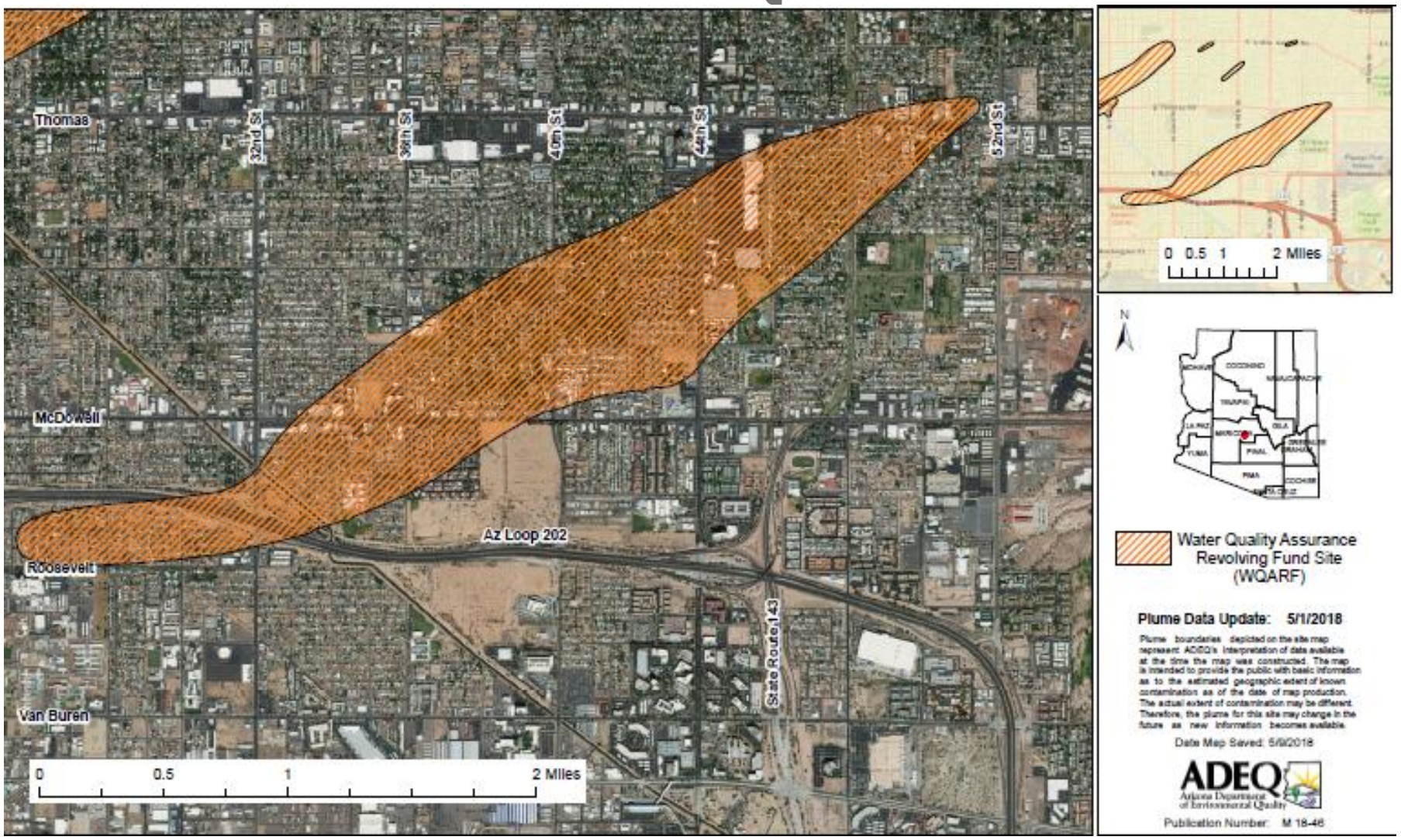
Site Activities Update and Draft Remedial Investigation (RI) Report 56th Street and Earll Drive WQARF Site

56th Street and Earll Drive WQARF Site CAB Meeting
20 August 2018

Overview

- Introductions
- CAB Update
- Remedial Investigation Overview (NXP)
- Early Response Action Overview (NXP)
- Remedial Objectives Overview (ADEQ)
- Questions & Answers
- Next Steps

56th Street and Earll Drive WQARF Site Location



56th St. and Earll Drive WQARF Site, Phoenix, AZ
Base map downloaded from ADEQ web site August 2018

COMMUNITY ADVISORY BOARD (CAB) UPDATE

CAB Update

- Consent Order amended to include O&M of the groundwater treatment plant (May 2015)

- Draft Remedial Investigation (RI) Report submitted to ADEQ (November 2015)
  - ADEQ requested additional monitor wells to delineate downgradient edge of plume
  - Freescale submitted work plan for 2 additional delineation wells (July 2016)
  - ADEQ approved work plan (August 2016)
  - Wells DM-43 and DM-44 installed (November 2016) and Well Installation report submitted (February 2017)

- Freescale Semiconductor, Inc. merges with NXP Semiconductors N.V. to become NXP USA, Inc. (NXP) (effective November 6, 2016). NXP continues the remediation work at the site.

CAB Update

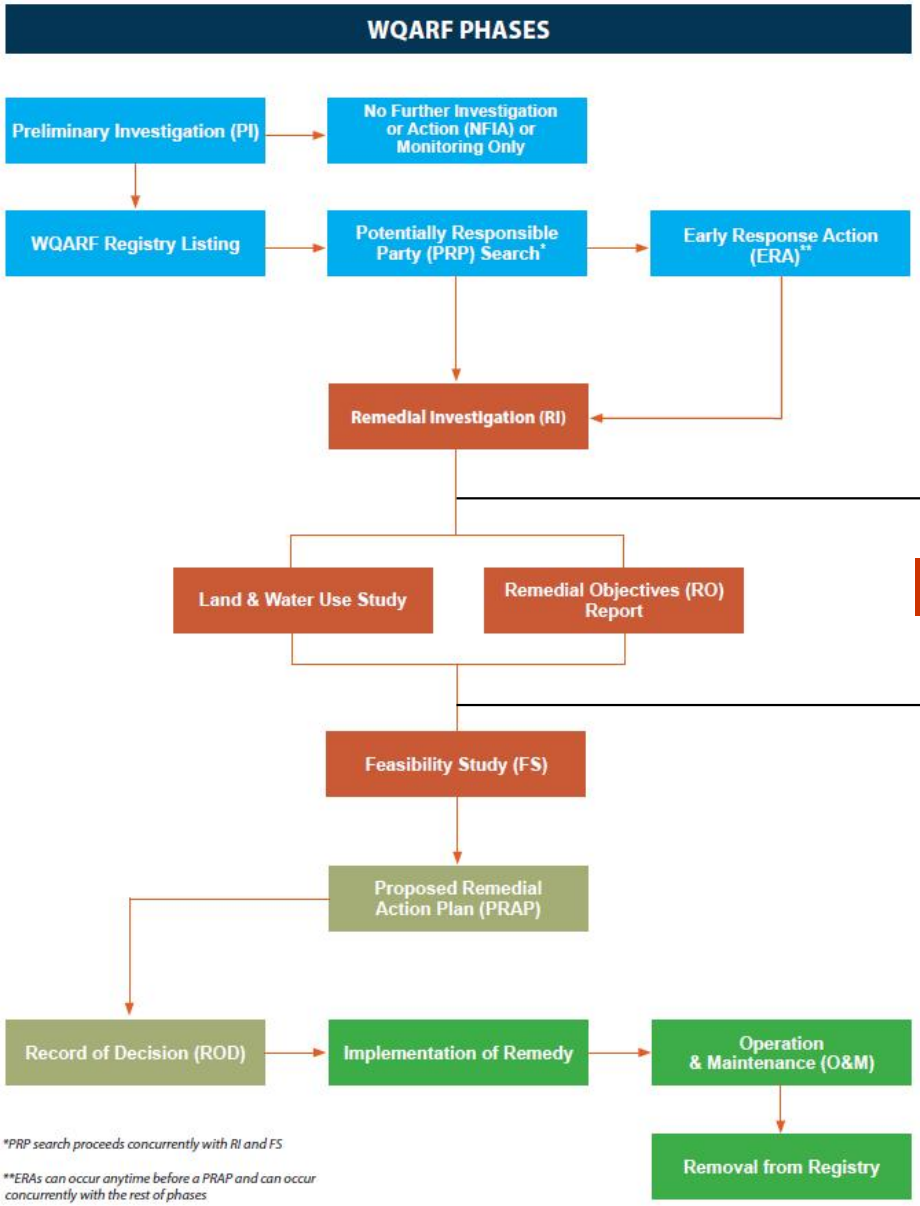
- Revised draft RI reports submitted to ADEQ (June 2017, May 2018)
  - Vapor Intrusion investigation identified as data gap to be addressed through Feasibility Study (FS) work plan

- NXP submitted draft work plans for vapor intrusion (VI) investigation to ADEQ (August 2017 and November 2017). ADEQ and NXP negotiated final VI investigation approach and NXP submitted final Work Plan (June 2018)
  - ADEQ approved final VI investigation work plan (July 2018)

- NXP has operated groundwater treatment plant as part of the Early Response Action (ERA) continuously (except for routine shut-downs for Grand Canal dry-up and low flow periods in winters) since installation

REMEDIAL INVESTIGATION (RI) REPORT OVERVIEW

WQARF Process



Released for 60-day comment period on July 5, 2018

56th Street and Earll Drive Remedial Investigation

- Purpose of Remedial Investigation (RI)

