



**EPA Update:  
TCE Hot Spot Areas Source  
Investigation Findings**

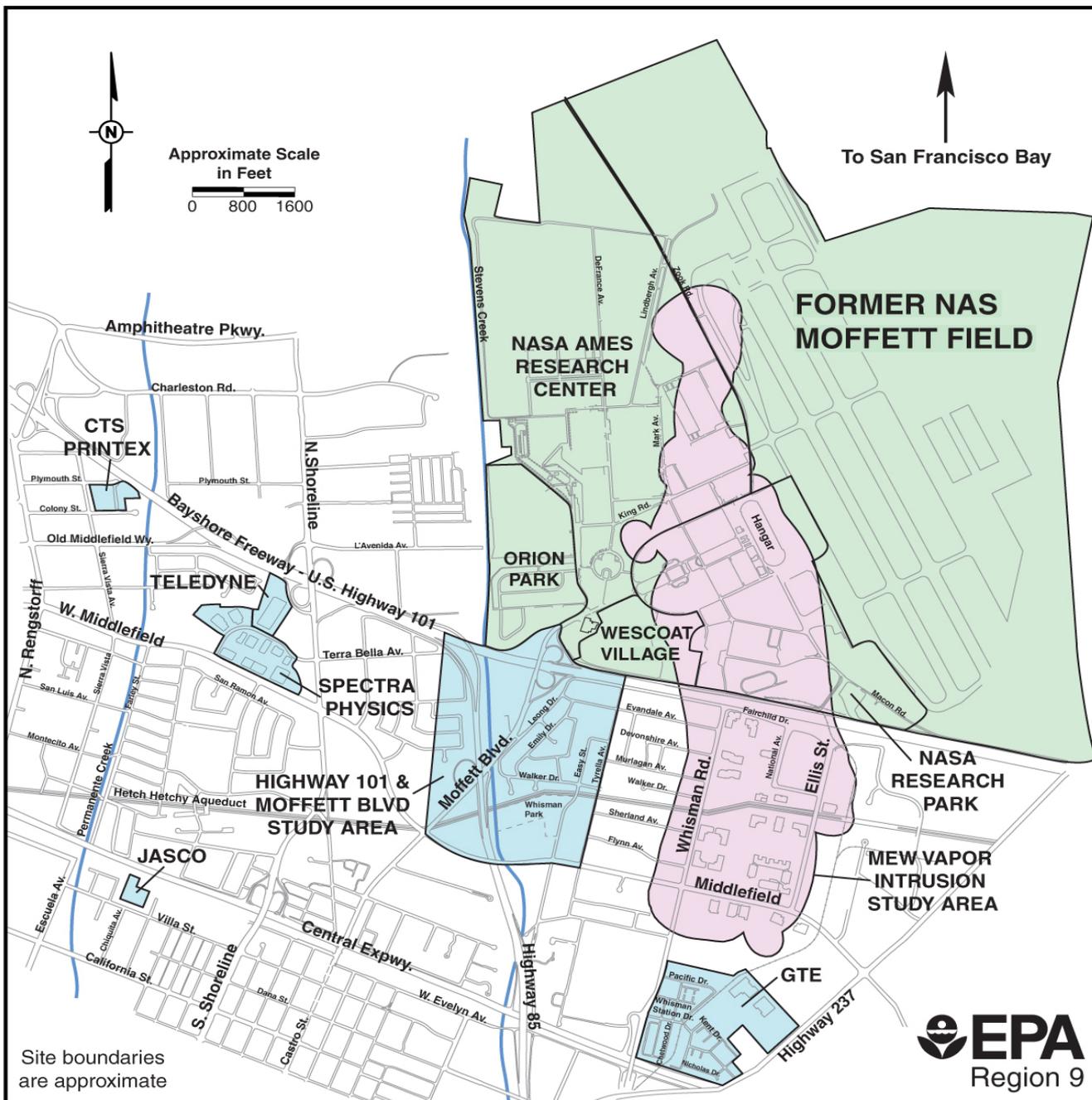
**Middlefield-Ellis-Whisman (MEW)  
Superfund Study Area  
Mountain View and Moffett Field, CA**

**Neighborhood Meeting**

**November 1, 2015**



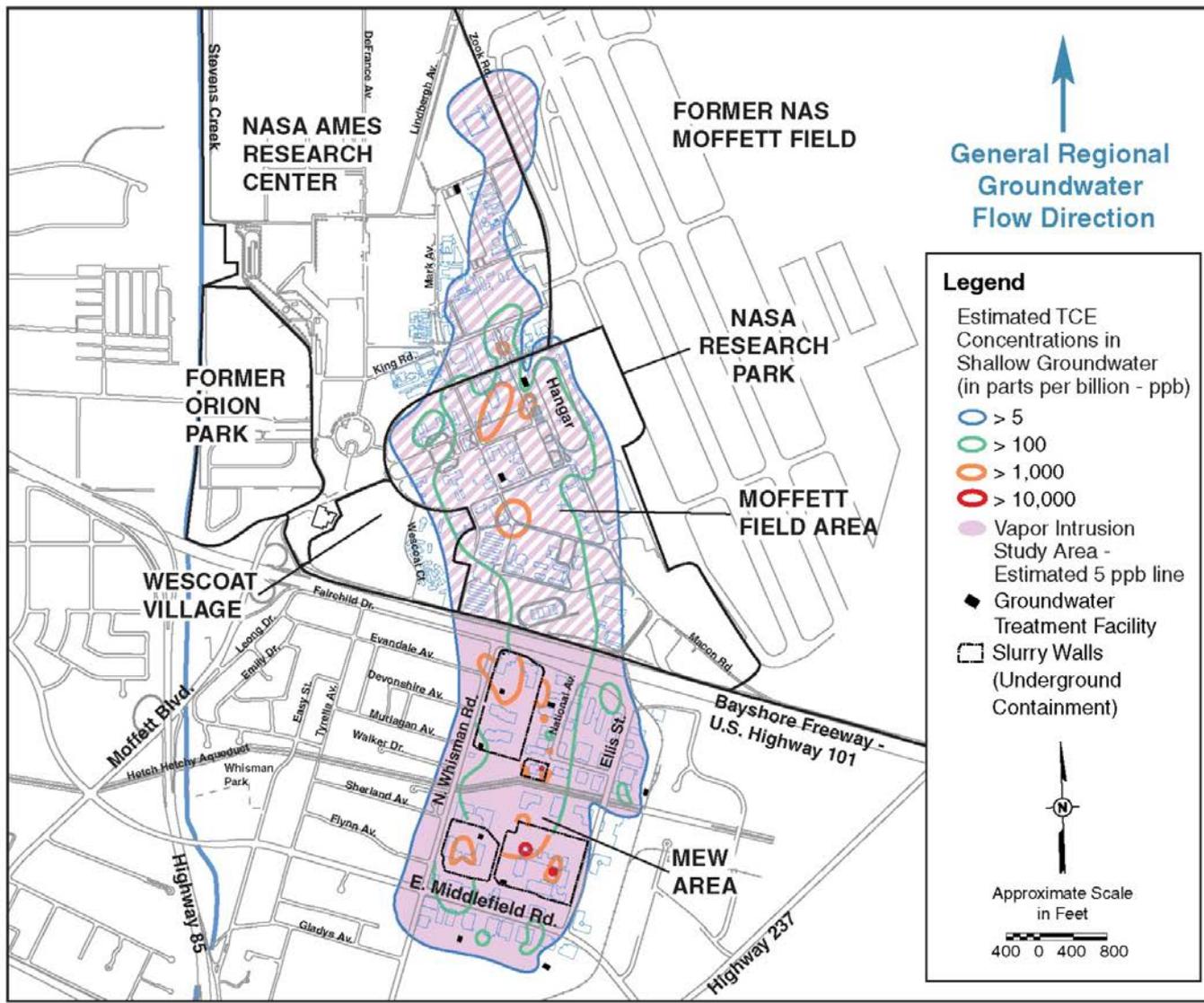
# MEW SITE LOCATION AND VICINITY



Site boundaries are approximate



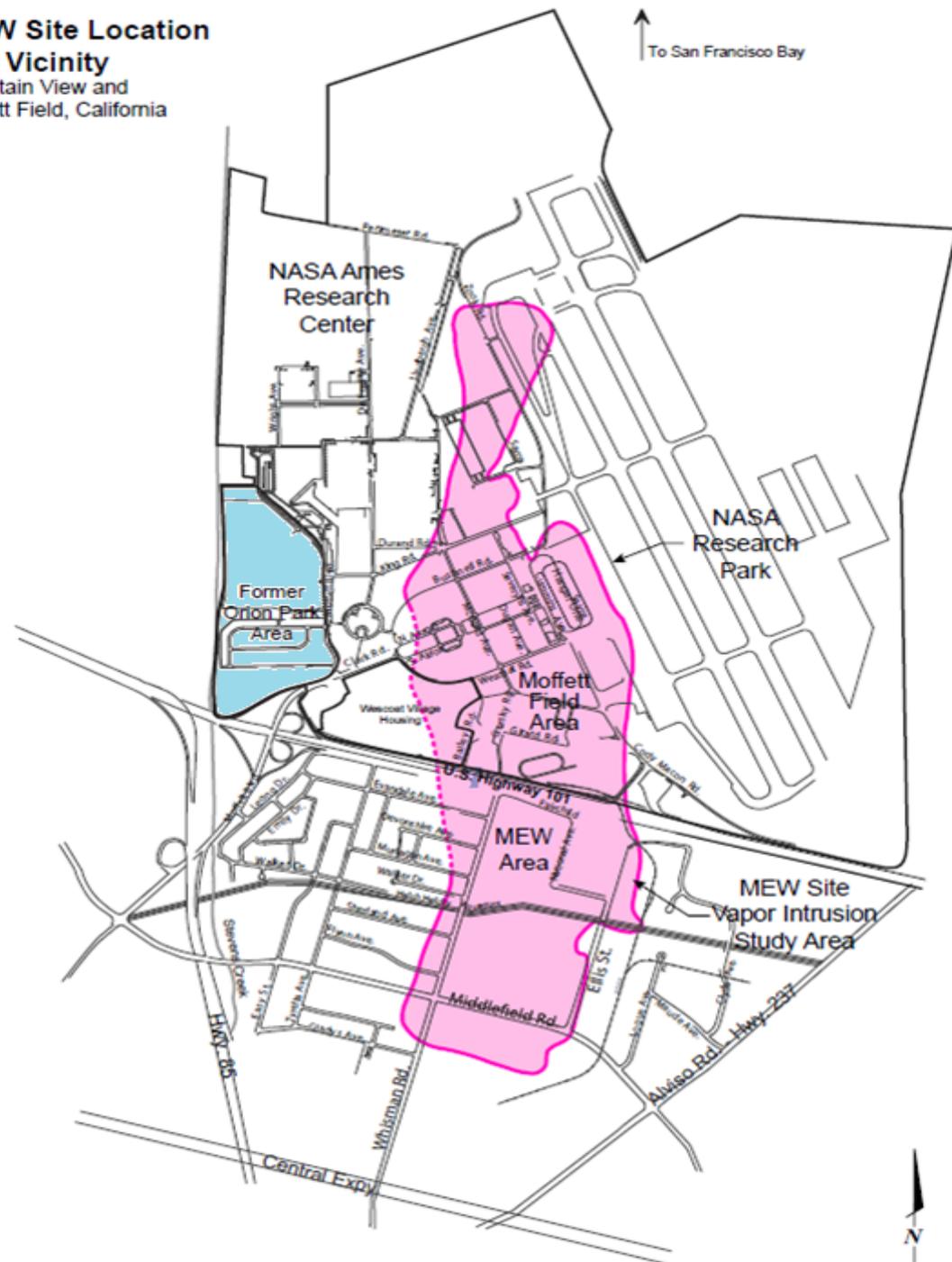
# Estimated Extent of Shallow TCE Groundwater Plume - 2009



