Review of Existing Data to Develop a Preliminary Conceptual Site Model

Countrymark Site in Mt. Vernon, IN

The world's leading sustainability consultancy

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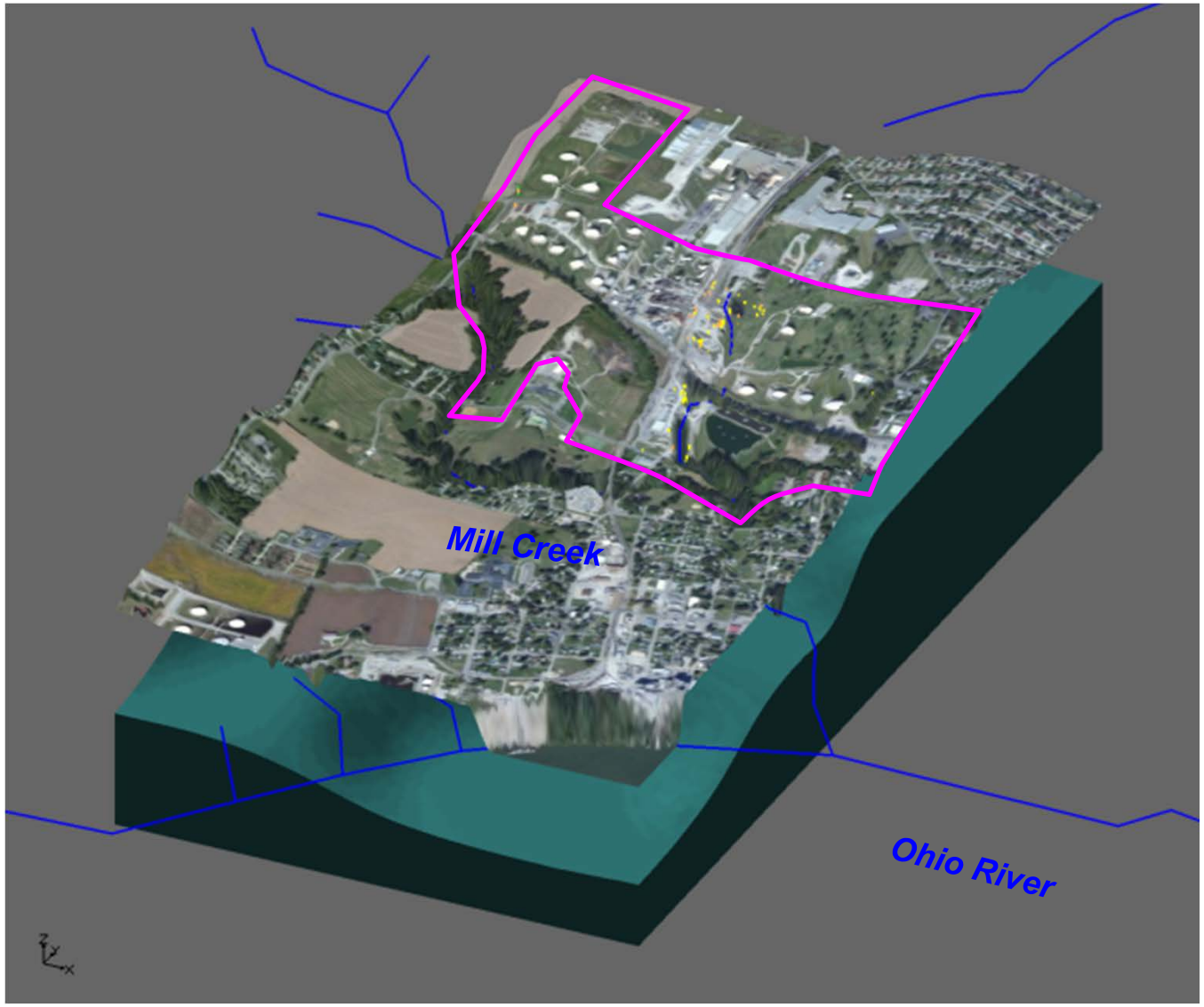
Conceptual Site Model – Site View



Legend

- Wells/boreholes
- 3-D drainage networks
- Bedrock
- Property boundary on 3-D ground surface

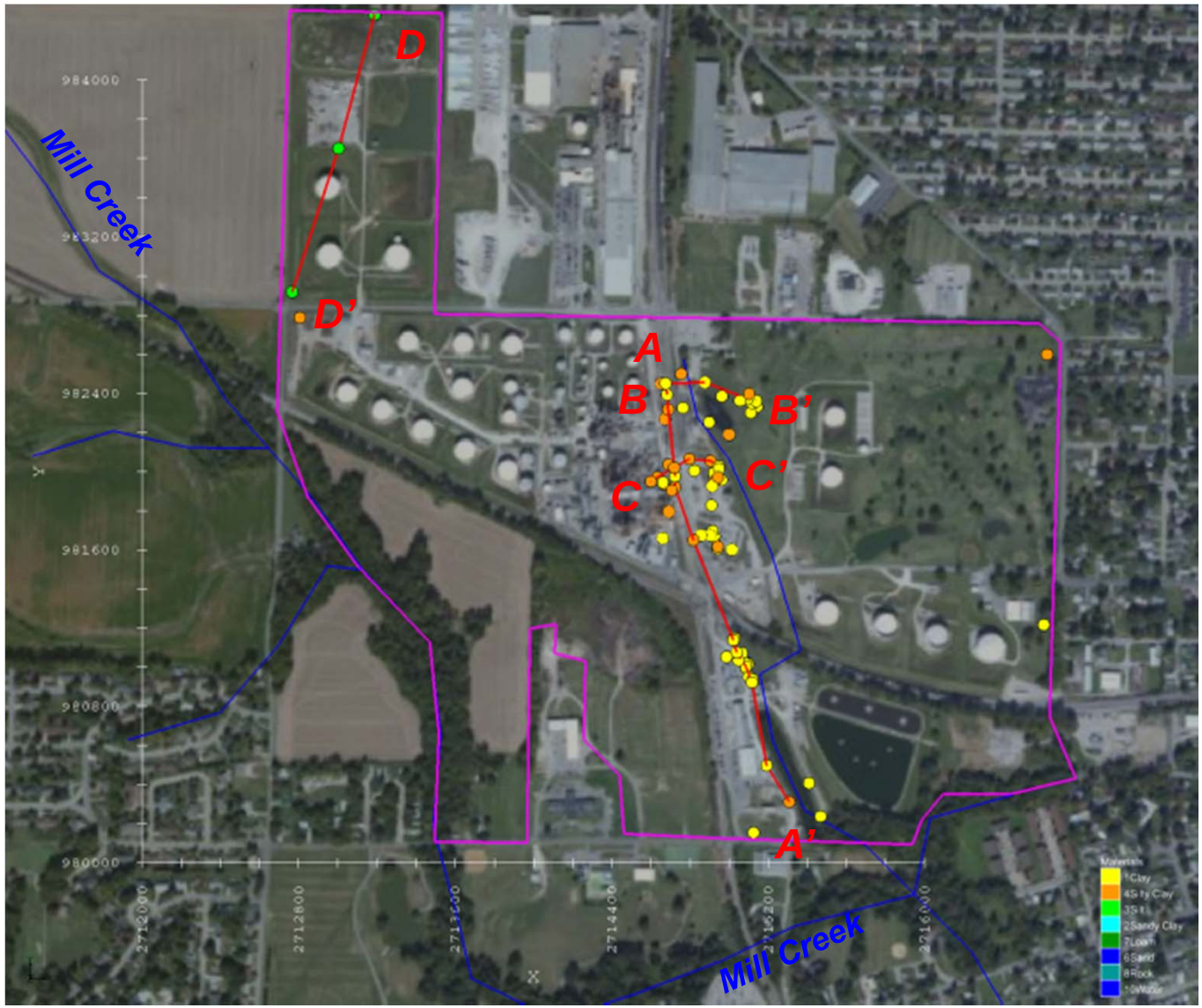
Note:

10x vertical exaggeration

Viewing northwest

Aerial image draped over 3-D ground surface

Cross Section Trace Map



Legend

- Wells/boreholes
- 3-D drainage networks
- Geological cross-section locations
- 3-D property boundary on ground surface

Note:

Scale: 1" = 800'

NAD83 IN State Plane Coordinate System West Zone in feet

2711300, 984400, 979280

N

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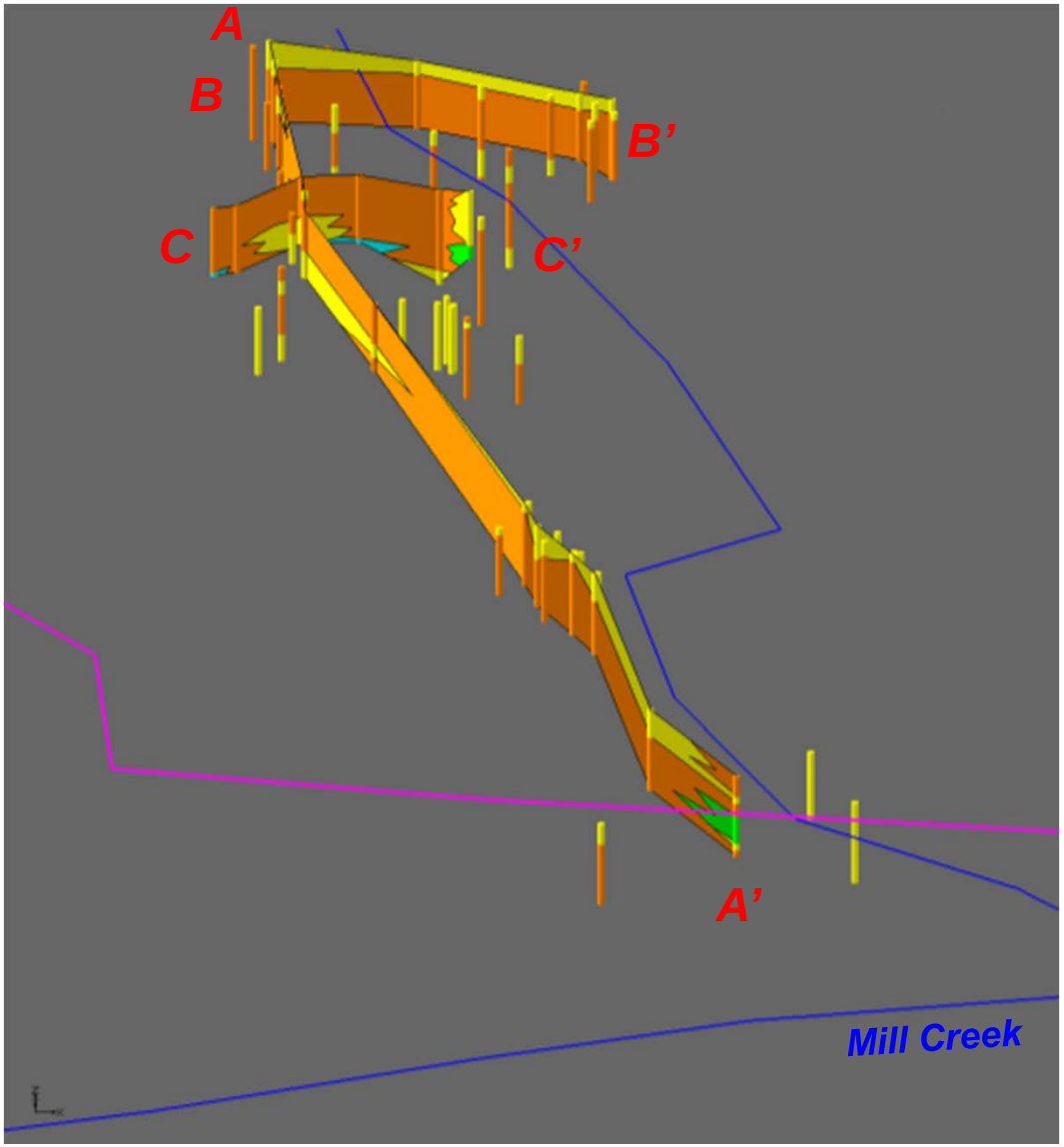
Geologic Cross Sections