  - Characterize the hydrogeology of the site
  - Delineate the nature and extent of contamination
  - Evaluate current and reasonably foreseeable actual or potential sources of exposure to hazardous substances
  - Identify current and reasonably foreseeable uses of land and water
    - Goal of WQARF remedies is to protect or preserve against the loss of existing uses of land and water and/or to replace or otherwise provide for uses of land and water that have been impacted by releases at Site

56th Street and Earll Drive Historical Overview

- 56th Street Facility
  - Motorola first occupied facility in 1950 for research and development, and small-scale product development, manufacturing, and testing
  - Operations discontinued in 1982 and facility was re-developed for office use
  - Soil, soil-gas, and groundwater investigations were initiated in 1984 to determine if there were impacts associated with historical operations
  - Facility closed and sold to developers in 2005
  - Facility was re-sold in 2011 and subsequently developed into a charter school

- Surrounding area
  - Highly urbanized consisting of residential, commercial, schools, retail, and office space

- Site placed on WQARF Registry in 2004

56th Street and Earll Drive Historical Overview

- Soil, soil-gas, and groundwater investigations have been conducted in multiple phases over time

  - Phased approach allowed investigators to build knowledge and identify additional work required to fully delineate site

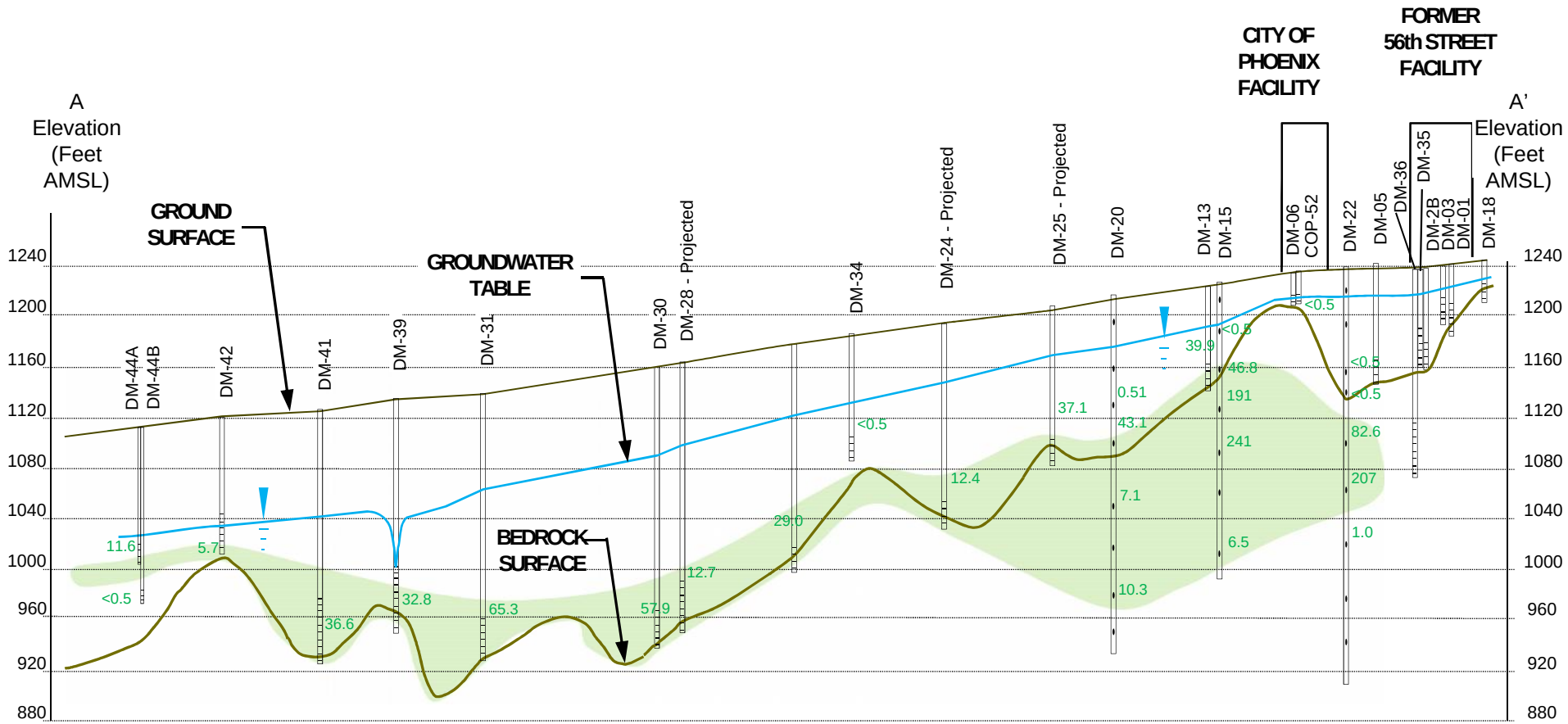
  - On-site investigations were conducted to identify potential sources and to support source removal and treatment
    - On-site sources have been fully addressed (supported by “detached” plume)

  - Off-site investigations were conducted to delineate the nature and extent of groundwater impacts that result from historical operations

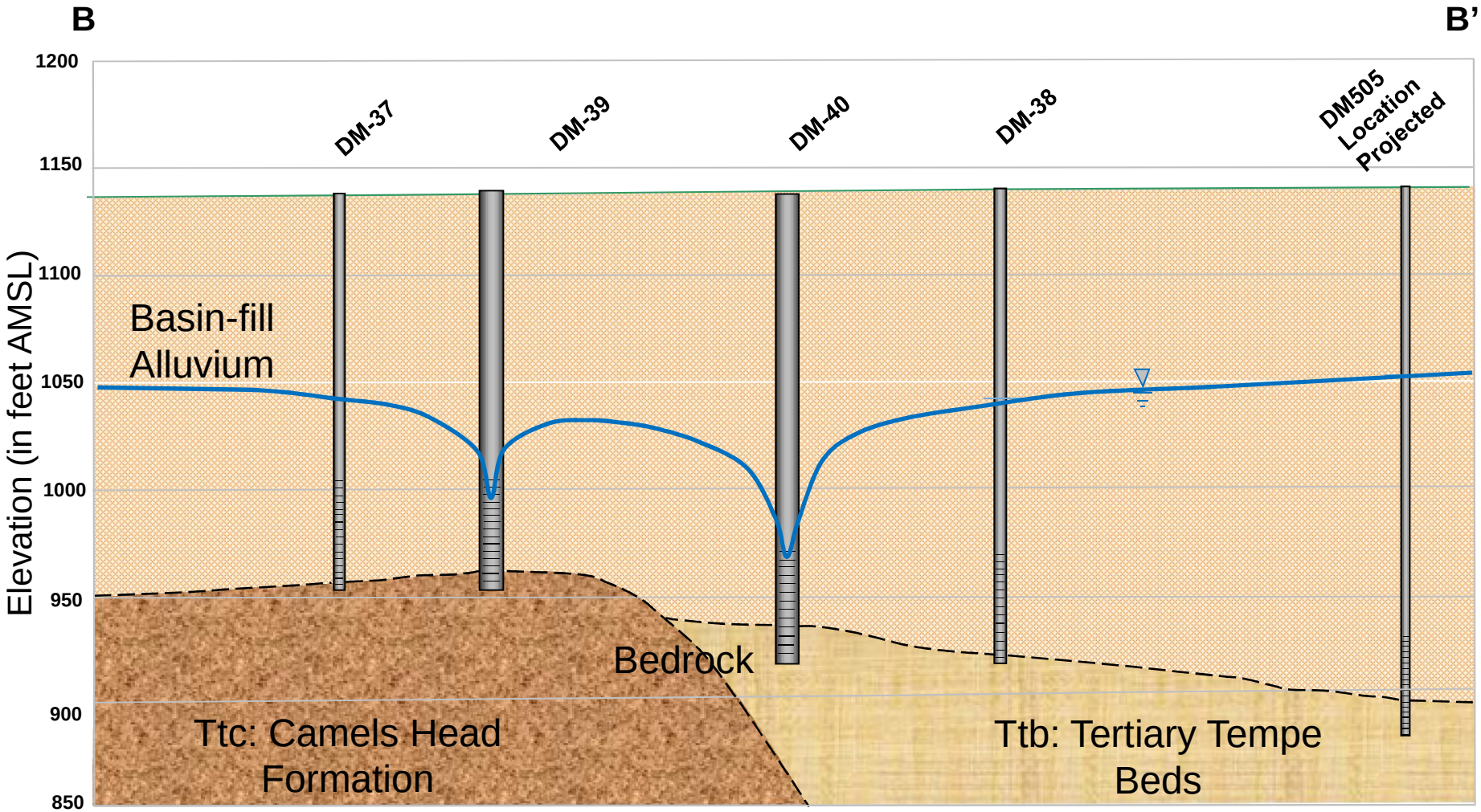
56th Street and Earll Drive Groundwater Overview

- Contaminants of Concern
  - Primarily trichloroethylene (TCE) with lesser amounts of perchloroethylene (PCE) and associated degradation products (cis 1,2-dichloroethylene [cis1,2-DCE])
  - TCE and PCE were cleaning solvents commonly used by industry
  - TCE and PCE are also known as volatile organic compounds (or VOCs) that are heavier than water (they sink)
- Hydrogeology
  - Impacts primarily occur in a “basin-fill” alluvial aquifer, consisting of silts, sands, and gravels, overlying bedrock
  - Impacts generally occur at depth near the basin-fill / bedrock contact
  - Areas in eastern portion of the site impacts extend into shallow bedrock