# Background/ Overview

## MEW/Moffett Field Vapor Intrusion Study Area (as known in 2012)

**MEW Site Location  
and Vicinity**  
Mountain View and  
Moffett Field, California

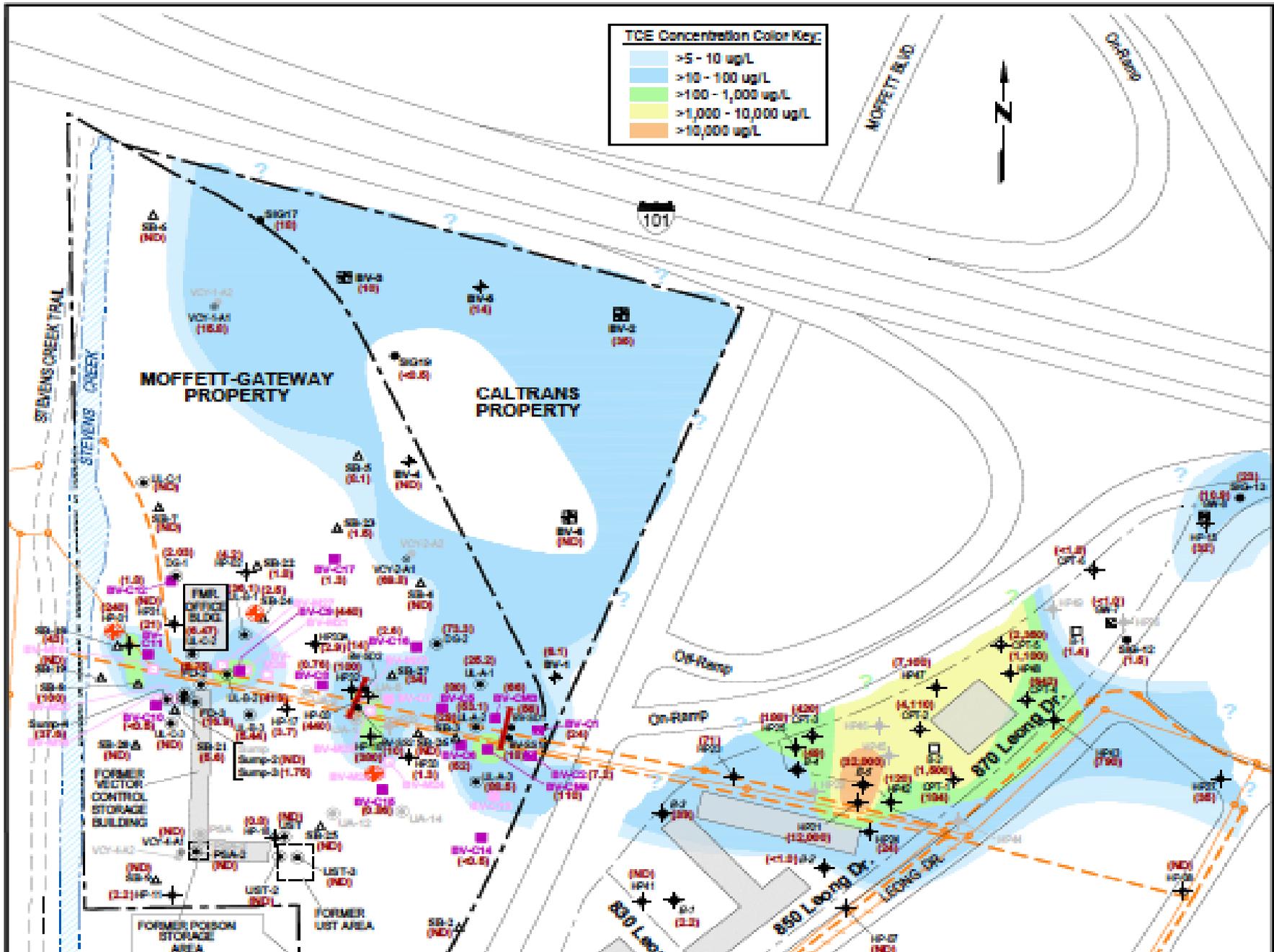
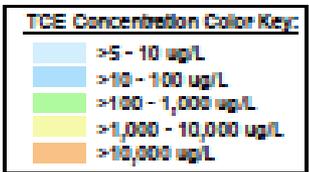


# Previous Investigations in Vicinity of Former Orion Park Housing Area (1999-2014)



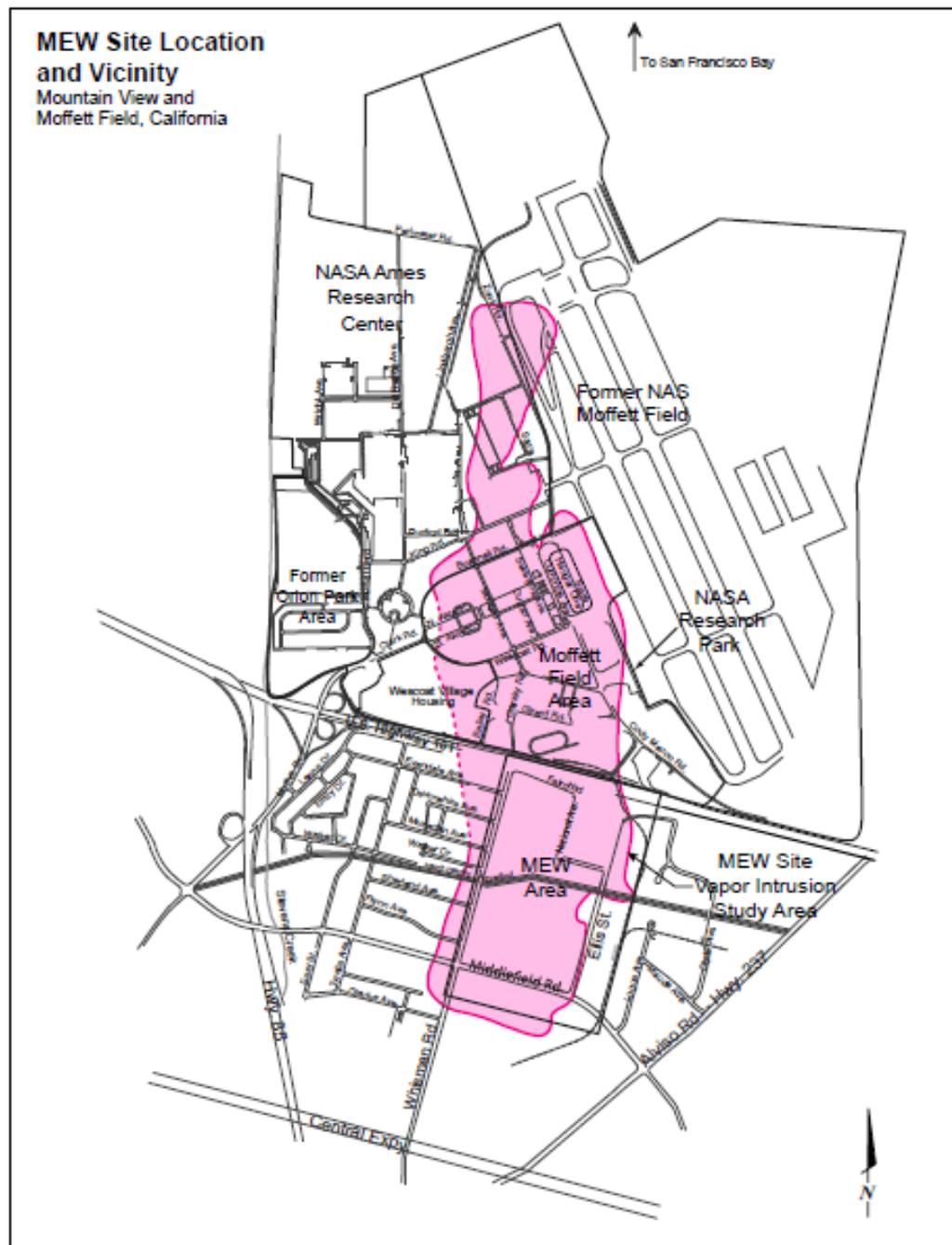
Modified slide from Army's Nov 20, 2014 Moffett Field RAB presentation

Investigation Type	Year	Investigator	Investigation Findings
Soil and Groundwater Investigation	1999	NASA	TCE detected in groundwater beneath downgradient boundary
Groundwater Investigation	2000	Navy	TCE detected in groundwater beneath upgradient and downgradient boundaries
Site Characterization	2002	Navy	No on-site TCE sources identified
Off-site Property Investigation	2003	Army	TCE detected in groundwater from upgradient monitoring points
Off-site Property Investigation	2005	EPA	TCE detected in upgradient off-site monitoring points
Groundwater Investigation/Monitoring Well Installation	2005	Navy	TCE groundwater hot spot areas identified beneath OPHA, but no on-site sources identified
Septic Tank and Drain Field Investigation	2009	Army	Septic tank and drain field not a source
Supplemental Site Investigation	2012	Army	Groundwater hot spots identified beneath OPHA, but no on-site sources identified
Off-site Upgradient Investigations	2013-2016	EPA	Investigation ongoing....