Legend

Wells/boreholes

3-D drainage networks

3-D property boundary on ground surface

Clay
Silty Clay
Silt
Sandy Clay
Loam
Sand
Rock
Water

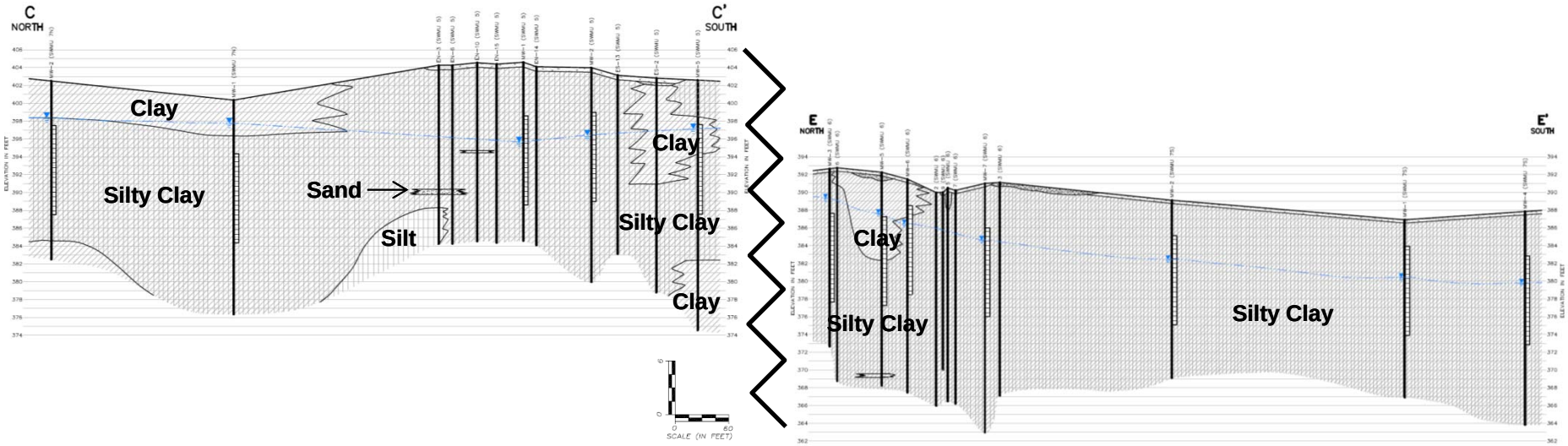
Note:

5x vertical exaggeration

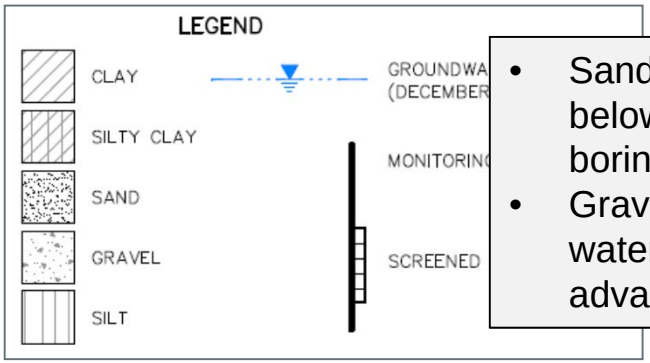
Viewing north

N

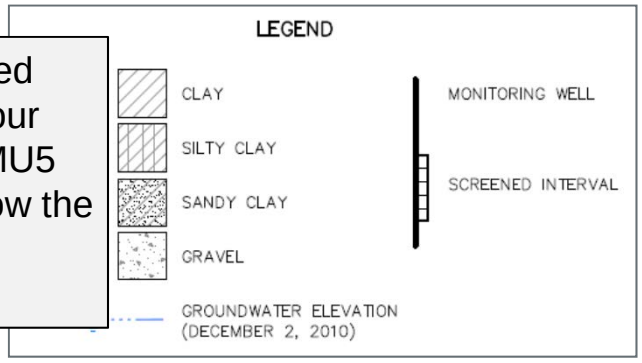
Geologic Cross Section



Geometric Average Hydraulic Conductivity (K) Value: 4 x 10^{-4} cm/s
(K values range from 3 x 10^{-5} to 2 x 10^{-3} cm/s)



- Sand lenses were observed below the water table in four borings advanced in SWMU5
- Gravel was observed below the water table in one boring advanced in "Other"



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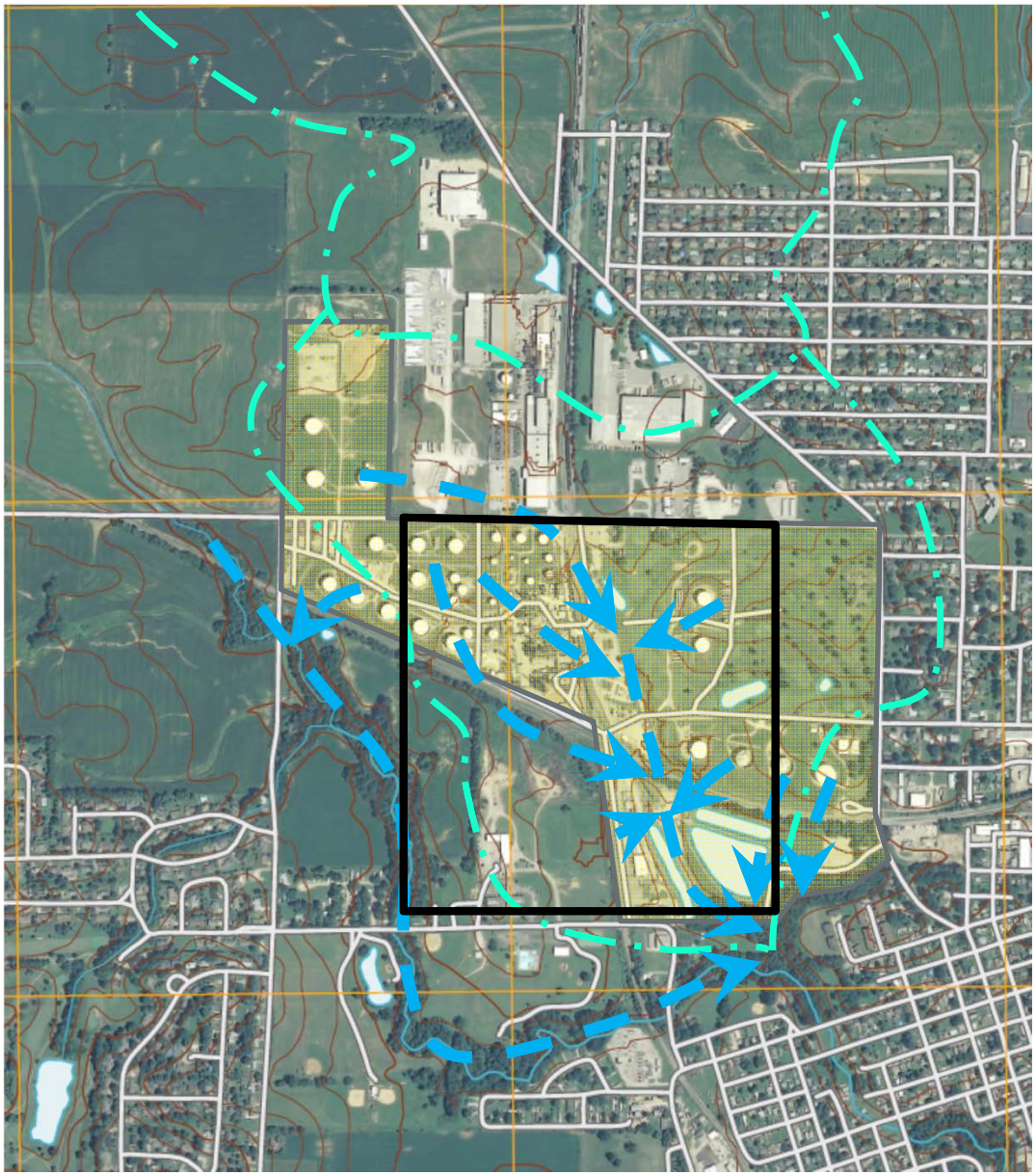
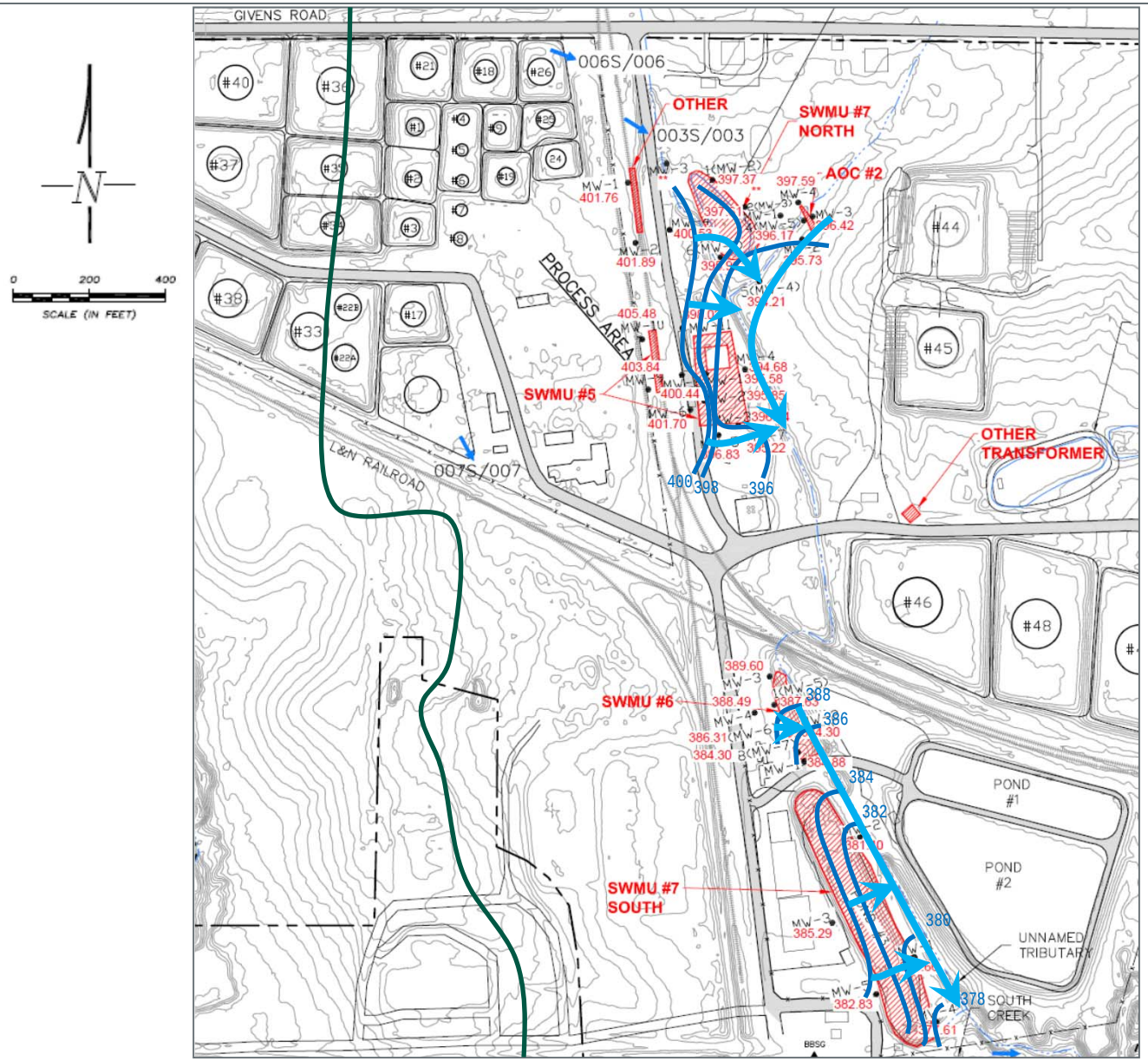
Drainage Basins