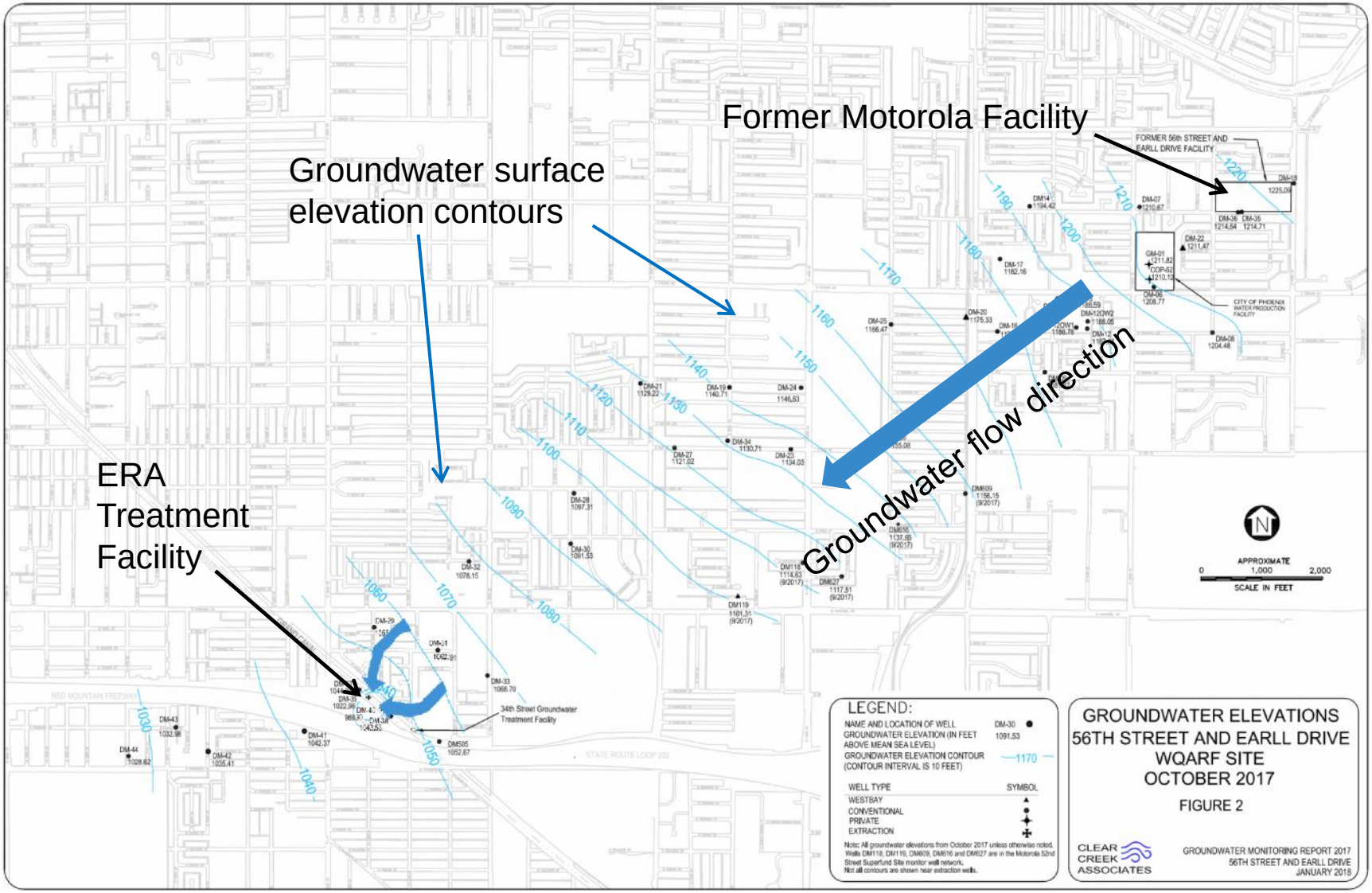
56th Street and Earll Drive WQARF Site
SW-NE Cross Section



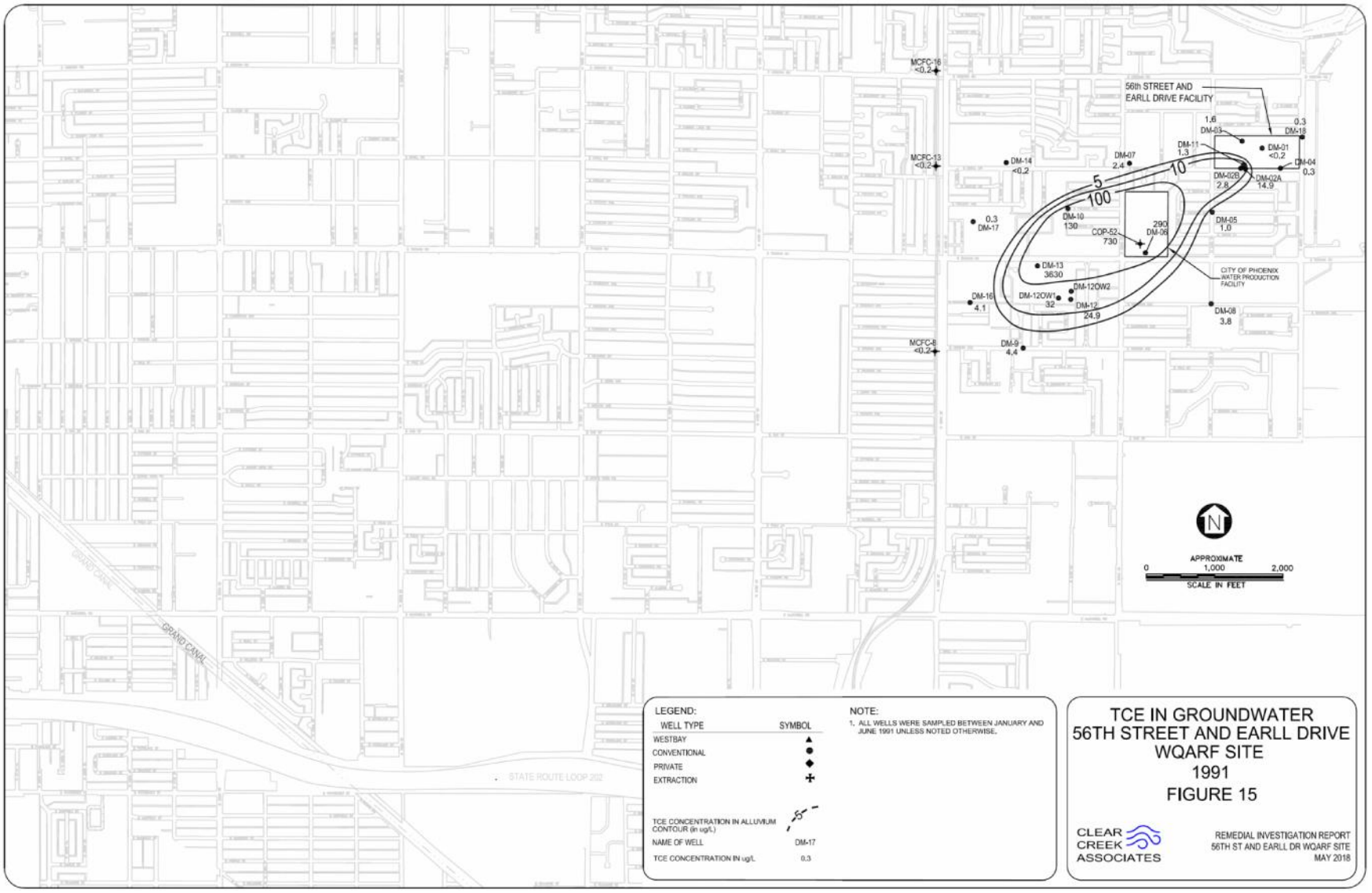
56th Street and Earll Drive WQARF Site Cross Section along Grand Canal