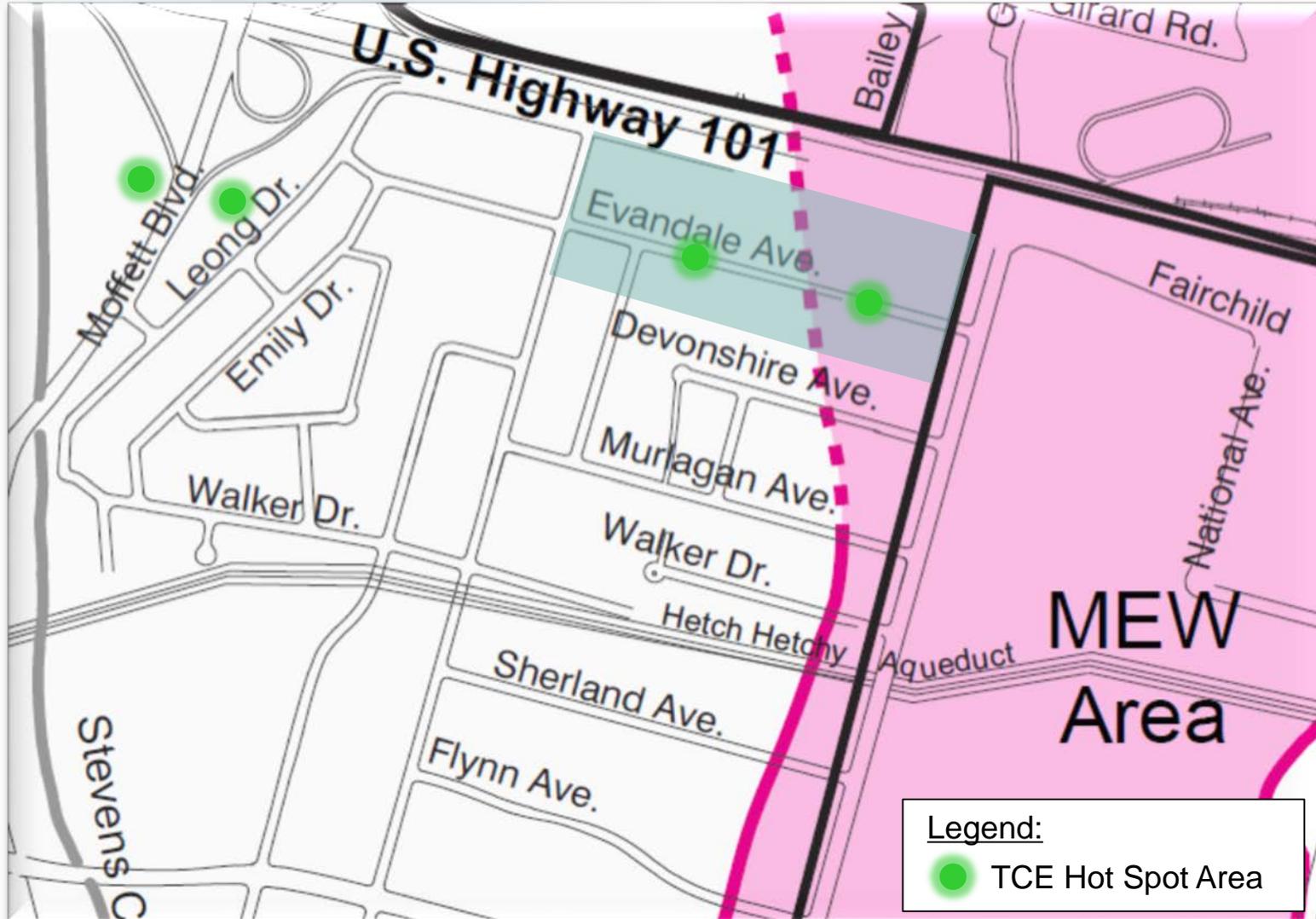


# Overview

## MEW Site Vapor Intrusion Study Area (as known in 2012)



# 2013 - TCE Hot Spot Areas and Residential Air Sampling Area



Legend:

