Enhanced Anaerobic Bioremediation Achieves Closure for a PHC Site

Sustaintech
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Overview

- Site Background
- Budget and Time
- Approach
- Results

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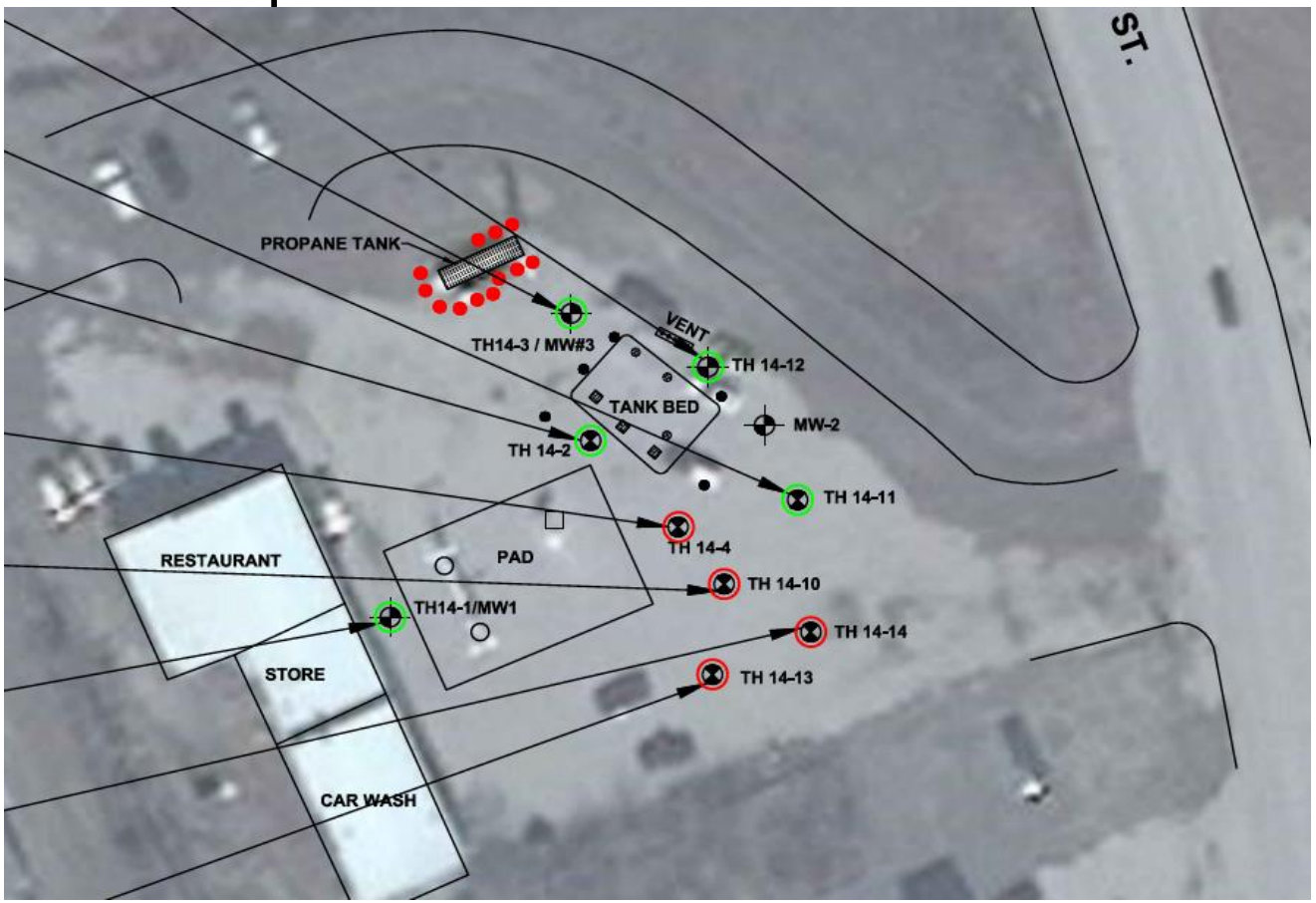
Background – 2014

- BTEX, F1 - GW flow south, ~30 m/year
- Lake is present 300 m south



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Background

- Client wished to retire in 3 to 6 years
- In 2014, estimated $500,000 for dig and dump
- Can you clean it up for less than $50,000?

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Approach

- Passive, Cost Effective
- Permeable Reactive Barriers(PRBs) removing nitrate/sulfate with carbon addition
  - Nitrate or Sulfate?
- Planned removal of USTs in fall 2015, piggyback on that project
- Pilot in two wells showed PHC GW down about 30% from Nov 2014 – Jun 2015. Control well showed no change.

