Proposed Remedial Action Plan
7th Street and Missouri Avenue
Water Quality Assurance Revolving Fund Site

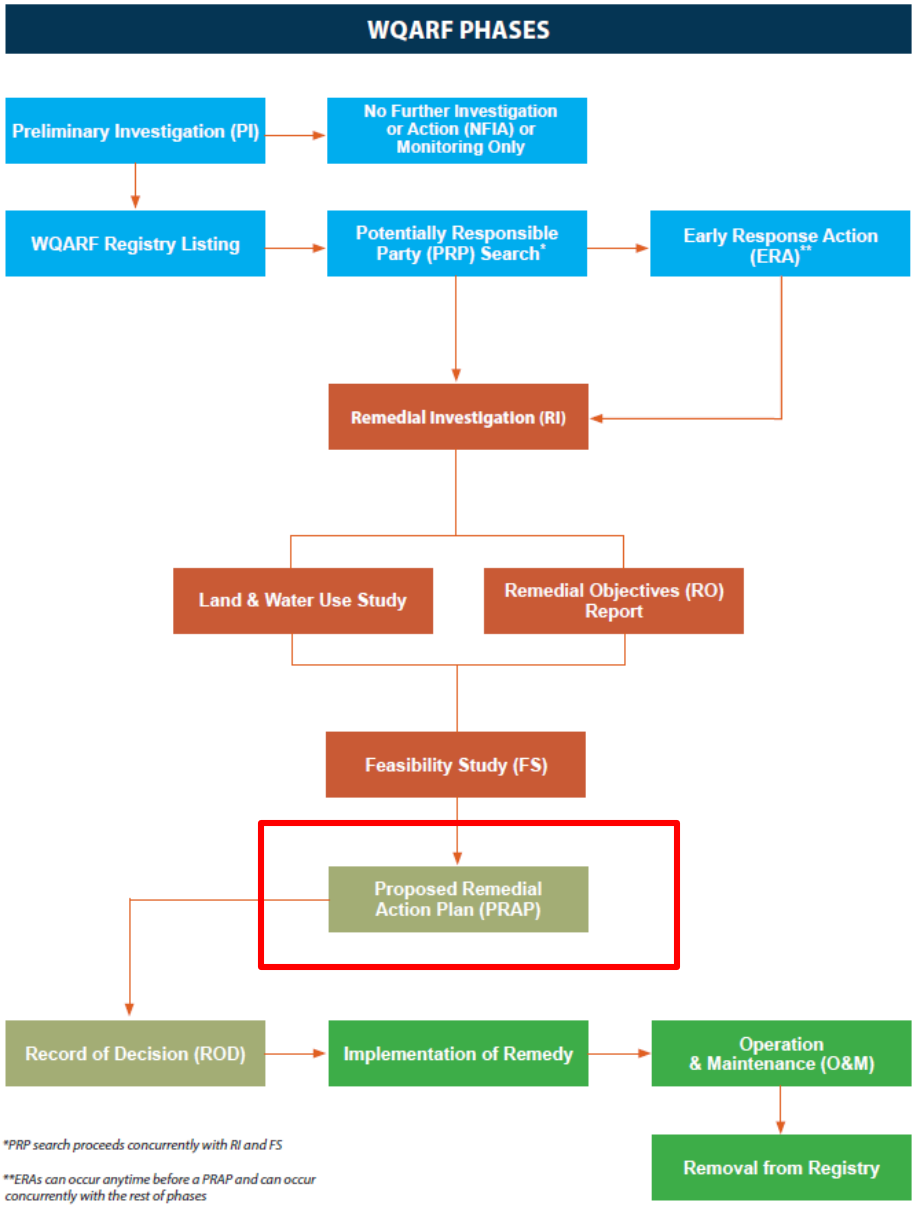
Dr. Hazel Cox, Project Manager

Central Phoenix CAB Meeting

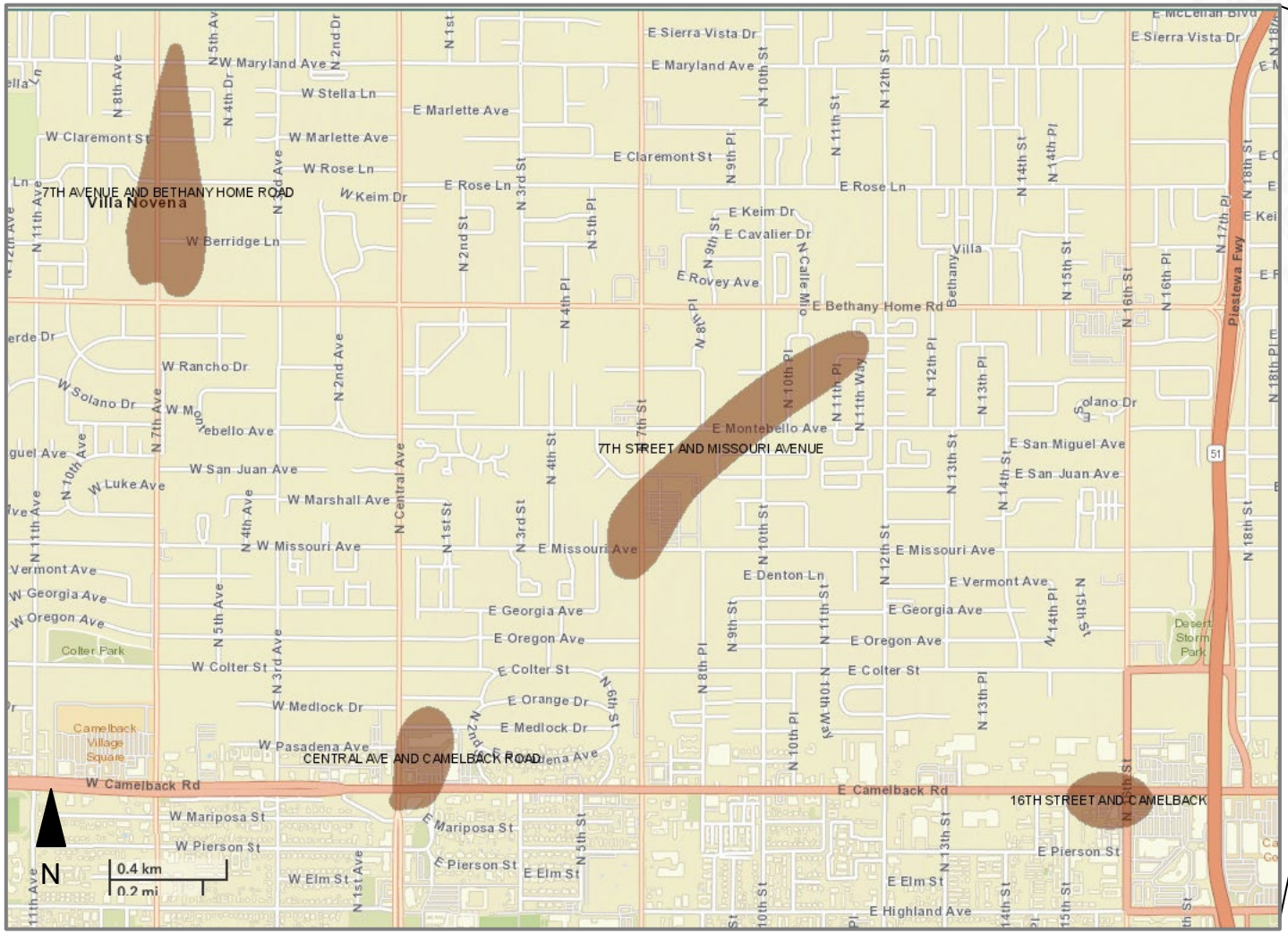
11 June 2020

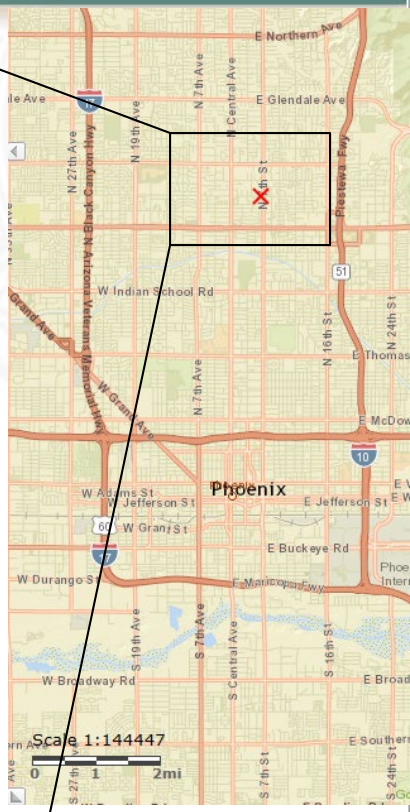
ADEQ
Arizona Department of Environmental Quality

7th Street and Missouri Avenue
Proposed Remedial Action Plan

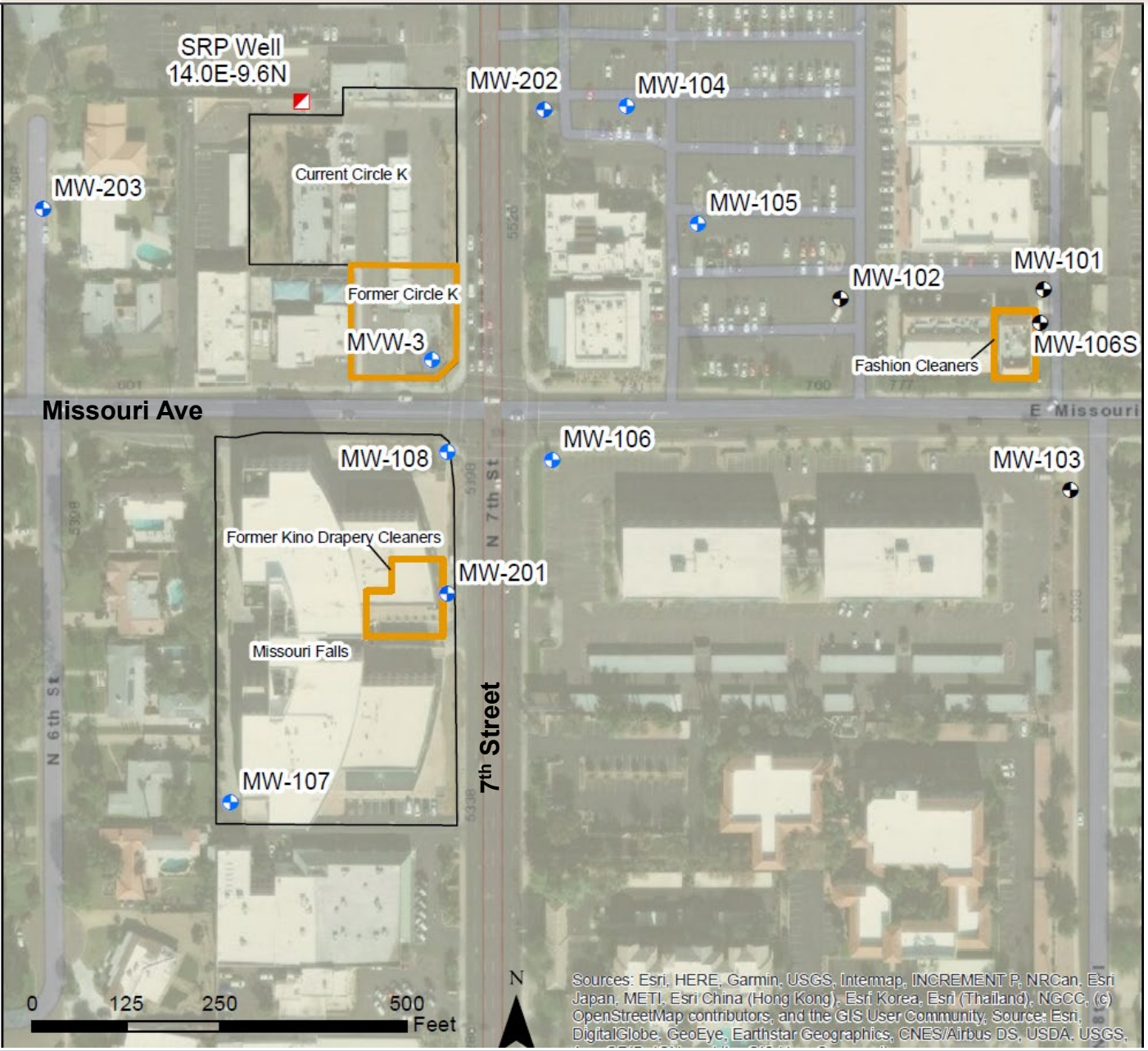


7th Street and Missouri Avenue
Site location





7th Street and Missouri Avenue Area facilities

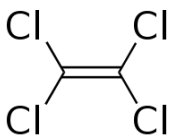


Legend

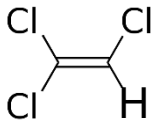
- Site Wells
- VRP Site Wells
- Production Well
- Area Facilities
- Area Properties

7th Street and Missouri Avenue
Contaminants of concern

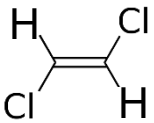
- Tetrachloroethene (**PCE**)



- Trichloroethene (**TCE**)



- Cis-1,2-dichloroethene (**cis-1,2-DCE**)