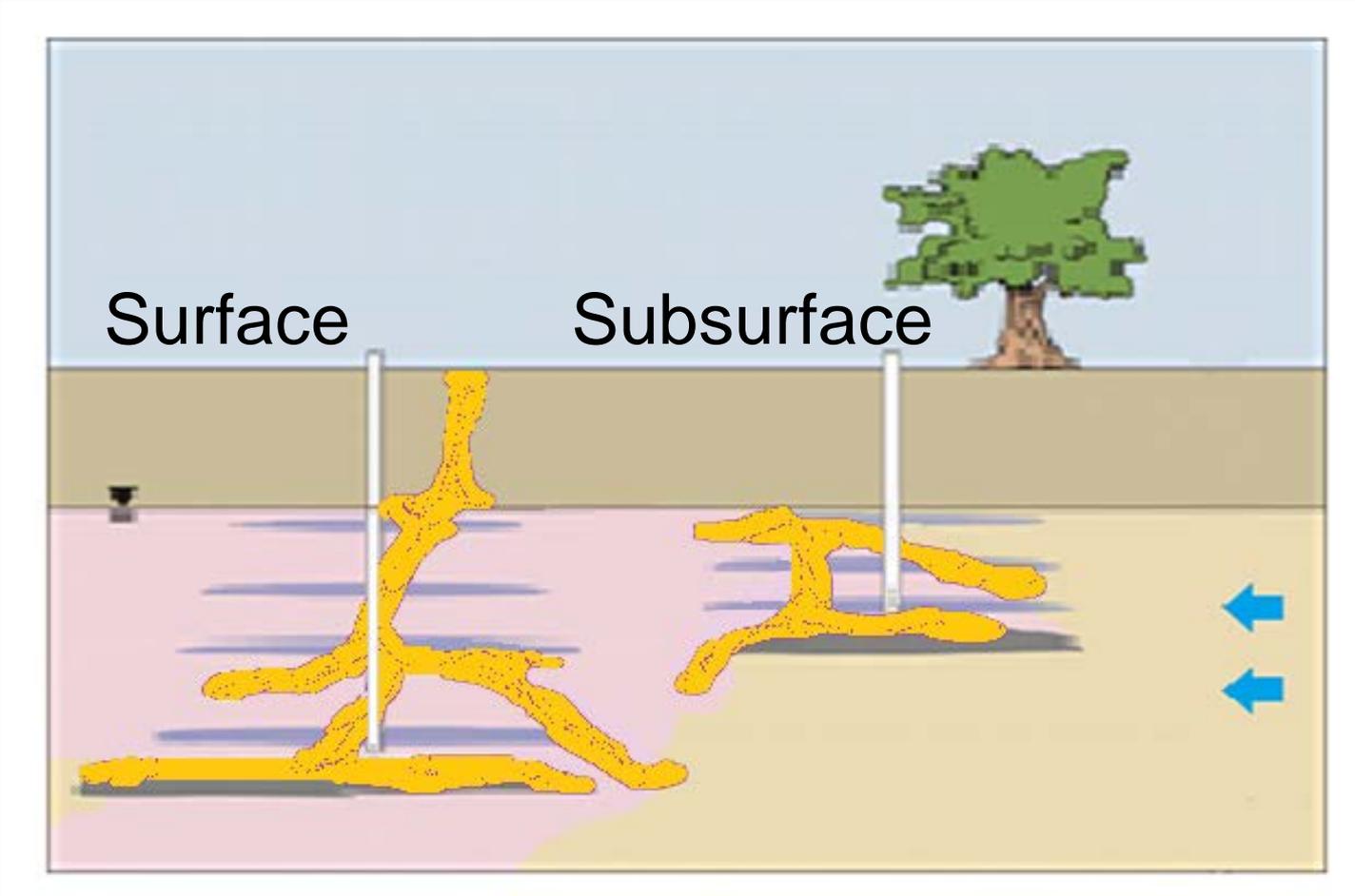
 TCE Hot Spot Area

# EPA Potential TCE Source Investigation

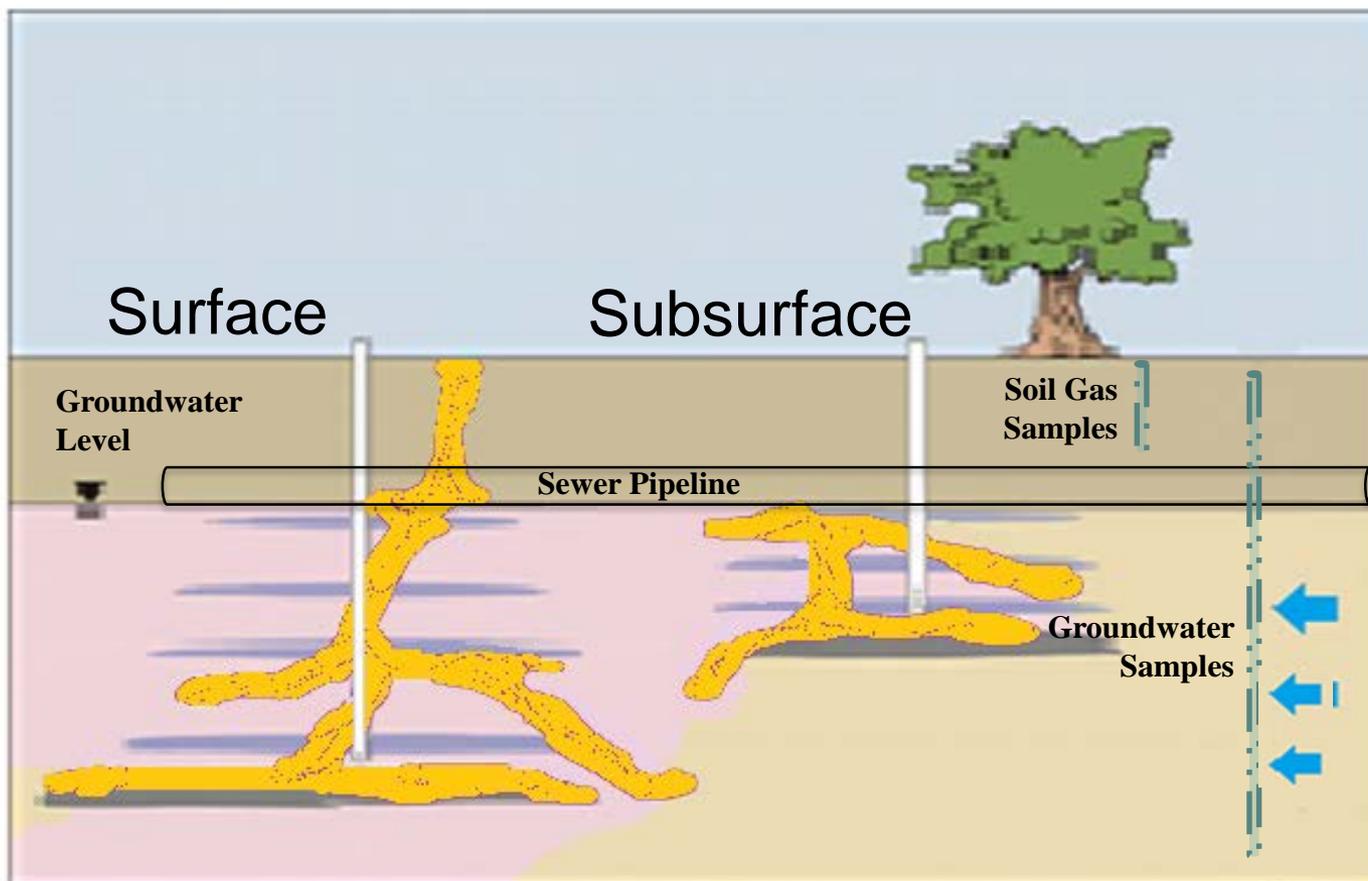


- In 2013-2014, EPA conducted potential source investigation of TCE Hot Spot Areas and conducted additional groundwater investigation to fill data gaps in residential area.
- Assessed potential migration pathways to TCE Hot Spot Areas – surface, subsurface, regional groundwater contamination

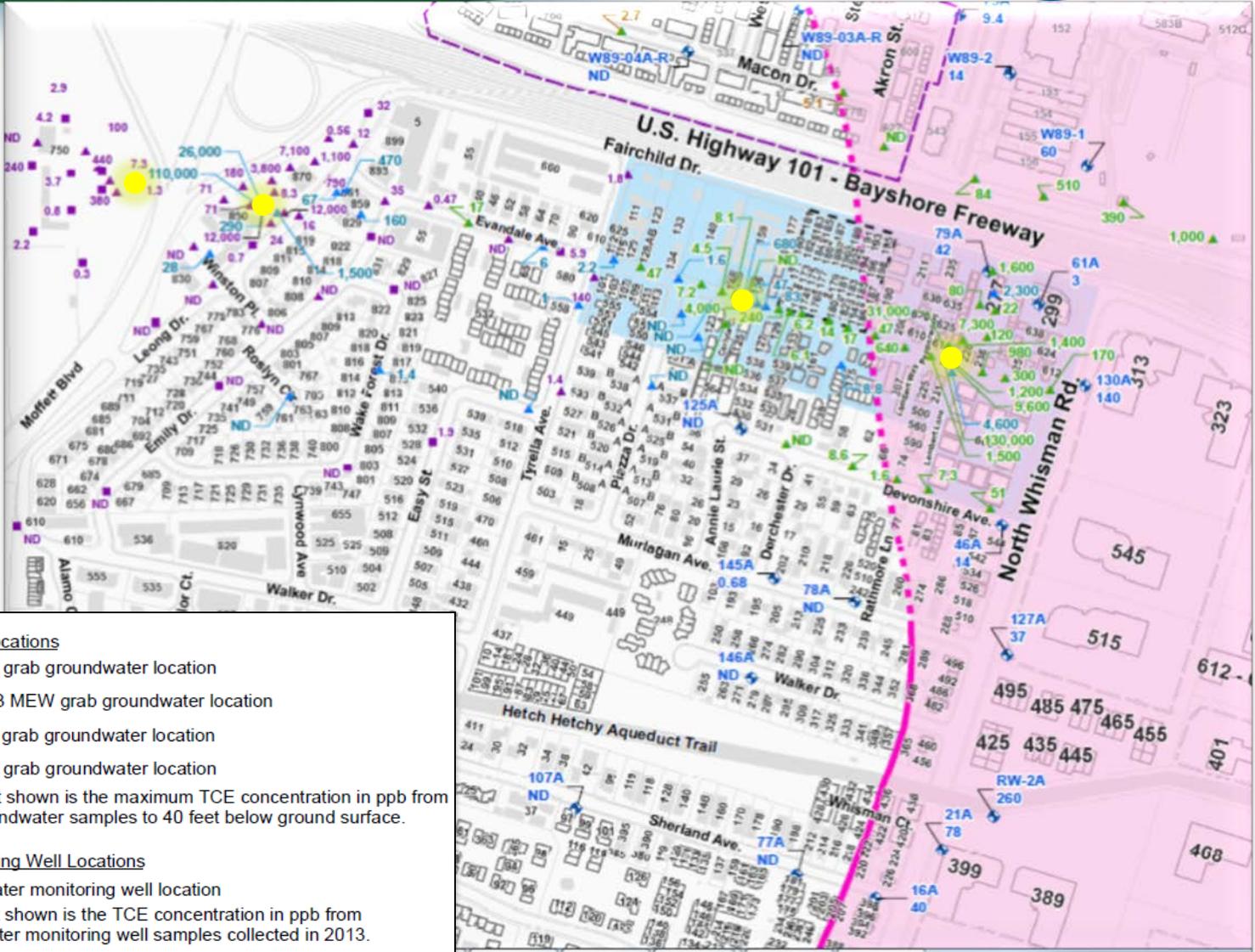
# Potential Source Type



# Sampling near Source Types



# Groundwater Sampling (2005-2013)



Grab Groundwater Locations

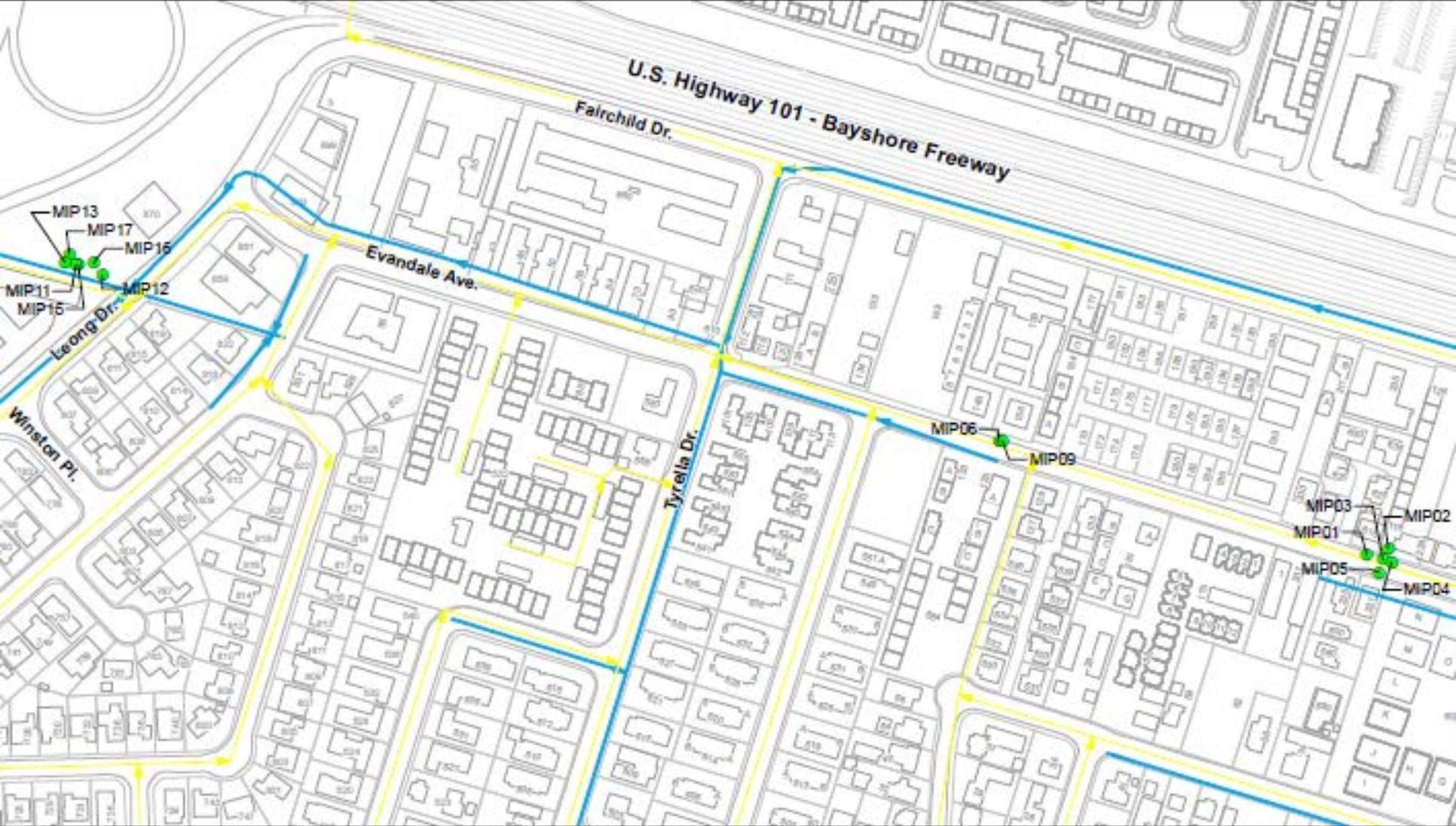
- ▲ 2013 EPA grab groundwater location
- ▲ 2012/2013 MEW grab groundwater location
- ▲ 2011 EPA grab groundwater location
- 2005 EPA grab groundwater location

The result shown is the maximum TCE concentration in ppb from grab groundwater samples to 40 feet below ground surface.

