Petroleum Release Investigation Using Laser-Induced Fluorescence (LIF) Ultra-Violet Optical Screening Tool (UVOST) Technology

FORMER KEENAN & ASSOCIATES
BILLINGS, MONTANA

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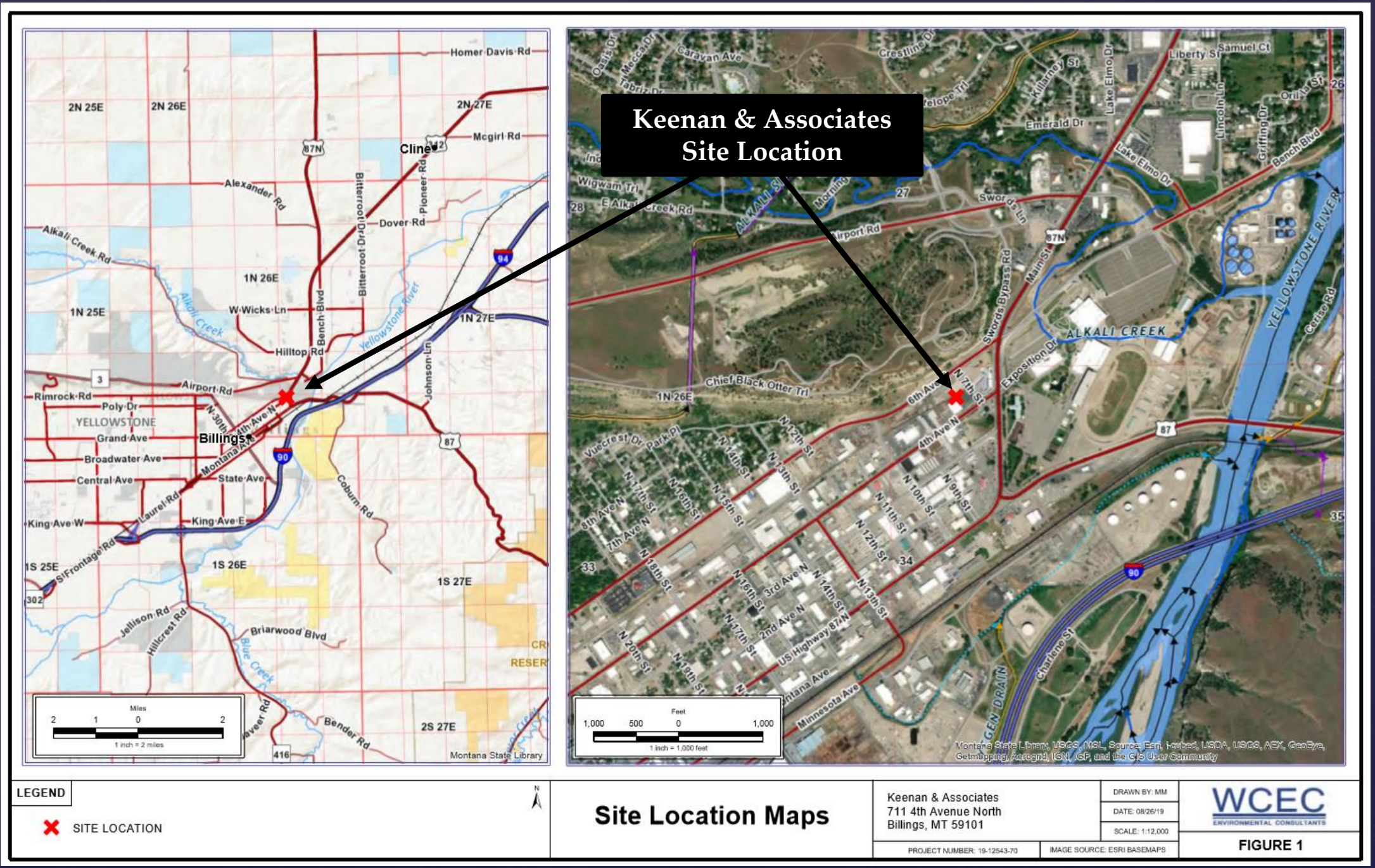
Montana Department of Environmental Quality



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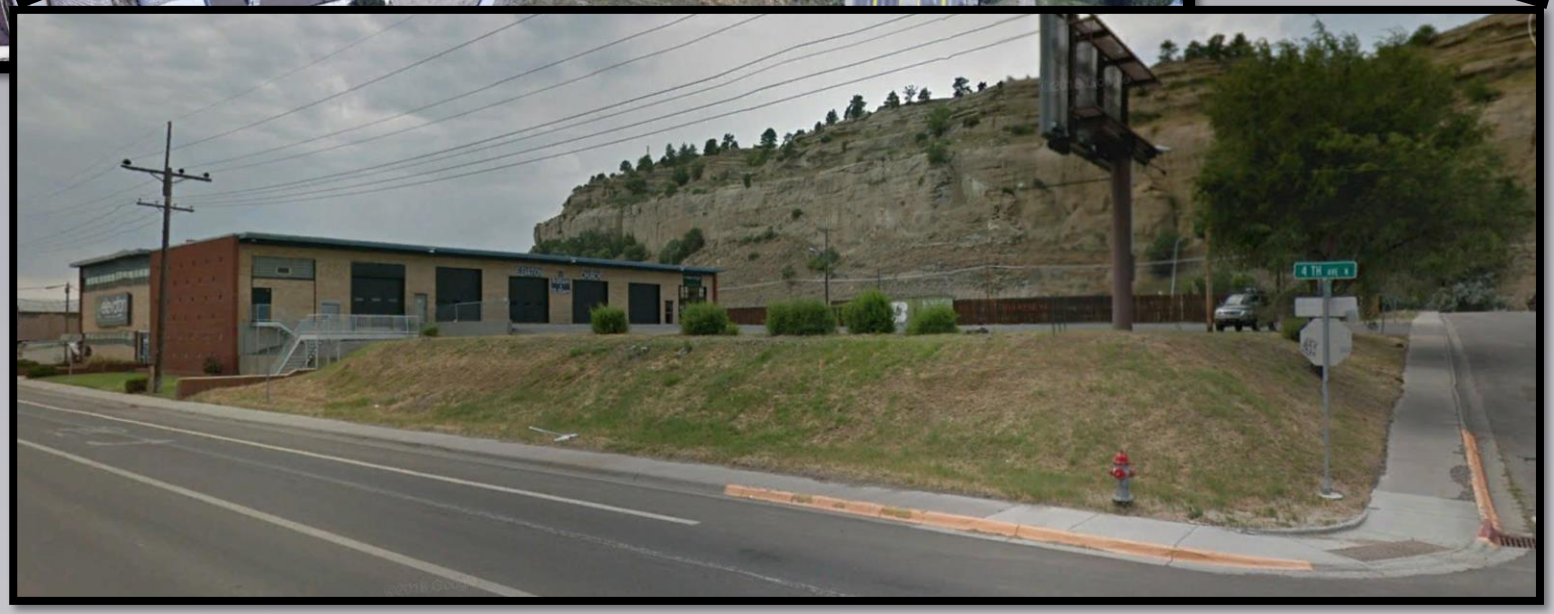