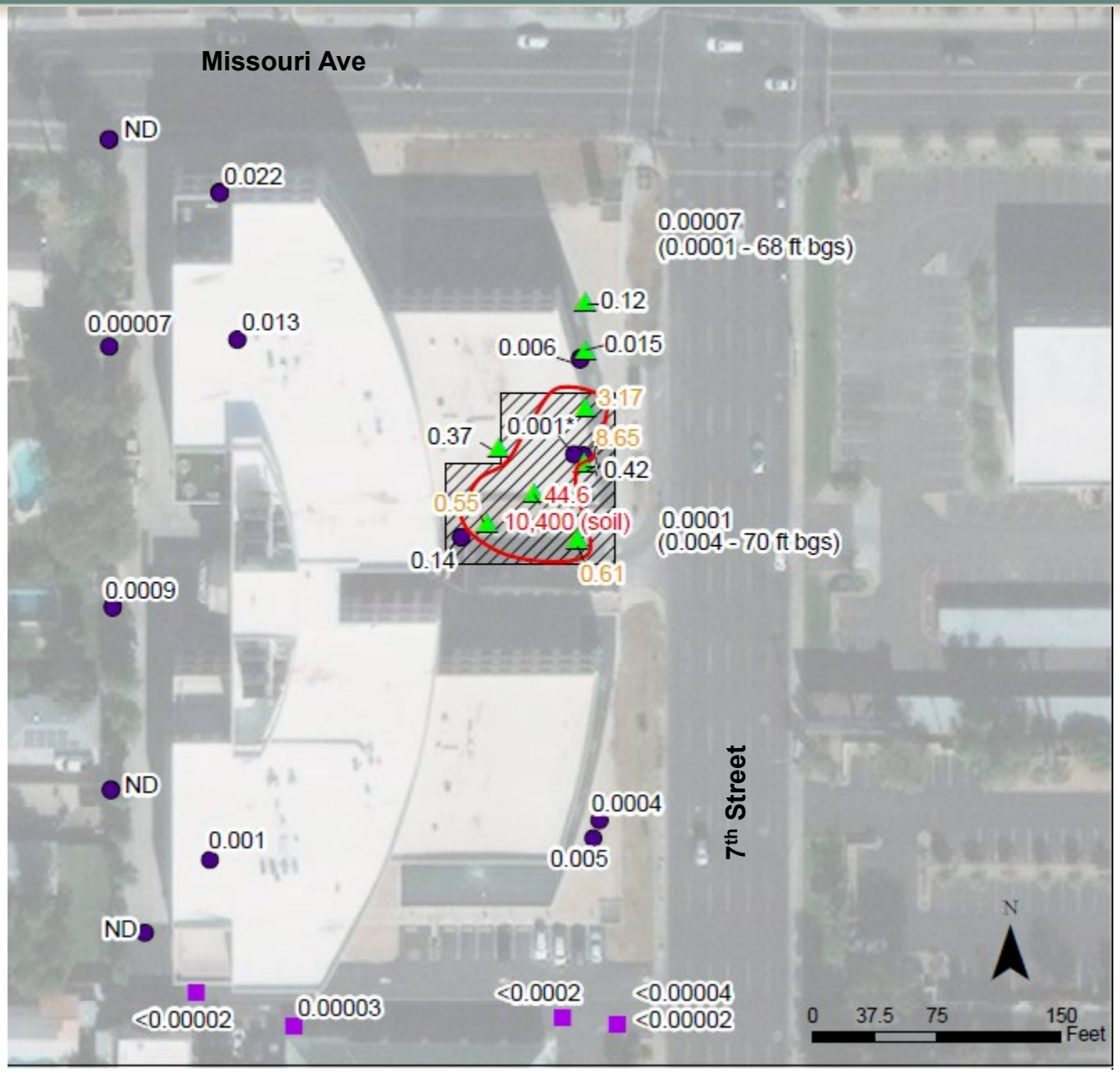


- **PCE** often used in dry cleaning
- **TCE** is a breakdown product of PCE; also used as a solvent
- **Cis-1,2-DCE** is a breakdown product of PCE/TCE

7th Street and Missouri Avenue Background

- Brief site history
  - 1995 - PCE reported in Circle K monitoring wells
  - PCE detected at Salt River Project (SRP) well 14.0E-9.6N
  - 2008 -2016 - Preliminary investigation found two PCE plumes. The groundwater plumes are not combined.
  - June 2016, one plume area entered Voluntary Remediation Program
  - June 2016, second plume area listed on WQARF registry