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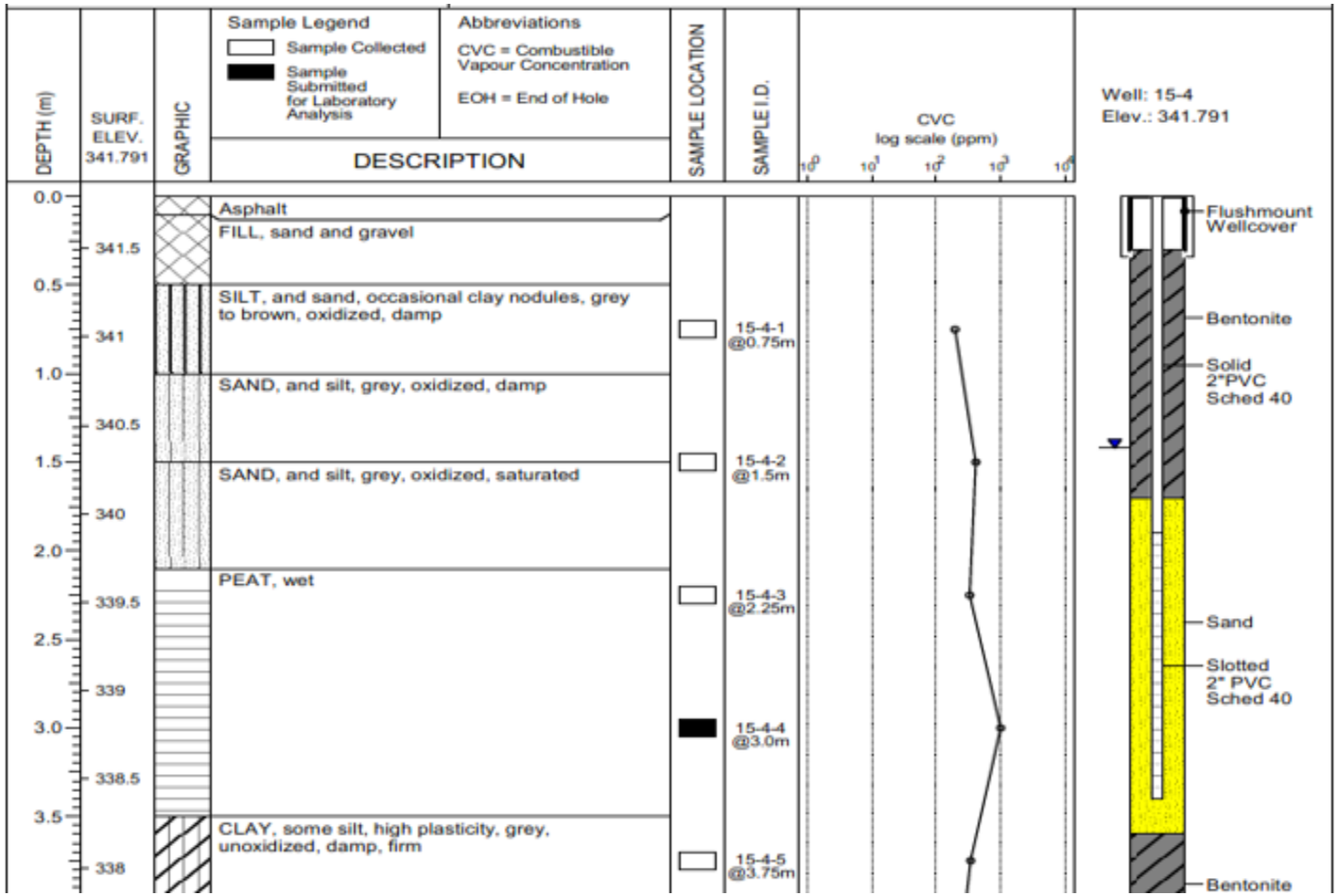
Lithology - Peat