Mount Vernon, IN/KY 7.5” Quadrangle, 2010

Shallow Groundwater Elevation Data



Legend

Drainage Basin Divide

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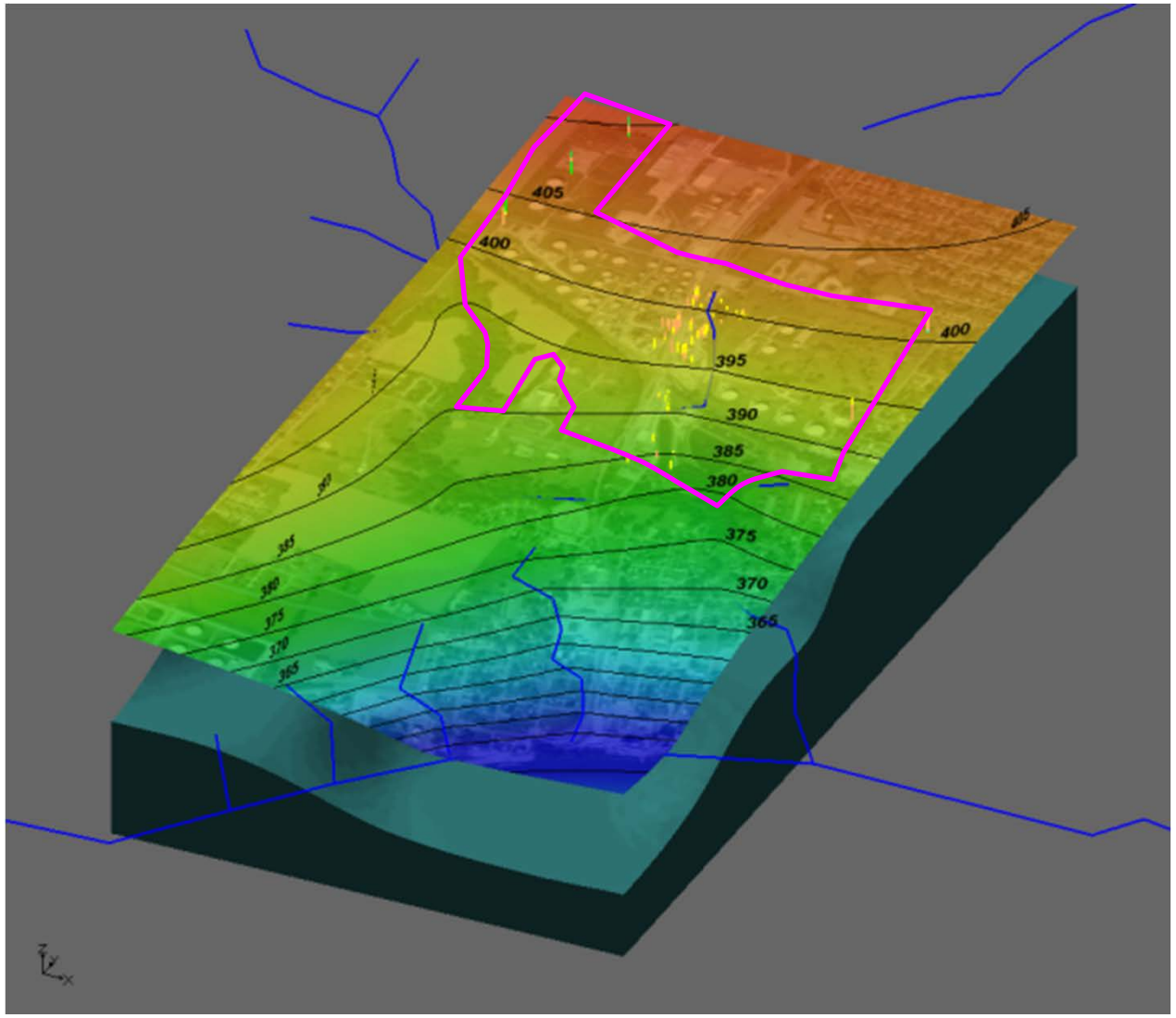
Modeled Regional Groundwater Contours



Legend

- Wells/boreholes
- 3-D drainage networks
- Bedrock
- Modeled groundwater contours, feet amsl

Note:

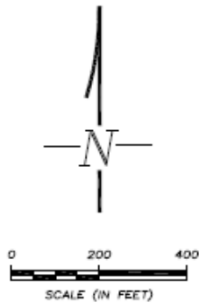
10x vertical exaggeration

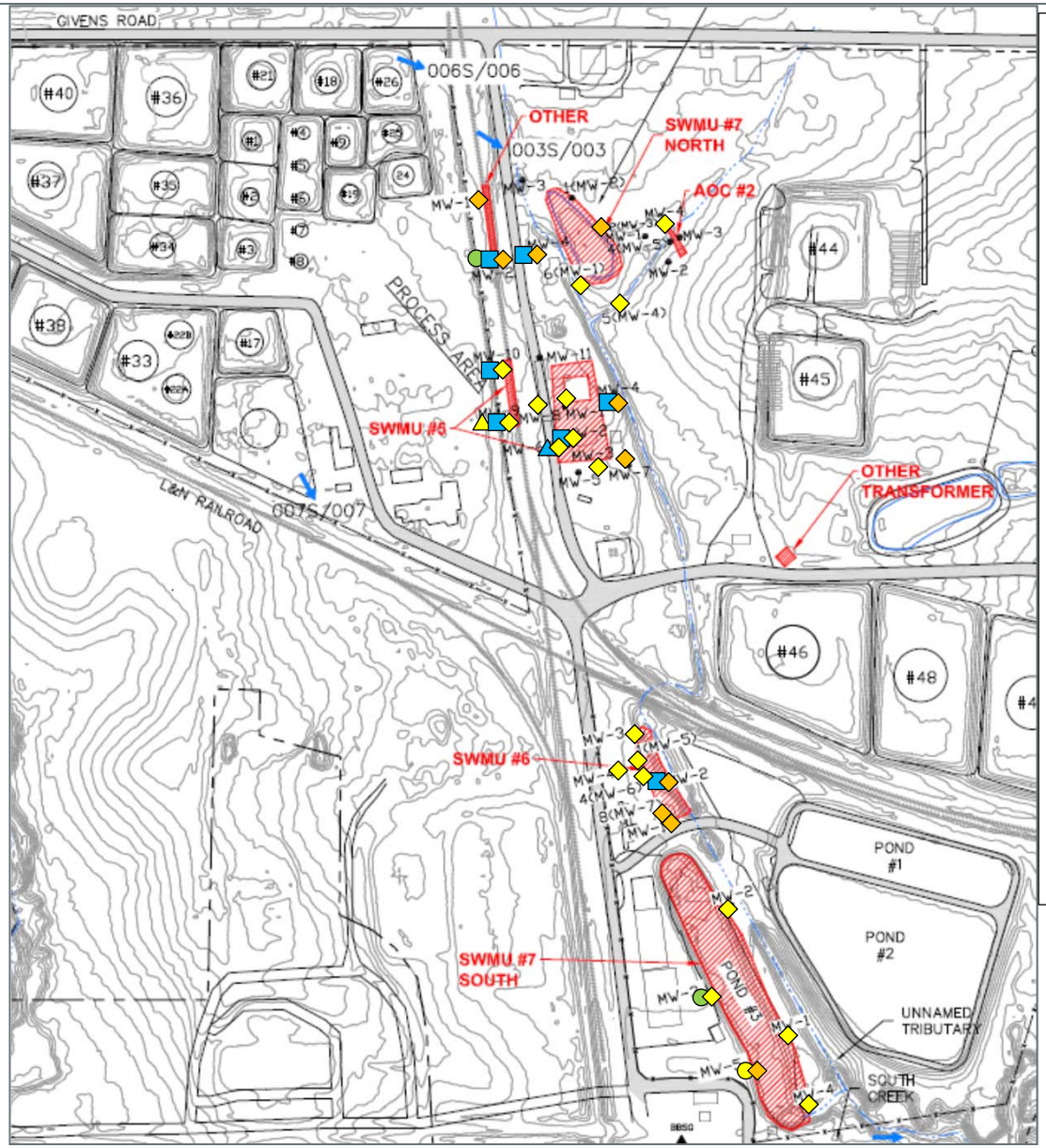
Viewing northwest

Groundwater contours developed based on observed data at the Site and regional groundwater modeling

Aerial image draped over 3-D groundwater table

Groundwater Contamination





Legend

Total VOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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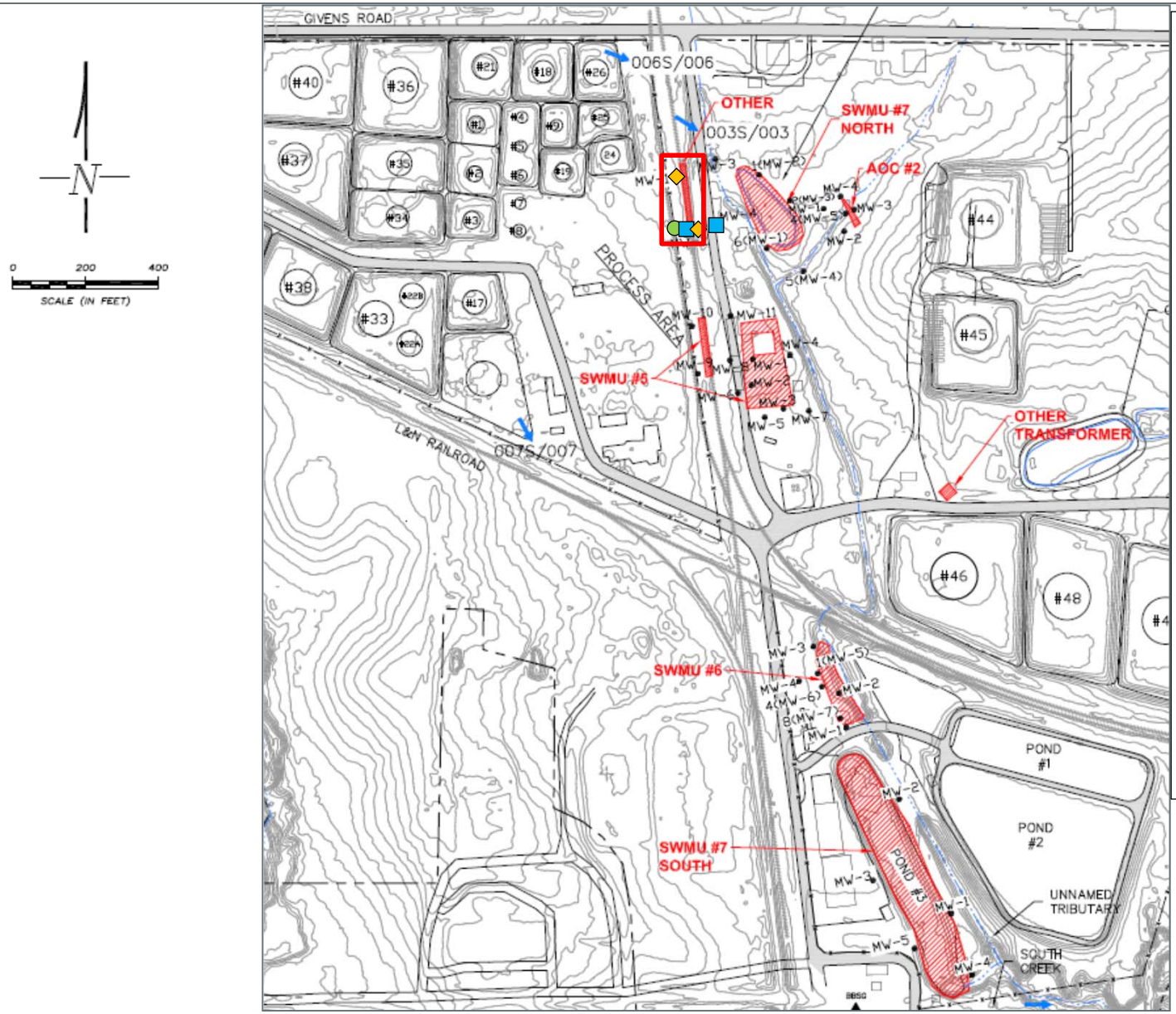
Groundwater Contamination: Other



