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Welcome



OU2 Vapor Intrusion Investigation Update

→ November 16, 2022





Drilling Equipment



Radiello™ Passive Sampler



Vapor Pin



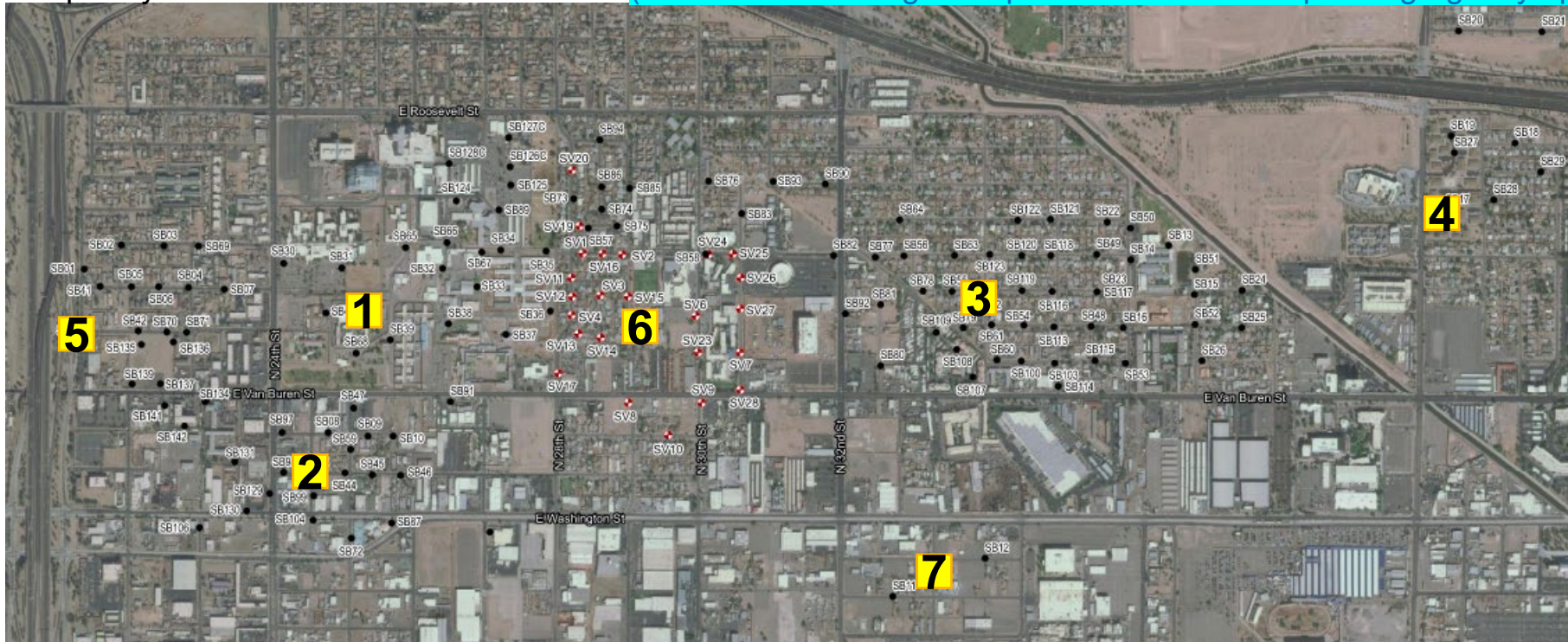
Soil Gas Sampling



SUMMA™ Canister

Soil Gas Investigation – 2022 Update

- Seven Areas – mix of residential, commercial/industrial, and school/hospital properties.
- 119 Temporary Soil Gas Sample (SGS) Points were installed (includes step-out locations) (1 SGS point installed in Area 5 in 2022)
 - Shallow sample interval: ~5 feet below ground surface (bgs)
 - Deep sample interval: ~15 feet bgs
- Initial and confirmation sampling events conducted
- Step-out until soil gas trichloroethene (TCE) concentrations <TCE Soil Gas Human Health Screening Levels (SGHHSs)
- 96 Temporary SGS Points abandoned to-date. (Abandon remaining SGS points in late 2022 – pending Agency approvals)



Indoor Air (IA) Investigation

- IA Sampling Approach
 - Define extent soil gas concentrations >SGHHSLs (primarily TCE)
 - Identify residential/commercial/school properties to sample
 - Conduct IA sampling - Two rounds (cool weather/warm weather)
 - No further sampling if results <Environmental Protection Agency's (EPA's) IA Regional Screening Levels (RSLs)
 - Results >RSLs – check indoor sources, resample IA, sub-slab
 - Limited outdoor air sampling - document conditions during sampling
 - To-date, no IA mitigation systems necessary for buildings
- Access
 - Contacted occupants/owners, some:
 - Allowed two rounds of sampling
 - Allowed one round (or resample) denied further access to complete
 - No access allowed - no samples collected
 - EPA assists to obtain access – where there was hesitation