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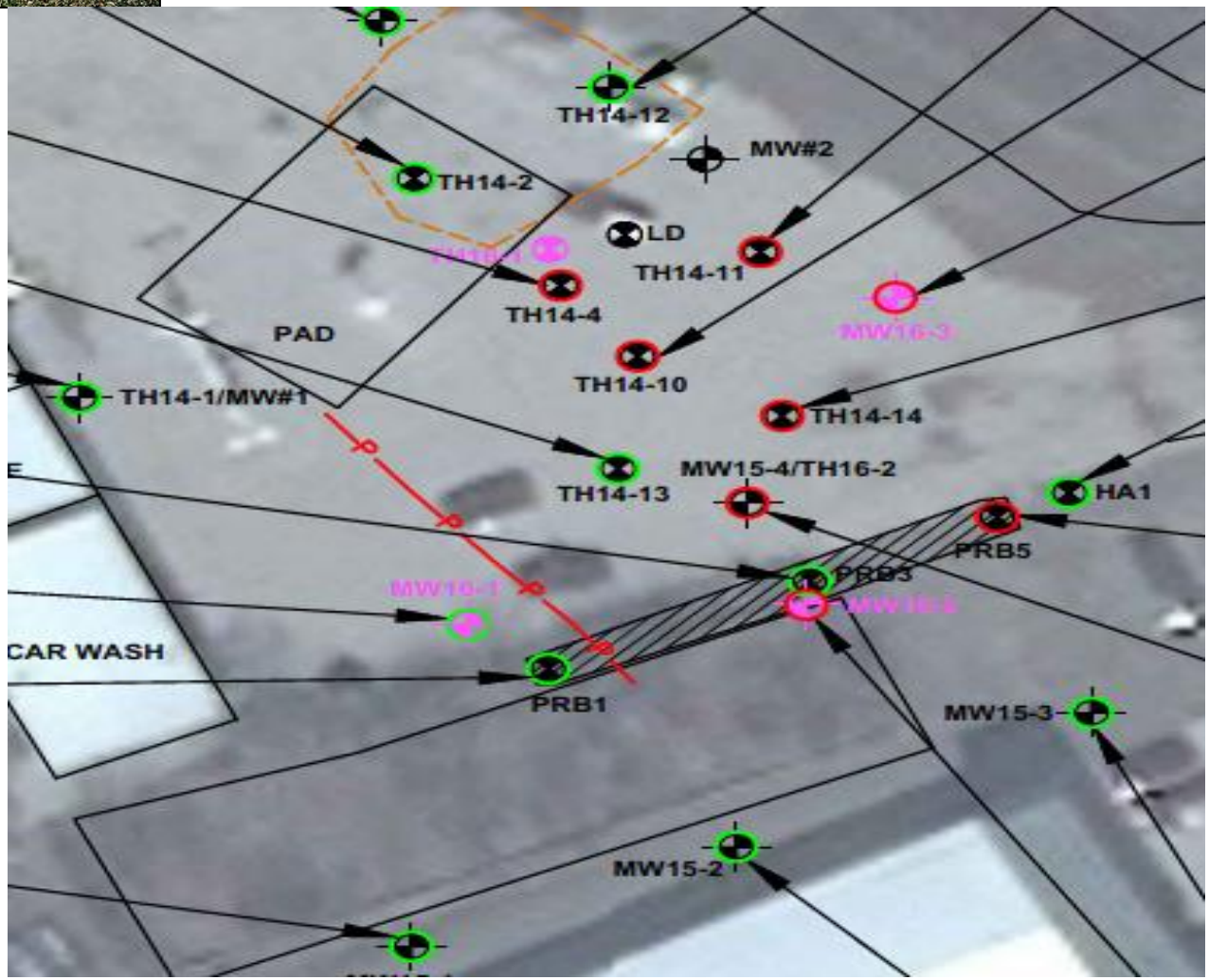
CAP - Visual



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CAP

- Further delineation required to the east
- Extend PRB to the east
- Design called for GW sulphate between 100 and 300 mg/L, peak no more than 500 mg/L
- Tier 2 endpoints conditional on performance of engineered control
- Tier 2 to eliminate potable, freshwater
- Predicted 3 to 5 years to Tier 2 closure

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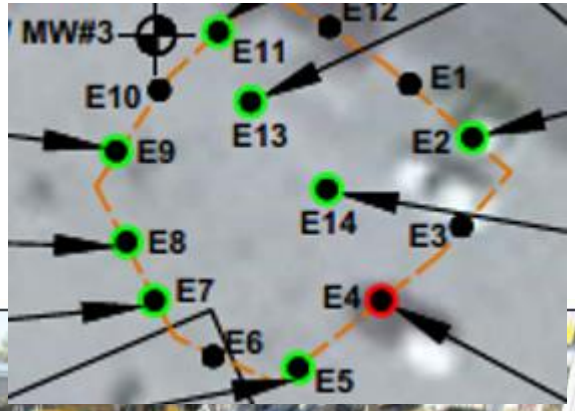
Installation



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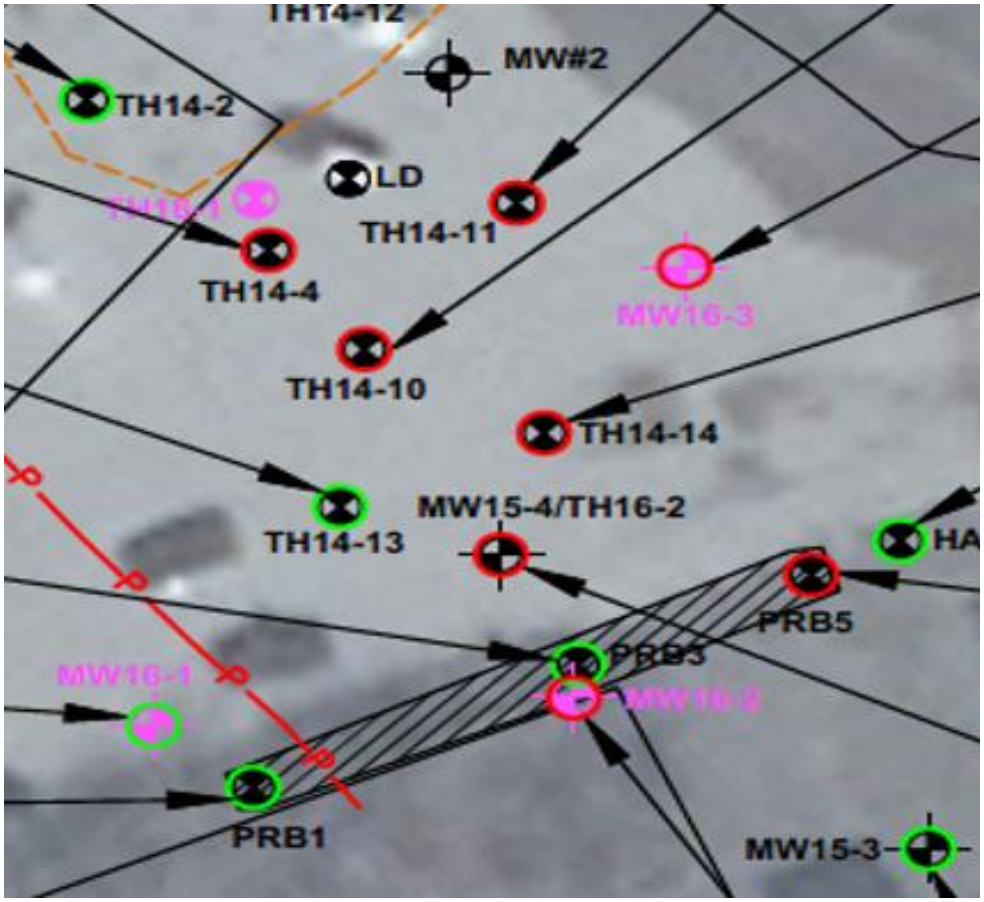
Sulphate Distribution