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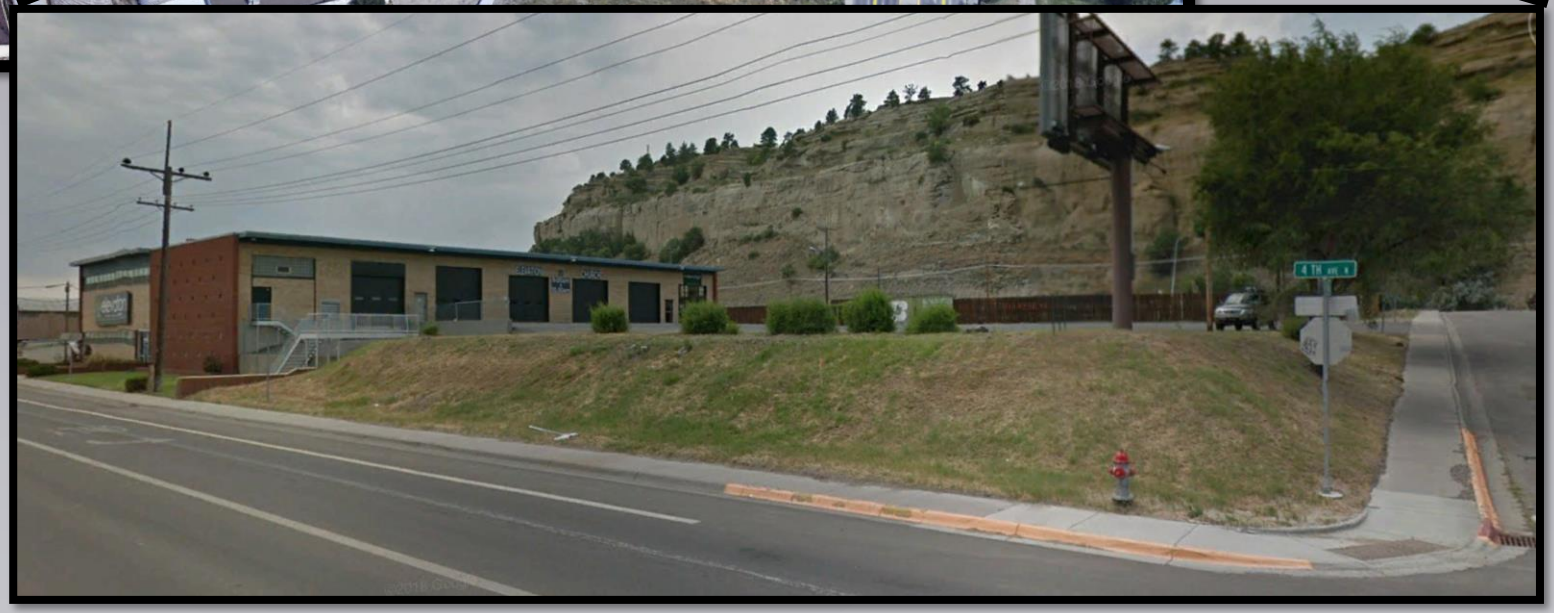
Pacific Hide & Fur

Keenan & Associates



Consolidated Freightways Petroleum Release 1094

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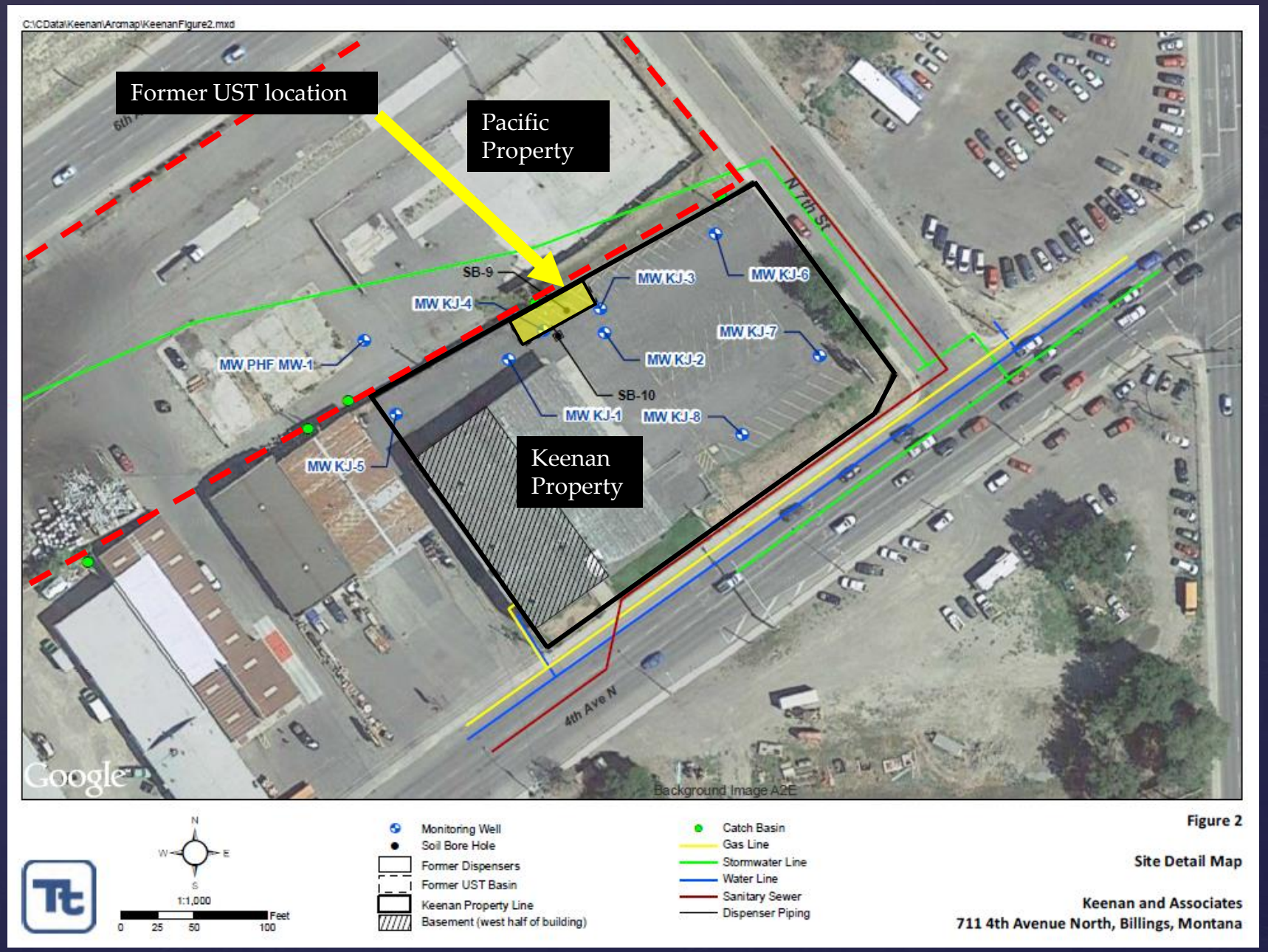
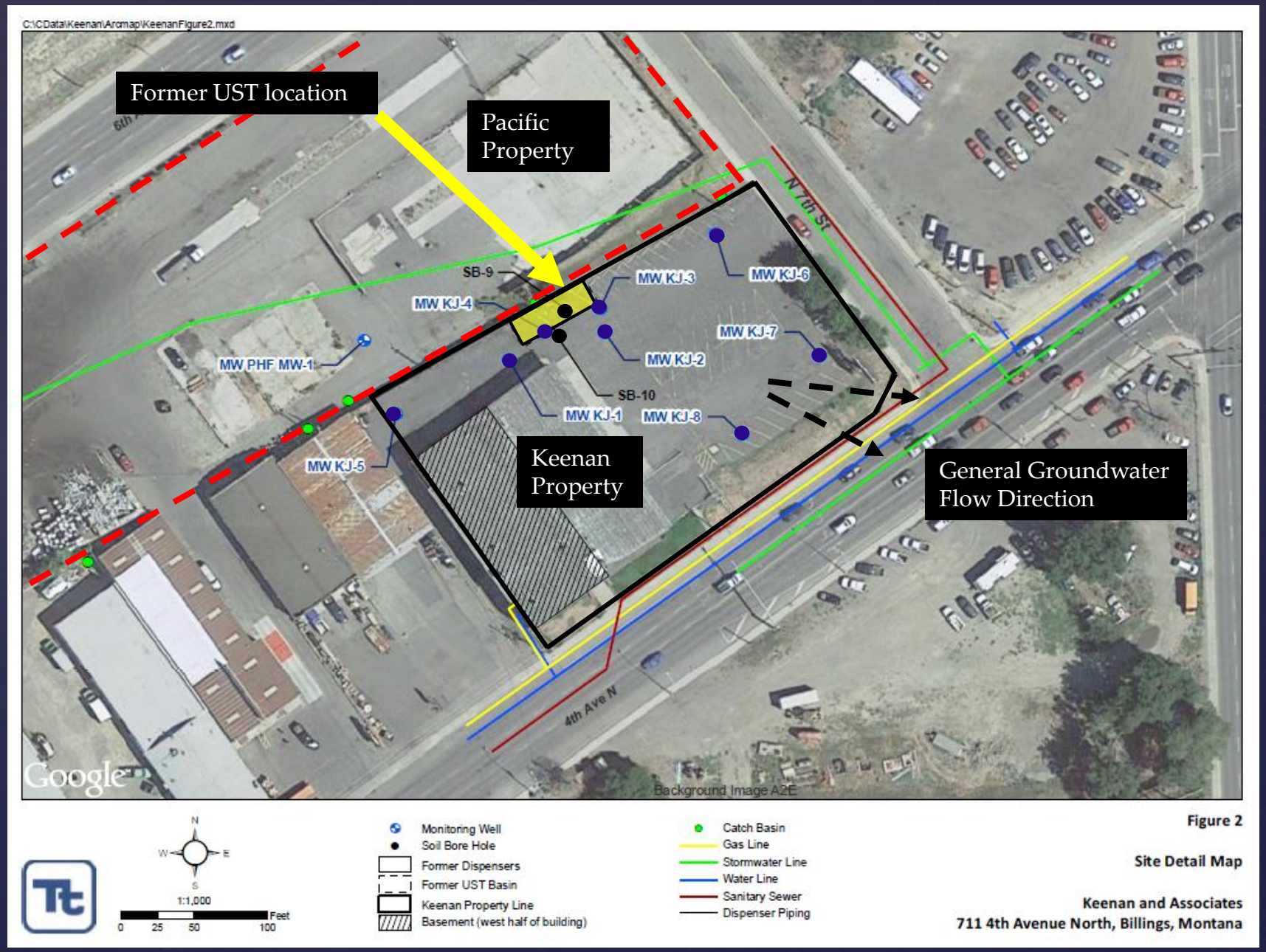
Release Investigation
2015 and 2017



