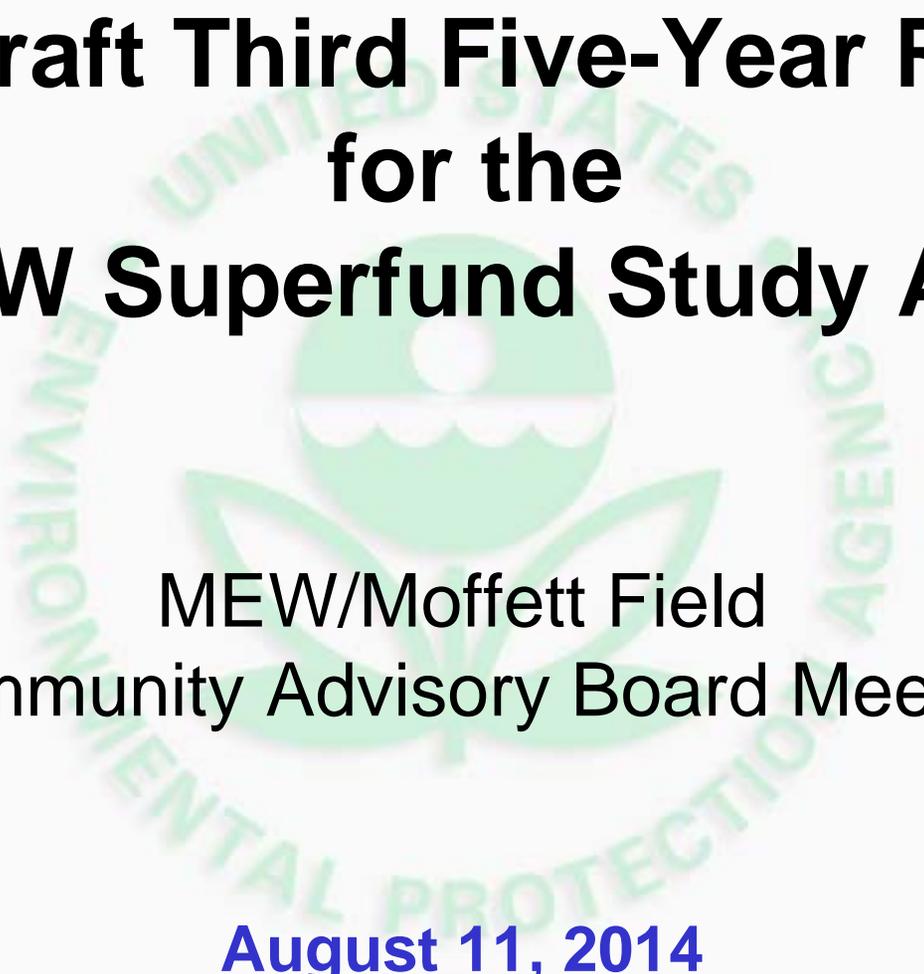


# **EPA Draft Third Five-Year Review for the MEW Superfund Study Area**

MEW/Moffett Field  
Community Advisory Board Meeting

**August 11, 2014**





# What is a Five-Year Review



- The purpose of a Five-Year Review is to evaluate the implementation and performance of the cleanup actions and to determine if the remedy is or will be protective of human health and the environment.
- This streamlined Five-Year Review provides:
  - a snapshot of the current status and technical assessment of the groundwater and vapor intrusion work over the past five years since the Second Five-Year Review in 2009
  - identifies issues, recommendations and follow-up actions
  - makes a protectiveness statement based on potential current and future exposure risk.