- Sulphate <3 mg/L
- MW#2
  - 1.5 m south
  - 375 mg/L
- MW15-4
  - 20 m south
- MW15-3
  - 15 m south



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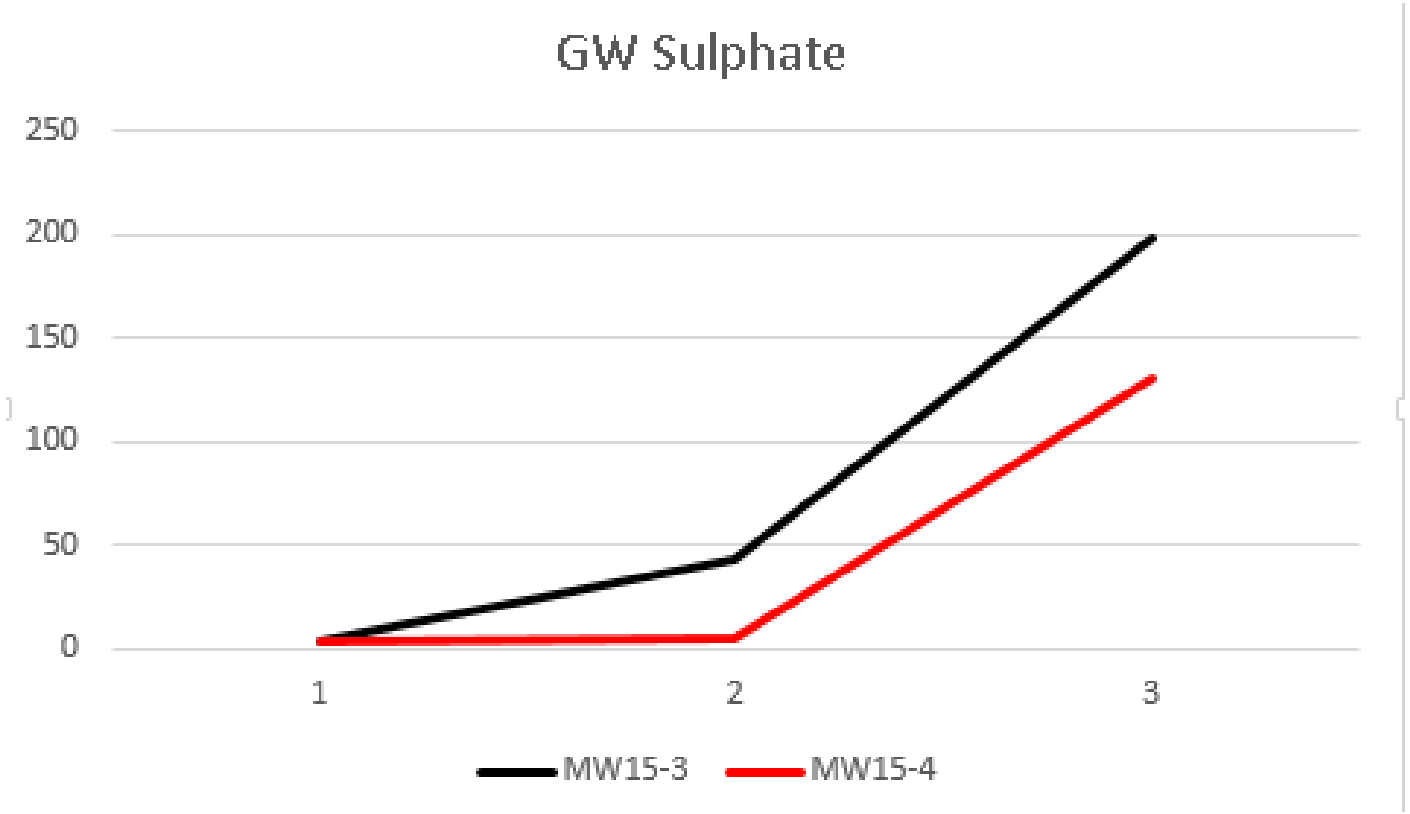
Sulphate Distribution