Keenan
Release Investigation
2015 and 2017

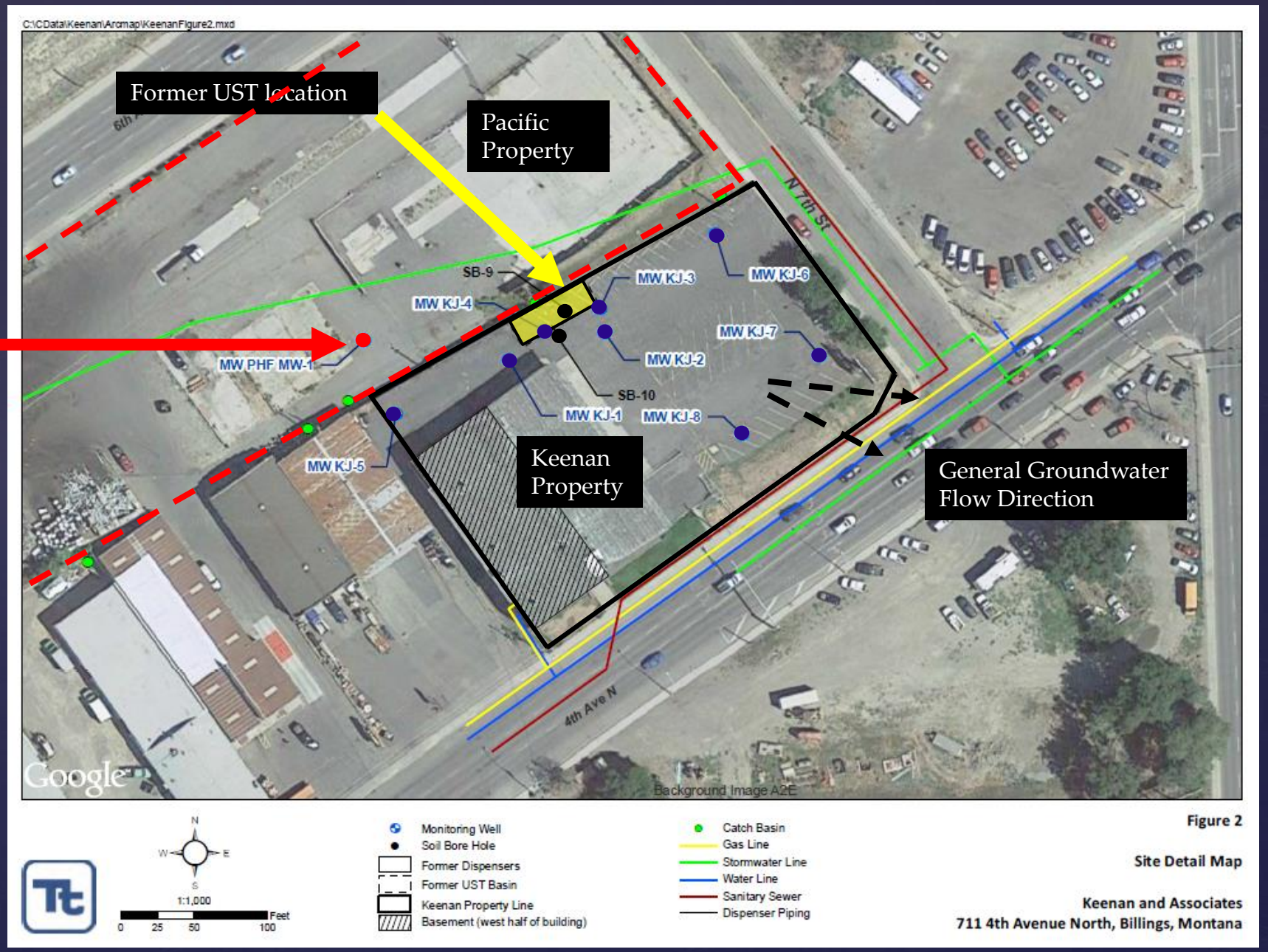
10 Soil Borings
8 Monitoring Wells



Keenan
Release Investigation
2015 and 2017

Pacific Hide & Fur Well
PHF MW-1
Installed 1993

10 Soil Borings
8 Monitoring Wells



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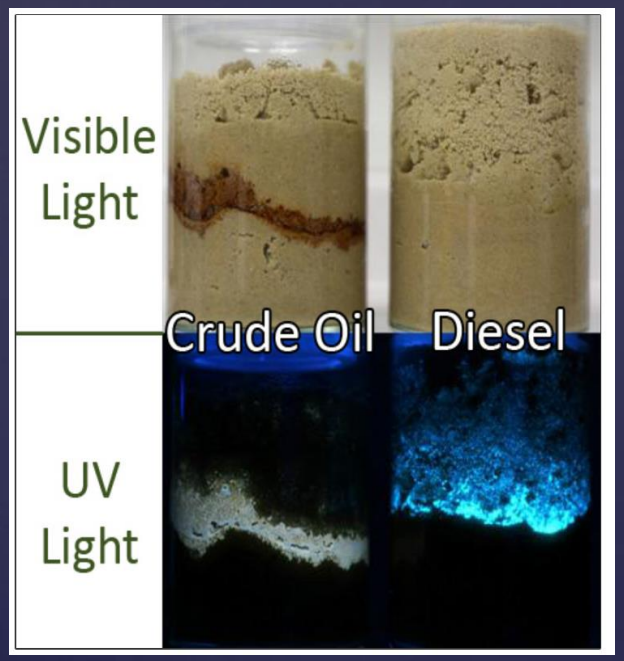
DEQ July/August 2019 - Petroleum Release Investigation

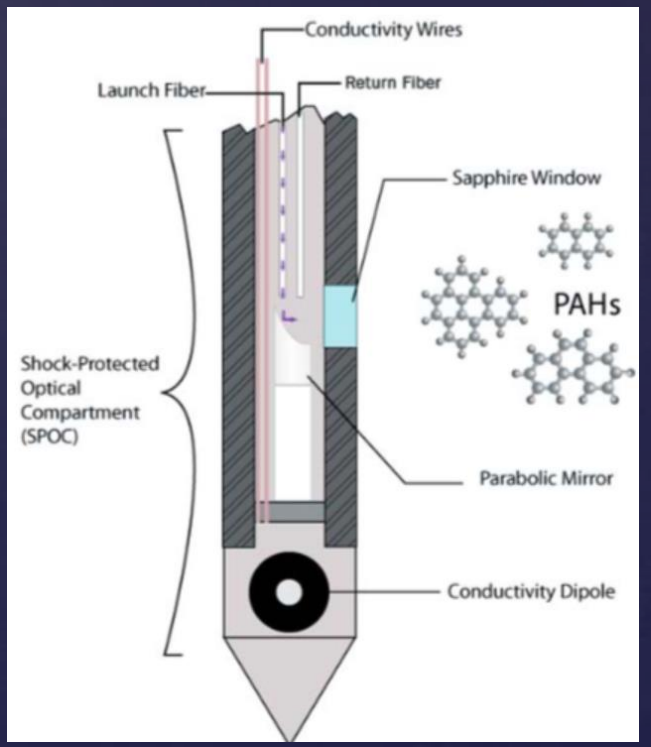
Laser-Induced Fluorescence (LIF) Ultra-Violet Optical Screening Tool (UVOST)

What is LIF?



Polycyclic Aromatic Hydrocarbons (PAHs) fluoresce when hit with a laser emitting ultra-violet light.

The ultra-violet optical screening tool (UVOST) is housed in the end of a direct-push probe.