Groundwater Monitoring Well Locations

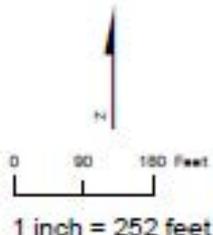
- ⊕ Groundwater monitoring well location
- The result shown is the TCE concentration in ppb from groundwater monitoring well samples collected in 2013.

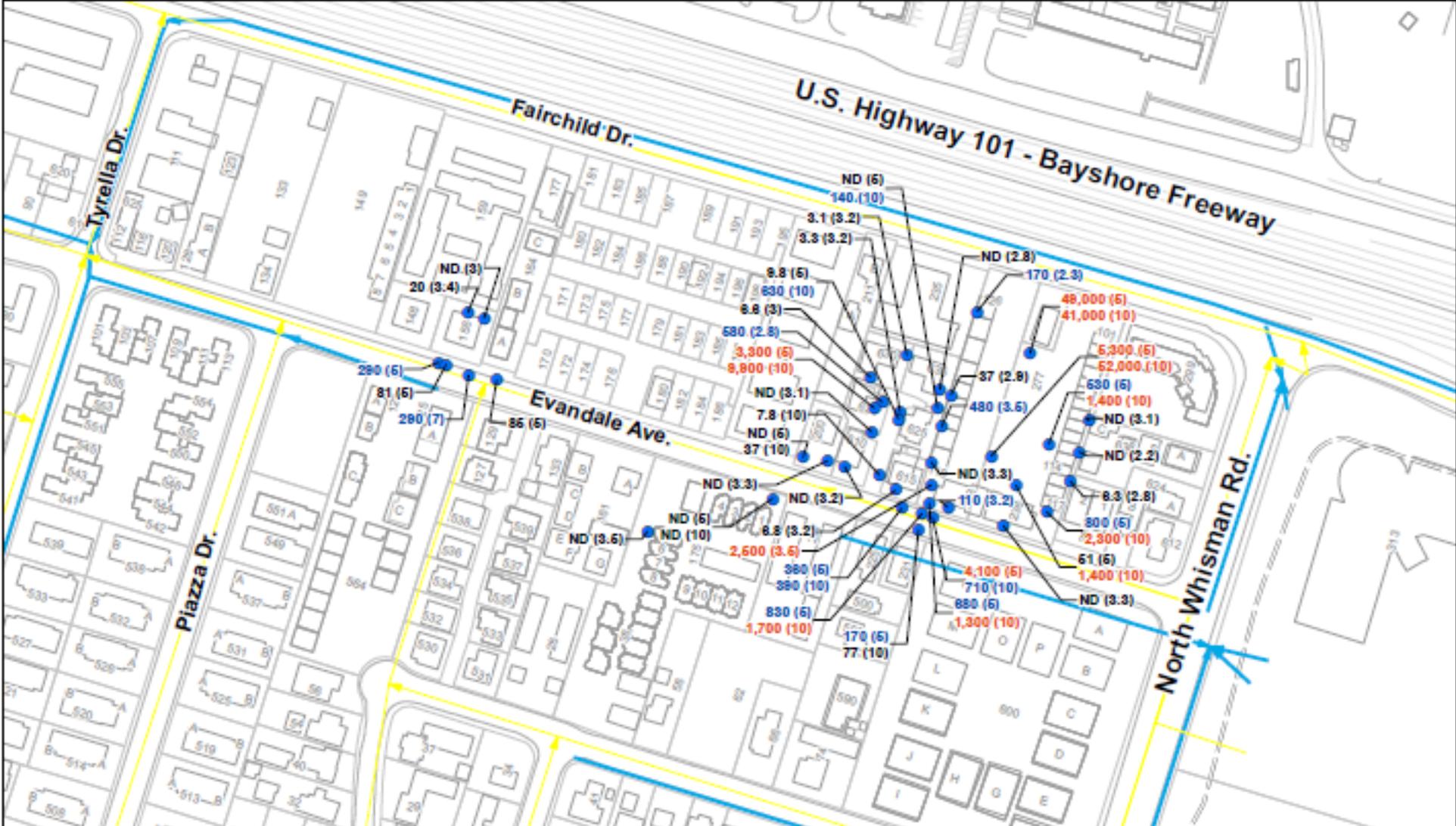
ND = Not Detected (below 0.5 ppb TCE)



- Membrane Interface Probe (MIP) Sampling Location
- Sanitary sewer drainage route
- Stormwater drainage route

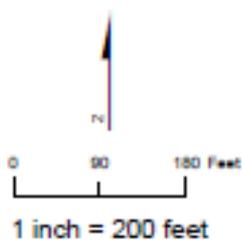
**MEMBRANE INTERFACE PROBE (MIP) SAMPLING LOCATIONS**  
**SEPTEMBER 2013**  
 In Vicinity of Highway 101 & Moffett Blvd Study Area and  
 MEW Superfund Site, Mountain View, CA

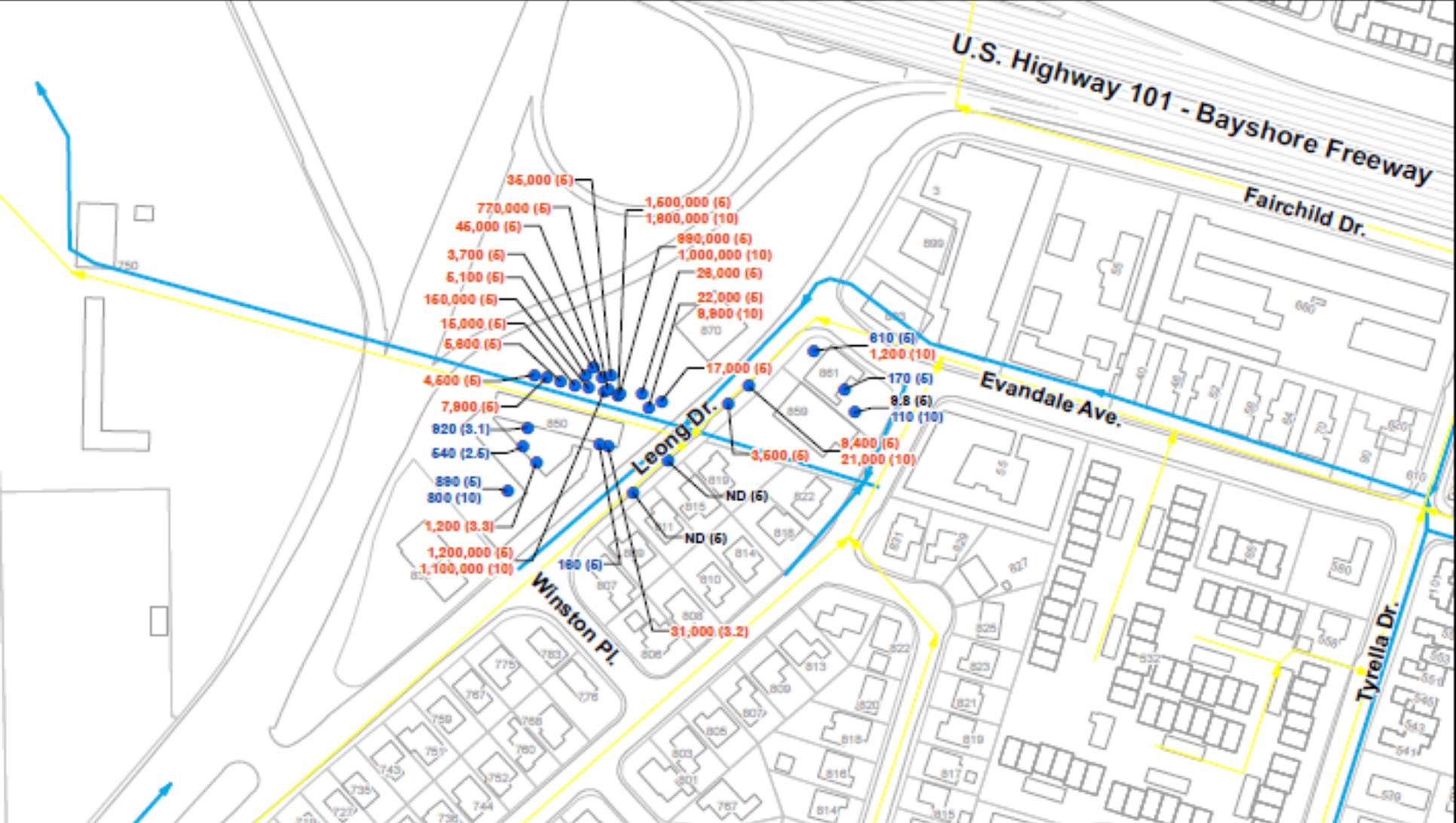




- Soil Gas Sample Location
  - Sanitary sewer drainage route
  - Stormwater drainage route
- 170 (5) The result shown is the TCE soil gas concentration in  $\mu\text{g}/\text{m}^3$ .  
The sample depth in feet below ground surface is shown in parentheses.
- ND Not detected. TCE result is below the laboratory detection limit of  $2.7 \mu\text{g}/\text{m}^3$ .
- $\mu\text{g}/\text{m}^3$  micrograms per cubic meter
- Black TCE soil gas concentration less than ( $<$ )  $100 \mu\text{g}/\text{m}^3$
- Blue TCE soil gas concentration greater than ( $>$ )  $100 \mu\text{g}/\text{m}^3$
- Orange TCE soil gas concentration greater than ( $>$ )  $1,000 \mu\text{g}/\text{m}^3$

**TCE IN SOIL GAS SAMPLE RESULTS IN RESIDENTIAL AREA**  
**SEPTEMBER 2013**  
**South of Highway 101**  
**MEW Superfund Site, Mountain View, CA**

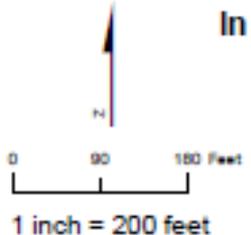




**TCE IN SOIL GAS SAMPLE RESULTS IN LEONG DRIVE AREA  
 SEPTEMBER 2013**

**In Vicinity of Highway 101 & Moffett Blvd Study Area and  
 MEW Superfund Site, Mountain View, CA**

- Soil Gas Sample Location
- Sanitary sewer drainage route
- Stormwater drainage route
- 170 (5) The result shown is the TCE soil gas concentration in  $\mu\text{g}/\text{m}^3$ . The sample depth in feet below ground surface is shown in parentheses.
- ND Not detected. TCE result is below the laboratory detection limit of  $2.7 \mu\text{g}/\text{m}^3$ .
- $\mu\text{g}/\text{m}^3$  micrograms per cubic meter
- Black TCE soil gas concentration less than ( $<$ )  $100 \mu\text{g}/\text{m}^3$
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# Information Reviewed by EPA