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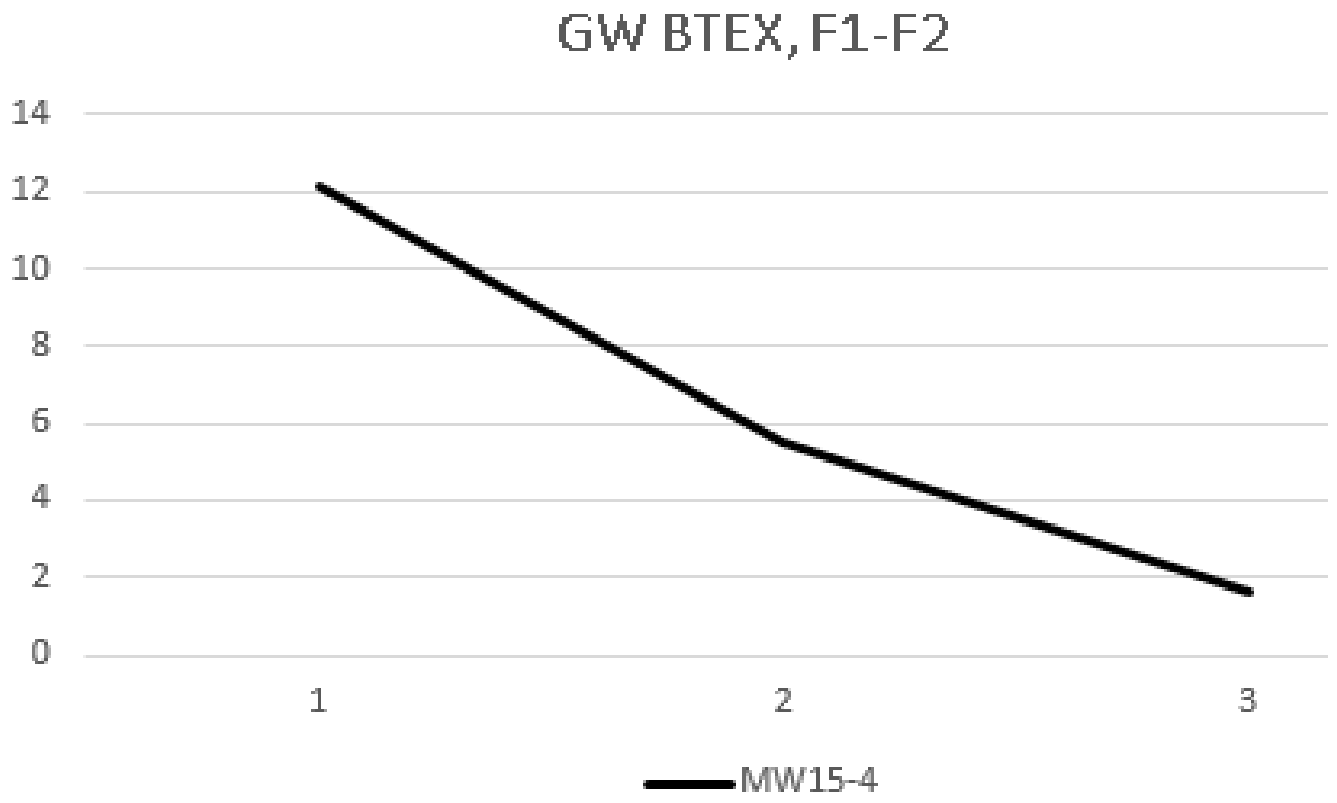
Groundwater Results