# Status of Issues Identified in the 2009 Five-Year Review



- Removal efficiency decreasing in groundwater remedy
- Hydraulic Containment Issues
- Slurry wall gradients not maintained
- Lack of Institutional Controls for Groundwater Remedy
- Indoor Air sampling
- Need Vapor Intrusion Remedy

# Status of 2009 Five-Year Review Issues



Issue	Status
<p>The mass removal efficiency is decreasing due to decreasing influent treatment system volatile organic compound (VOC) concentrations. Based on concentration trends, the existing remedy is not expected to achieve Site cleanup levels for many more decades.</p>	<p>In June 2012, EPA prepared a draft Feasibility Study (FS) to evaluate alternative technologies and optimization of the existing groundwater remedy to accelerate timeframe for meeting groundwater cleanup levels. Based on comments, EPA is currently conducting various optimization/pilot tests to support a final Feasibility Study.</p>
<p>Groundwater contamination plume is not fully captured by existing extraction wells.</p>	<p>45 grab groundwater sample locations to place 10 monitoring wells in the A and B1 aquifer zones to determine extent. The estimated TCE groundwater plume boundary was confirmed in most of the areas, with the exceptions along Evandale Avenue, the northern toe of the shallow A/A1 Zone and a portion of the B2 contamination plume on Moffett Field. Work is ongoing.</p>

# Status of 2009 Five-Year Review Issues



Issue	Status
Inward gradients within slurry walls and upward vertical gradients are not consistently maintained.	Well extraction rates have been modified, but gradients at three of the four slurry walls continue to not be maintained completely.
No Institutional Controls for groundwater remedy.	Several governmental restrictions are in place to prevent exposure to groundwater.

# Status of 2009 Five-Year Review Issues

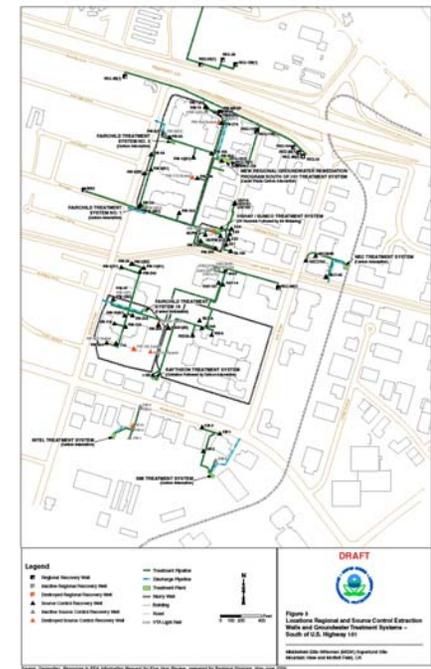
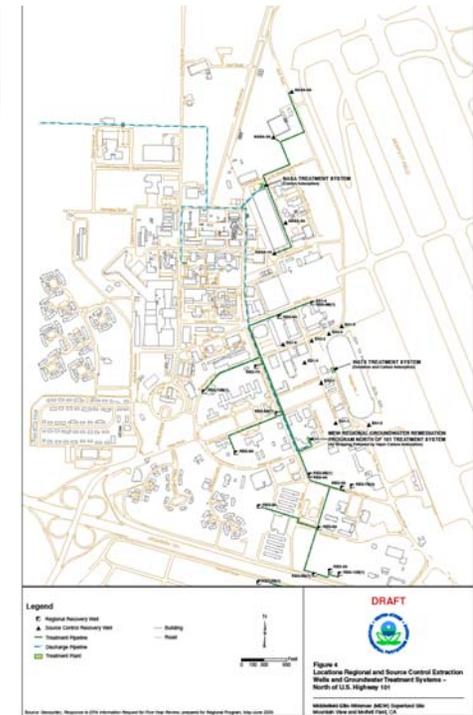


Issue	Status
<p>Indoor air sampling has not been performed at many of the buildings within the Vapor Intrusion Study Area</p>	<p>As of July 2014, 117 commercial/non-residential buildings and over 140 residences within the Vapor Intrusion Study Area have been sampled. All occupied, commercial/non-residential buildings within the Vapor Intrusion Study Area have had at least one sampling round completed</p>
<p>Existing remedy does not address the vapor intrusion pathway.</p>	<p>In August 2010, EPA signed a Record of Decision Amendment selecting the vapor intrusion remedy to address the subsurface vapor intrusion pathway at the MEW Site.</p>