EPA Region 9 Interim TCE IA Response Action Levels

EPA Region 9 Interim TCE Indoor Air Response Action Levels					
Residential and Commercial TCE Inhalation Exposure from Vapor Intrusion and Soil Gas Screening Levels					
Exposure Scenario	Soil Gas Human Health Screening Level (SGHHSL)	Indoor Air Regional Screening Level <i>Risk <math>1 \times 10^{-6}</math>; HQ<math>1</math></i>	Protective Risk Range <i>Risk <math>1 \times 10^{-6}</math> to <math>1 \times 10^{-4}</math></i>	TCE Accelerated Response Action Level (ARAL) (HQ=1)	TCE Urgent Response Action Level (HQ=3)
Residential	210 $\mu\text{g}/\text{m}^3$	0.48 $\mu\text{g}/\text{m}^3$	>0.48 $\mu\text{g}/\text{m}^3$ to $2 \mu\text{g}/\text{m}^3$	2 $\mu\text{g}/\text{m}^3$	6 $\mu\text{g}/\text{m}^3$
Commercial/Industrial (8-hour workday)	2,500 $\mu\text{g}/\text{m}^3$	3 $\mu\text{g}/\text{m}^3$	>3 $\mu\text{g}/\text{m}^3$ to $8 \mu\text{g}/\text{m}^3$	8 $\mu\text{g}/\text{m}^3$	24 $\mu\text{g}/\text{m}^3$
Risk-Base Decision Making	Soil Gas Based on IA Risk 1×10^{-6} times AF (attenuation factor)	<i>Risk <math>1 \times 10^{-6}</math>; HQ<math>1</math></i>	<i><math>1 \times 10^{-6}</math> <math>< \text{Risk} <math>1 \times 10^{-4}</math></math></i>	HQ=1 (to 3)	HQ ≥ 3
	Below SGHHSL - No Further Action	If both warm (summer) and cold (winter) weather samples below - No further action	Evaluate Need for Action - Additional Data Collection - Monitoring - Mitigation	Interim mitigation measures implemented quickly and evaluated to confirm reduction in IA concentration below HQ=1 within few weeks	Interim mitigation measures implemented quickly and evaluated to confirm reduction in IA concentration below HQ=1 within few days
	Above SGHHSL - - Additional Step-out samples - Indoor Air Samples - Possible Sub-slab Samples				

Modified from: Framework for Investigating Vapor Intrusion at Residential and Commercial/Industrial Buildings Motorola 52nd Street Superfund Site (EPA 2014)