56th Street and Earll Drive Site Groundwater Flow



56th Street and Earll Drive Historical TCE Contours



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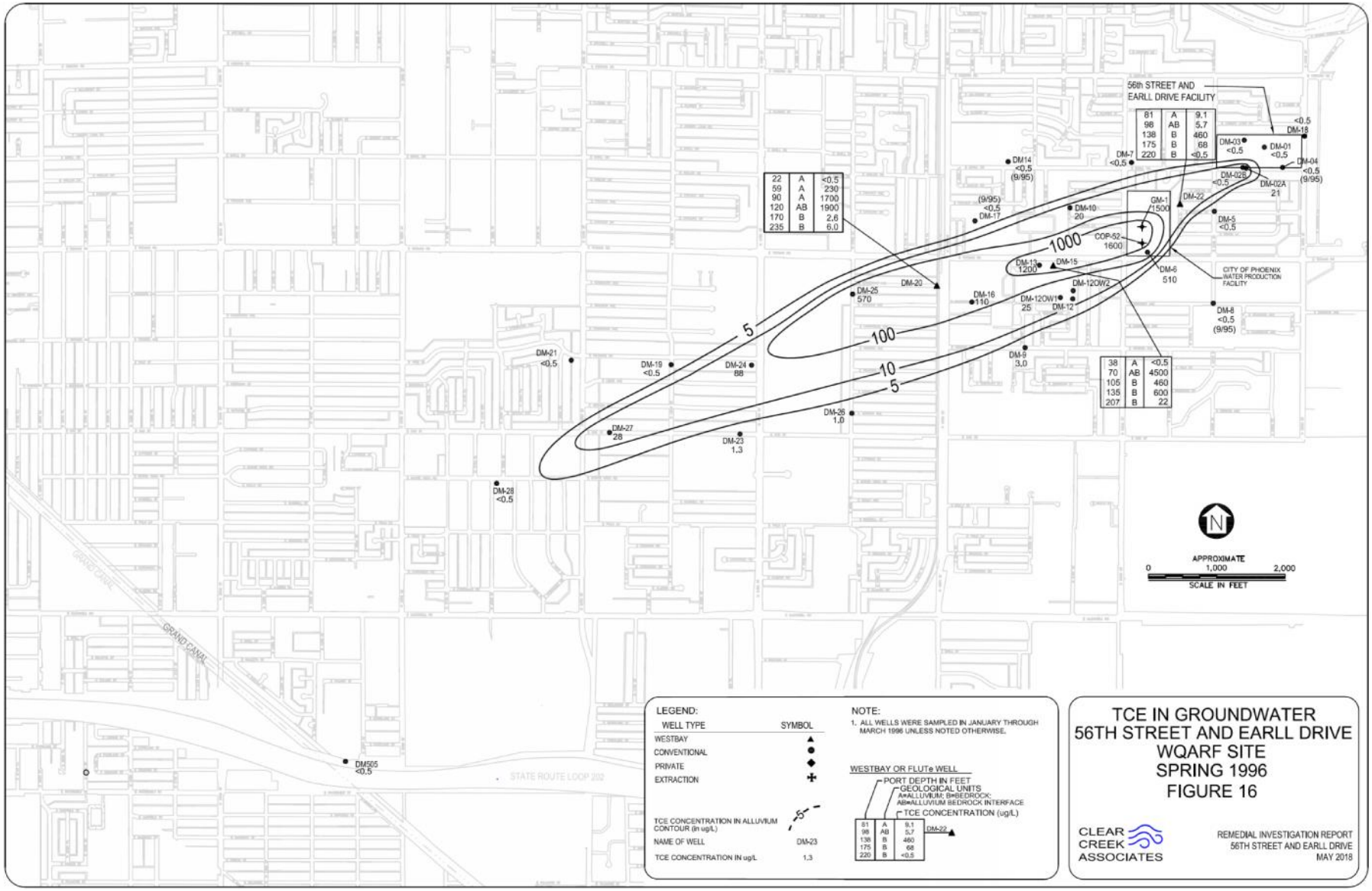

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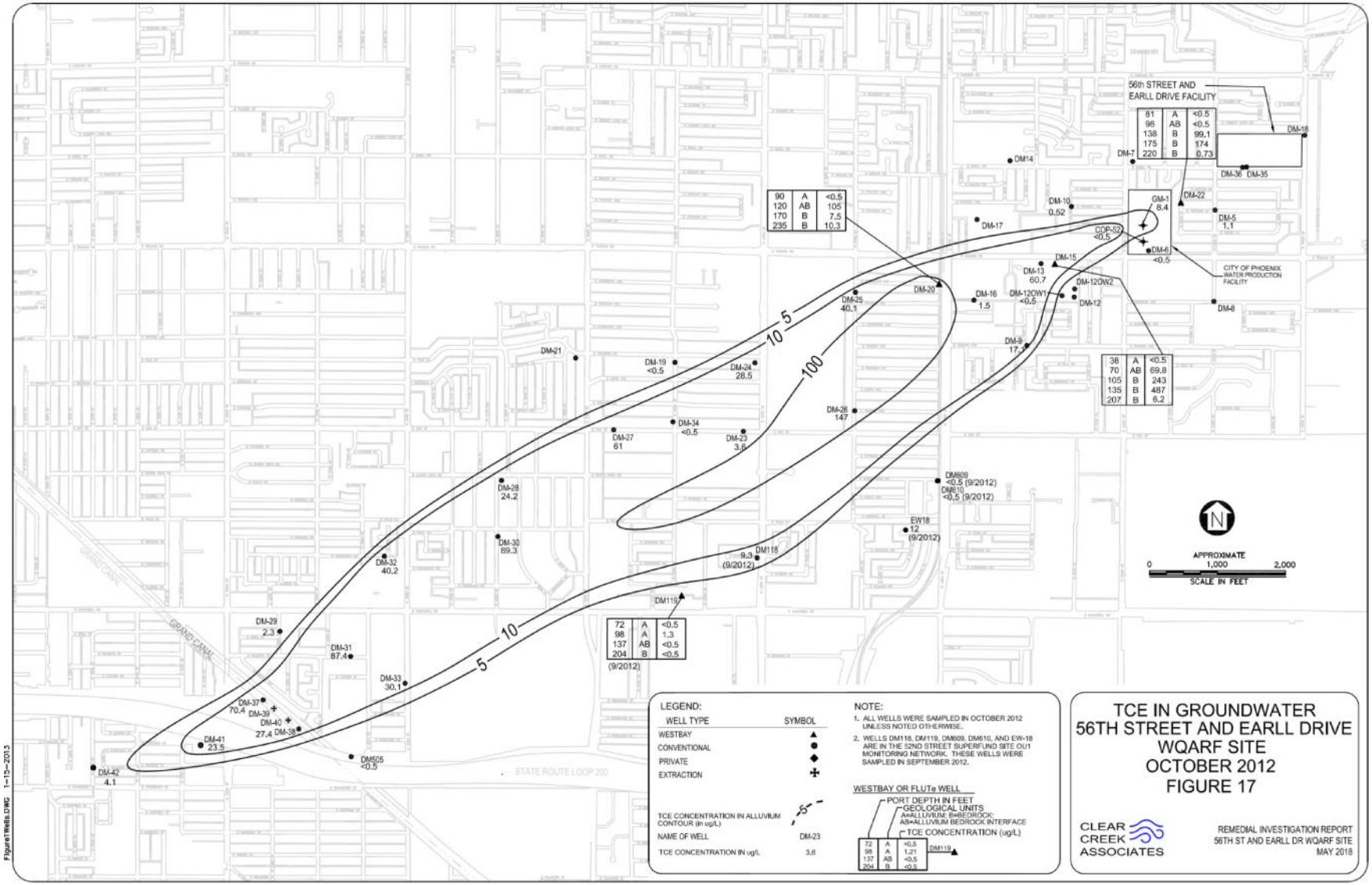
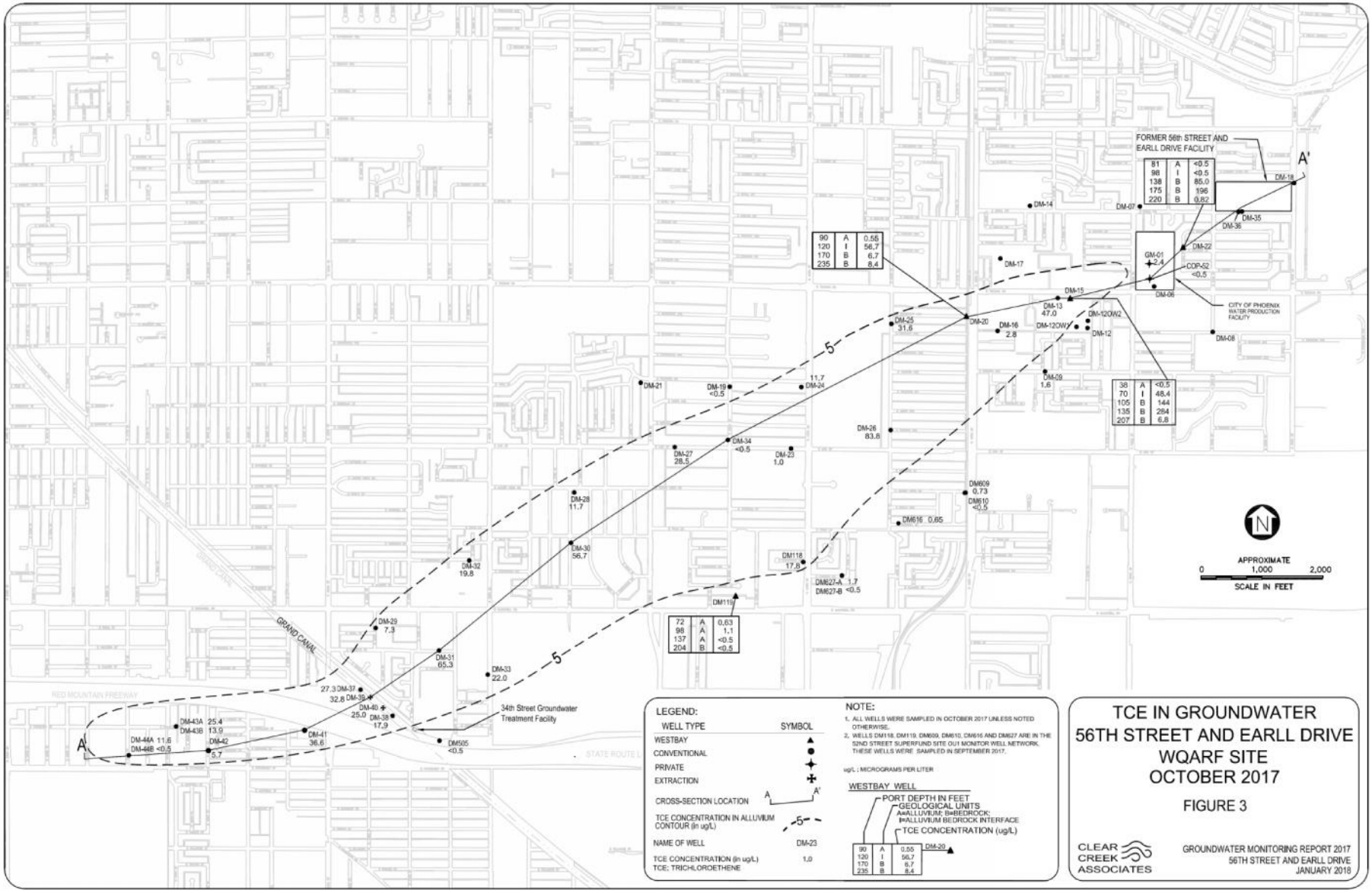