Legend

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Total PAH Conc. (ug/L)
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Total DRO+GRO Conc. (ug/L)
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- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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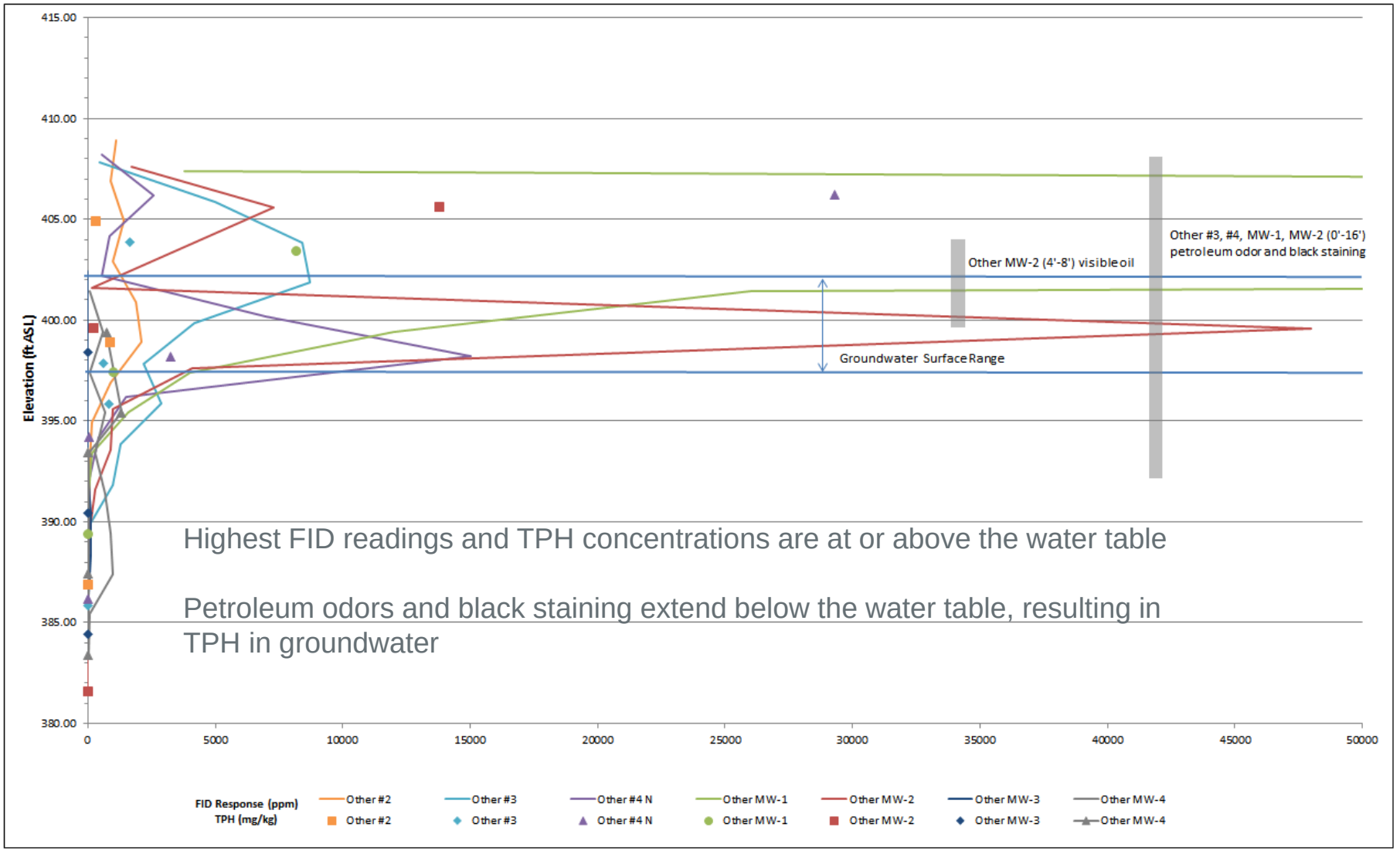
Other Composite Soil Dataset



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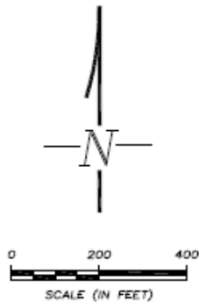
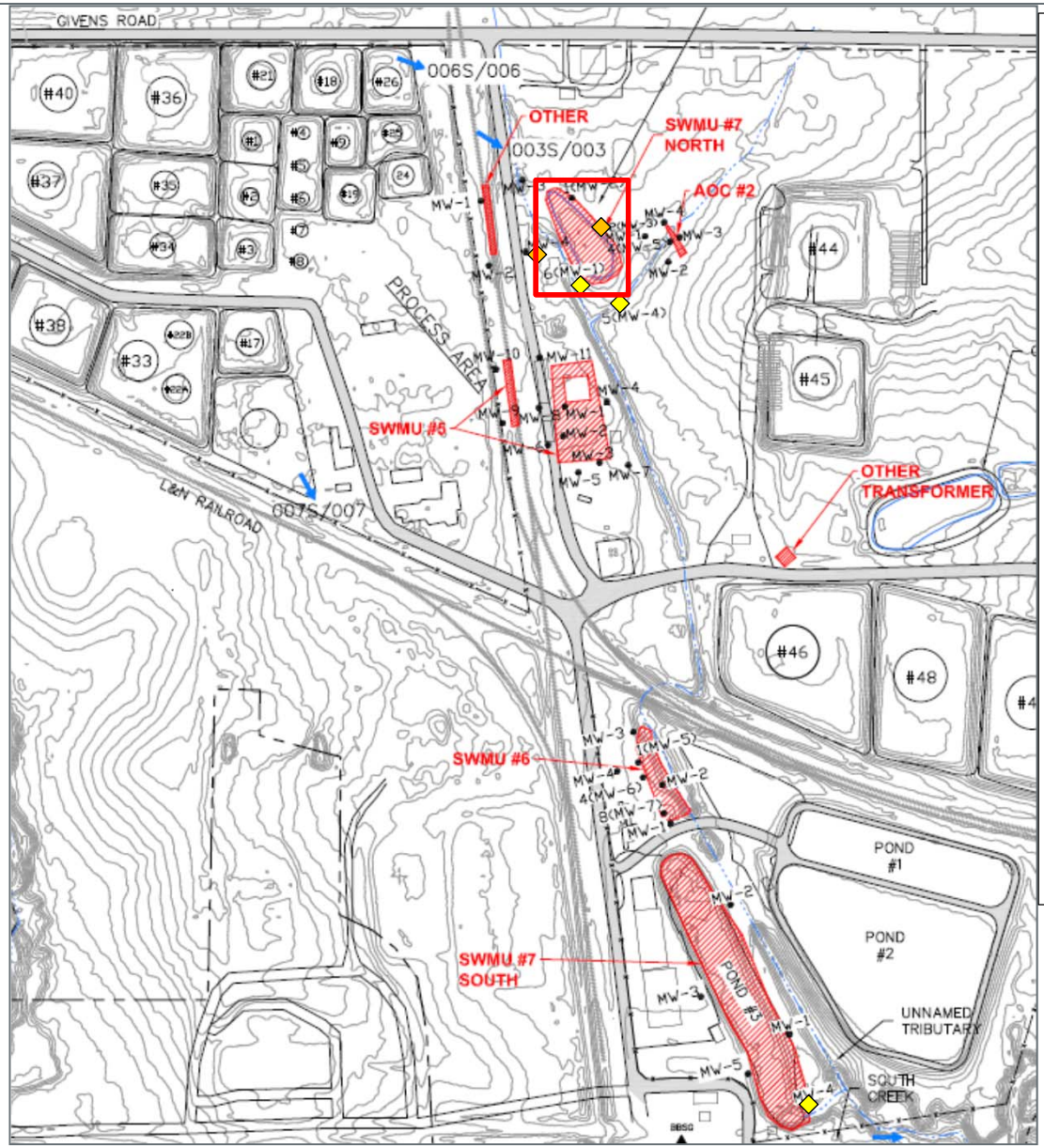
Groundwater Contamination: SMWU 7 North





Legend

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- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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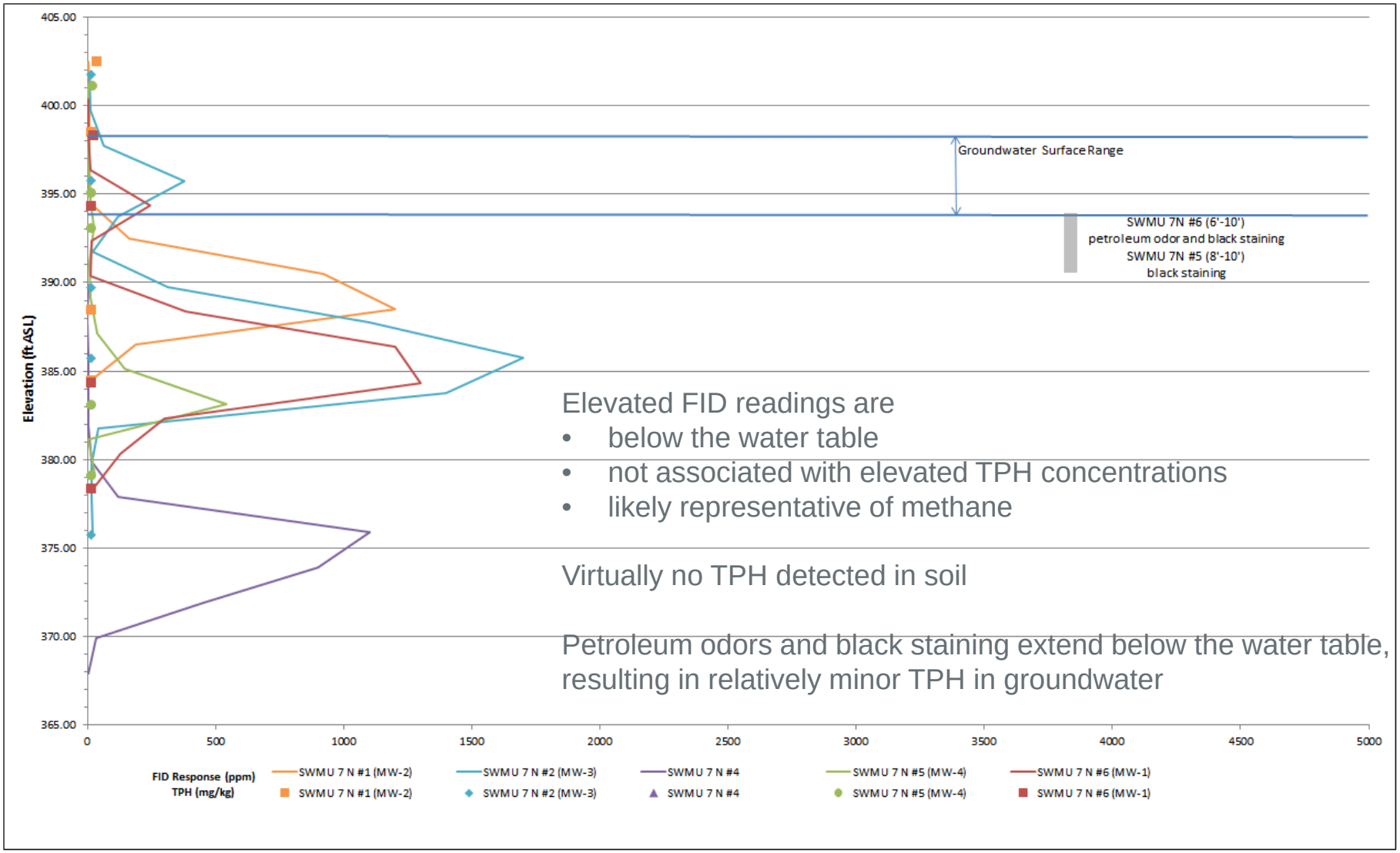
SMWU 7 North Composite Soil Dataset



