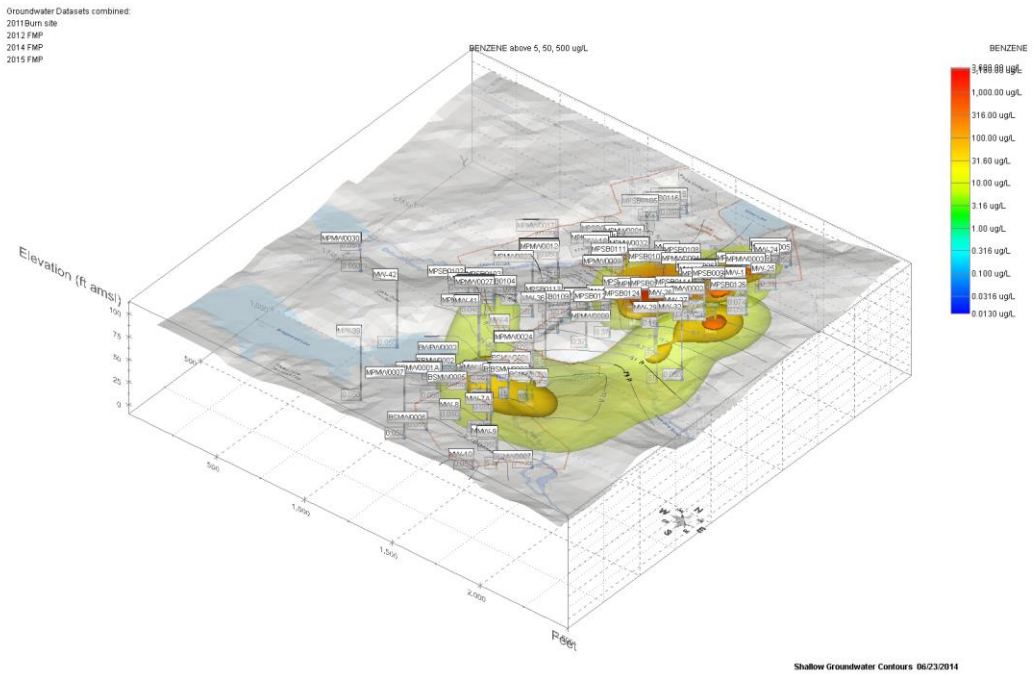


Example 1: Superfund Site

Stone was tasked with creating a conceptual site model for a superfund site

- Data going back to 1979
- More than 250 soil borings and wells
- Thousands of individual datapoints
- Data scattered between 115 different files

Results!



Example 2: Area Wide Redevelopment

Stone analyzed and mapped historic uses of parcels in Bennington, VT

- Historic maps and directories
- Presented in ArcGIS Online

(Link)

Thank You!

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