7th Street and Missouri Avenue
PCE extent in soil



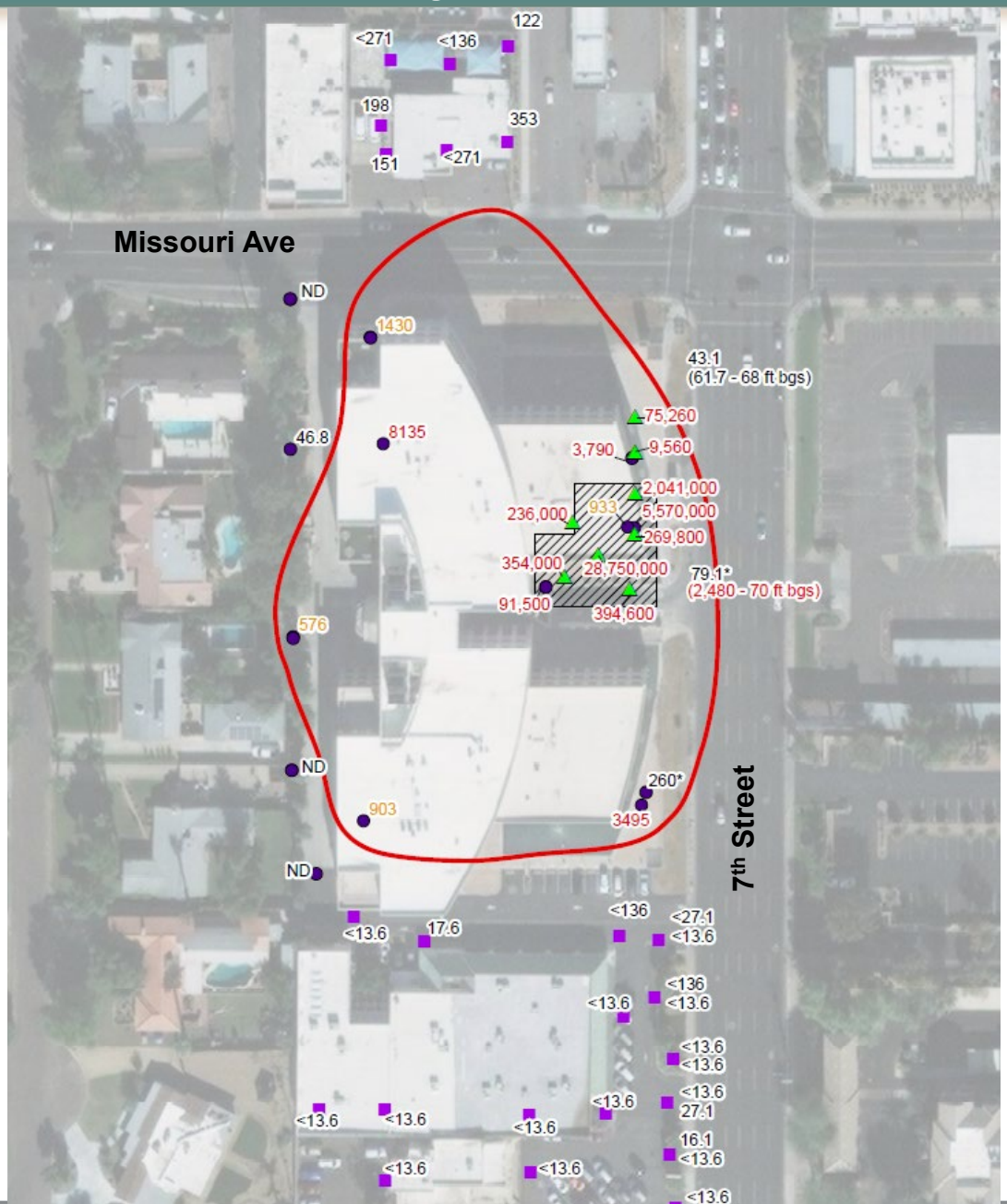
Legend

- Nov 2018, 20 ft bgs (highest concentration and depth in parenthesis)
- June 2018 - ~35 ft bgs
- 2017 - 5-15 ft bgs
- 2014 - 20-35 ft bgs
- Approximate area above SRLs
- Former dry cleaner location

Notes:

All numbers in mg/kg
Values from converting soil-gas into soil equivalents unless otherwise noted
Red indicates above non-residential SRL
Orange indicates above residential SRL
* Not used for contouring

7th Street and Missouri Avenue
PCE extent in soil gas



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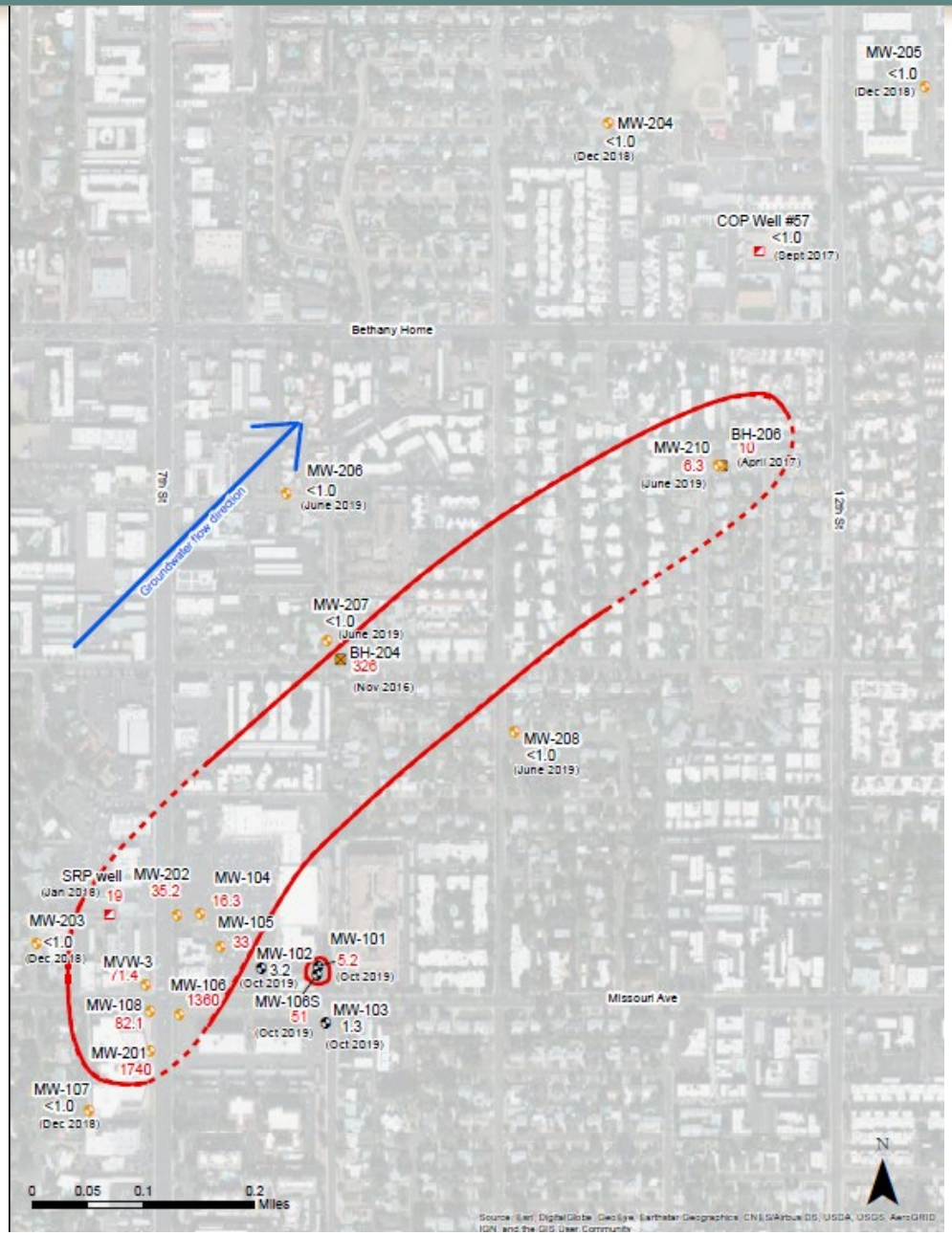
7th Street and Missouri Avenue PCE extent in groundwater