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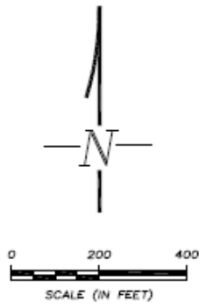
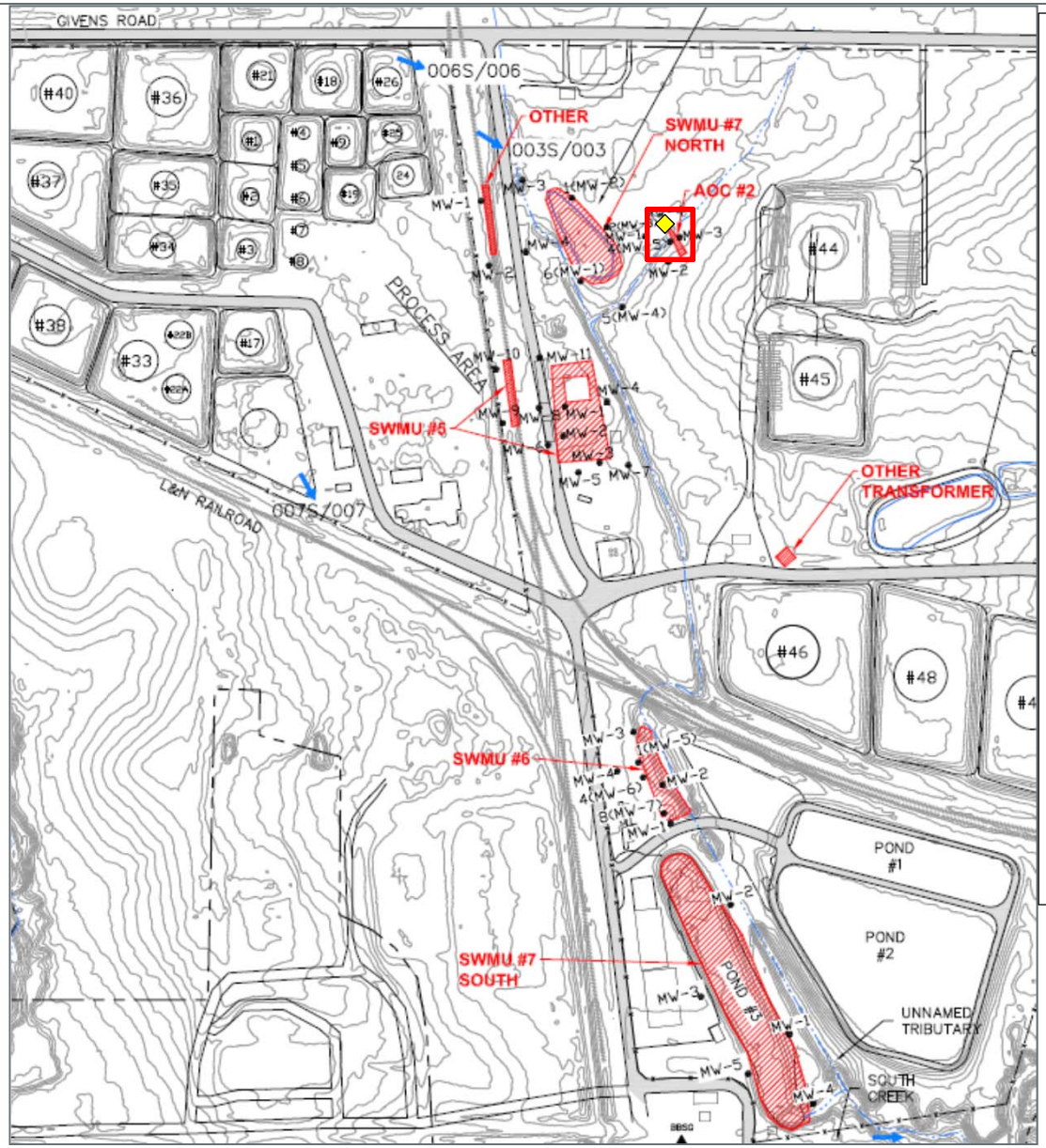
Groundwater Contamination: AOC 2





Legend

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- 100 – 1,000
- 10 – 100
- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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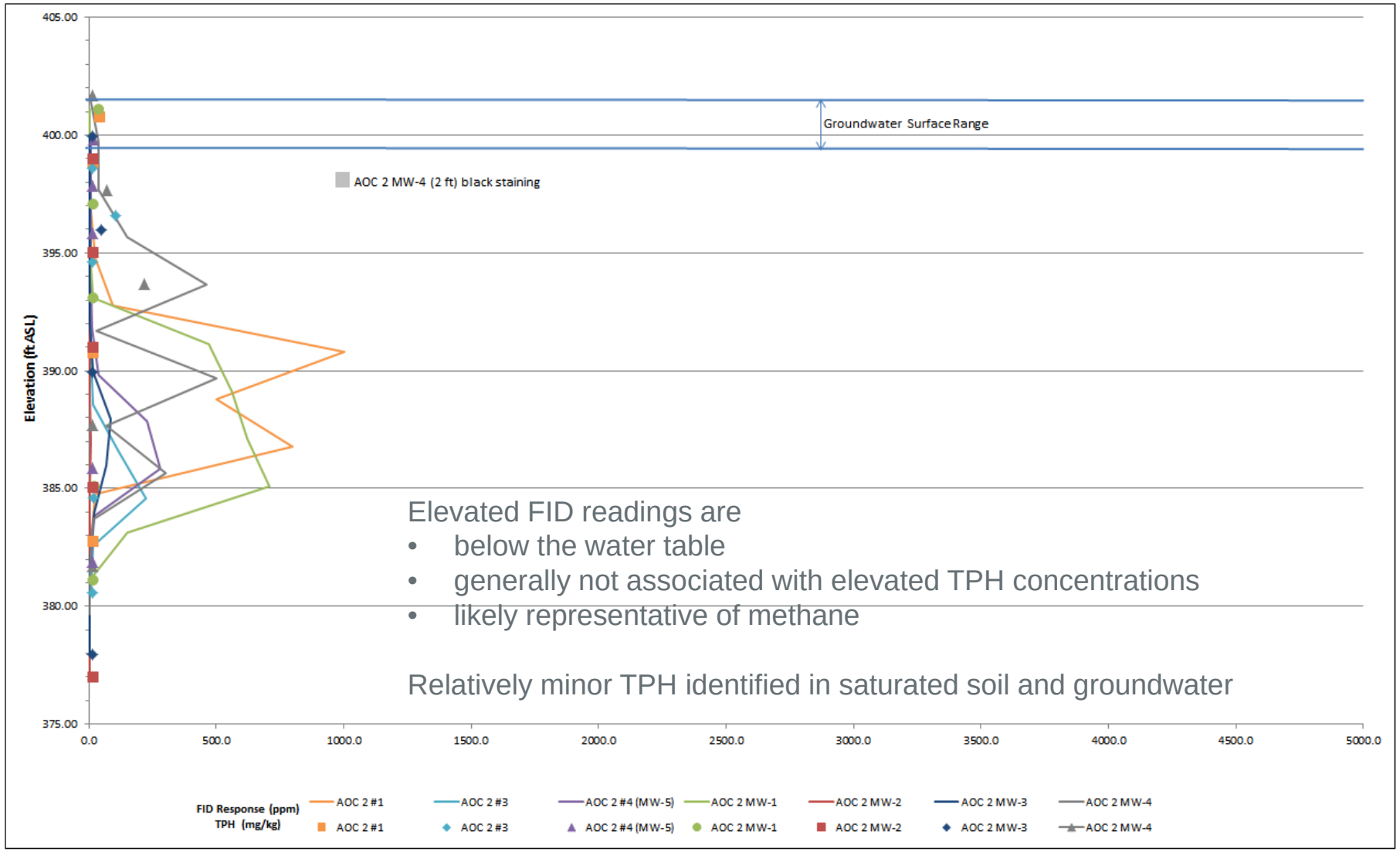
AOC 2 Composite Soil Dataset



Elevated FID readings are

- below the water table
- generally not associated with elevated TPH concentrations
- likely representative of methane

Relatively minor TPH identified in saturated soil and groundwater

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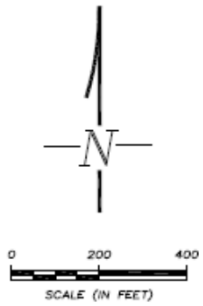
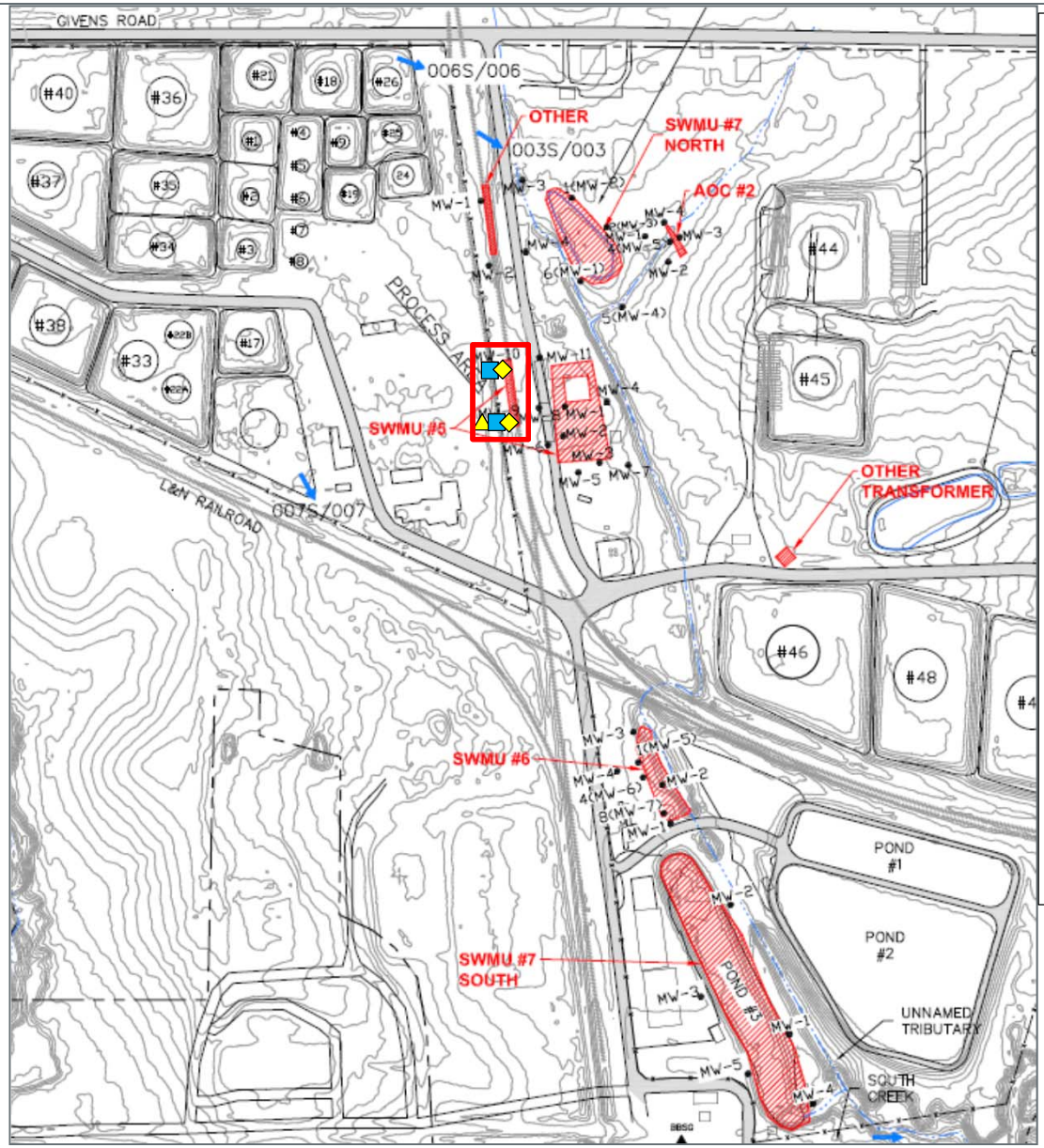
Groundwater Contamination: SMWU 5 (west)