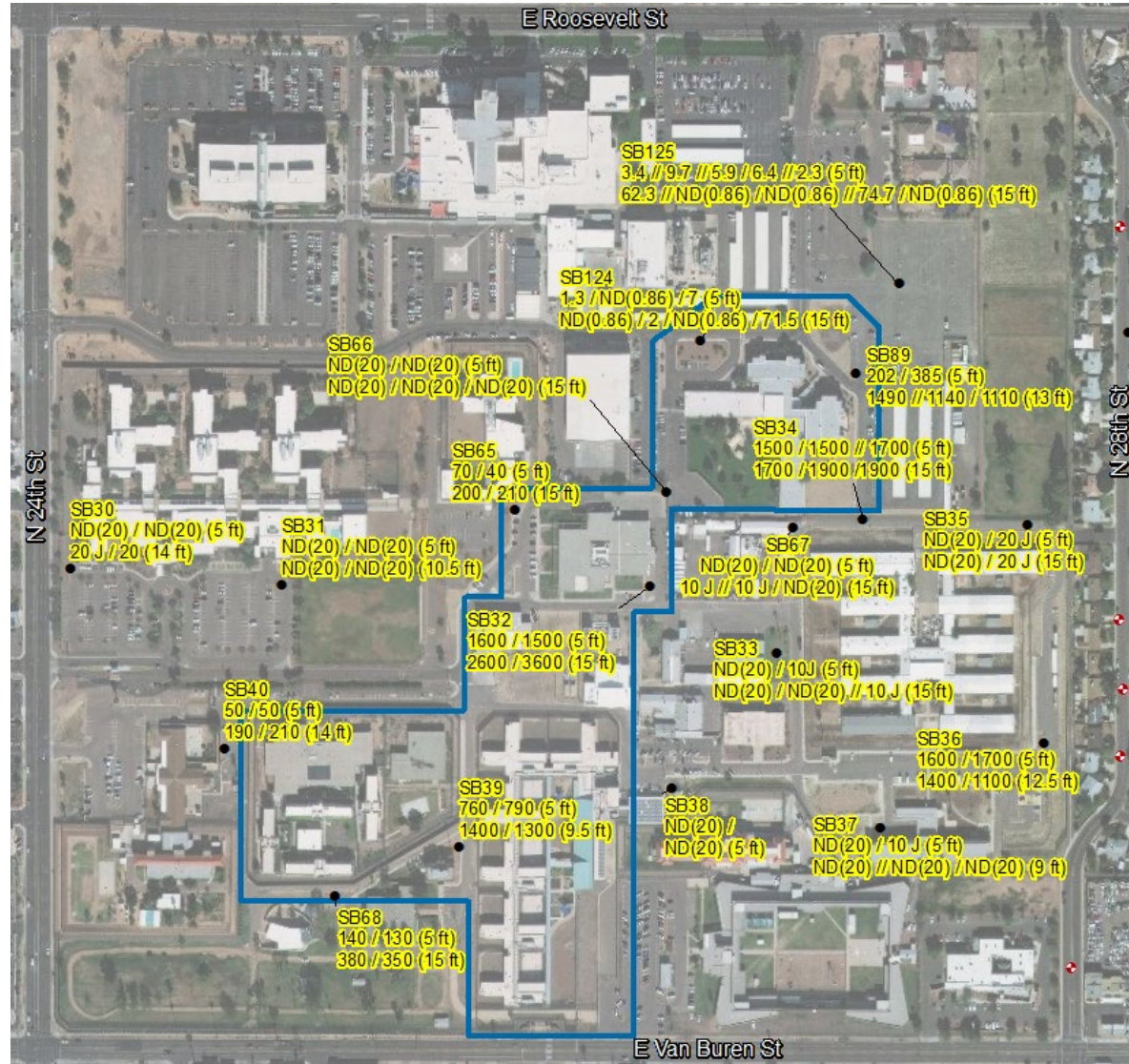
IA Investigation – 2022 Update

- Area 1: Maricopa Hospital Complex (Valleywise Health)
 - Summer/hot weather round 5 samples and 4 locations – ND < residential RSL
 - Winter/cool weather round – 4 samples at 4 location planned in November
- Area 2: Residential
 - Summer/hot weather round - 2 samples collected at 1 location < residential RSL
 - Winter/cool weather round – 1 sample at 1 location planned
- Area 3 : Residential
 - Summer/hot weather round– 9 samples collected at 6 locations < residential RSL
 - Summer/hot weather round - 3 samples collected at 1 location > residential RSL (1 > EPA protective risk range)
 - Winter/cool weather round– 5 samples at 5 locations planned
- Area 5 : Residential
 - Summer/hot weather round– 15 samples collected at 9 locations < residential RSL
 - Winter/cool weather round– 12 samples at 12 locations planned
- Area 6 : Residential
 - Summer/hot weather round– 17 samples collected at 14 locations < residential RSL
 - Summer/hot weather round– 2 samples collected at 1 locations > residential RSL < EPA protective risk range
 - Winter/cool weather round– 14 samples at 14 locations planned

Soil Gas Investigation – Area 1

Arizona State Hospital Complex

24th St. and 28th St. (W & E) and
Van Buren St. and Roosevelt St. (S & N)



Soil Gas Investigation

Area 1

- 18 Temporary SGS Points installed and abandoned
- TCE was detected at 15 of 18 locations
 - TCE concentrations – not detected (ND) (<20 microgram per cubic meter [$\mu\text{g}/\text{m}^3$]) to 3,600 $\mu\text{g}/\text{m}^3$
 - 11 samples >TCE residential SGHHS� – 210 $\mu\text{g}/\text{m}^3$
 - One sample >TCE industrial SGHHS� – 2,500 $\mu\text{g}/\text{m}^3$
- TCE delineated – Soil gas investigation complete

IA Investigation – Area 1 (Commercial)



Arizona State Hospital

Maricopa Hospital Complex

41 samples collected

IA Investigation

Area 1

- Arizona State Hospital Complex
 - 36 IA and outdoor air samples at 18 locations
 - 35 samples ND ($0.2 \mu\text{g}/\text{m}^3$) or $<$ residential RSL
 - One sample slightly $>$ residential RSL
 - No vapor intrusion (VI) identified
- 2022 IA Update
 - Summer/hot weather round completed
 - 5 total samples collected at 4 locations; 5 samples – ND $<$ residential RSL
 - 4 samples planned for winter/cool weather round in November

Soil Gas Investigation – Area 2

24th St. and 27th St. (W & E) and Jefferson St. and Van Buren St. (S & N)