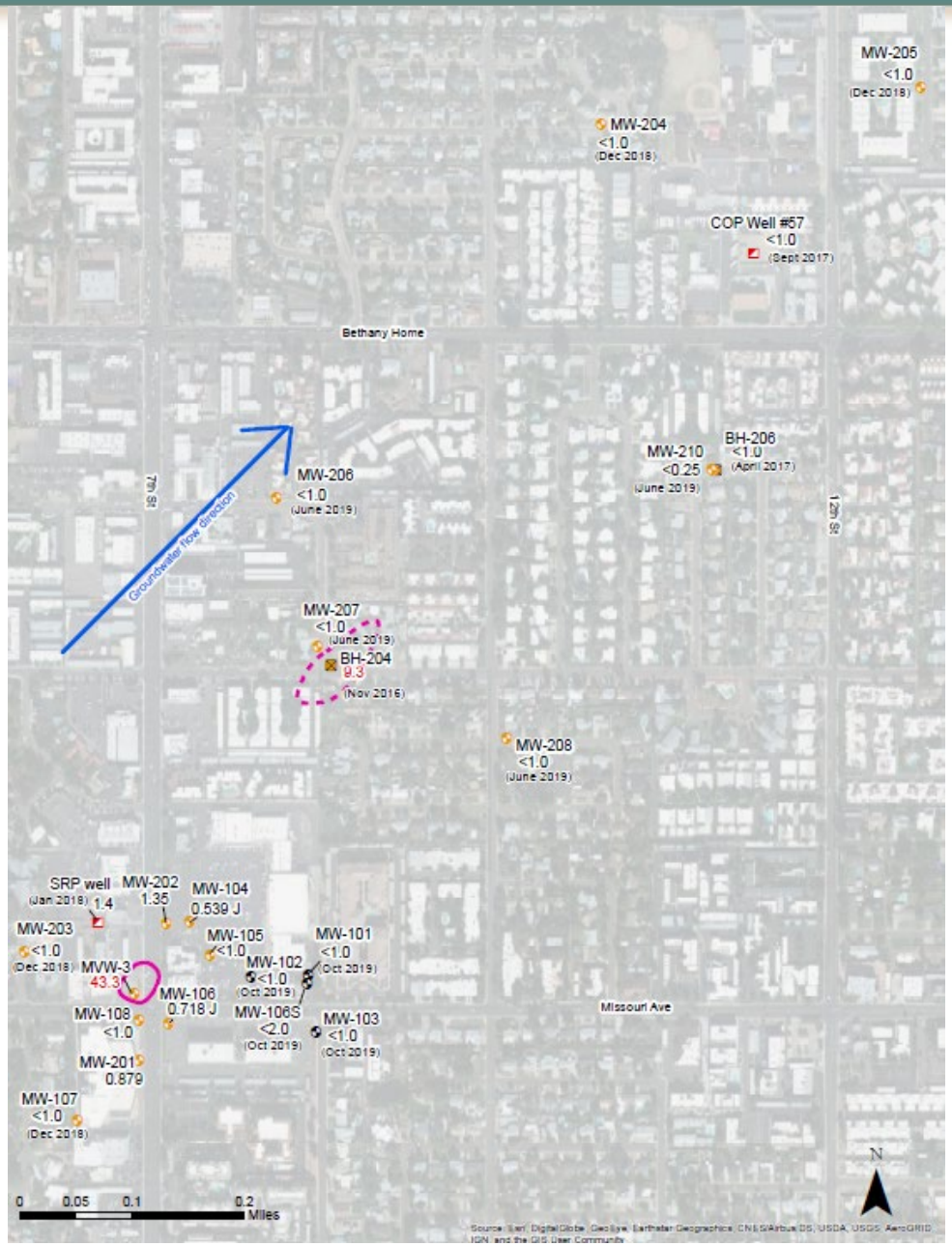


Legend

- 7th St and Missouri Ave Site wells
- VRP Site wells
- Boreholes
- Production well
- Approx PCE extent (dashed where inferred)
- 430 PCE concentration, µg/L

Notes:
Results from January 2020 unless otherwise noted

7th Street and Missouri Avenue TCE extent in groundwater



Legend

- 7th St and Missouri Ave Site wells
- VRP Site wells
- Boreholes
- Production well
- Approx TCE extent (dashed where inferred)
- 64 TCE concentration, µg/L

Notes:
Results from January 2020 unless otherwise noted

Table 1: Screening of remedial technologies		
Technology	**Retained**	**Reason for Retention or Elimination**
No Action	No	The vadose zone soil would not be remediated; as a result, the ROs for the Site would not be met.
Institutional Controls	Yes	In the event residential standards cannot be achieved for the Site vadose zone, a Declaration of Environmental Use Restriction (DEUR) could to be implemented if non-residential standards are met.
Monitored Natural Attenuation (MNA)	Yes	Retained remedial technology (primarily for abiotic processes).
Soil Vapor Extraction (SVE)	Yes	A remedial technology that was implemented as part of the ERA; has been cost-effective at removing volatile organic compound (VOC) mass from the vadose zone.
Air Sparging	No	Not likely to be cost-effective or improve treatment due to low groundwater concentrations immediately downgradient of the plume, the large extent of the dilute plume, and residual VOC mass in fine grained intervals.
Groundwater Extraction & Treatment System (GETS)	Yes	Retained as effective for control of VOCs in groundwater and as potential wellhead treatment for contingency.
Enhanced Reductive Dechlorination (ERD)	Yes	Retained for potentially targeted treatment areas.
In Situ Chemical Reduction (ISCR)	No	Technically and economically infeasible due to thickness of impacted groundwater zone and the size and depth of the plume.
In Situ Chemical Oxidation (ISCO)	Yes	Retained for potentially targeted treatment areas, including the VOCs source and areas immediately downgradient of the source.

7th Street and Missouri Avenue
Summary of Feasibility Study

Table 2: Summary of Remedial Alternatives				
Alternative	**Practicability**	**Risk**	**Cost***	**Benefit**
Reference Remedy	• Very Feasible • Moderately Implementable • Likely Effective • Duration Six Years	• Protective • Reduces Residual VOCs Source to Groundwater	$6.2M	• Protects Water Supply • Achieves ROs Quickly
Less Aggressive Remedy	• Very Feasible • Moderately Implementable • Potentially Effective • Duration 30 Years	• Unknown • Some Potential Risk • Potential DEUR	$6.8M	• Less Beneficial
More Aggressive Remedy	• Moderately Feasible • Least Implementable • Likely Effective • Duration 10 Years	• Protective • Established Technology	$8.2M	• Protects Water Supply • Contains Plume
Notes: ***The costs presented in this table were taken directly from the FS Report.**				

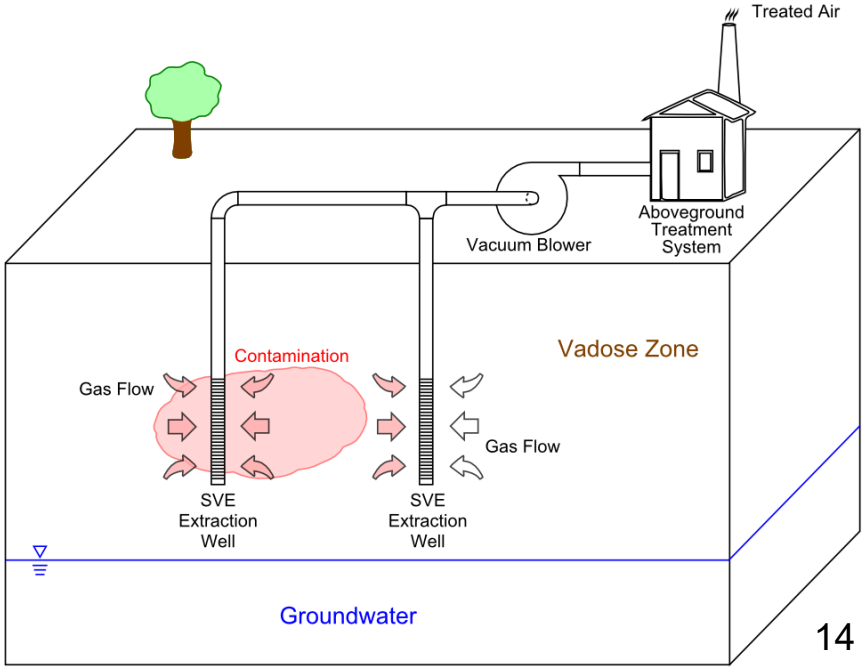
The purpose of the Proposed Remedial Action Plan (**PRAP**) is to inform the public on the remedy selected from the alternatives evaluation performed during the feasibility study which addresses site-specific Remedial Objectives (ROs)