Legend

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- 100 – 1,000
- 10 – 100
- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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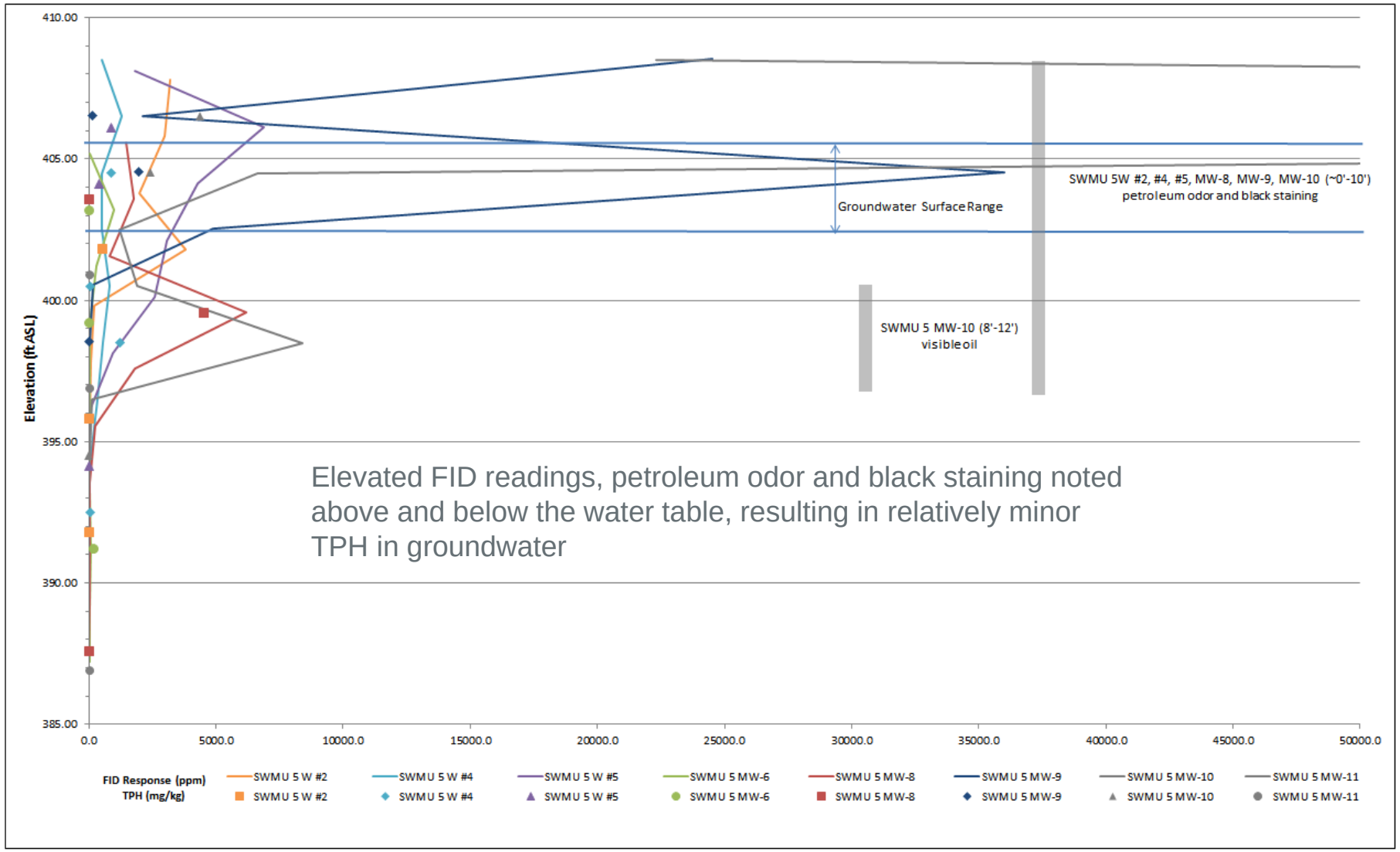
SMWU 5 (west) Composite Soil Dataset



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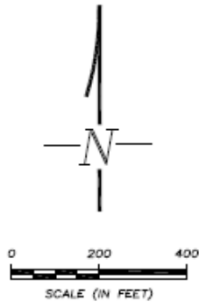
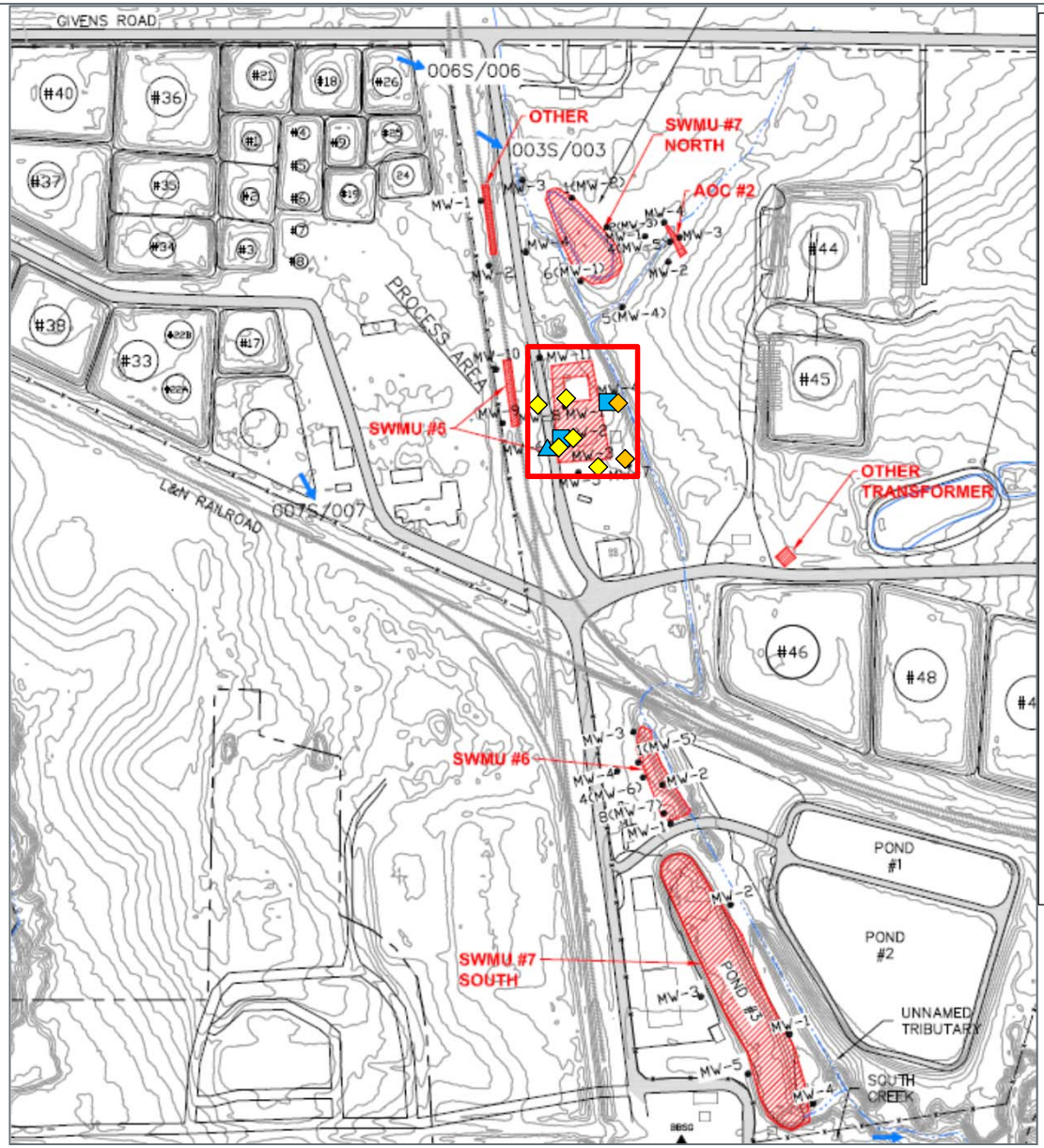
Groundwater Contamination: SMWU 5 (east)





Legend

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- 100 – 1,000
- 10 – 100
- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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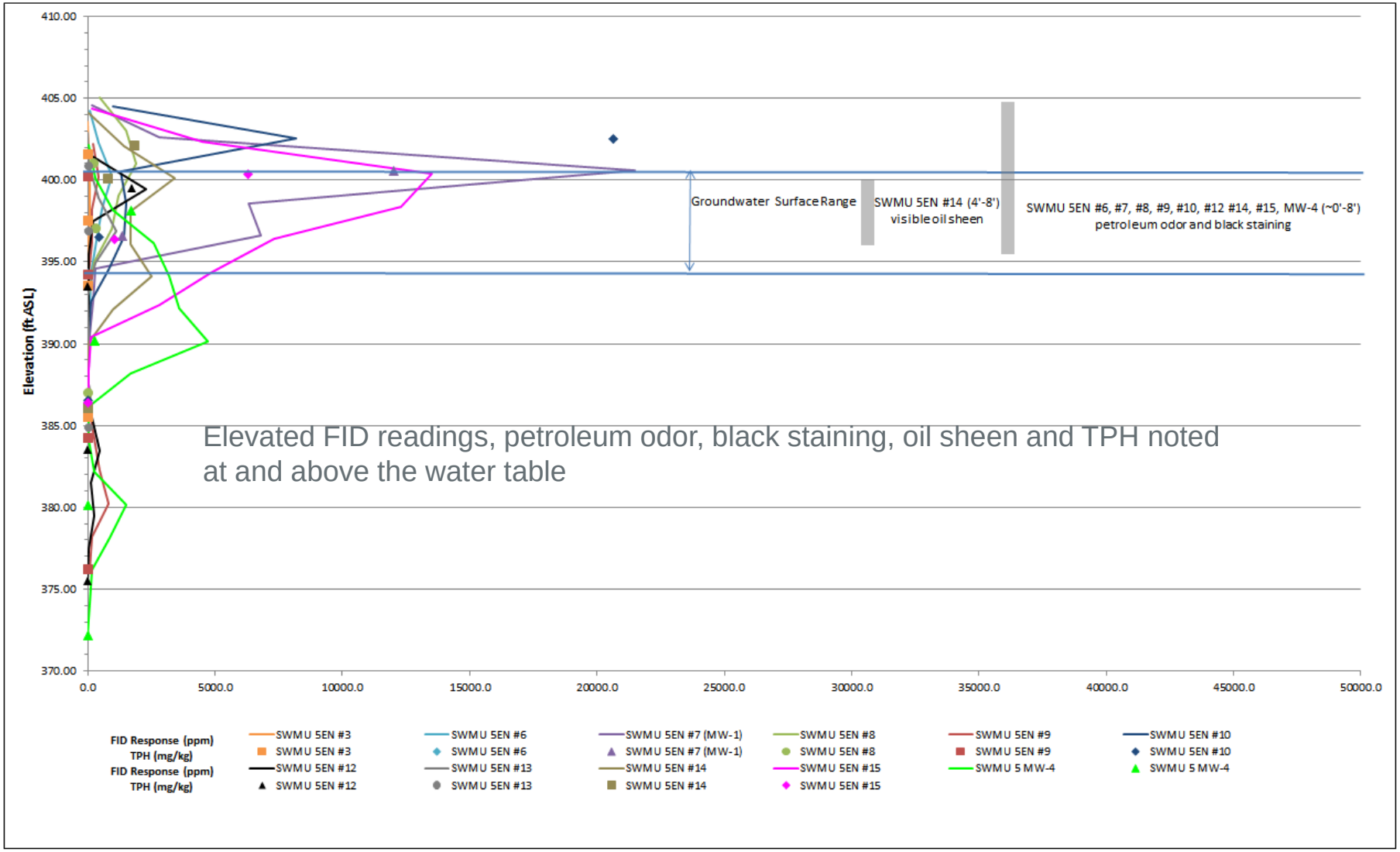
SMWU 5 (east) Composite Soil Dataset (north)