56th Street and Earll Drive TCE Contours

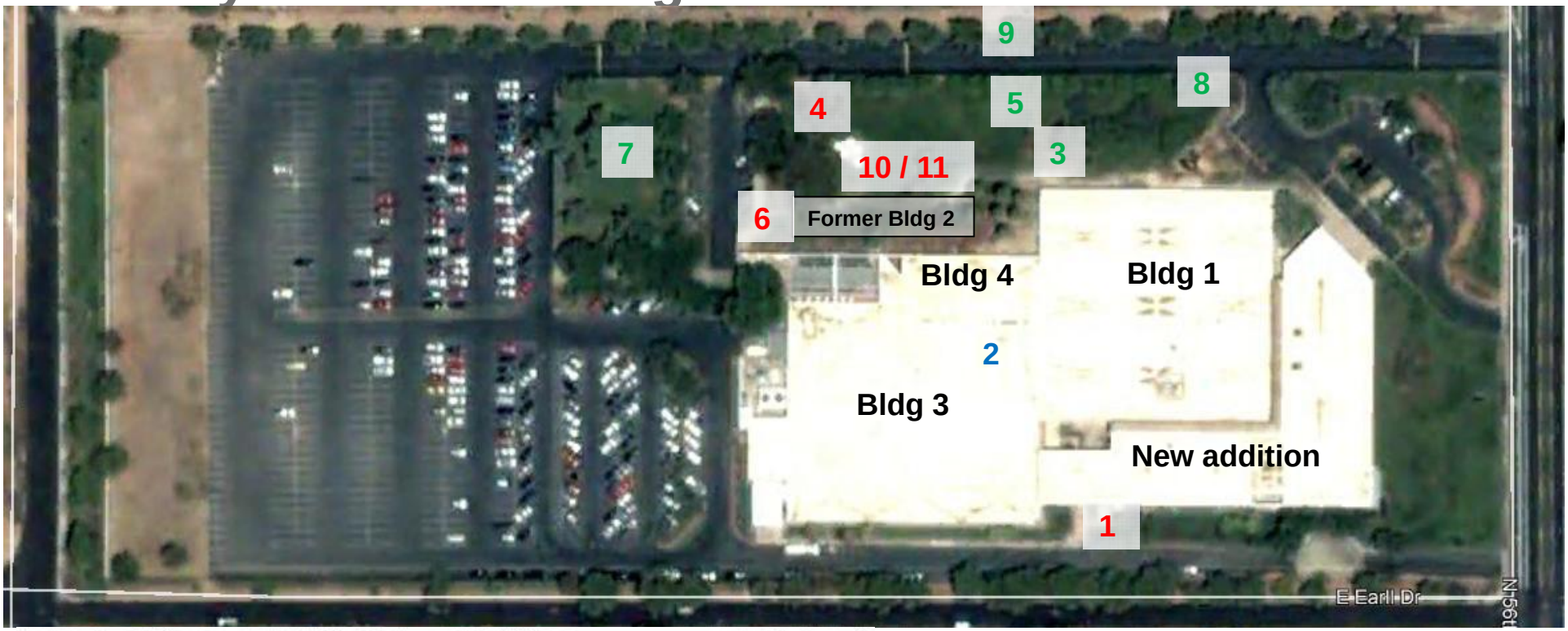


FORMER MOTOROLA FACILITY SOURCE INVESTIGATION AND SOILS REMEDIATION

Former Motorola 56th St. Facility Source Investigations

- Investigations conducted in phases over time
  - An initial potential source assessment conducted through operational overview and employee interviews
  - Soil-gas investigations conducted to assess and verify potential VOC source areas
  - Soil boring / sampling investigations conducted of potential VOC and inorganic source areas
  - Additional soil and/or soil-gas investigations conducted as required based on findings from preliminary investigations
  - 2011 Phase I/Phase II findings and re-development work identified additional historic source under building slab

Facility Source Investigation Results



POTENTIAL SOURCE NUMBER	METHOD OF DISPOSITION/TREATMENT	YEARS OF OPERATION	TYPE OF MATERIAL
1	DRY WELLS SOUTH OF BUILDING 1	1950–1962	SOLVENTS, METALS
2	DISCHARGE FROM ACID TREATMENT WEST OF BUILDING 1	1950–1953	METALS
3	GREASE PITS NORTH OF BUILDING 1	1950–1962	KITCHEN WASTE
4	SEWAGE LEACH FIELDS NORTH OF BUILDING 2	1950–1953	SOLVENTS, METALS
5	DRY WELLS EAST OF LEACH FIELDS	1950–1953	SOLVENTS, METALS
6	DRY WELLS WEST OF BUILDING 2	1954–1962	WASH WATER
7	SEWAGE LEACH FIELDS NORTHWEST OF BUILDING 3	1954–1972	SOLVENTS, METALS
8	SHALLOW HOLES NORTH OF BUILDING 1	1962–1974	SOLVENTS
9	CITY OF PHOENIX SEWER SYSTEM	1962–1982	
10	SOLVENT RECLAIM–FREON	1954–1982	FREON
11	SOLVENT SALVAGE	1972–1982	SOLVENTS

Air photo base GoogleEarthPro, 2002 aerial

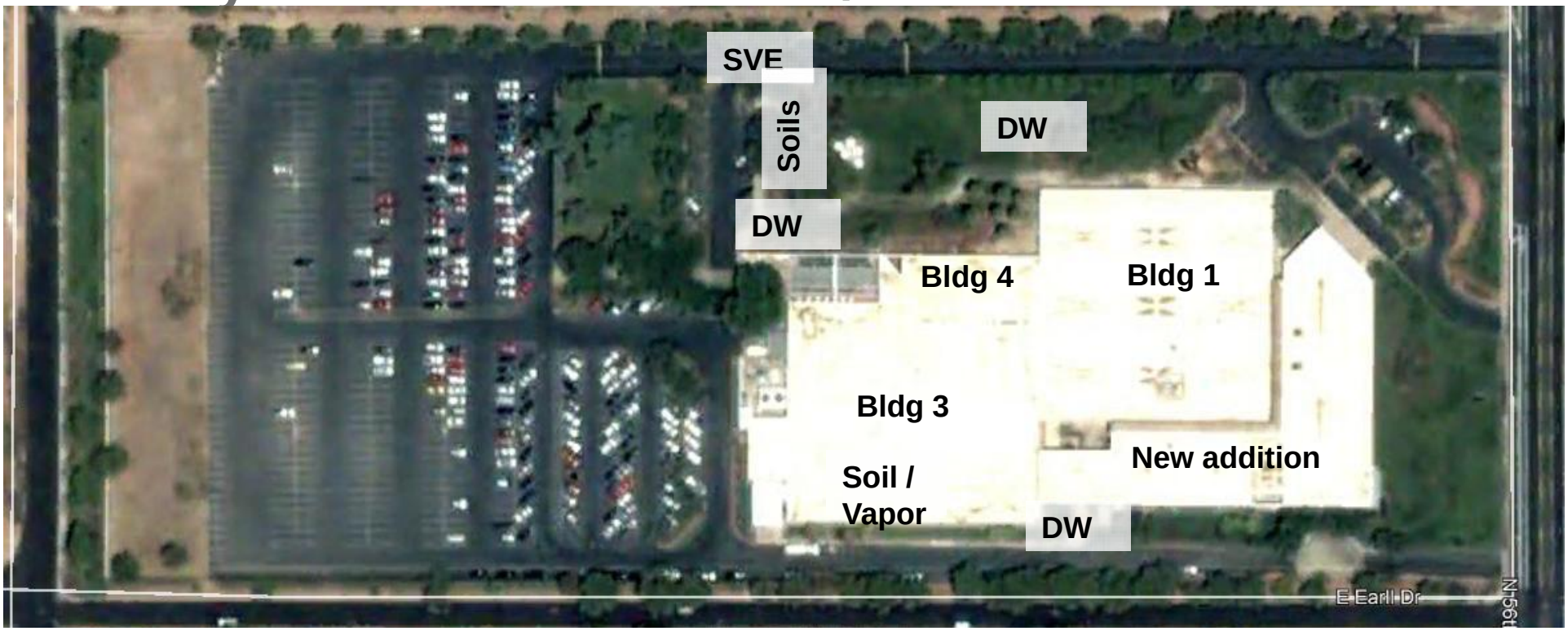
 # - Insignificant or non-solvent source

 # - Neutralized acid (water) discharge

 # - Potential solvent source

Characterization of sources based on operational assessment and subsequent soil-gas and soil investigations

Facility Soil Source Removal / Remediation



Air photo base GoogleEarthPro, 2002 aerial

Historical On-site Soil Remediation and Removal Efforts

DW = dry well over-excavation and abandonment (1993)

SVE = soil vapor extraction system (1994-96)