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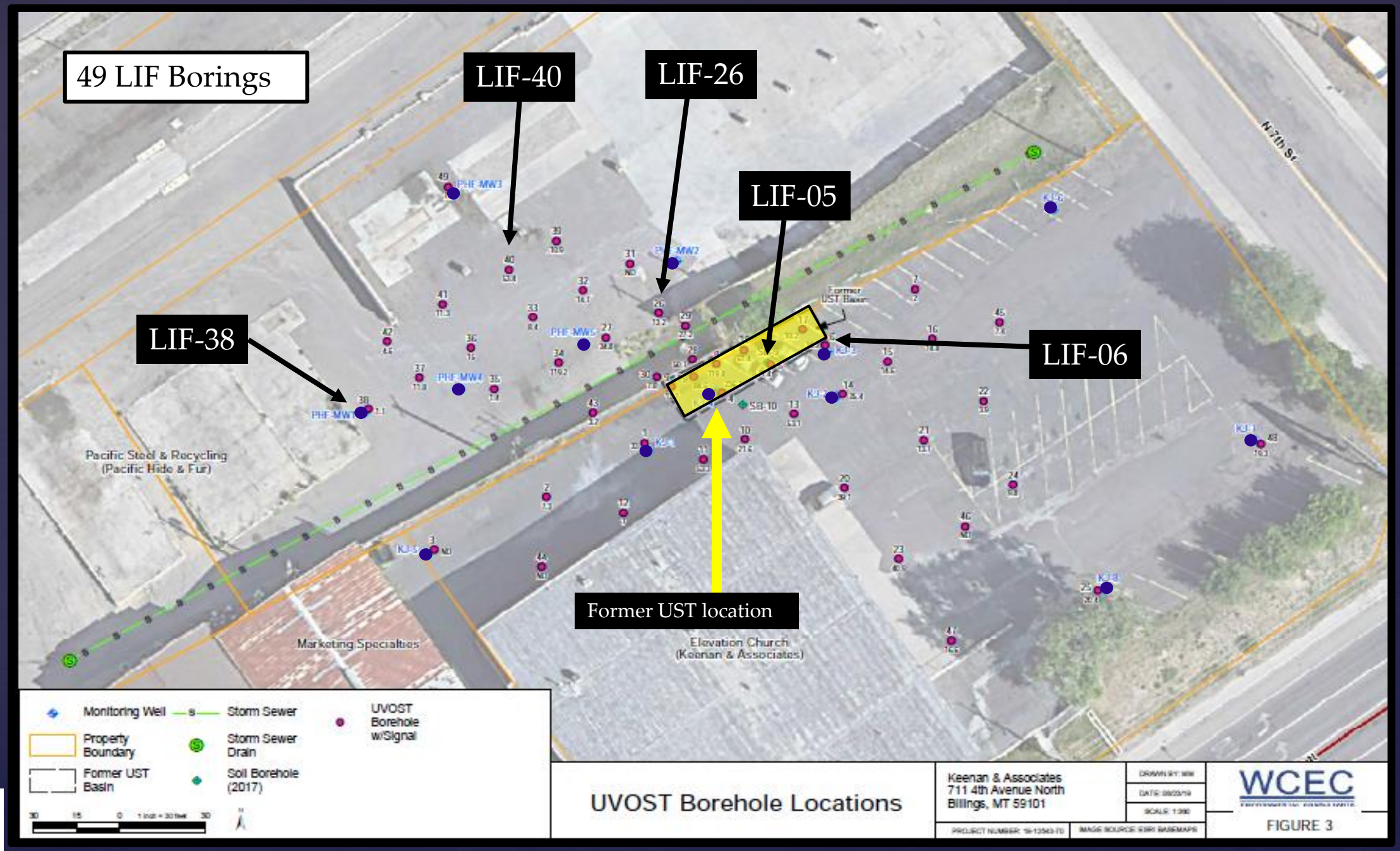
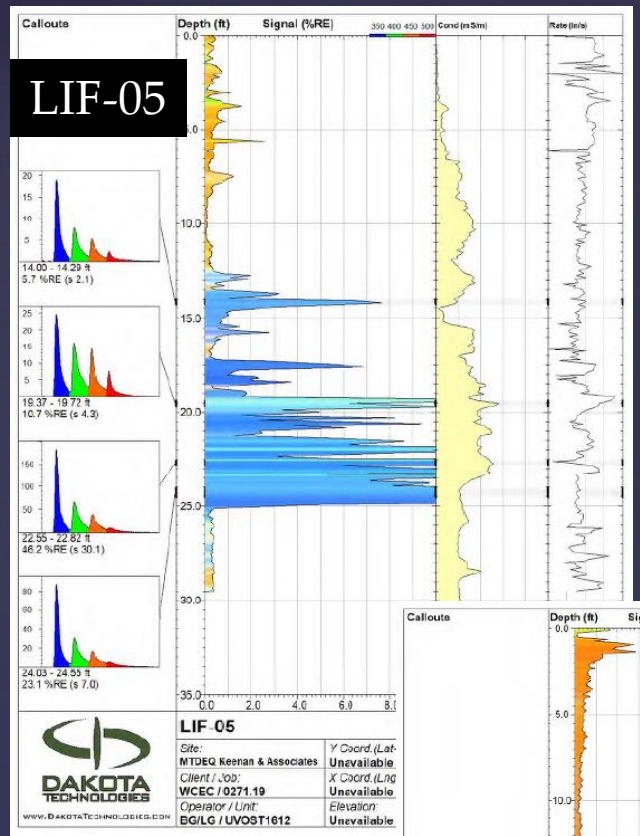
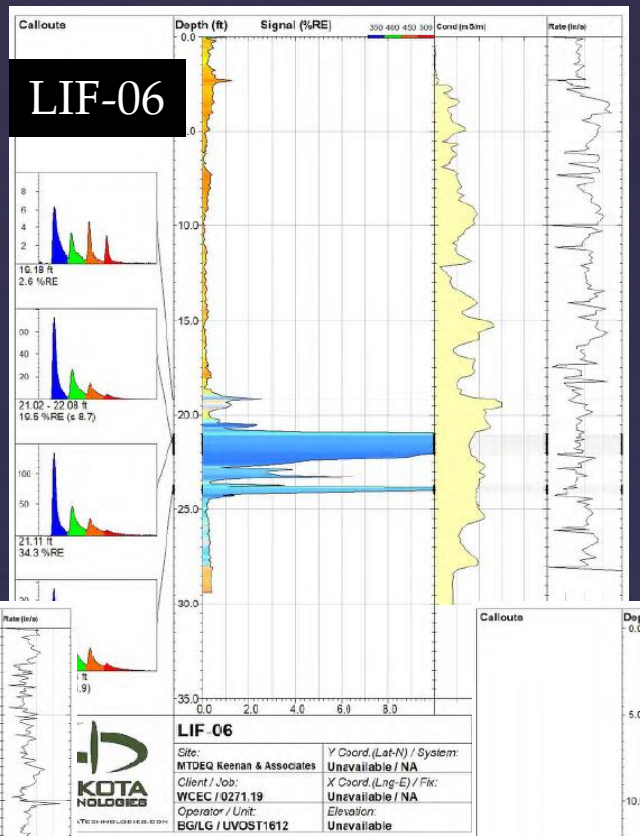
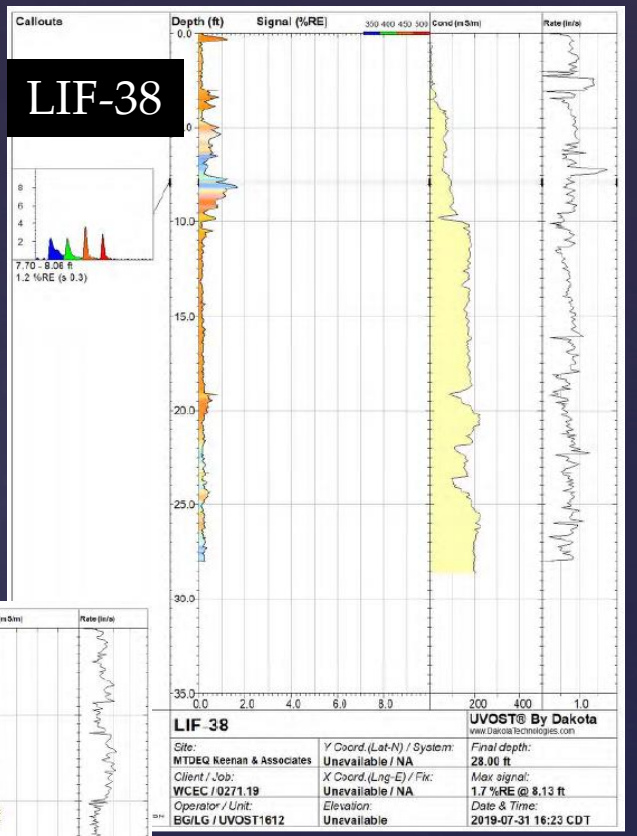
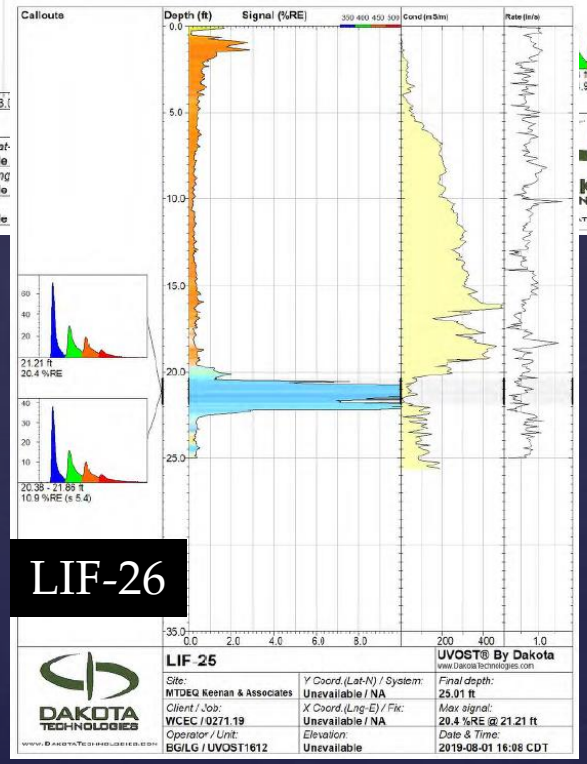
LIF Equipment Set Up

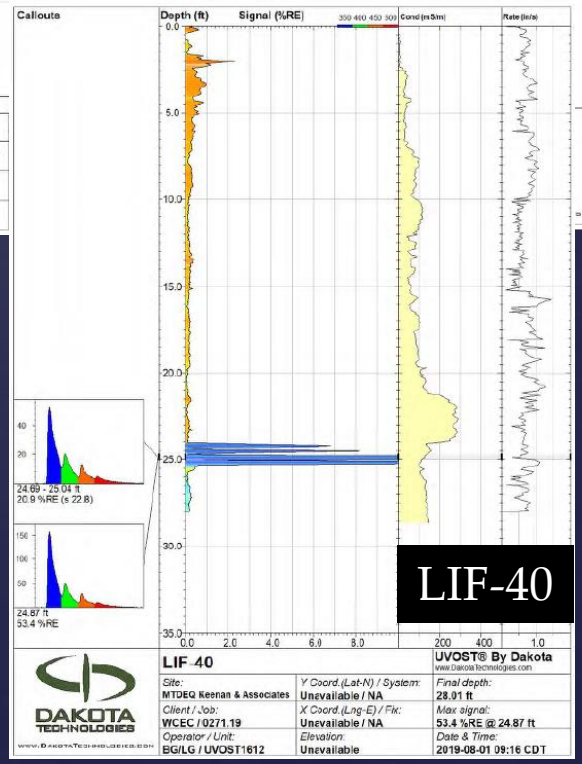

49 LIF Borings
LIF-40
LIF-26
LIF-05
LIF-38
LIF-06
Former UST location
Pacific Steel & Recycling
(Pacific Hide & Fur)
Marketing Specialties
Elevation Church
(Keenan & Associates)
N 7th St
Monitoring Well
Property Boundary
Former UST Basin
Storm Sewer
Storm Sewer Drain
Soil Borehole (2017)
UVOST Borehole w/Signal
UVOST Borehole Locations
Keenan & Associates
711 4th Avenue North
Billings, MT 59101
WCEC
FIGURE 3