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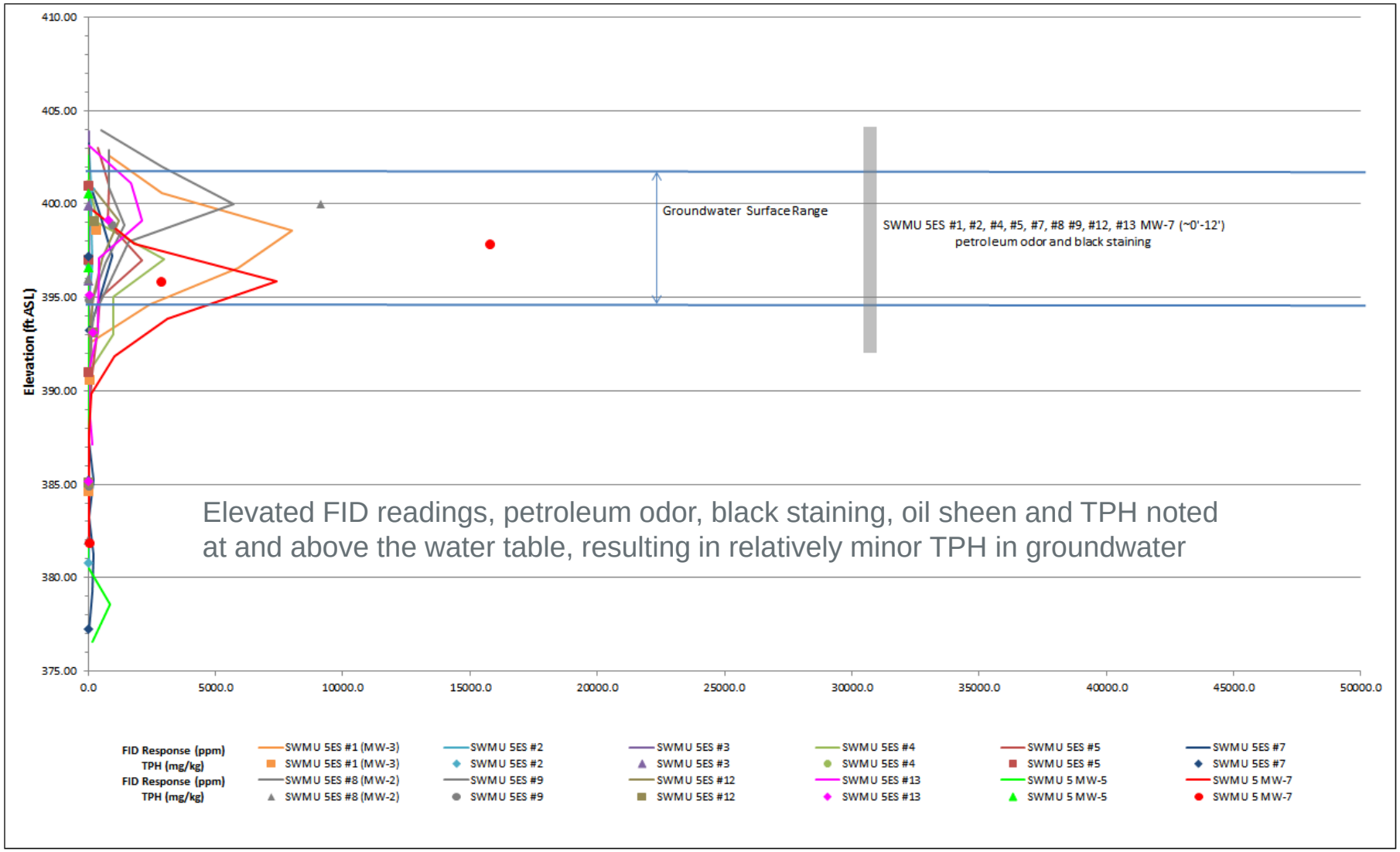
SMWU 5 (east) Composite Soil Dataset (south)



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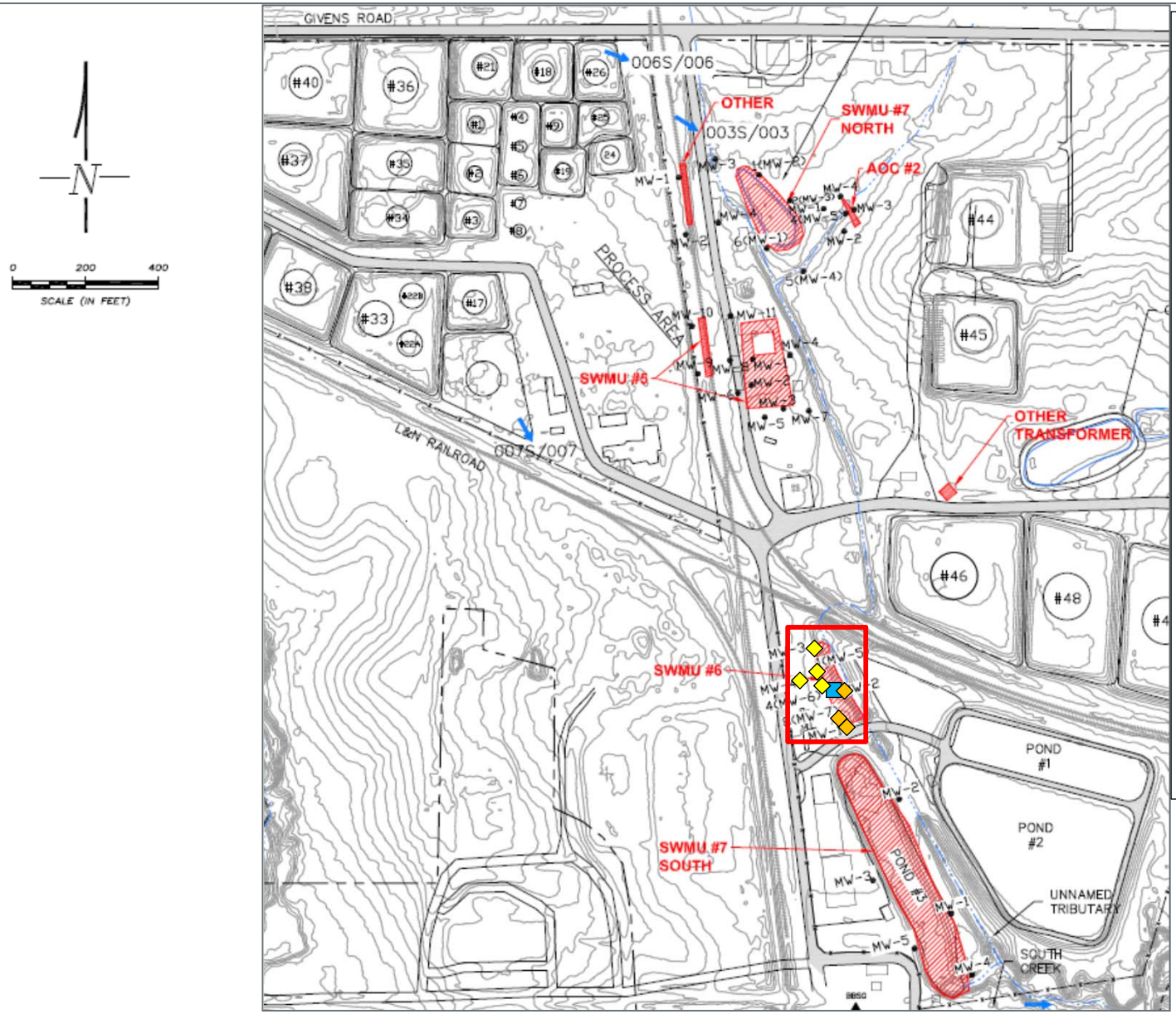
Groundwater Contamination: SMWU 6



Legend

Total VOC Conc. (ug/L)
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- 100 – 1,000
- 10 – 100
- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
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- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
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- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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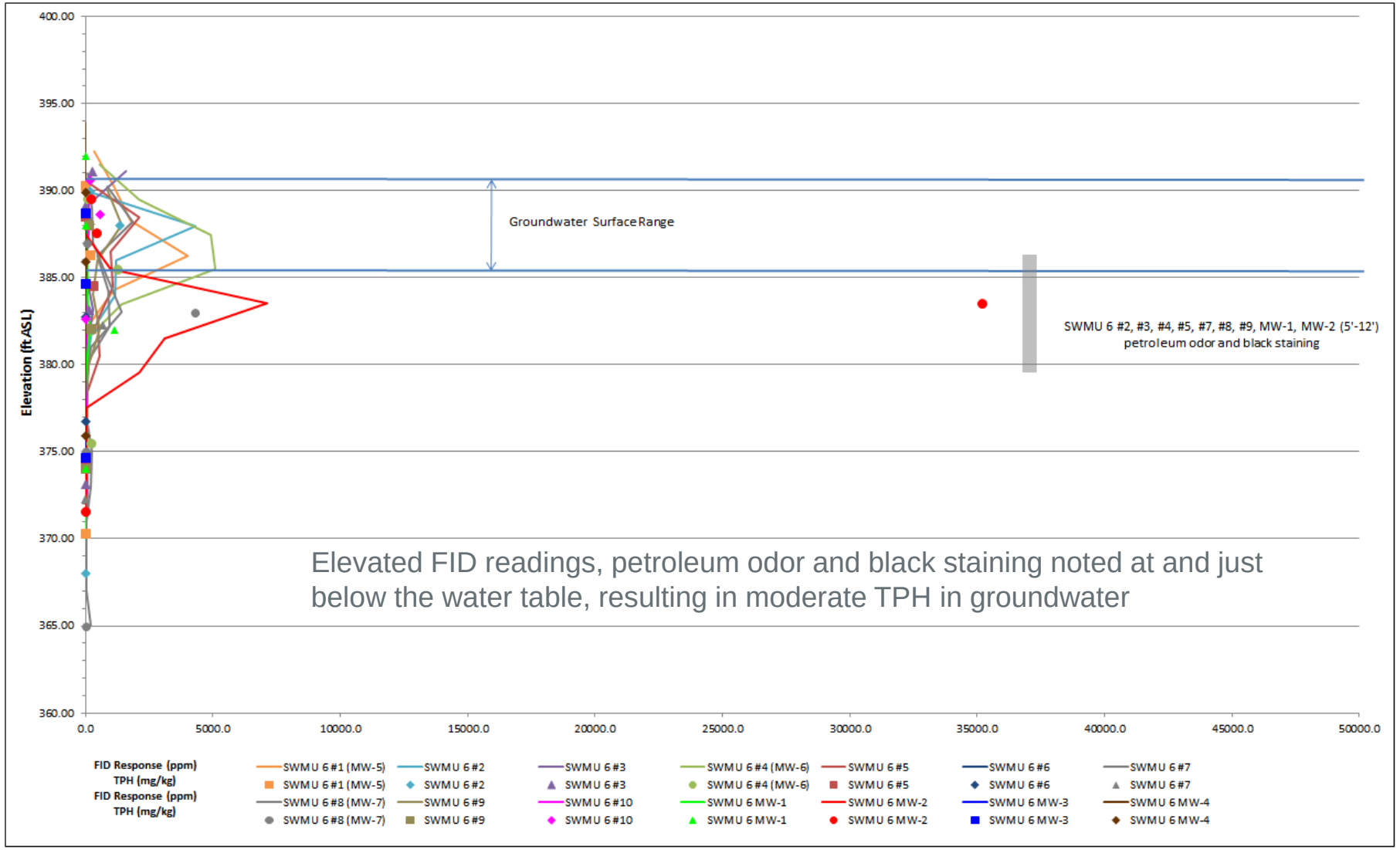
SMWU 6 Composite Soil Dataset



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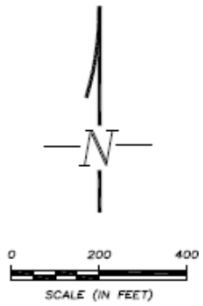
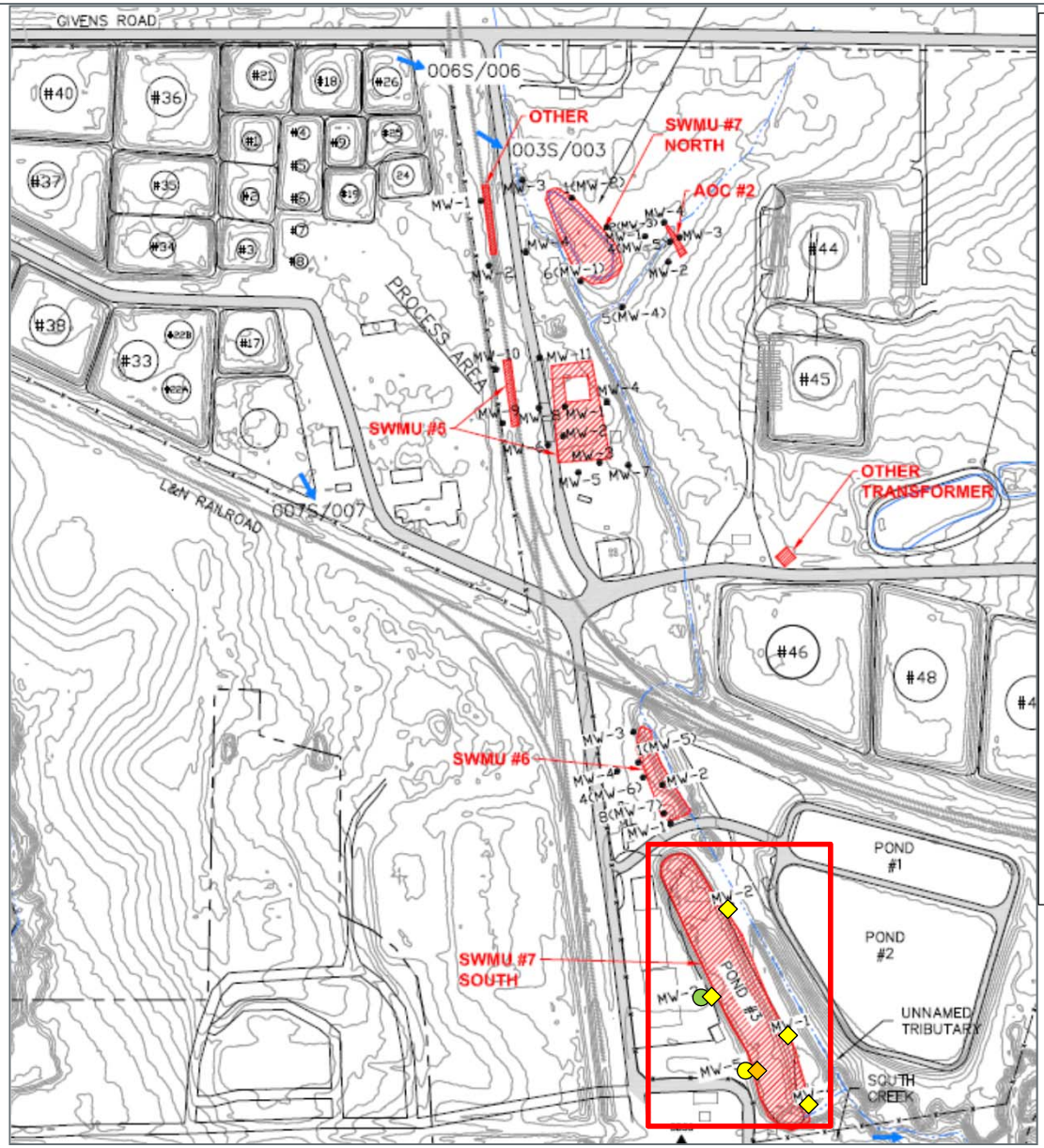
Groundwater Contamination: SMWU 7 South