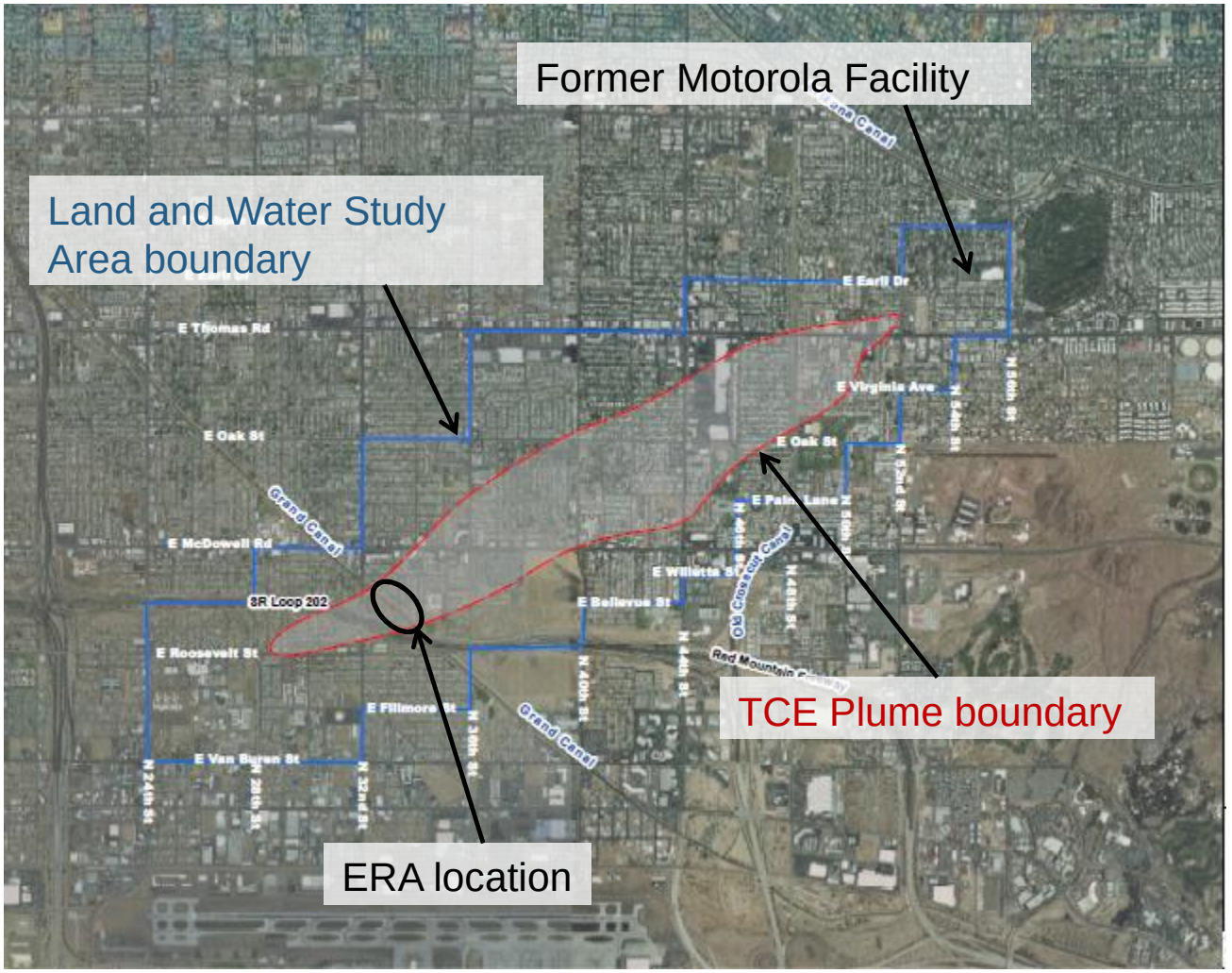
Soils = excavation and removal of underground concrete structures and surrounding soils (1996)

Soil / Vapor = excavation and removal of underground concrete structure and surrounding soils and installation of a passive sub-slab venting system (2011)

LAND AND WATER USE STUDY

Land and Water Use Study Area

- Land and Water Use Study Area generally extends ¼-mile beyond the plume boundary
  - Study Area was extended upgradient to include the former Motorola facility



56th Street and Earll Drive Land and Water Use Study

- Land Use
  - Current and future use of the former Motorola facility is K-12 charter school
  - Current use in City of Phoenix within site is mixed residential, light commercial, retail, schools, and office space. City of Phoenix is updating its general plan but does not expect changes in future use
- Surface Water Use
  - SRP operates the Arizona, Cross-cut, and Grand Canals in or near the Study Area
    - Canals are concrete lined and convey water from the Salt and Verde river systems, CAP water, and SRP supply well water
    - Current use of the Cross-cut and Grand Canal water is for urban and agricultural irrigation purposes and groundwater recharge
    - SRP indicates the potential future use of surface water for municipal supply off the Grand Canal

56th Street and Earll Drive Land and Water Use Study

- Groundwater Use
  - City of Phoenix (COP) and Salt River Project (SRP) have rights to pump water from the area
  - COP currently has no wells in the site although it retains right to pump water in the future
  - SRP currently owns and operates irrigation supply wells in proximity to the site.
    - The SRP wells are not impacted
    - SRP will continue to operate its wells in the future and future municipal uses on the Grand Canal are possible
    - An early response action is in place to protect the SRP supply well closest to the site

56th Street and Earll Drive Land and Water Use Study

- Groundwater Use (continued)
  - No private water supply wells have been identified in the site
  - Six exempt wells identified - none used as drinking water supply
  - Four of the 6 exempt wells are no longer in use
  - Two of the six wells may be used for flood irrigation

56th Street and Earll Drive Exposure Pathway Assessment

- Potential human health risk requires a completed exposure pathway. For an exposure pathway to be complete all of the following must exist
  - A source of contamination must exist
  - A mechanism for release of the contaminant to the environment
  - The presence of impacted media in the environment
  - A pathway for the contaminant to migrate to an exposure point
  - A receptor to the contaminant

56th Street and Earll Drive Exposure Pathway Assessment

- Soils
  - There is no completed exposure pathway to surface or subsurface soils at the former Motorola facility due to the completion of remediation activities and other engineering controls
  - There are no known impacted surface or subsurface soils off-site. Therefore, the off-site soils exposure pathway is not complete

56th Street and Earll Drive Exposure Pathway Assessment

- Soil-gas to Indoor Air
  - The soil gas to indoor air pathway for the charter school at the former Facility is not complete through the implementation of soil removals and installation of a passive sub-slab vent system. Indoor air confirmation testing was also completed.
  - A data gap was identified for residential properties adjacent to the former Facility based on results of a 2011 soil gas investigation
  - Off-site the soil gas to indoor air pathway is considered incomplete due to the depth and concentration of the identified groundwater impacts and the presence of un-impacted water overlying the impacted groundwater

56th Street and Earll Drive Exposure Pathway Assessment

- Groundwater
  - There are no known supply wells that have been impacted so there is no current completed exposure pathway to groundwater

- Surface water
  - Nearby SRP supply well that discharges to the Grand Canal is currently not impacted so there is no complete exposure pathway

  - An ERA has been implemented to protect the SRP supply well from future impacts

EARLY RESPONSE ACTION

56th Street and Earll Drive Early Response Action (ERA)

- Arizona Administrative Code (R18-16-405.A) allows an ERA to be performed for one or more of the following reasons
  1. To address a current risk to public health, welfare, and the environment
  2. To protect or provide a supply of water
  3. To address sources of contamination
  4. To control or contain contamination where such actions are expected to reduce the scope or cost of the remedy needed at the site

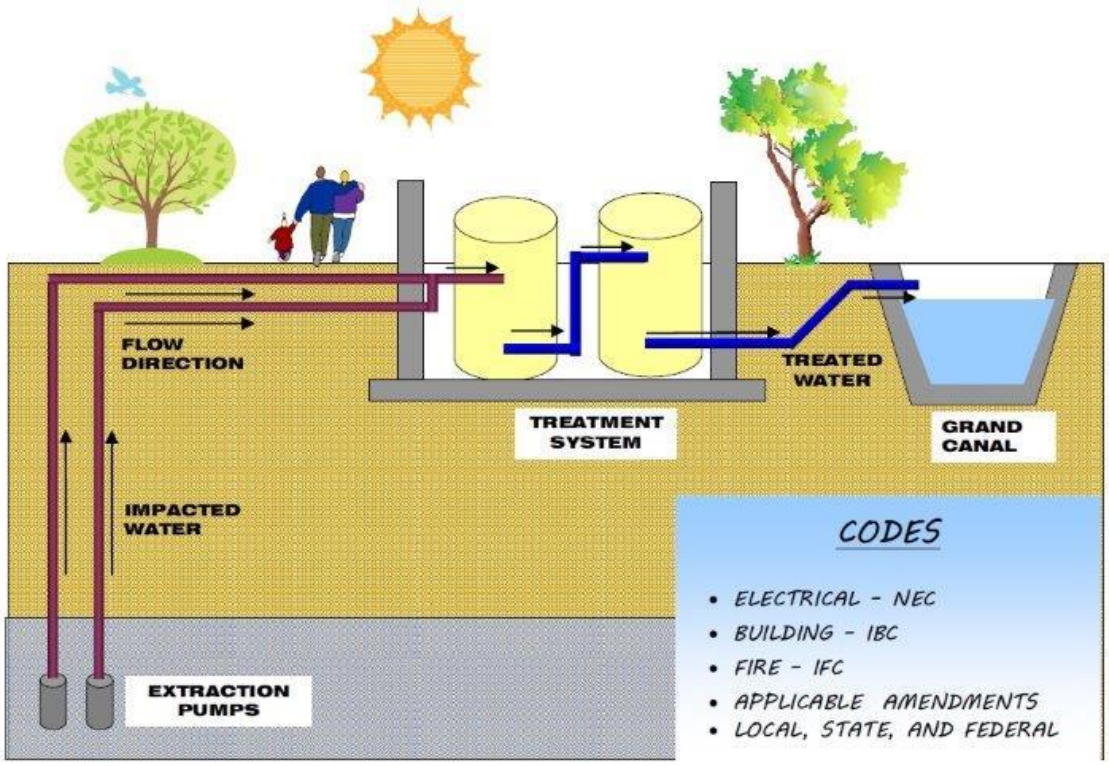
56th Street and Earll Drive Early Response Action (ERA)

- NXP has been implementing an ERA since 2013.