- About 86% reduction in 15-4
- About 65% average reduction in others



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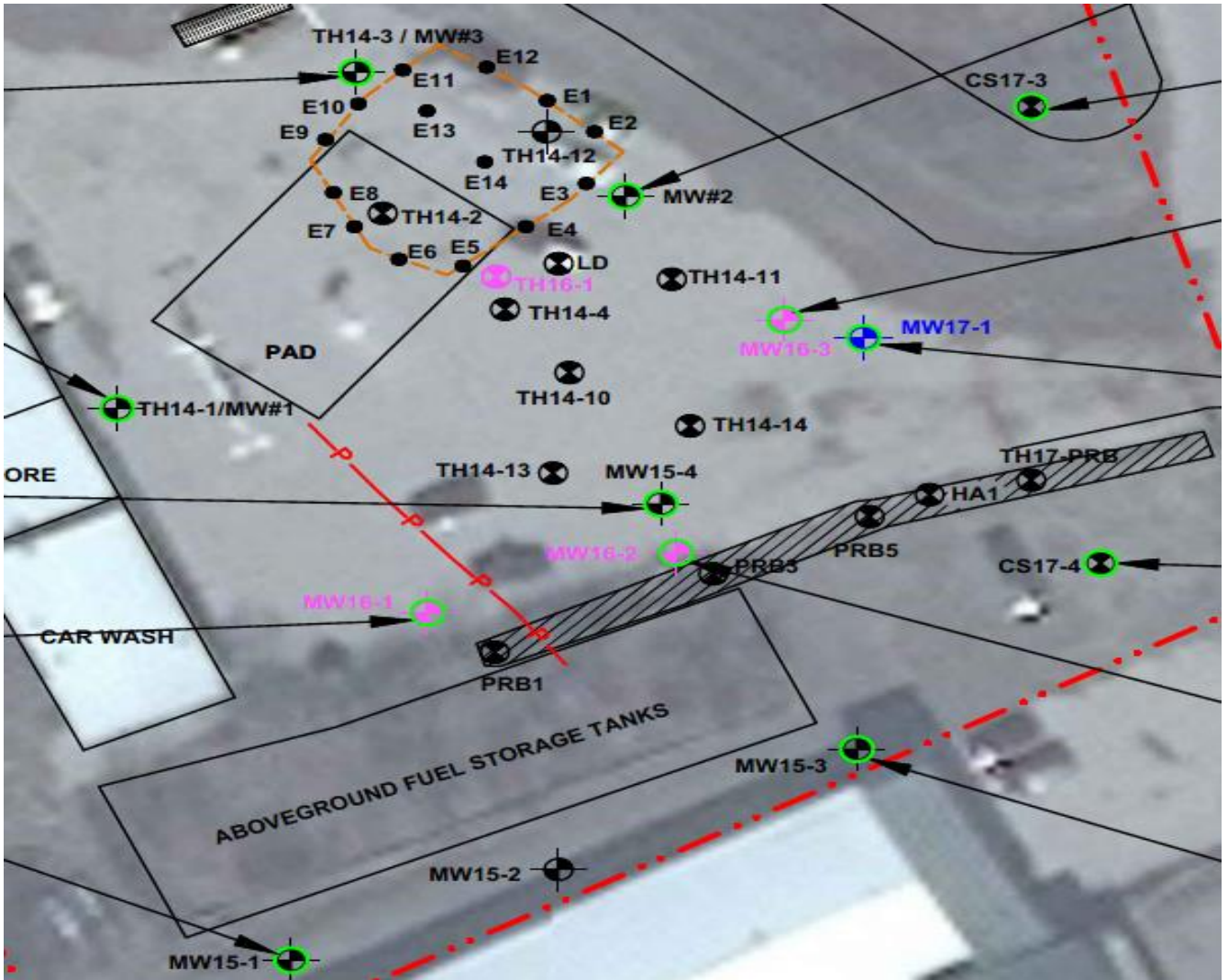
Final Results - GW



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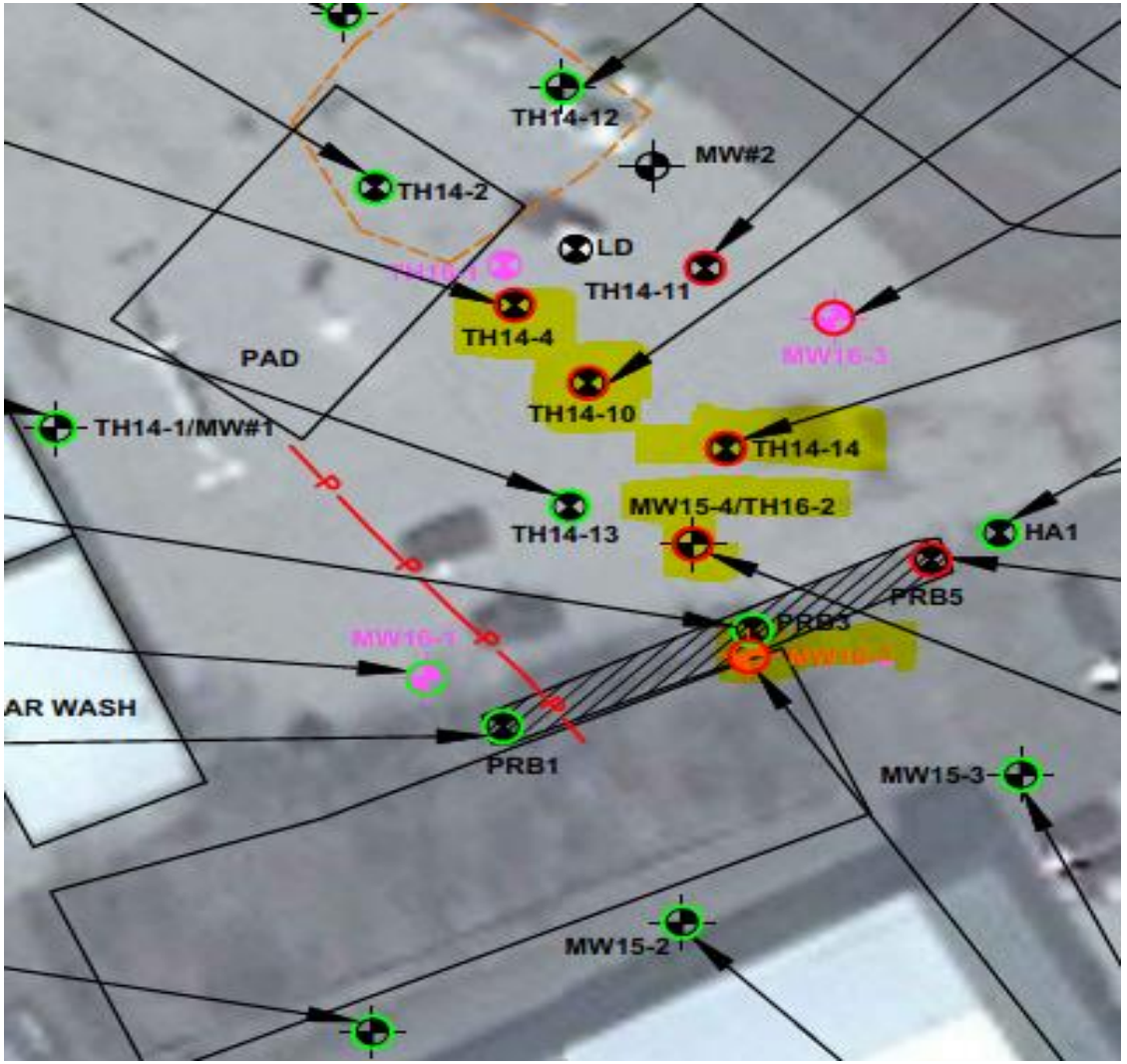
Evaluation– Soil