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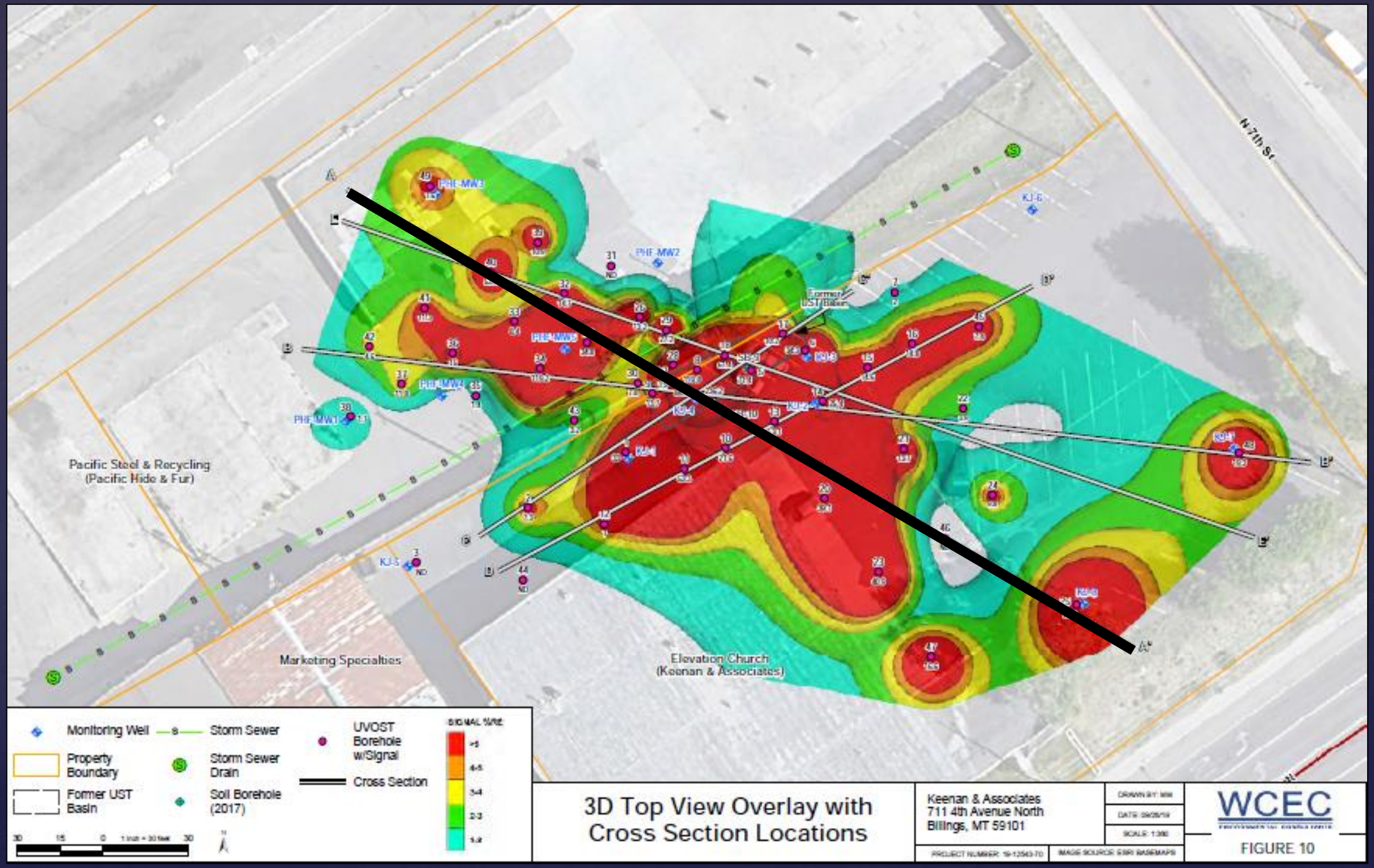

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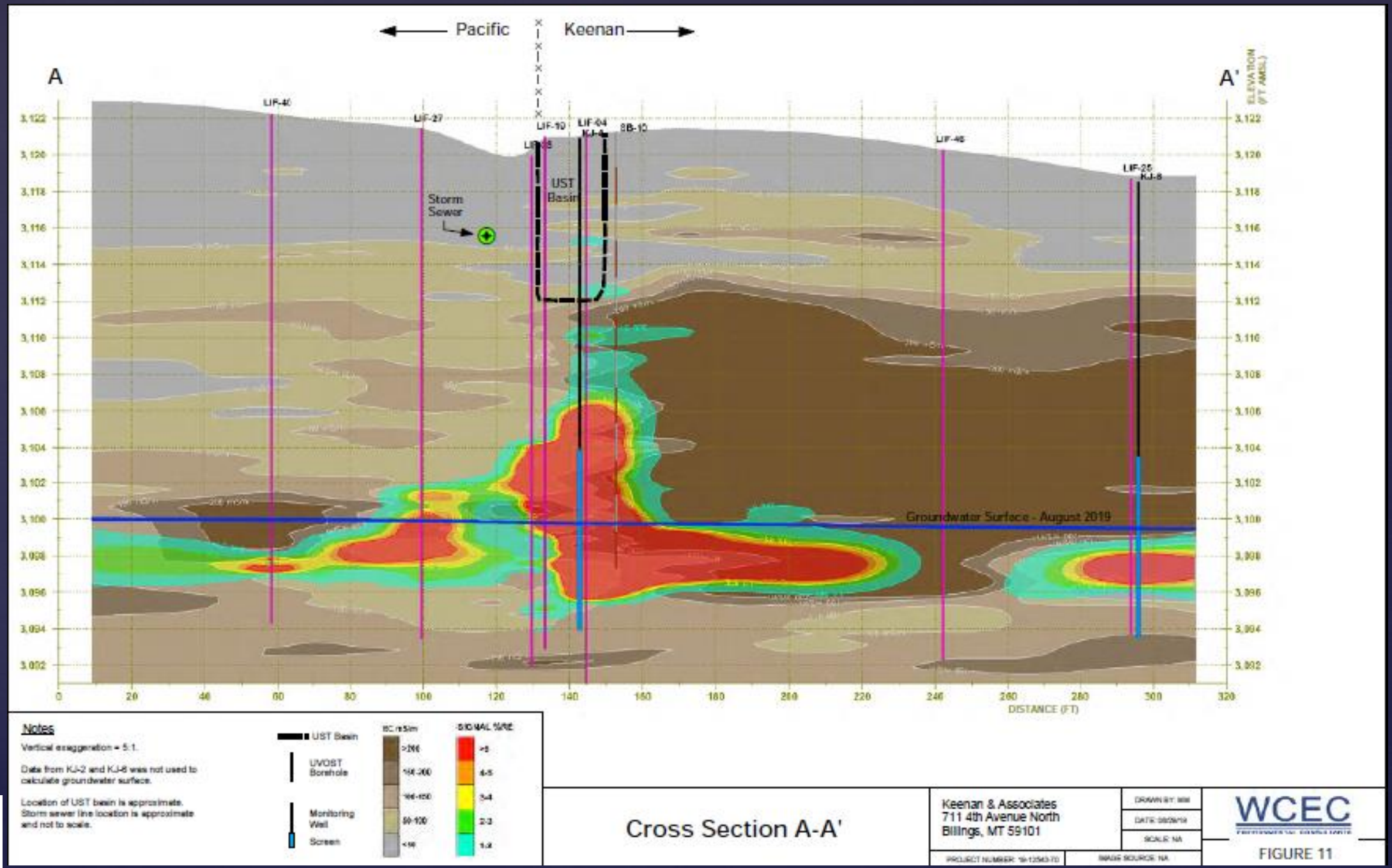