- ERA objectives are to
  - Protect the SRP supply well adjacent to the site and
  - To control or contain contamination to reduce the scope or cost of the remedy at the site

56th Street and Earll Drive ERA

GROUNDWATER EXTRACTION AND TREATMENT SYSTEM
56TH STREET AND EARLL DRIVE
WATER QUALITY ASSURANCE REVOLVING FUND SITE



PROCESS

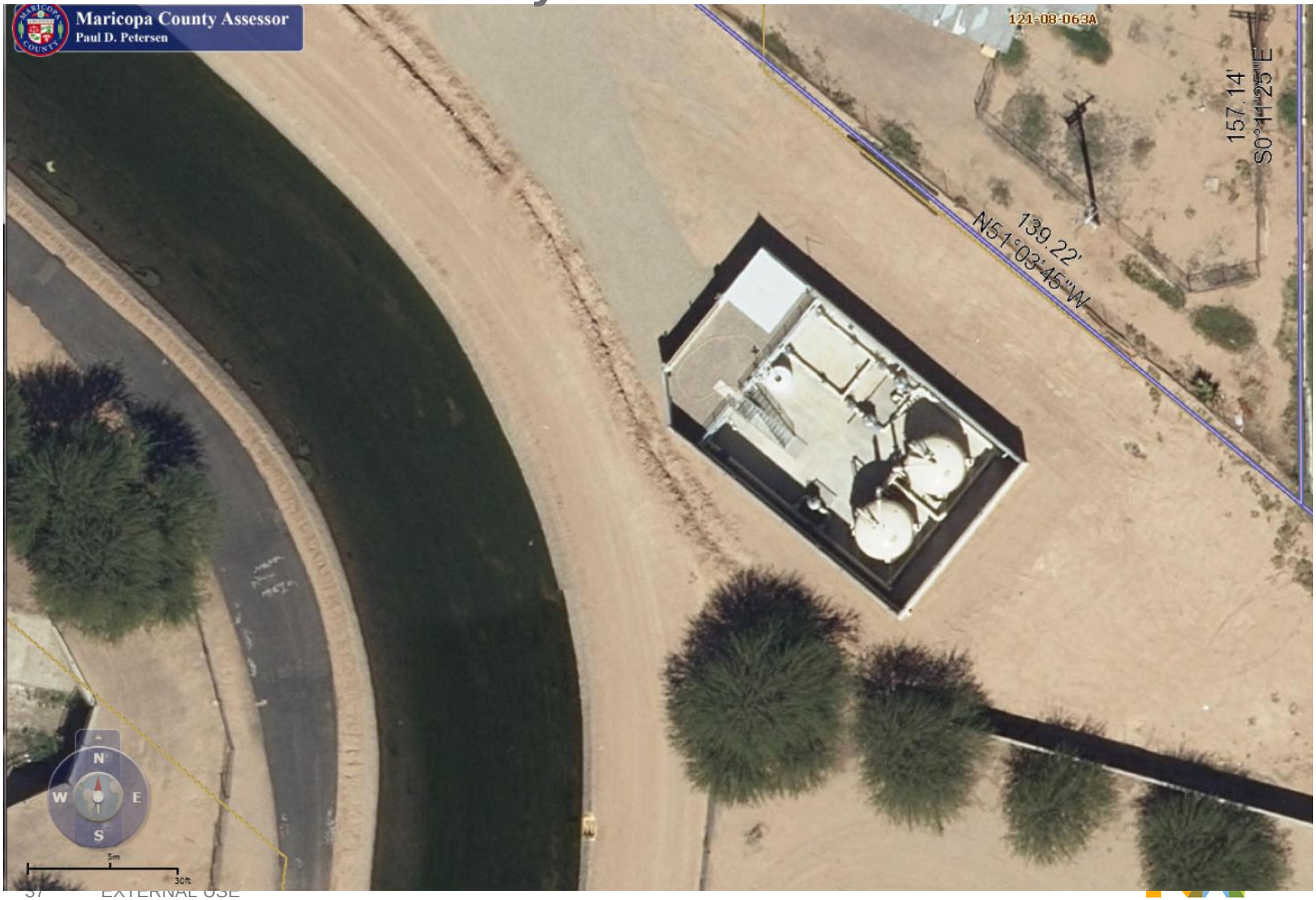
- EXTRACT GROUNDWATER
- TREAT GROUNDWATER USING GRANULAR ACTIVATED CARBON (*SIMILAR TO HOME WATER FILTER TECHNOLOGY*)
- DISCHARGE TREATED WATER TO THE GRAND CANAL.

OPERATIONS

- MINIMAL TRAFFIC: ONE TRUCK/WEEK AVERAGE
- NO ODOR
- NO DUST
- NO GAS USED/OPERATED
- SILENT OPERATION
- NO VIBRATIONS
- NO SMOKE
- NO HEAT
- NO GLARE
- INTERIOR LIGHTING

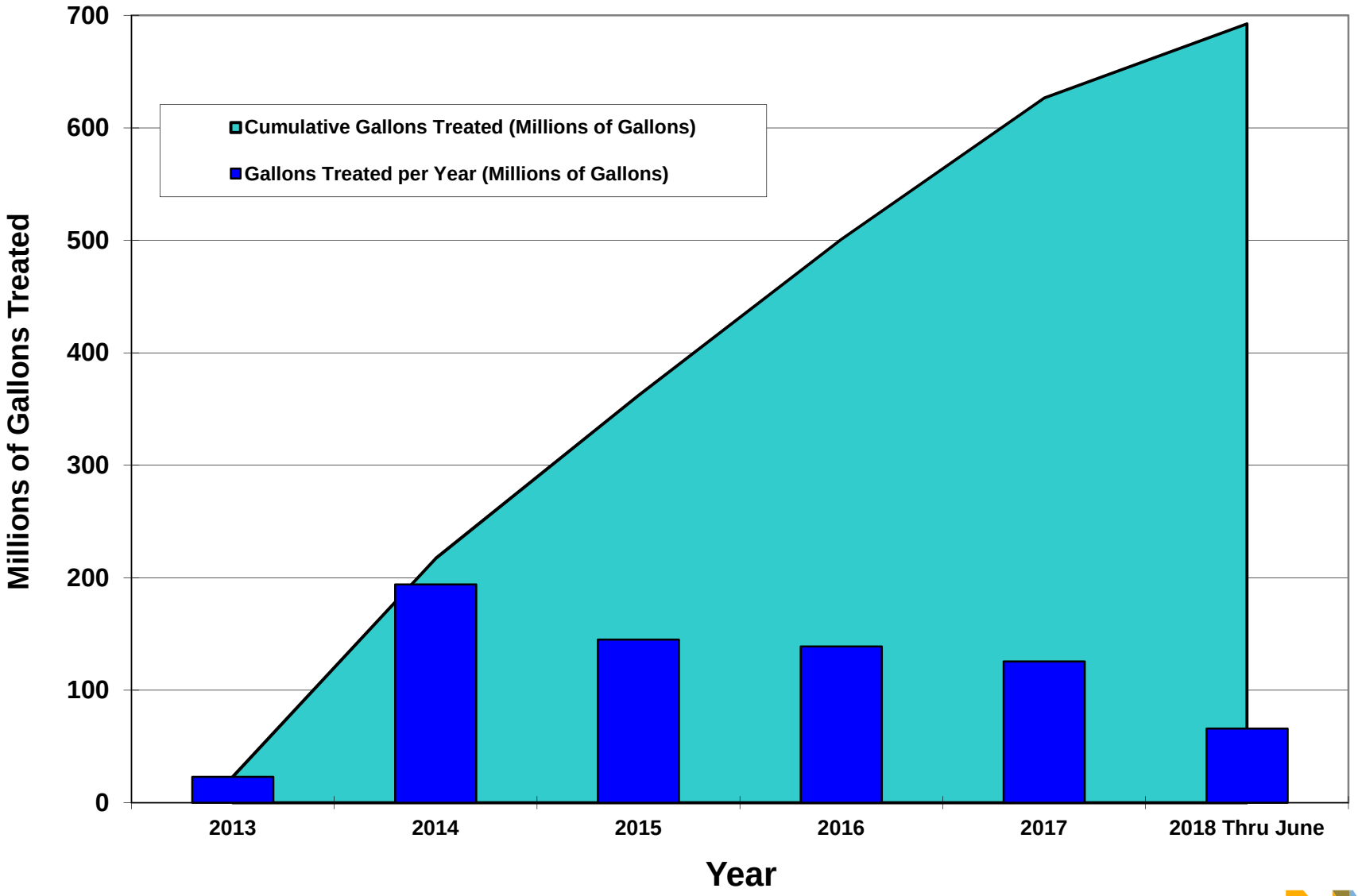

Maricopa County Assessor
Paul D. Petersen
ERA Components and Nearby Facilities
SRP 19.9E-6N
DM-29
DM-31
DM-33
DM-37
DM-39
DM-40
DM-38
DM-41
DM 505
Groundwater Treatment System
Grand Canal
E McDOWELL RD
E Brill St
E Willetta St
E Culver St
E Belleview St
E Portland St
E Moreland St
E Oakleaf Dr
E Priscilla Ct
N Indian Tr
E Indian Tr
N 31st St
N 32ND ST
N 33rd St
N 34th St
N 35th St
N 36th St
202
56th Street and Earll Drive Groundwater Monitor Wells and Other Wells (not used for Drinking Water)
DM-29 Name of Well
Groundwater Extraction Wells
Groundwater Monitor Wells
Other Groundwater Wells (Salt River Project) – not used for drinking water
100 m
400 ft