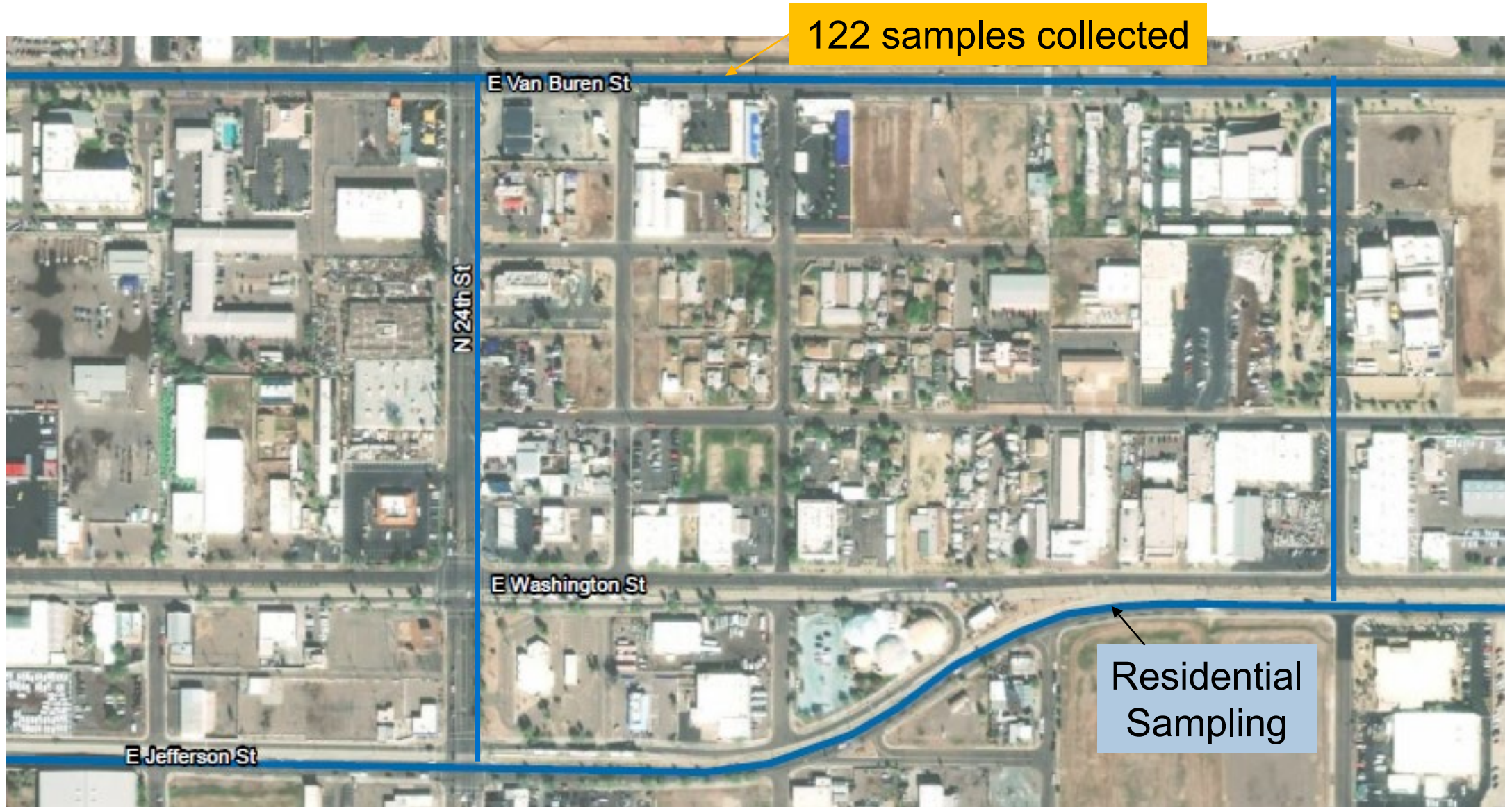


Soil Gas Investigation

Area 2

- 20 Temporary SGS Points installed and abandoned
- TCE was detected at 18 locations
 - TCE concentrations - ND ($<0.86 \mu\text{g}/\text{m}^3$) to $7,100 \mu\text{g}/\text{m}^3$
 - 22 samples $>$ TCE residential SGHHS - $210 \mu\text{g}/\text{m}^3$
 - Six samples $>$ TCE industrial SGHHS - $2,500 \mu\text{g}/\text{m}^3$
- TCE delineated – Soil gas investigation complete

IA Investigation – Area 2



IA Investigation

Area 2

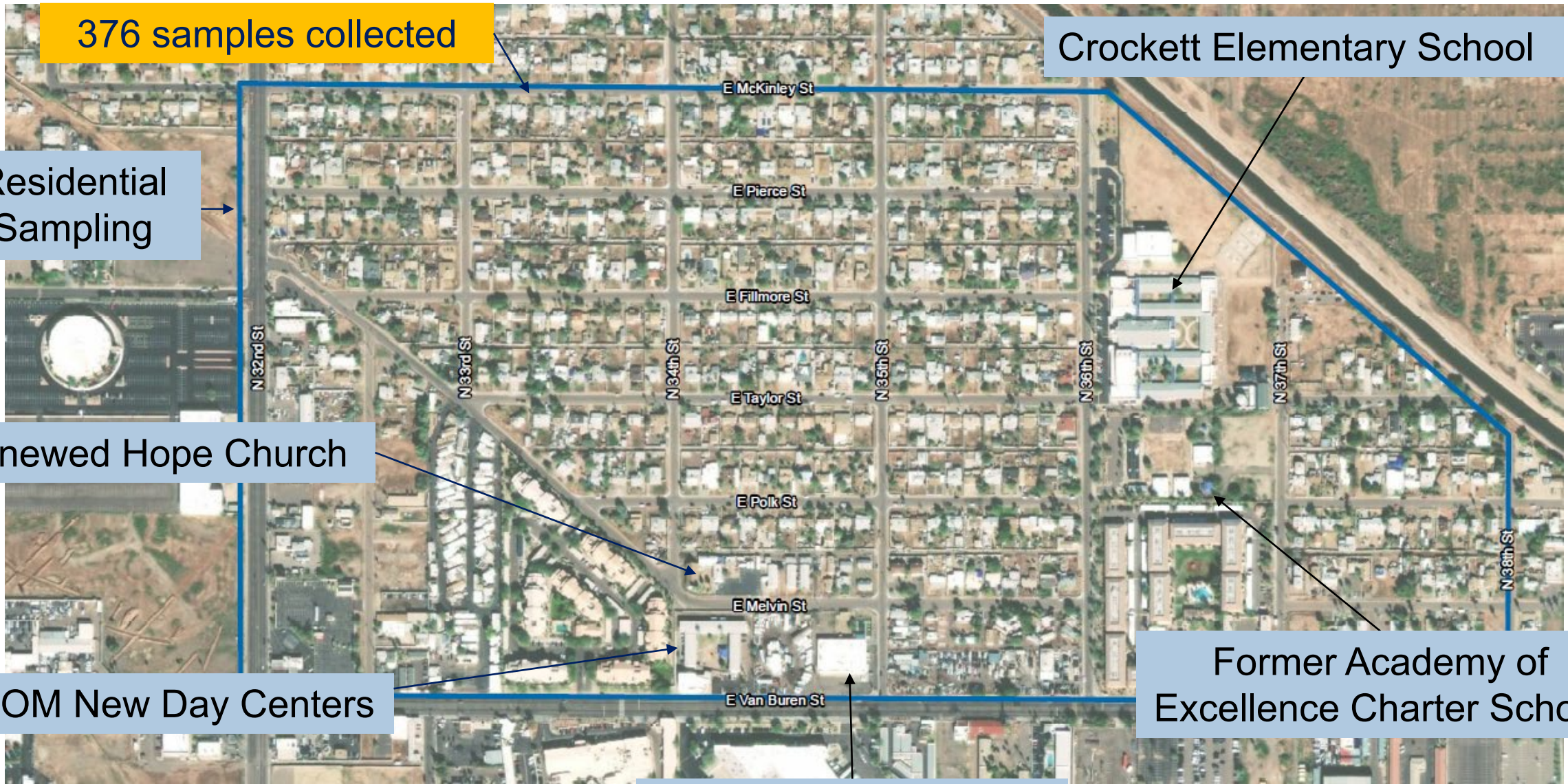
- 36 residences
- 122 IA, sub-slab, and outdoor air samples
 - 111 samples ND or <residential RSL
 - Four samples for TCE >residential RSL (2 resamples < residential RSL)
 - Five samples for TCE > EPA protective risk range (1×10^{-6} to $<1 \times 10^{-4}$)
 - No VI identified
- 2022 Update
 - Summer/hot weather round - 2 samples collected at 1 location < residential RSL
 - Winter/cool weather round – 1 sample at 1 location planned