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Worst Case Soil

- MW15-4, just north of PRB

15-4	Date Sampled	CVC	B	T	E	X	F1	F2	F3	F4
		ppm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
15-4-4 @ 3.0m	22-Sep-15	1000	7.22	67.6	78.4	285	12500	<90	604	<90
15-4-2-4 @ 3.0m	25-Sep-17	120	0.145	<0.070	<0.023	<0.11	<40	<25	238	78

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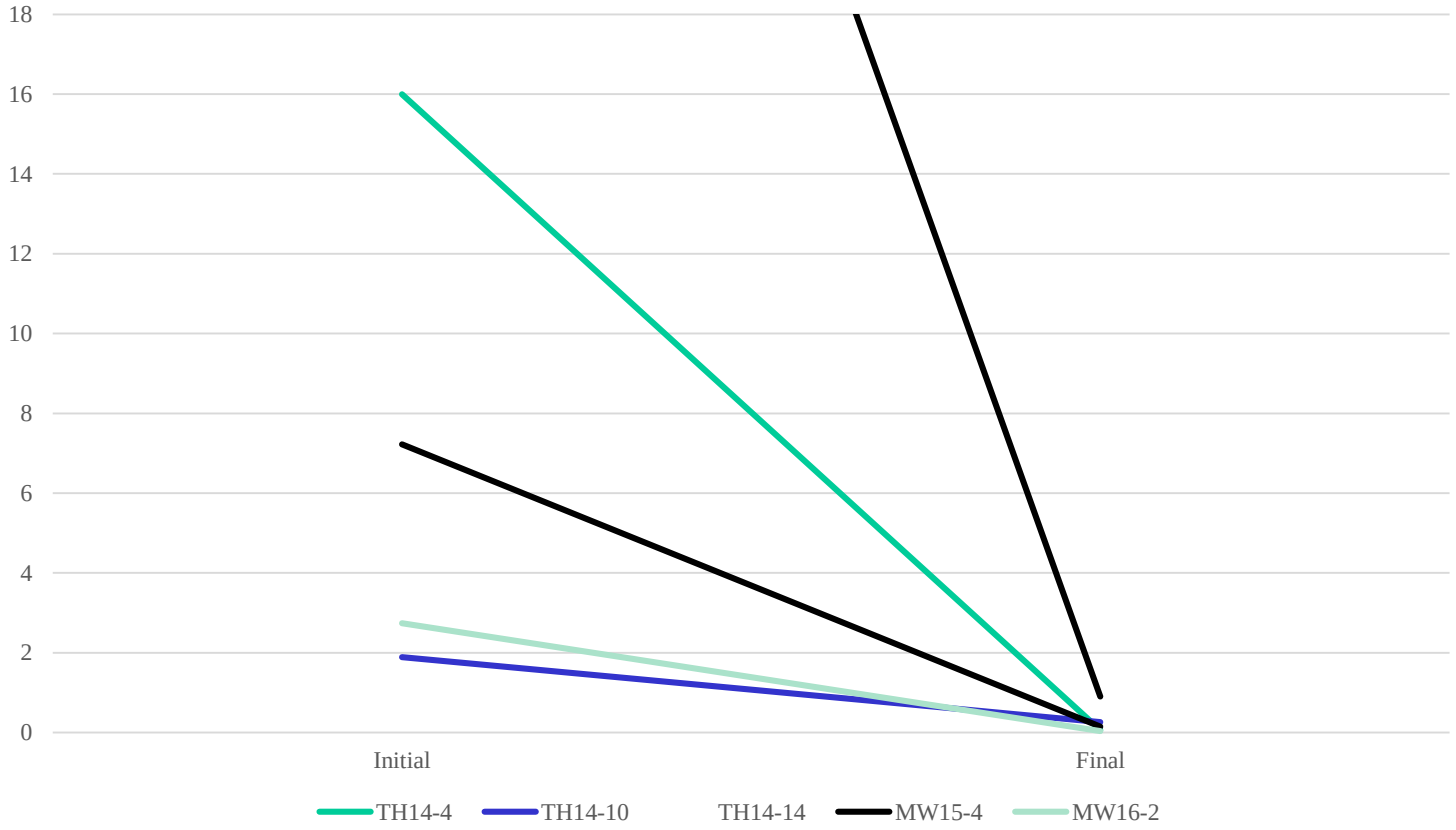
Results - Soil