## – Areas of Interest



- Historical operations and use, aerial photos, City, County, State agencies files/records search
- Utilities infrastructure – historical and current
- Previous Potentially Responsible Parties (PRP) search information and updates

# City of Mtn View Sewer Infrastructure Events & TCE Releases to Sewer



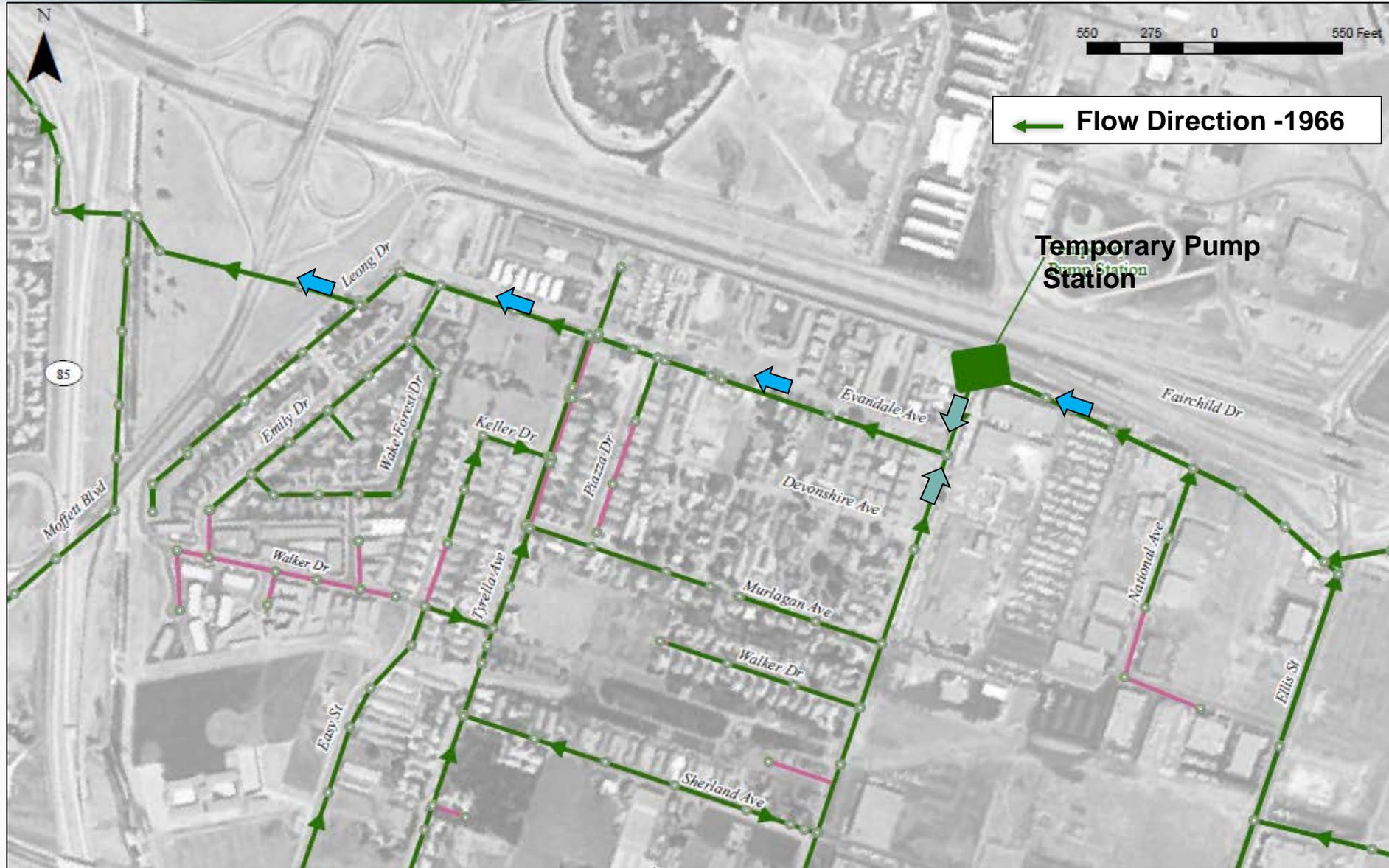
- 1953 – First treatment plant constructed.
- 1957 – Evandale Trunk constructed and noted as inadequate.
- 1960 – City identified source of TCE to sewage plant.
- 1961 – City ordinance regulating disposal of harmful chemicals, including TCE, to sewer system.
- 1961 – Sewer lines around MEW Study Area constructed.
- 1961- 66 – Temporary pump station lifting sewage from Fairchild Drive to Evandale Trunk.
- 1961- 66 – Various releases of TCE to sewer
  
- 1966 - Present – East Trunk (Fairchild Dr) replaces Evandale Trunk due to capacity issues. Evandale line carries sewage generated along Evandale only.

# Historical TCE Operations



- Historical operations and TCE use
- Pre-1966 Sewer Flow and Migration Path to TCE source areas along Evandale Trunk (Hotspots 1 - 4 along Evandale, Leong Drive, Moffett Gateway properties)

# Temporary Pump Station and Sewer Flow along Evandale Trunk (~1961-1966)



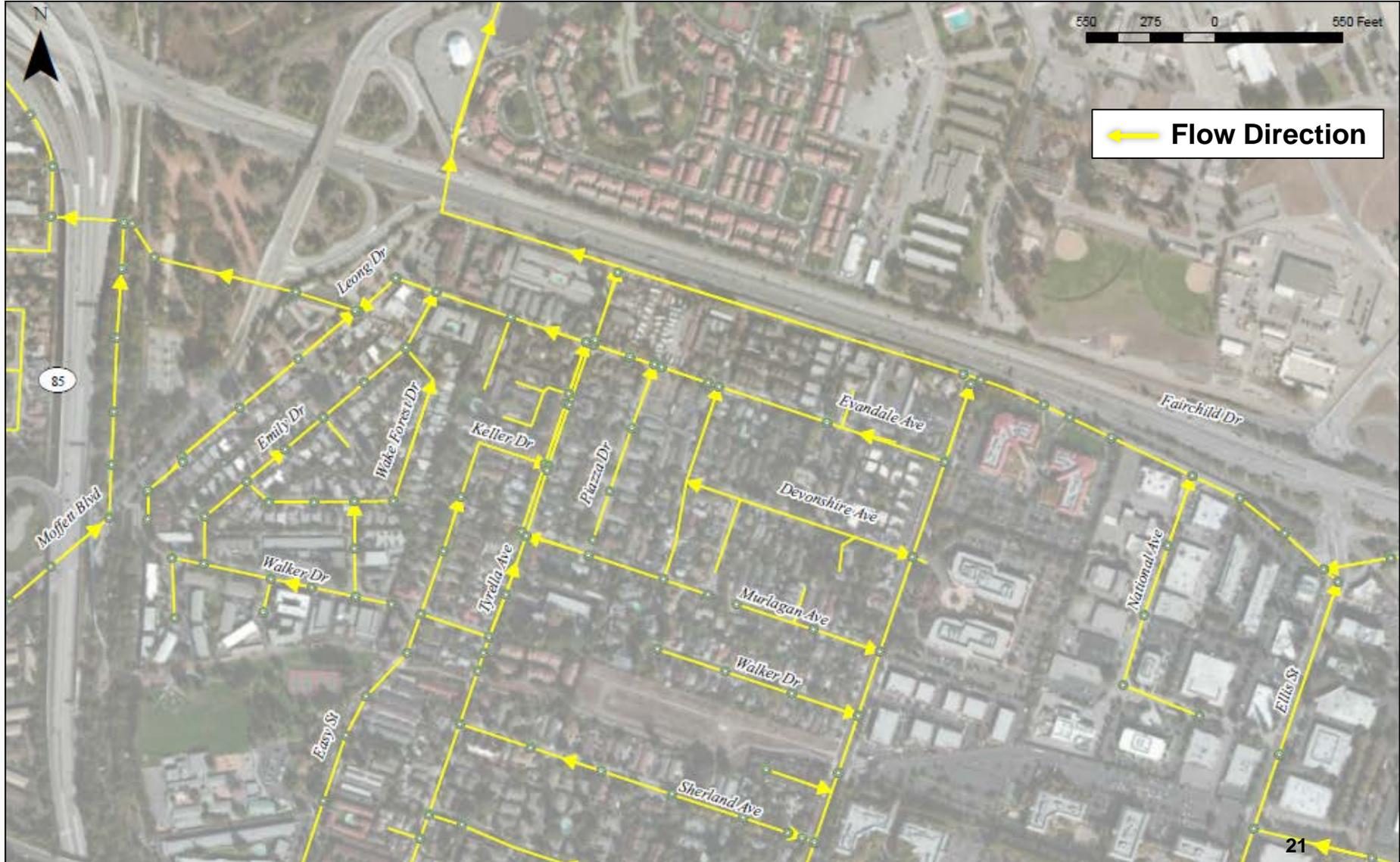
← Flow Direction -1966

Temporary Pump Station

85

550 275 0 550 Feet

# Current Sewer Flow Direction



# Ongoing Work and Next Steps



- Potential Vapor Intrusion Concerns – air sampling area, new development, implementation of MEW Site vapor intrusion remedy
- Source Area / Hot Spot – Characterization and Cleanup
- *Ongoing Potentially Responsible Party Search and Investigation*
- Determine Extent of Contamination from TCE Source Areas
- *Data Gaps Evaluation*