Soil Gas Investigation

Area 3

- 40 Temporary SGS Points installed and abandoned
- TCE was detected at 36 locations
 - TCE concentrations - ND ($<2.7 \mu\text{g}/\text{m}^3$) to $1,340 \mu\text{g}/\text{m}^3$
 - 24 samples $>$ TCE residential SGHHS - $210 \mu\text{g}/\text{m}^3$
- TCE delineated – Soil gas investigation complete

IA Investigation – Area 3



376 samples collected

Residential Sampling

Crockett Elementary School

Renewed Hope Church

UMOM New Day Centers

Magic Keys to Learning

Former Academy of Excellence Charter School

IA Investigation

Area 3

- Schools and Daycare
 - Crockett Elementary School
 - Head Start Day Care
 - Former Academy of Excellence Charter School
 - Renewed Hope Church
 - UMOM New Day Centers
 - Magic Keys to Learning
- 132 IA, crawl space, and outdoor air samples at 47 locations
 - 119 samples ND or <TCE residential RSL
 - 13 samples (initial results) >TCE residential RSL (resampling all 13 results <TCE residential RSL)
- Next Steps:
 - No VI identified - no additional samples required in schools/day care facilities

IA Investigation

Area 3 – Continued

- Residential
 - 97 Residences
 - 244 IA and outdoor air samples
 - 209 samples ND or <residential RSL
 - 19 samples > residential RSL
 - Six samples > EPA protective risk range
- 2022 IA Update
 - Summer/hot weather round– 9 samples collected at 6 locations < residential RSL
 - Summer/hot weather round - 3 samples collected at 1 location > residential RSL (1 > EPA protective risk range)
 - Winter/cool weather round– 5 samples at 5 locations planned

Soil Gas Investigation – Area 4



North and South of the Loop 202
between 40th St. and 42nd St. (W & E)