- Average Benzene Removal – 98%



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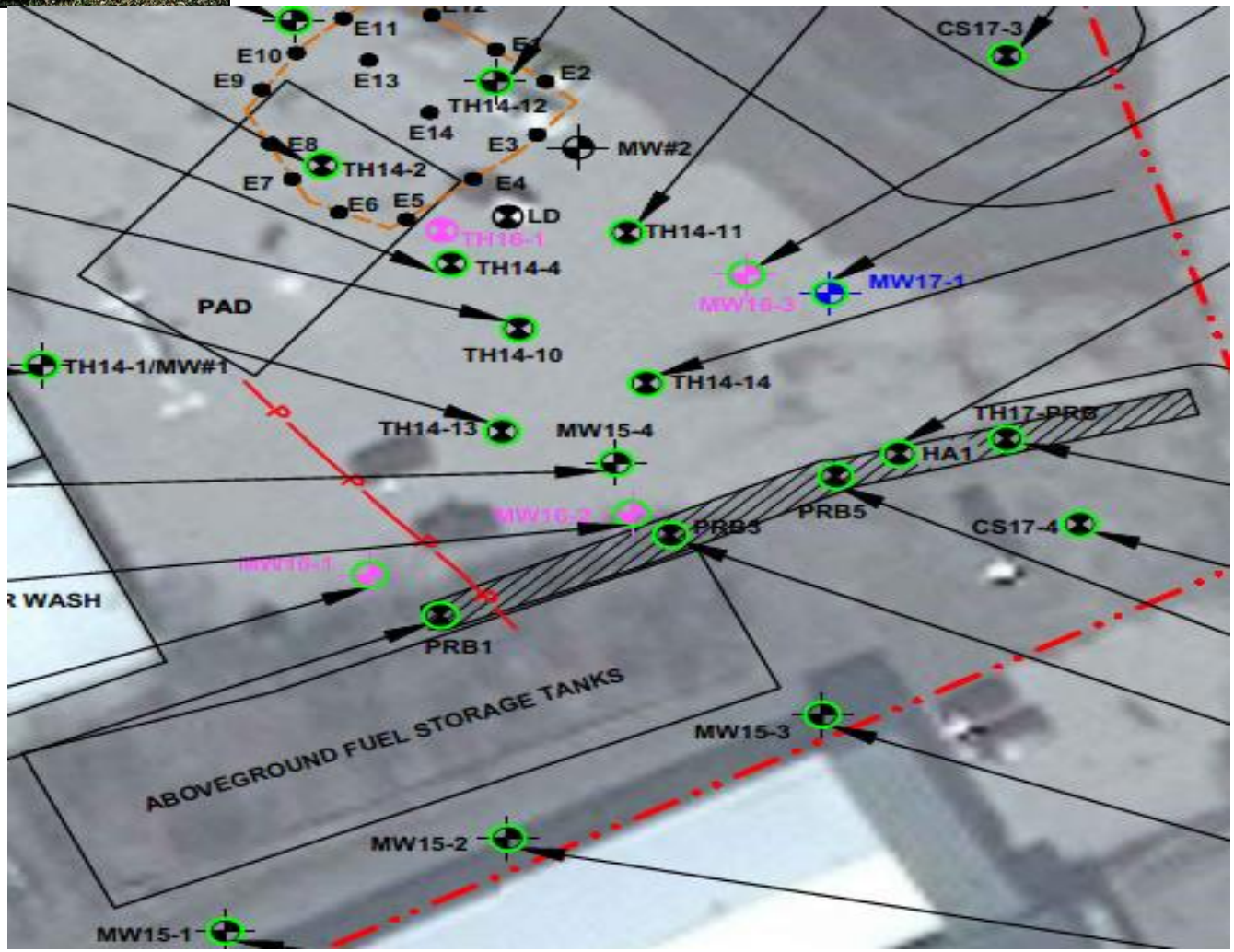
Final Results - Soil



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Summary

- Tier 2 closure from MOE
- No Site downtime
- Costs of approximately 10% compared to dig and dump

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QUESTIONS?

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