Legend

Total VOC Conc. (ug/L)
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- 100 – 1,000
- 10 – 100
- <10

Total PAH Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total DRO+GRO Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

Total CVOC Conc. (ug/L)
- 1,000 – 10,000
- 100 – 1,000
- 10 – 100
- <10

- ND for all parameters

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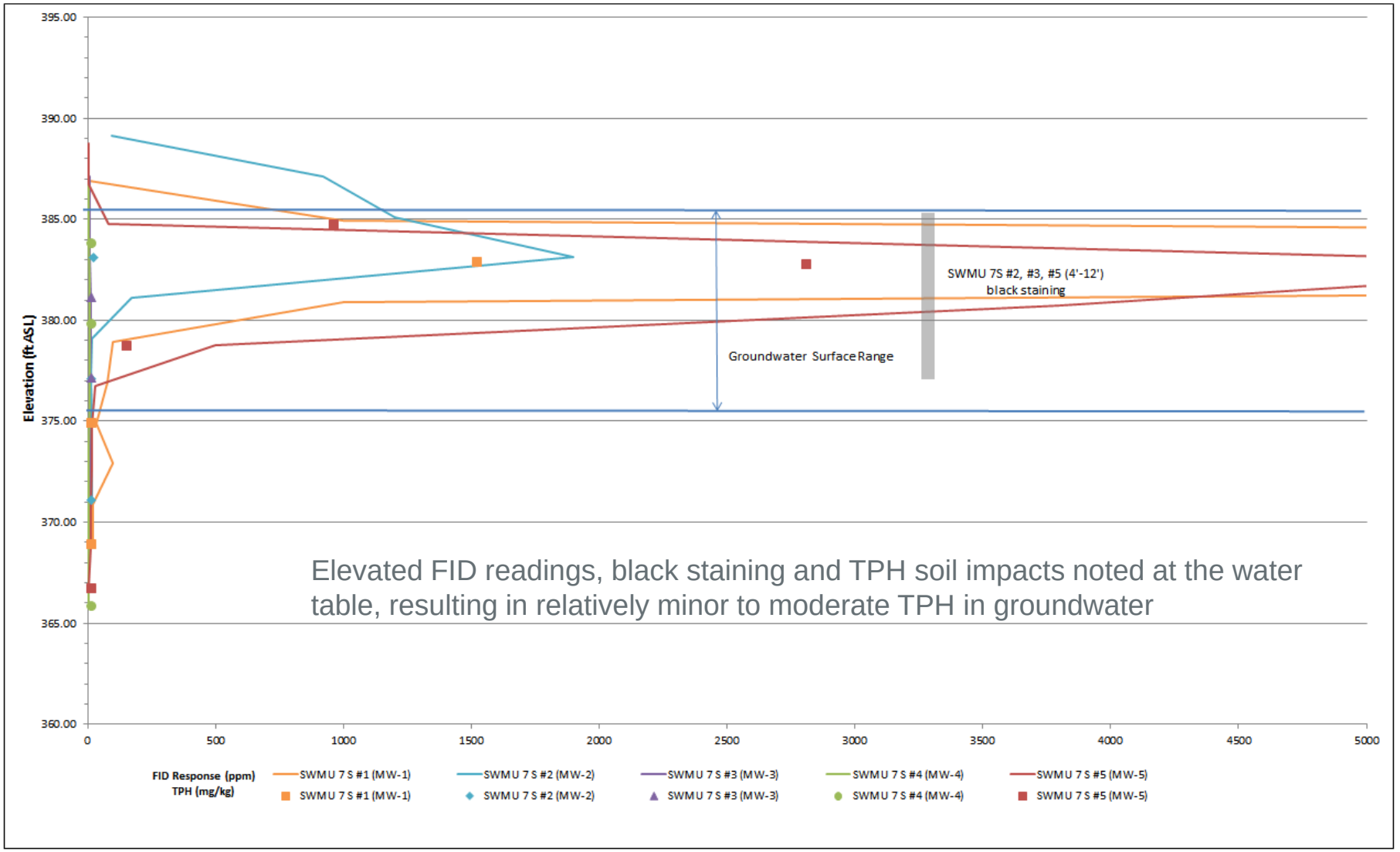
SMWU 7 South Composite Soil Dataset



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Conceptual Site Model Summary

- Geology consists of low-permeability silts and clays overlying a reported sand layer, which overlies low-permeability bedrock
- Low-permeability silts and clays
  - Groundwater flow appears to mirror the ground surface topography
  - Groundwater flow velocities are likely very low
- Higher-permeability sand layer
  - Groundwater flow is expected to be to the south toward the Ohio River
  - Groundwater flow velocities are expected to be moderate
  - This geologic layer likely represents a preferential groundwater migration pathway

Conceptual Site Model Summary

- Elevated FID readings, black staining and petroleum odors identified in the vicinity of the water table in most SMWUs
- In general, significant TPH in soil identified at and above the water table
- Relatively low TPH identified in groundwater in most SMWUs
- Moderate TPH identified in groundwater downgradient of Other and SMWU 6, and possibly SMWU 5 (east)
- Minor localized VOC and PAH impacts to groundwater identified
- Minor CVOC impacts identified upgradient of SMWU5 (west), likely emanating from production area

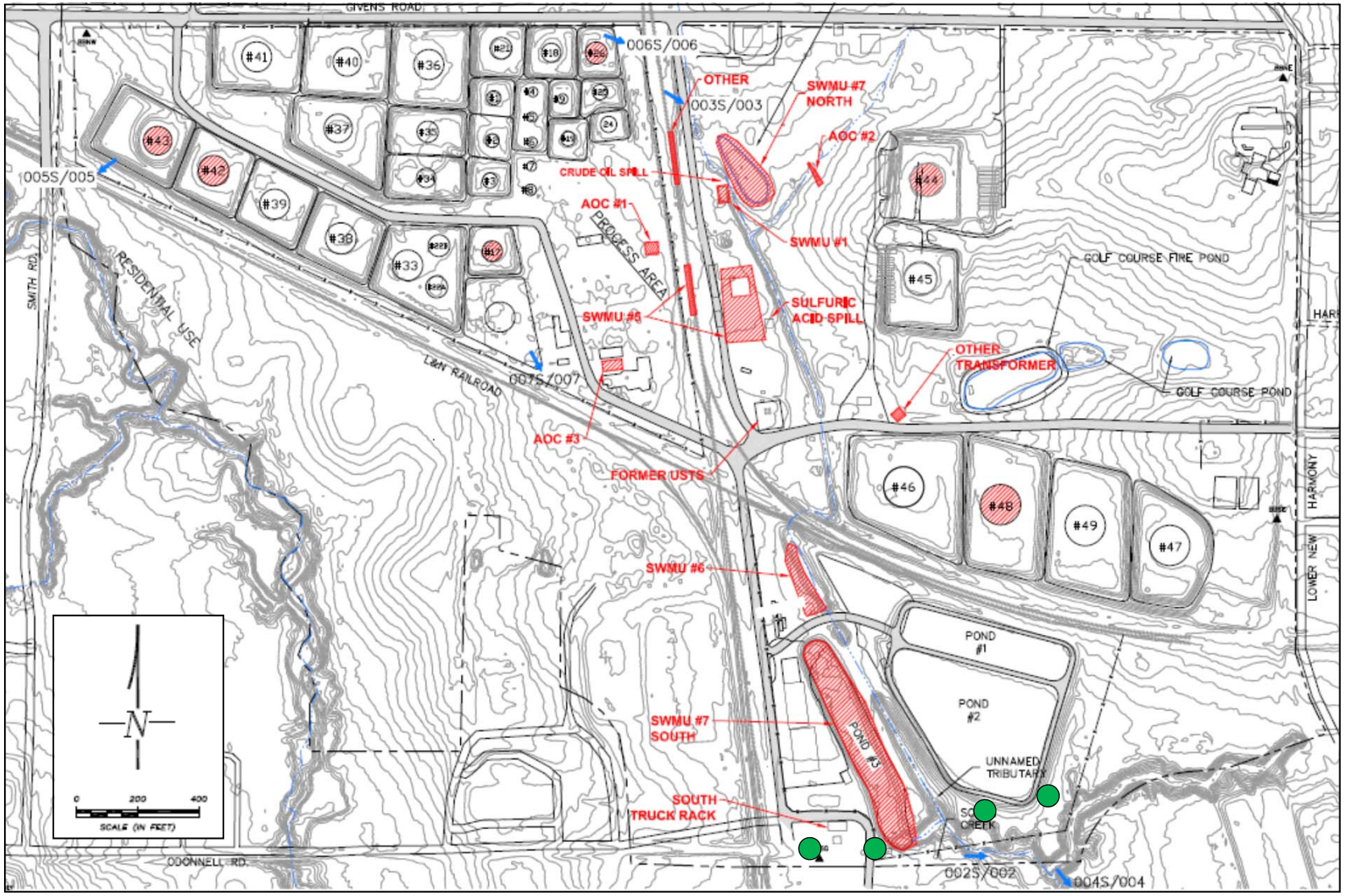
Next Steps

Conduct Waterloo^{APS} program along downgradient site boundary to

- Refine understanding of site geology and hydrogeology
- Evaluate presence of dissolved-phase plumes that could migrate off site

Develop strategic plan to efficiently complete site characterization activities

Proposed Waterloo^{APS} Program



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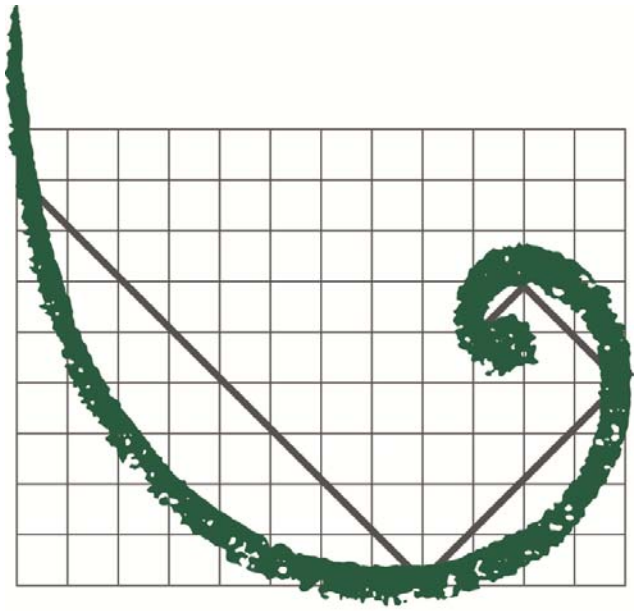

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