Remedial Objective (for RO Report)

To restore soil conditions at the site to remediation standards for non-residential use as specified in A.A.C. R18-7-204 (background remediation standards), A.A.C. R18-7-205 (pre-determined remediation standards), or A.A.C. R18-7-206 (site-specific remediation standards) that are applicable to the hazardous substances identified. The concentrations remaining in soil after remediation standards are met will not cause or threaten to cause a violation of groundwater remediation standards specified in A.A.C. R18-7-203. This action is needed for the present time and for as long as the level of soil contamination exceeds applicable cleanup standards

Proposed Remedy

- Soil Vapor Extraction (SVE)



7th Street and Missouri Avenue
Proposed Remedial Action Plan - Soil

- SVE Pilot Test in June 2018
- SVE system installed October 2018 as Early Response Action (ERA)
  - Estimated over 700 lbs PCE removed to date
- Proposed Remedy:
  - Expand current SVE system capacity
  - Contingency for additional years operation and installation of additional SVE extraction well

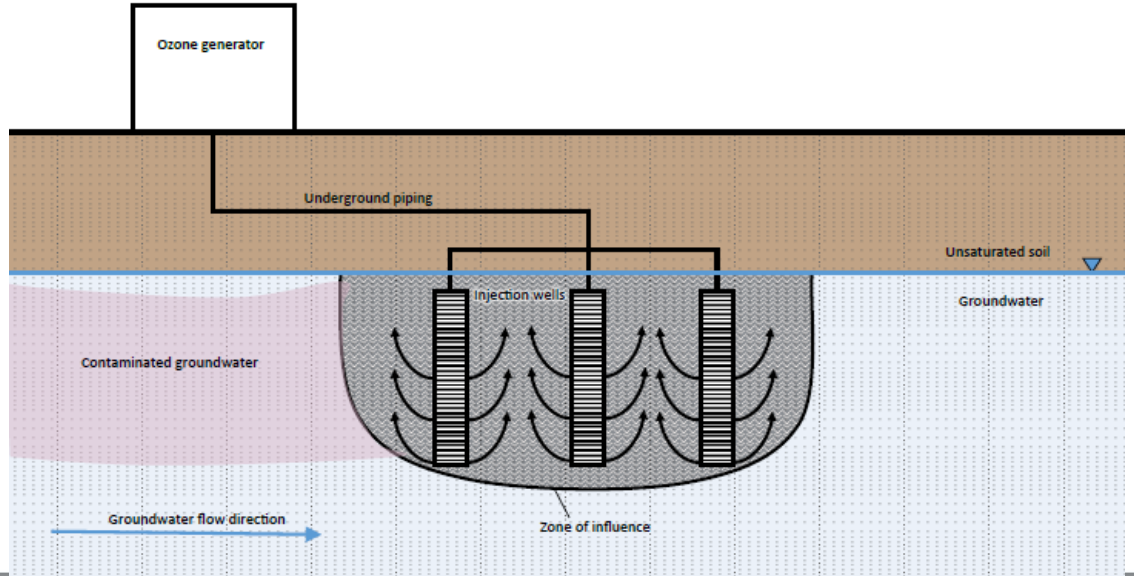
By Gwremed - Own work, CC BY-SA 3.0,
https://commons.wikimedia.org/w/index.php?curid=27524589

Remedial Objective

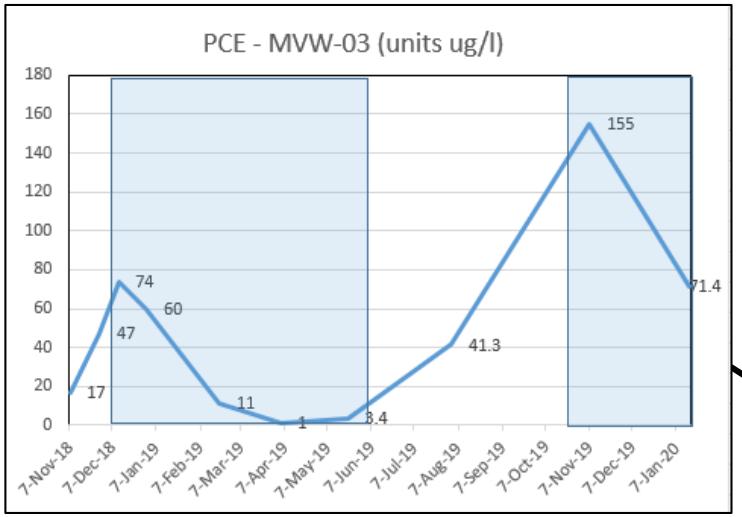
To restore, replace, or otherwise provide for water for its designated municipal use that is lost or impaired by contamination associated with the 7th Street and Missouri Avenue WQARF site. This action is needed for the present time and for as long as the need for the water exists, the resource remains available and the contamination associated with the 7th Street and Missouri Avenue WQARF site prohibits or limits the designated municipal use of groundwater