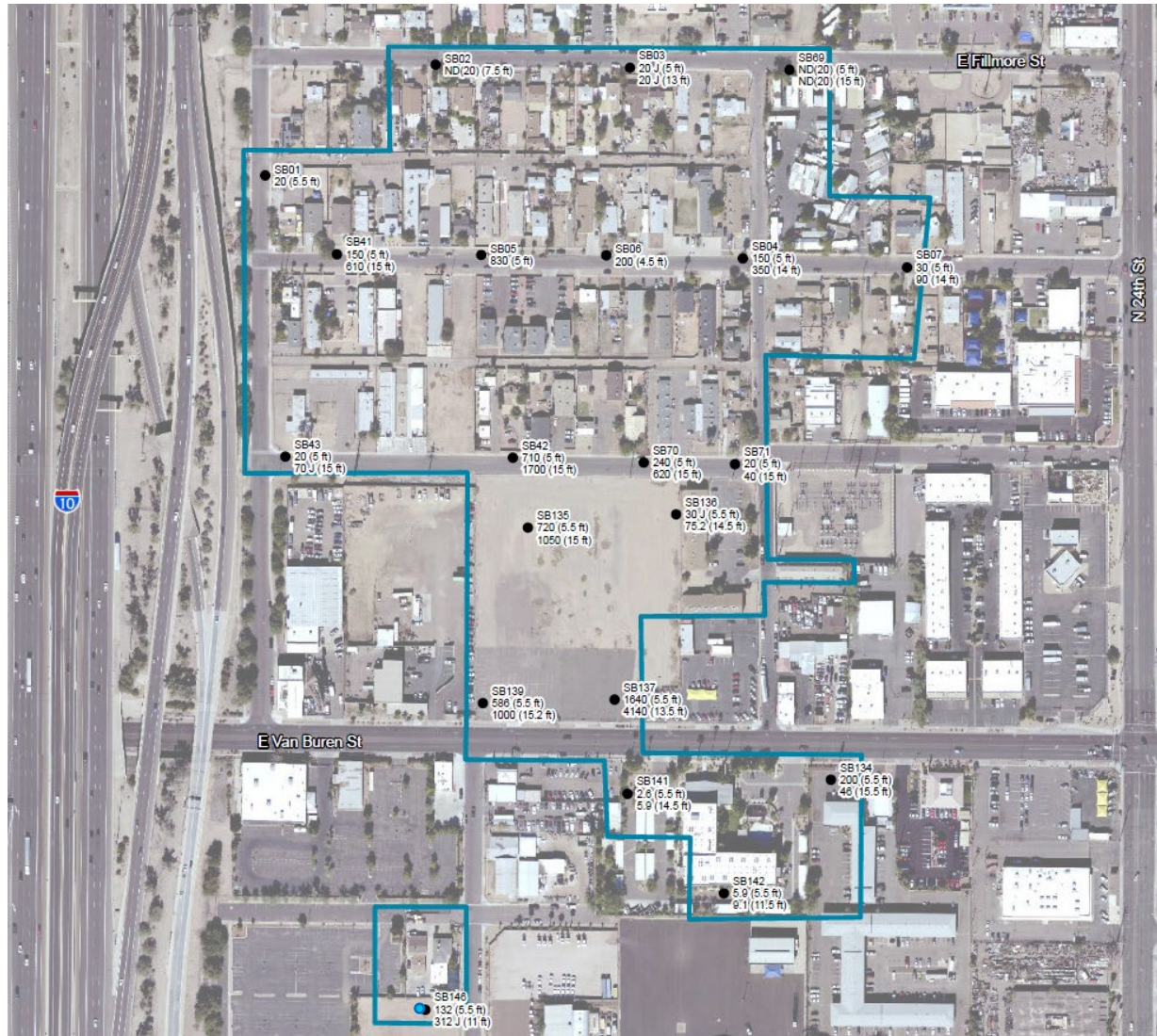
Soil Gas Investigation

Area 4

- Five Temporary SGS Points were installed in April 2017 and abandoned in 2021
- TCE detected at one of five locations
 - TCE concentrations – ND to 170 $\mu\text{g}/\text{m}^3$
- Soil gas investigation complete
- No IA sampling required

Soil Gas Investigation – Area 5

I-10 and 24th St. (W & E) and between Washington St. and Pierce St. (S & N)



Soil Gas Investigation

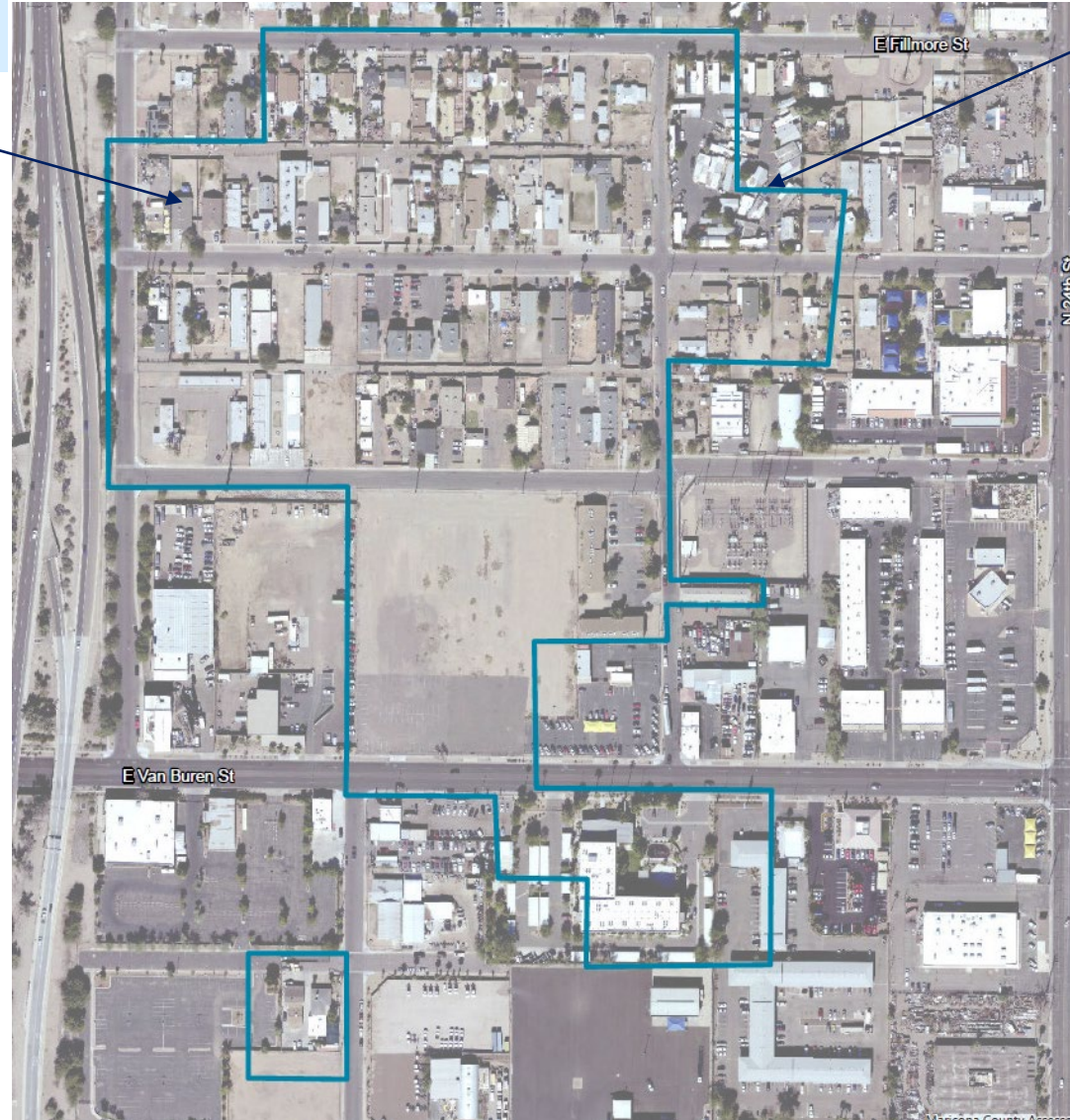
Area 5

- 23 Temporary SGS Points installed TCE was detected at 18 locations
 - TCE - ND ($<20 \mu\text{g}/\text{m}^3$) to $1,700 \mu\text{g}/\text{m}^3$
 - 10 samples $>$ TCE residential SGHSL - $210 \mu\text{g}/\text{m}^3$ Residential RSL
- 2022 Update
- 1 additional SGS installed
- Next Steps:
 - Review 13th Round of SGS analytical results and supplemental IA samples collected in 2022 with Agencies to determine if any additional work is needed.