ERA Treatment Facility Aerial View

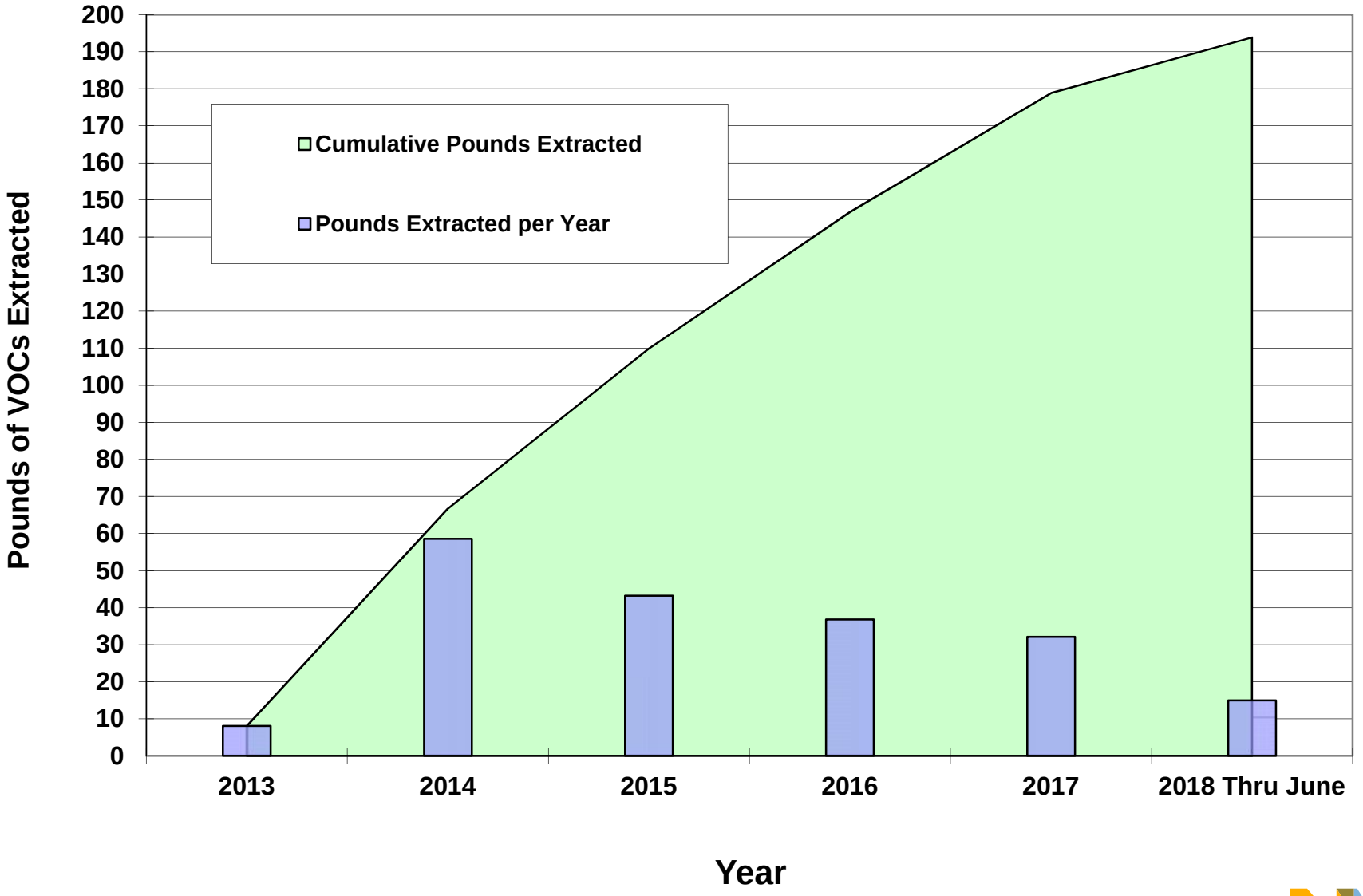


ERA Treatment Facility View looking south

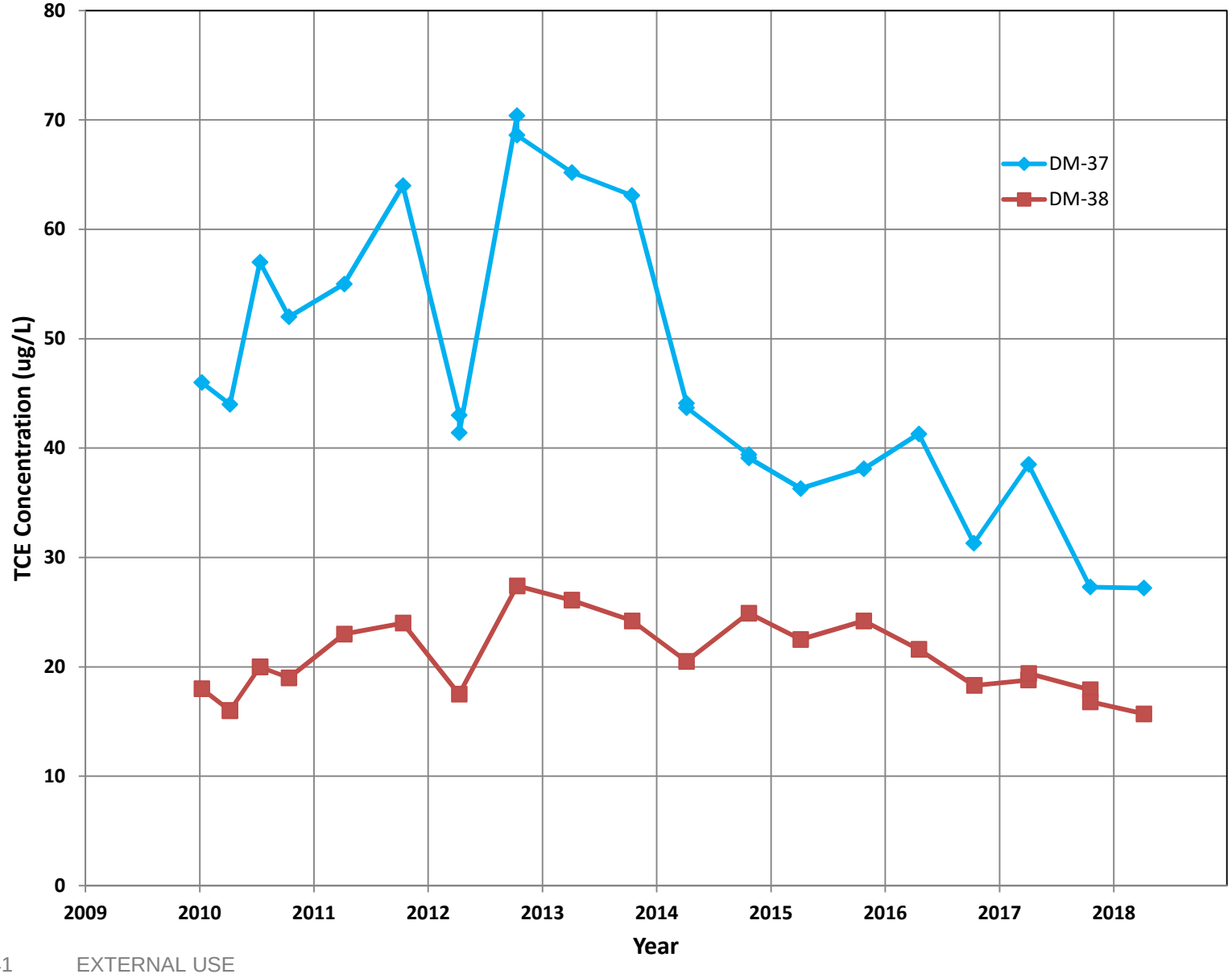
ERA Volume of Water Treated



ERA Pounds of VOCs Removed



ERA Performance on Sentinel Monitor Wells



NEXT STEPS

56th Street and Earll Drive Feasibility Study

- Implement the Vapor Intrusion investigation per the ADEQ-approved work plan
  - NXP currently working to obtain access to residential properties in the area as agreed to with ADEQ
  - Investigation will be implemented over two seasons – warm weather season and cool weather season
  - Initial results will be evaluated to determine if additional (step-out) sampling locations are warranted
- Initiate work on Feasibility Study for site

56th Street and Earll Drive RI Report Comments

- Comment period ends September 4

- How to Comment
  - Now: provide ADEQ comments
    - State your name, affiliation, and oral comment
    - Hand in written comment form
  - By email (time stamped by September 4, 2018)
    nso@azdeq.gov
  - By mail
    Nicole Osuch
    ADEQ
    1110 W Washington Street
    Phoenix, AZ 85007

SECURE CONNECTIONS
FOR A SMARTER WORLD