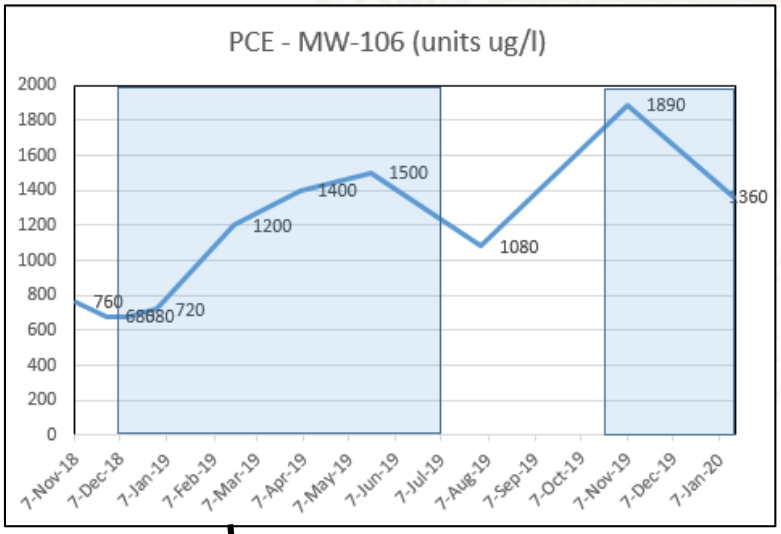
Proposed Remedy

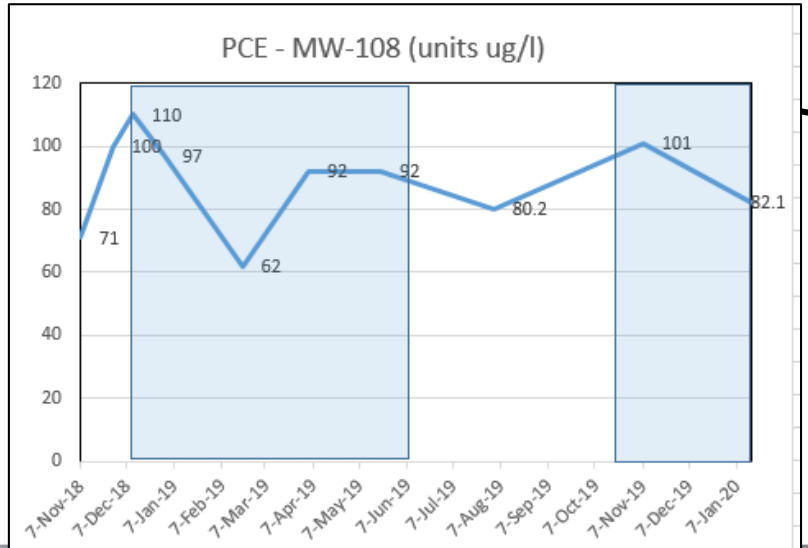
- In situ chemical oxidation (ISCO) via ozone injection at and near source area