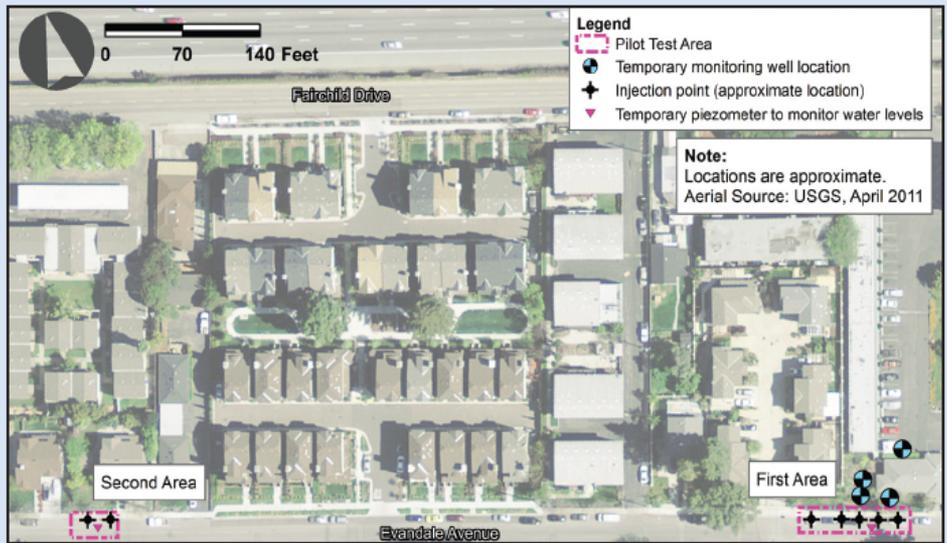
# Middlefield-Ellis-Whisman (MEW) Study Area

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • August 2014

*Mountain View, California*

## Field Work Notice for Pilot Test

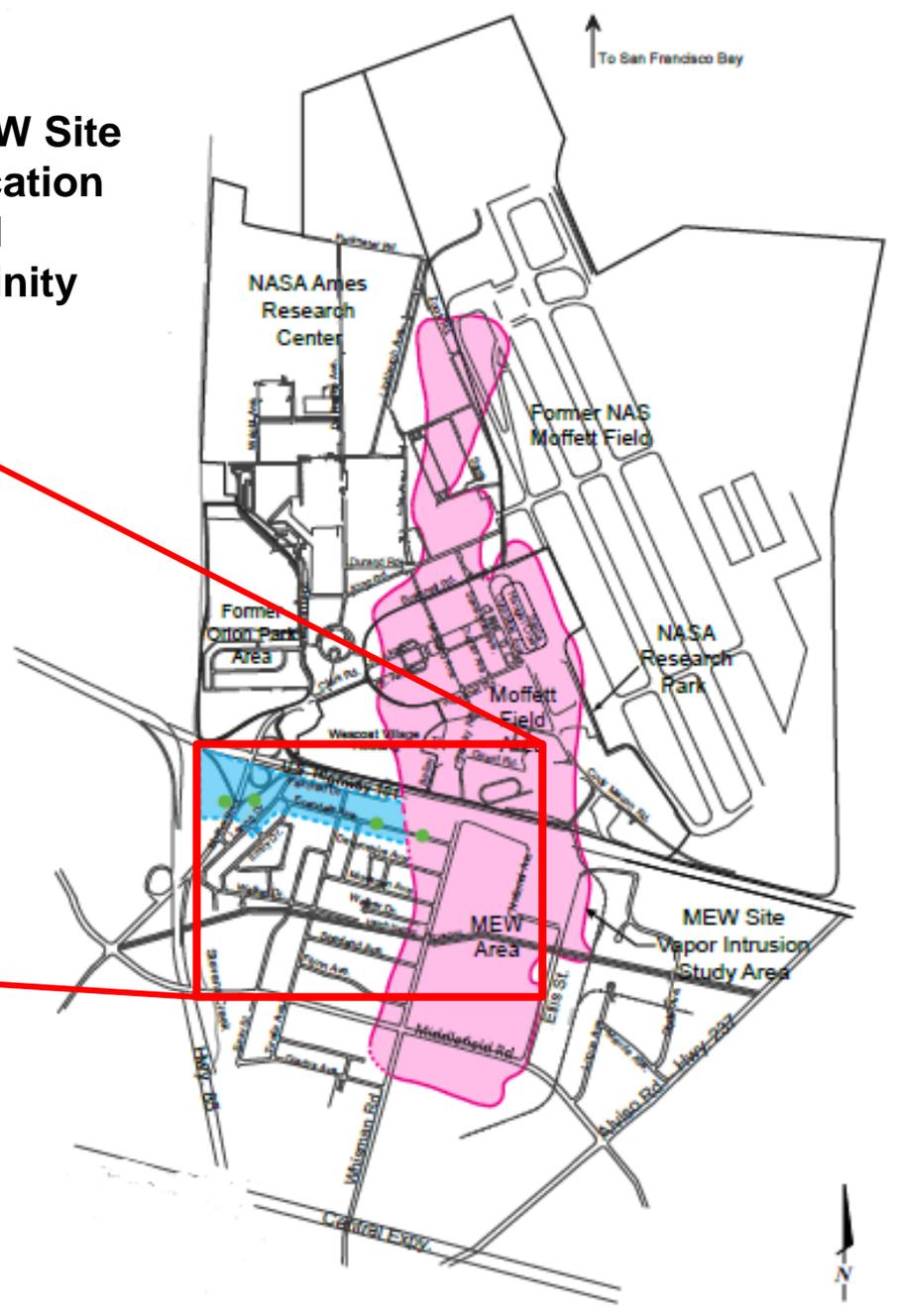
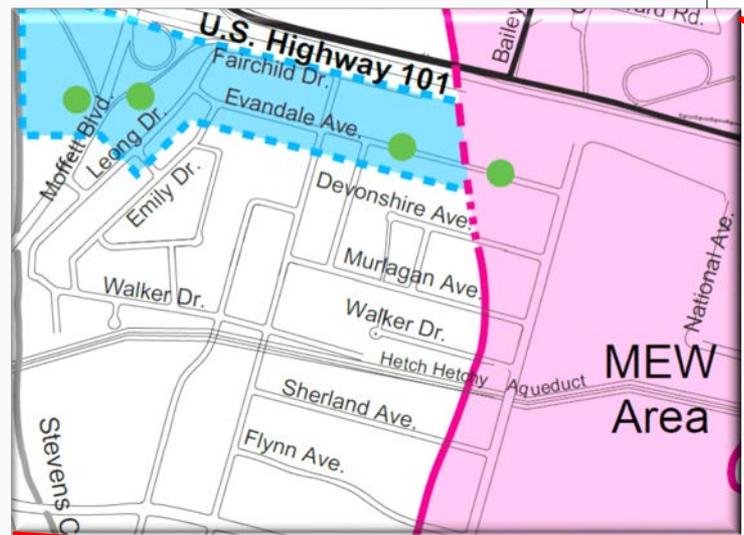
In February and April 2014, pilot tests using the chemical oxidant sodium permanganate were shown to be effective at significantly reducing a trichloroethene (TCE) groundwater hot spot area (see: "First Area" in Figure 1) located along Evandale Avenue. As a result, additional permanganate injections are scheduled for the weeks of August 11 and August 18. This work will include a final permanganate injection at the "First Area" location, and begin permanganate injection at a