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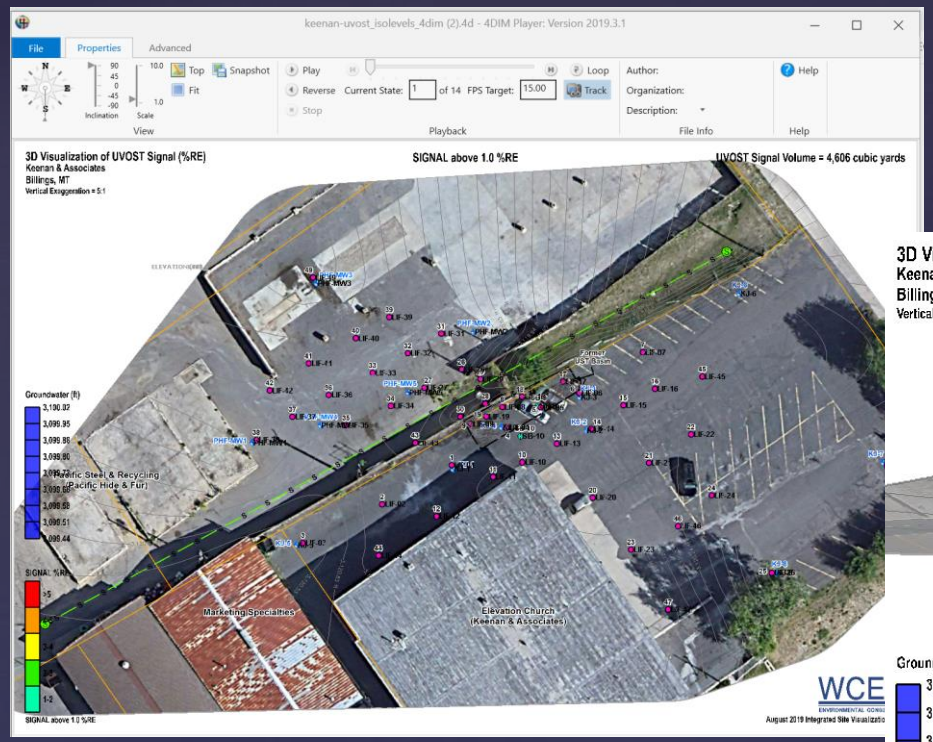