IA Investigation – Area 5

Residential Sampling

149 samples collected



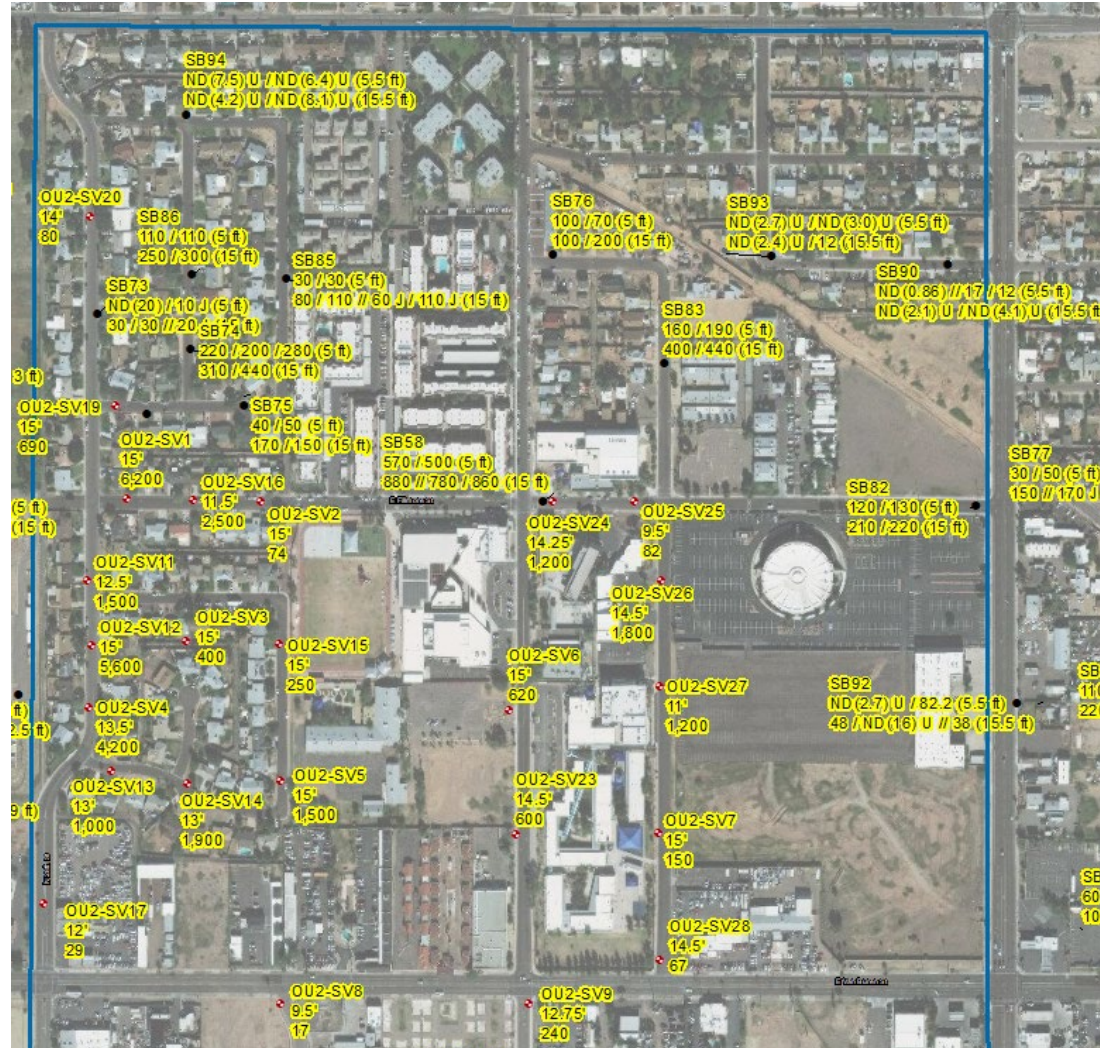
IA Investigation

Area 5

- 92 residences/apartments
- 149 IA and outdoor air samples
 - 142 samples ND or <residential RSL
 - Seven samples >residential RSL
 - Two samples had TCE >EPA protective risk range
 - No VI identified
- 2022 IA Update
 - Summer/hot weather round – 15 samples collected at 9 locations < residential RSL
 - Winter/cool weather round – 12 samples at 12 locations planned

Soil Gas Investigation – Area 6

28th St. and 32nd St. (W & E) and between Van Buren St. and Garfield St. (S & N)



Red circles – EPA
2014 SGS Points

Black circles – SGS
installed by the
Companies

Soil Gas Investigation

Area 6

- 2014 EPA conducted initial soil gas sampling detected TCE >SGHHSLs
- Potentially Responsible Parties complete sampling
- 13 Temporary SGS Points installed and abandoned
- TCE detected at 12 locations
 - TCE concentration ND (<0.86 $\mu\text{g}/\text{m}^3$) to 2,700 $\mu\text{g}/\text{m}^3$
 - Nine samples >TCE residential SGHHSL of 210 $\mu\text{g}/\text{m}^3$
- TCE delineated - Soil gas investigation complete