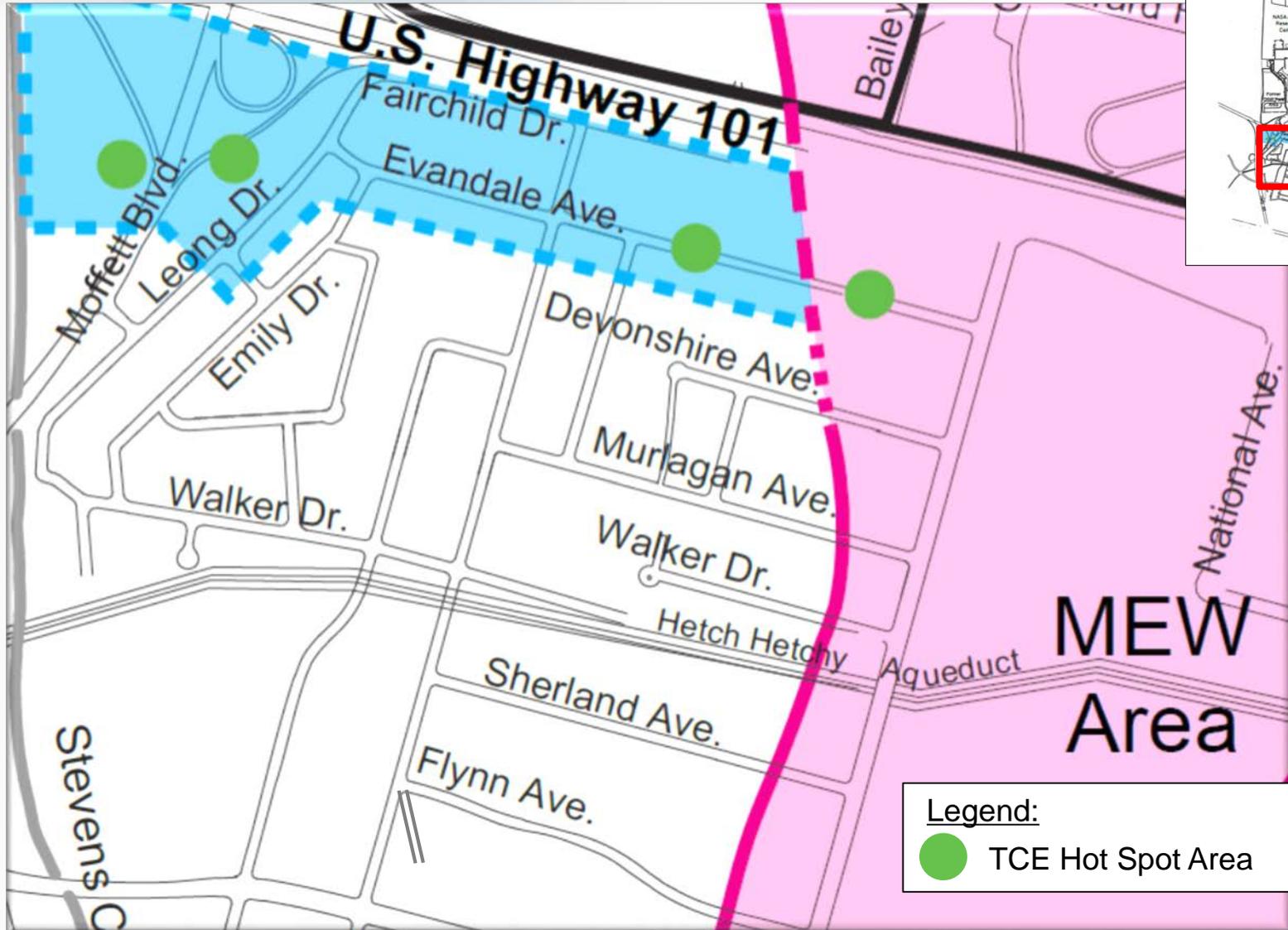
**Figure 1:** Pilot test location

# OU3 Vapor Intrusion Evaluation Area

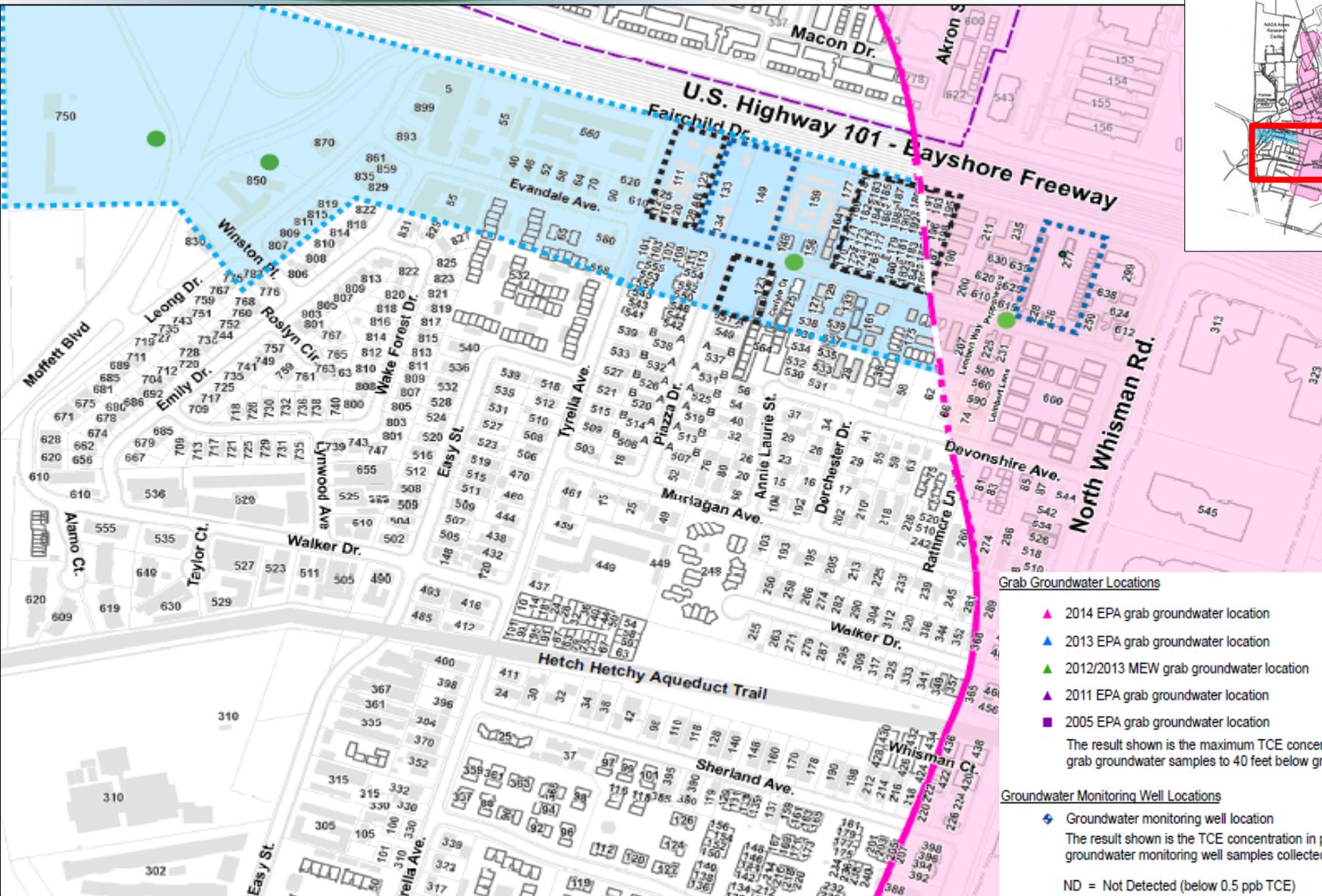
MEW Site Location and Vicinity



# TCE Hot Spot Areas and OU3 Vapor Intrusion Evaluation Area



# OU3 Vapor Intrusion Evaluation Area - 2015



### Grab Groundwater Locations

- ▲ 2014 EPA grab groundwater location
- ▲ 2013 EPA grab groundwater location
- ▲ 2012/2013 MEW grab groundwater location
- ▲ 2011 EPA grab groundwater location
- ▲ 2005 EPA grab groundwater location

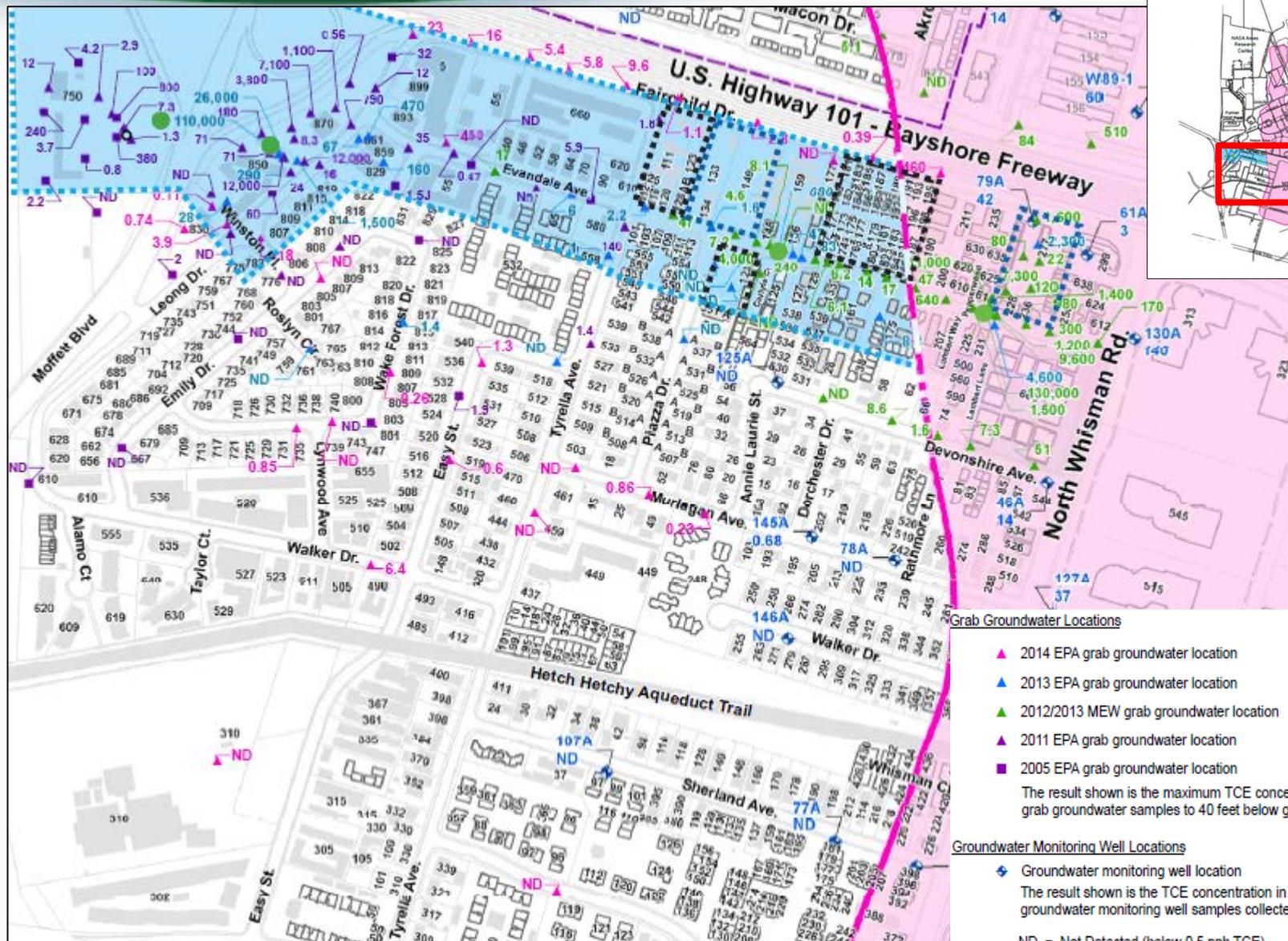
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### Groundwater Monitoring Well Locations

- ◆ Groundwater monitoring well location
- The result shown is the TCE concentration in ppb from groundwater monitoring well samples collected in 2013.

ND = Not Detected (below 0.5 ppb TCE)

# TCE Shallow Groundwater Results Residential Areas (2005 - 2014)



Grab Groundwater Locations

- ▲ 2014 EPA grab groundwater location
- ▲ 2013 EPA grab groundwater location
- ▲ 2012/2013 MEW grab groundwater location
- ▲ 2011 EPA grab groundwater location
- 2005 EPA grab groundwater location

The result shown is the maximum TCE concentration in ppb from grab groundwater samples to 40 feet below ground surface.

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- ◆ Groundwater monitoring well location
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# EPA Ongoing Work and Community Updates



- EPA Investigation is Ongoing
- EPA Meetings with Work Parties, Stakeholders, Community
- EPA will continue to update the community on the planned work and our findings.

Thank you for your interest and for attending!

# For More Information



Presentations, fact sheets, figures, technical plans and reports are posted on EPA's [MEW Superfund Area](#) website.

## EPA Points of Contact:

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**MEW Superfund Area**

**Vapor Intrusion, TCE Source Investigation, Groundwater Cleanup**

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### **Jackie Lane**

**Community Involvement Coordinator**

**415.972.3236**

[Lane.Jackie@epa.gov](mailto:Lane.Jackie@epa.gov)

### **See also, EPA Websites –**

[www.epa.gov/region9/mew](http://www.epa.gov/region9/mew)

[www.epa.gov/region9/moffettfield](http://www.epa.gov/region9/moffettfield)

[www.epa.gov/oswer/vaporintrusion](http://www.epa.gov/oswer/vaporintrusion)