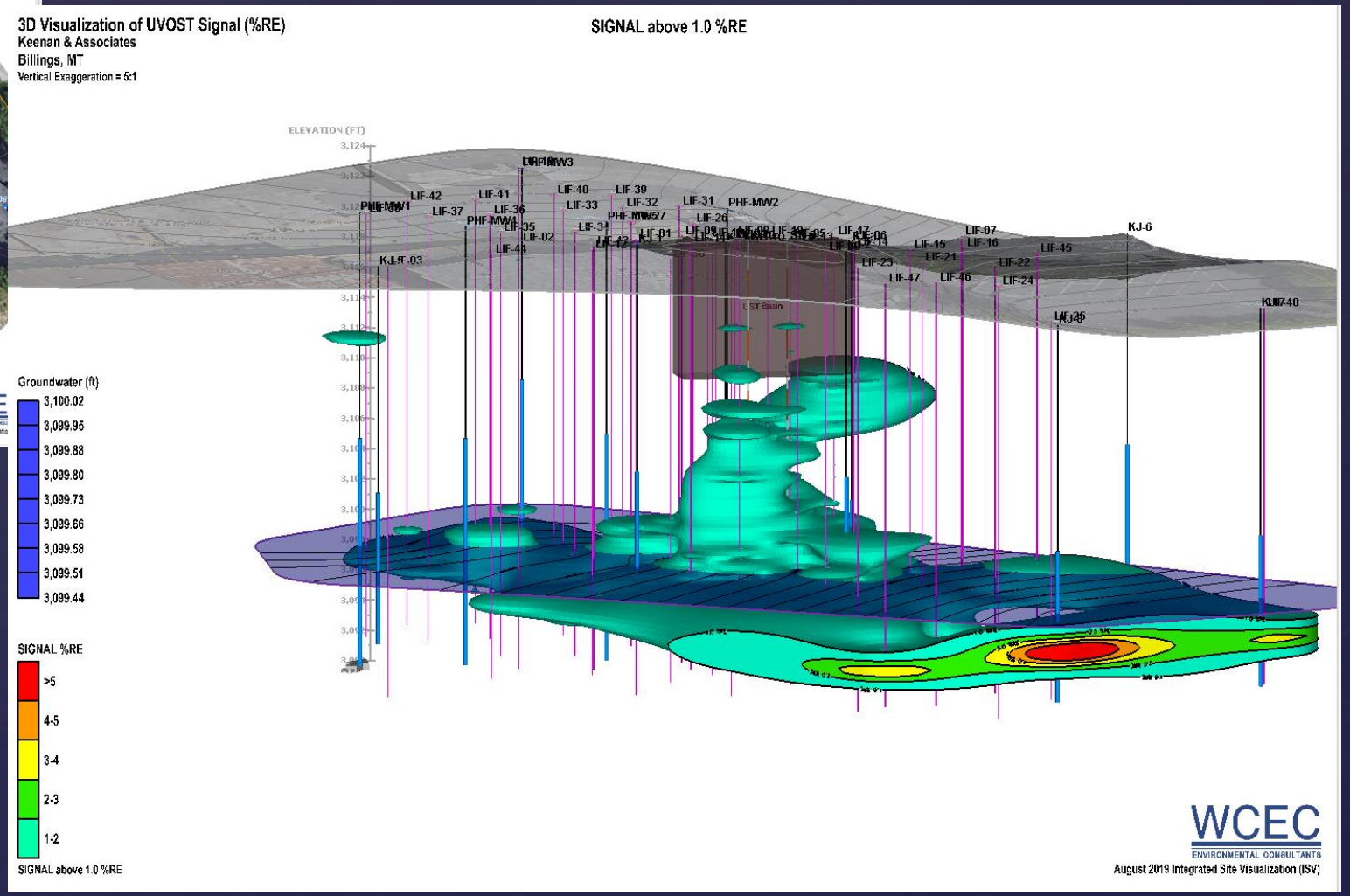

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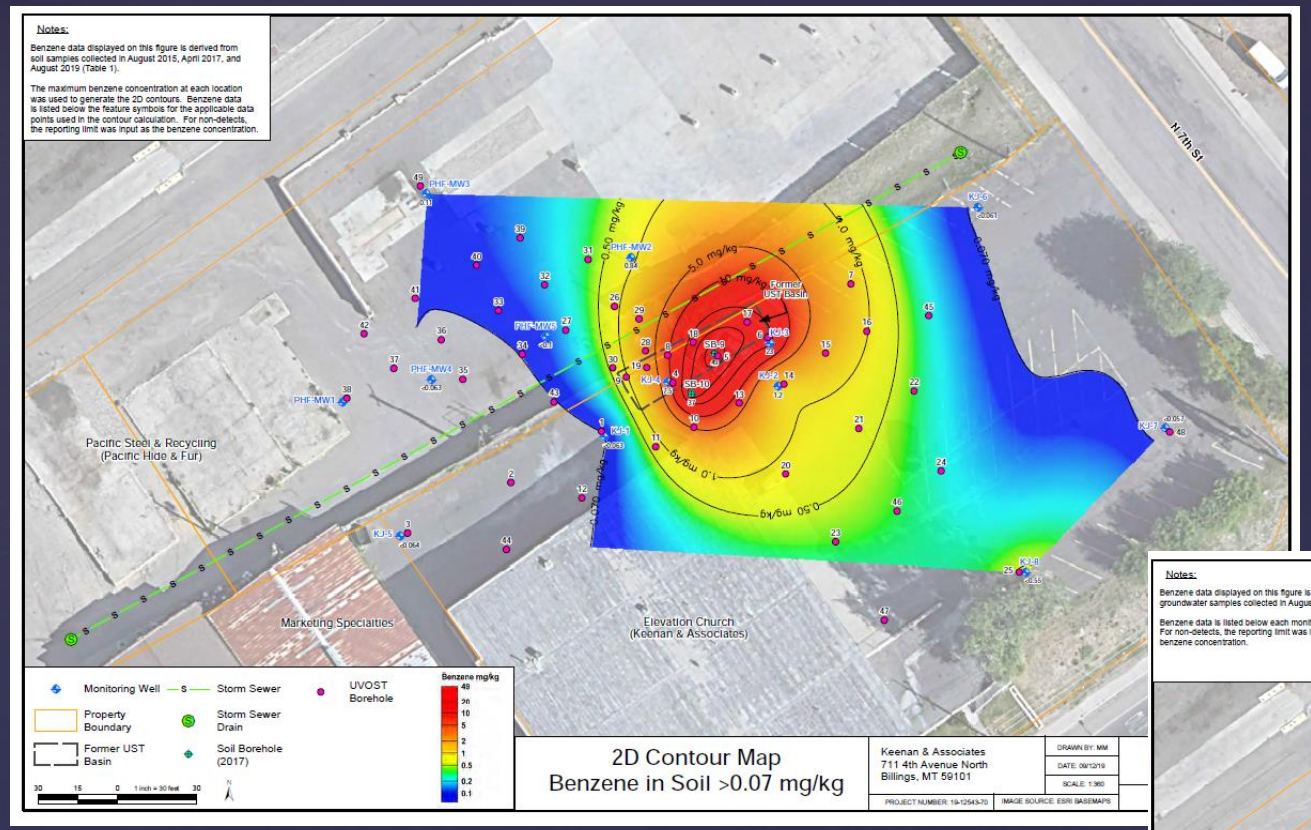
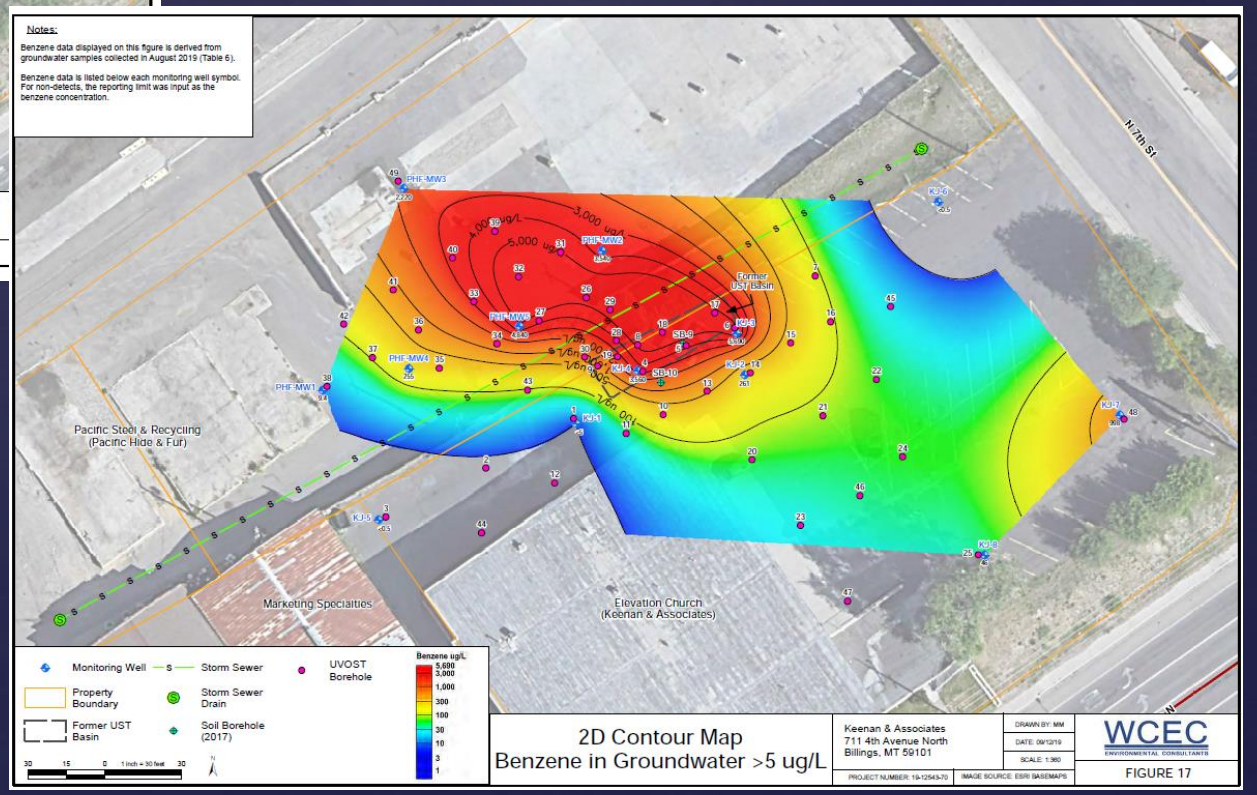
Benzene Concentrations



Soil Sample Results
From 14 Borings

Groundwater Sample Results
From 13 Wells



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Discussion of Results

- LIF UVOST Investigation:
  - A good screening tool for making field decisions.
    - Soil borings and monitoring well locations.
    - Delineating a release area.
  - Assists in identifying petroleum release sources, migration pathways and/or cleanup strategies.
- For the Keenan release - Additional investigation needed:
  - Completely define impacts upgradient and downgradient.
  - Identify other sources.

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Questions?

Further information on LIF:

LUST Line article, Paul Stock , MN, June 2011:
http://www.neiwpcc.org/lustline/lustline_pdf/lustline_68.pdf

Clu-In: Article by Dakota Technologies, Randy St. Germain
https://clu-in.org/characterization/technologies/lif.cfm

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