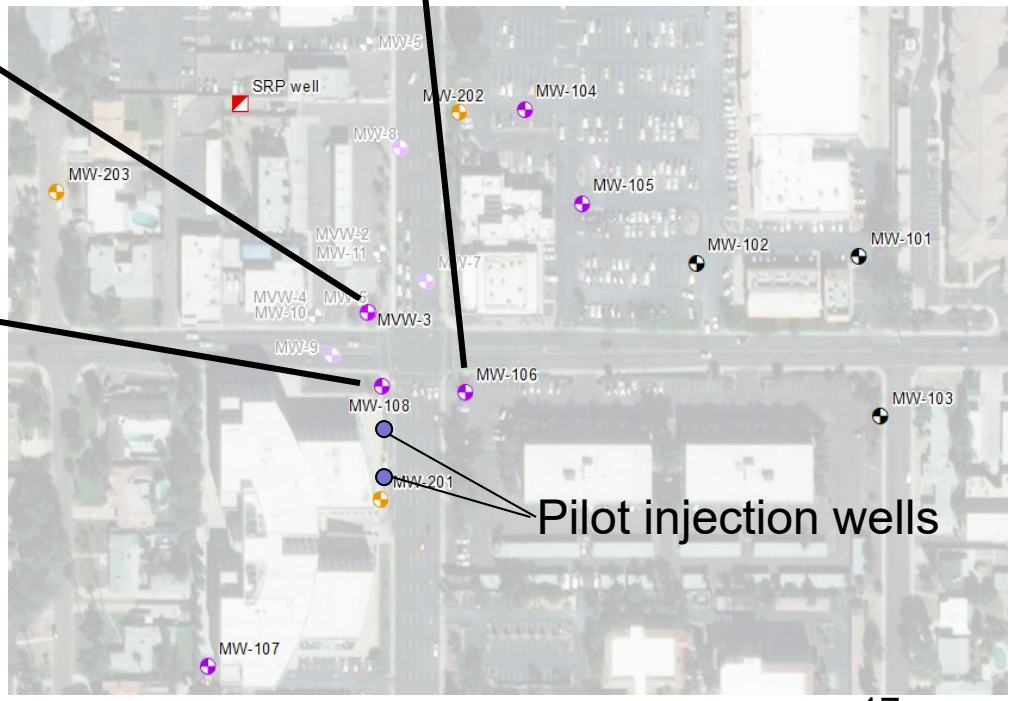


- Ozone Injection Pilot Test started Dec 2018, restarted Nov 2019







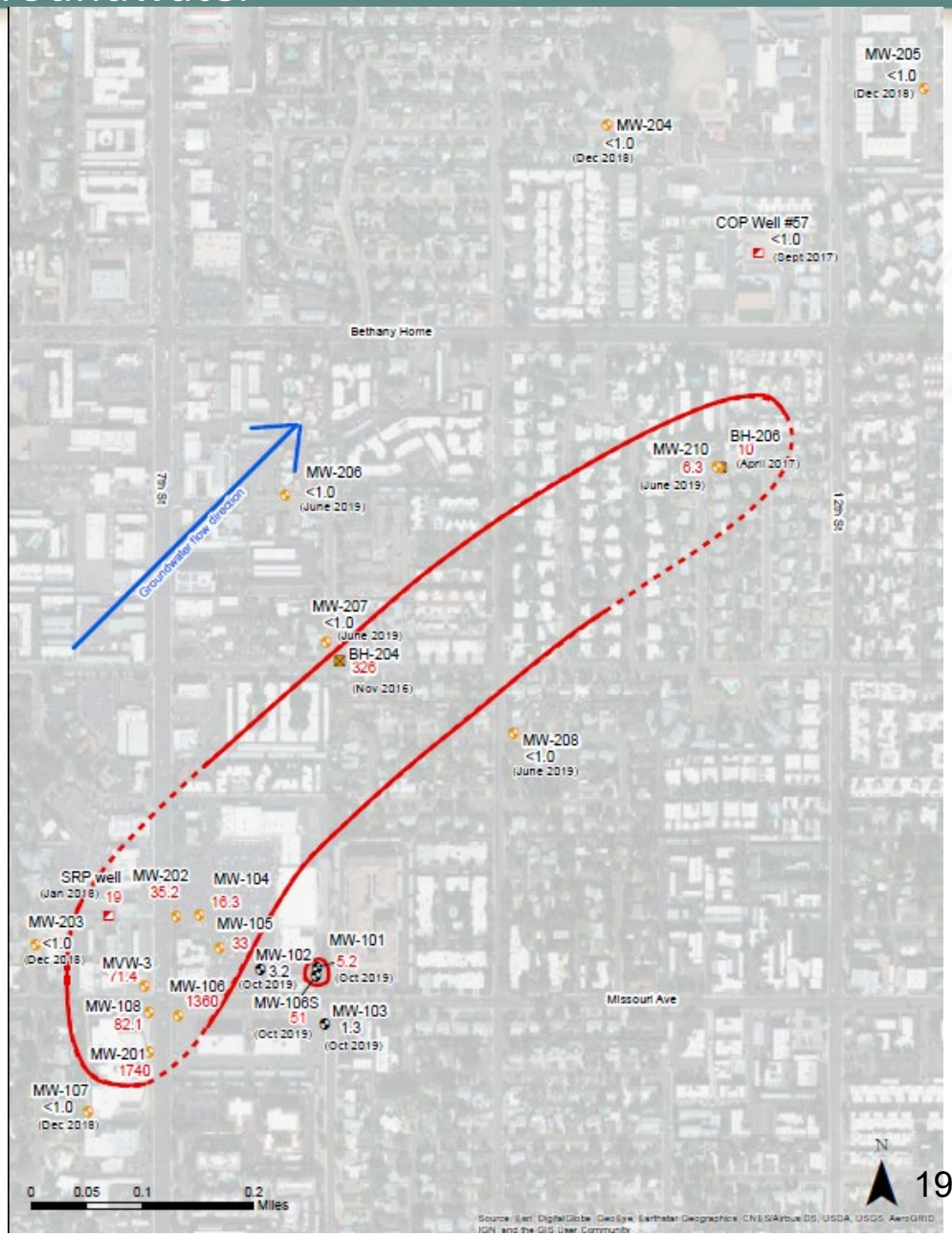


7th Street and Missouri Avenue
Proposed Remedial Action Plan

- Proposed Remedy:
  - Add to ozone injection points, increase mass of ozone injection
- Expanding pilot this month
  - Likely to become ERA incorporating part of proposed remedy

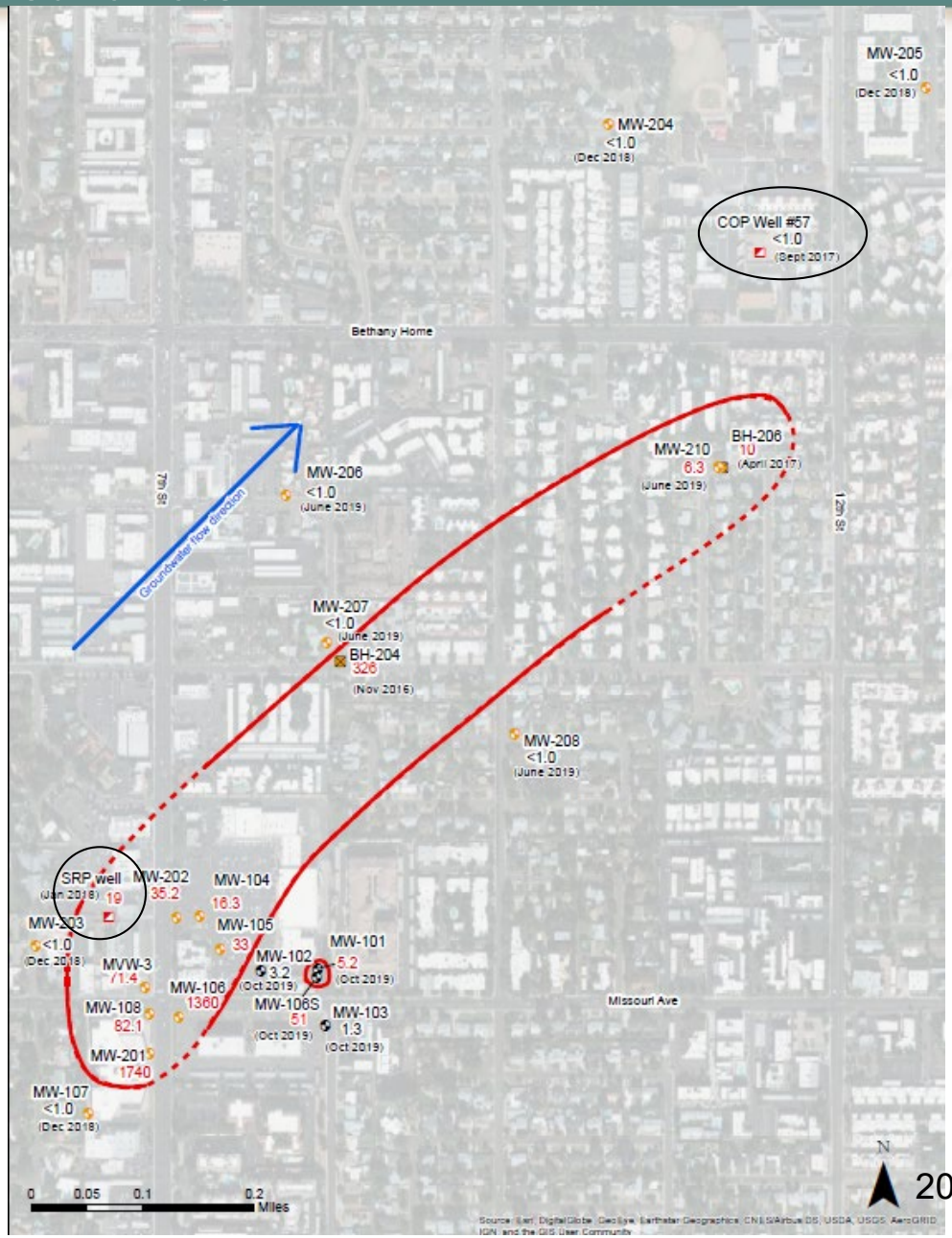
Proposed Remedy Continued

- Monitored Natural Attenuation (MNA) for diffuse plume
  - Evaluate plume migration, plume stability, & natural attenuation
- Contingency included for additional ozone injection wells in plume
  - Triggered by periodic reviews for remedy effectiveness



Proposed Remedy Continued

- Contingencies for wellhead treatment for SRP/COP wells
  - Triggered PCE above AWQS at the point of compliance of drinking water well
- Remedy also includes
  - Site inspections and system monitoring, remedy performance monitoring, periodic reviews for remedy effectiveness



Estimated Cost

Table 3: Summary of Proposed Remedy Costs	
Remedial Action Element Description	**Cost**
PRIMARY ELEMENTS	
Vadose Zone - Expansion of SVE System and Operation	$256,000
Groundwater - Source and Extended Area Ozone Sparge	$909,000
Groundwater - MNA	$773,000
PRIMARY ELEMENTS SUBTOTAL:	**$1,938,000**
CONTINGENCY ELEMENTS	
SVE Additions	$325,000
Ozone System Additions	$830,000
MNA Additions	$650,000
Wellhead Treatment	$4,511,000
CONTINGENCY ELEMENTS SUBTOTAL:	**$6,316,000**
PROPOSED REMEDY GRAND TOTAL:	**$8,254,000**
Notes: Cost assumes 3% annual inflation rate for multi-year items (e.g. groundwater sampling)	

- Proposed Remedy:
  - Meets Remedial Objectives
  - Consistent with current & future land & water use
  - Protects public health & the environment
  - Provides control, management, & cleanup of contamination to allow maximum beneficial use of the waters of the state
  - Is reasonable, necessary, cost-effective, & technically feasible

- Comment period on the PRAP Report ends Tuesday, June 23, 2020

- **How to view:** https://static.azdeq.gov/wqarf/7thmiss_prap.pdf
- **How to comment:**
  - **By Email**: cox.hazel@azdeq.gov (*timestamped June 23, 2020)*
  - **By Mail** (*Must be postmarked by June 23, 2020):*

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Contact us!

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