IA Investigation – Area 6

Residential Sampling

394 samples collected



Phoenix Union High School

Wilson School District #7

St. Mark Catholic Church

IA Evaluation

Area 6

- Schools/Daycare
 - Phoenix Union High School
 - Wilson Elementary School
 - St. Mark Catholic Church
- 135 IA and outdoor air samples at 47 locations
 - 122 samples ND or <residential RSL
 - 13 samples >residential RSL
 - Three samples >EPA protective risk range
- Next Steps:
 - No VI identified – no additional investigation required for schools/daycare

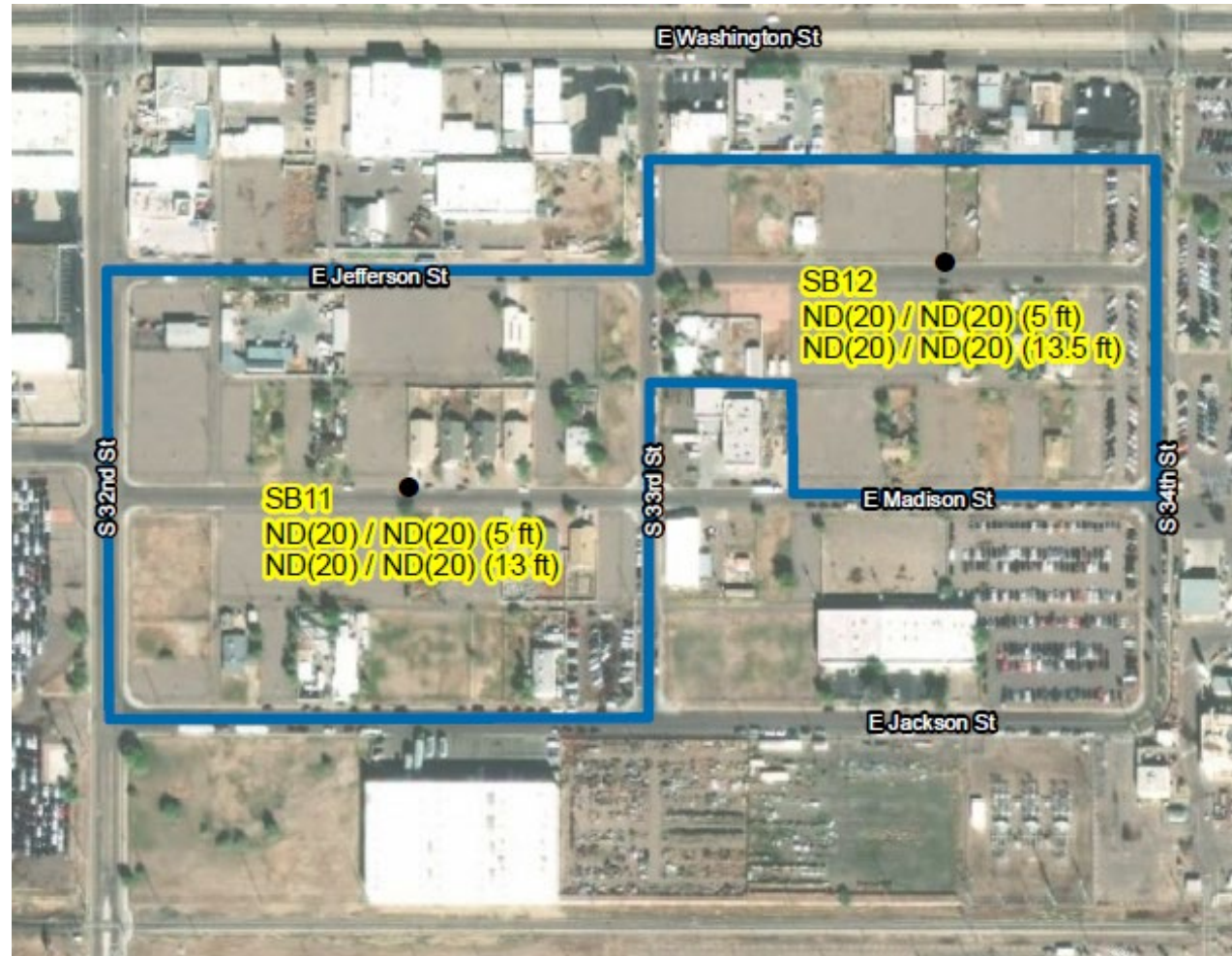
IA Evaluation

Area 6 – Continued

- 81 residences and 1 apartment building
- 259 IA, sub-slab, and outdoor samples
 - 245 samples ND or <TCE residential RSL
 - 12 samples (initial results) >TCE residential RSL (resampling eight results <TCE residential RSL)
 - Three samples (initial results) > EPA protective risk range (resampling three results <TCE residential RSL)
 - No VI identified
- 2022 IA Update
 - Summer/hot weather round – 17 samples collected at 14 locations < residential RSL
 - Summer/hot weather round – 2 samples collected at 1 locations > residential RSL < EPA protective risk range
 - Winter/cool weather round– 14 samples at 14 locations planned

Soil Gas Investigation – Area 7

32nd St. and 34th St. (W & E) and between Jackson St. and Pierce St. (S & N)



Soil Gas Investigation

Area 7

- Two Temporary SGS Points installed and abandoned
- No TCE detected
- No IA investigation required



*** Thank You**

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