# Work Progress over the Past Five Years

## Groundwater Pump and Treat

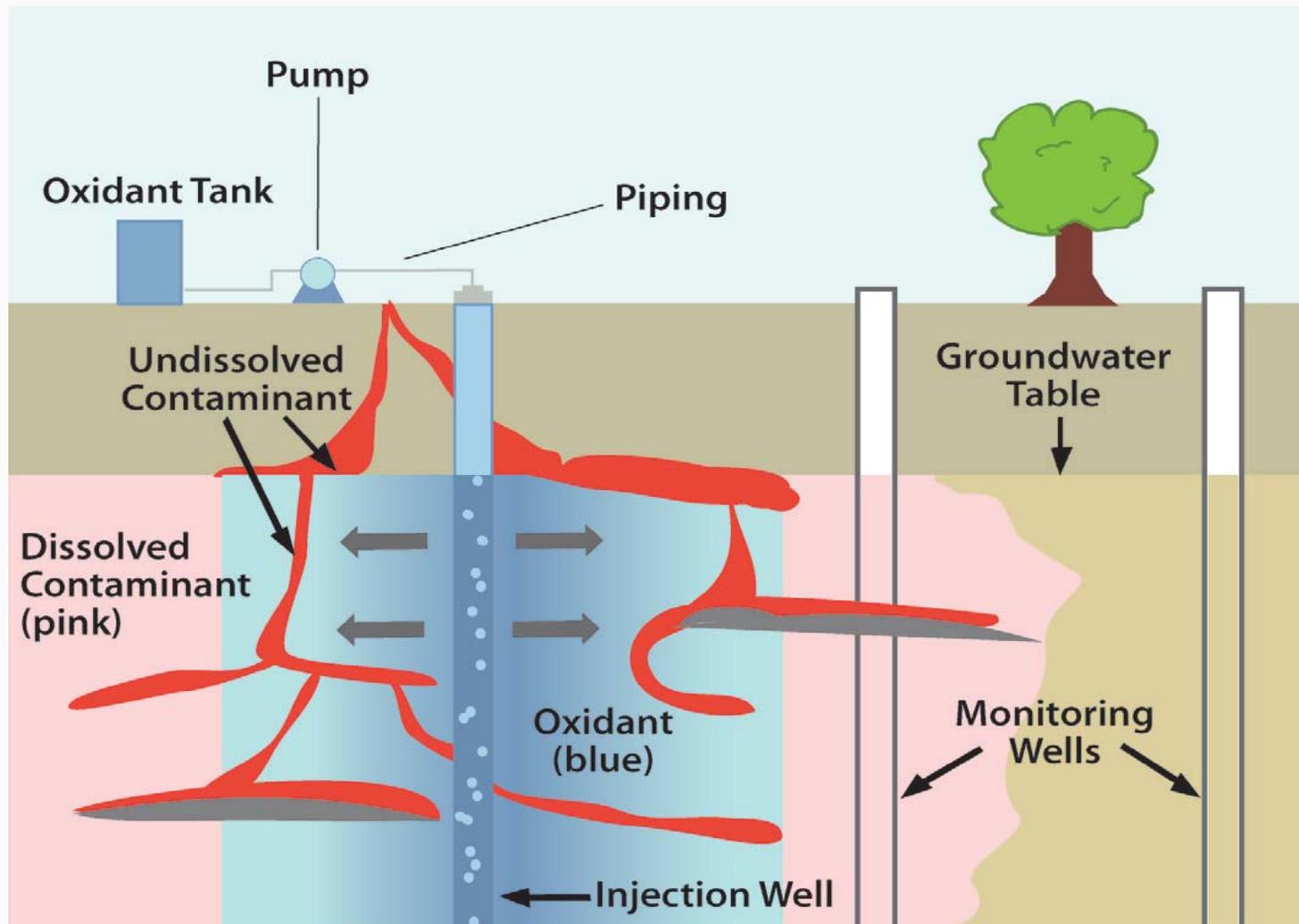
- Over 5.25 billion gallons contaminated groundwater cleaned up from 12 treatment systems and 90 extraction wells.
- Over 100,000 pounds of contaminants removed. Approximately 12,000 pounds of contaminants removed in past 5 years (2009 - 2013).



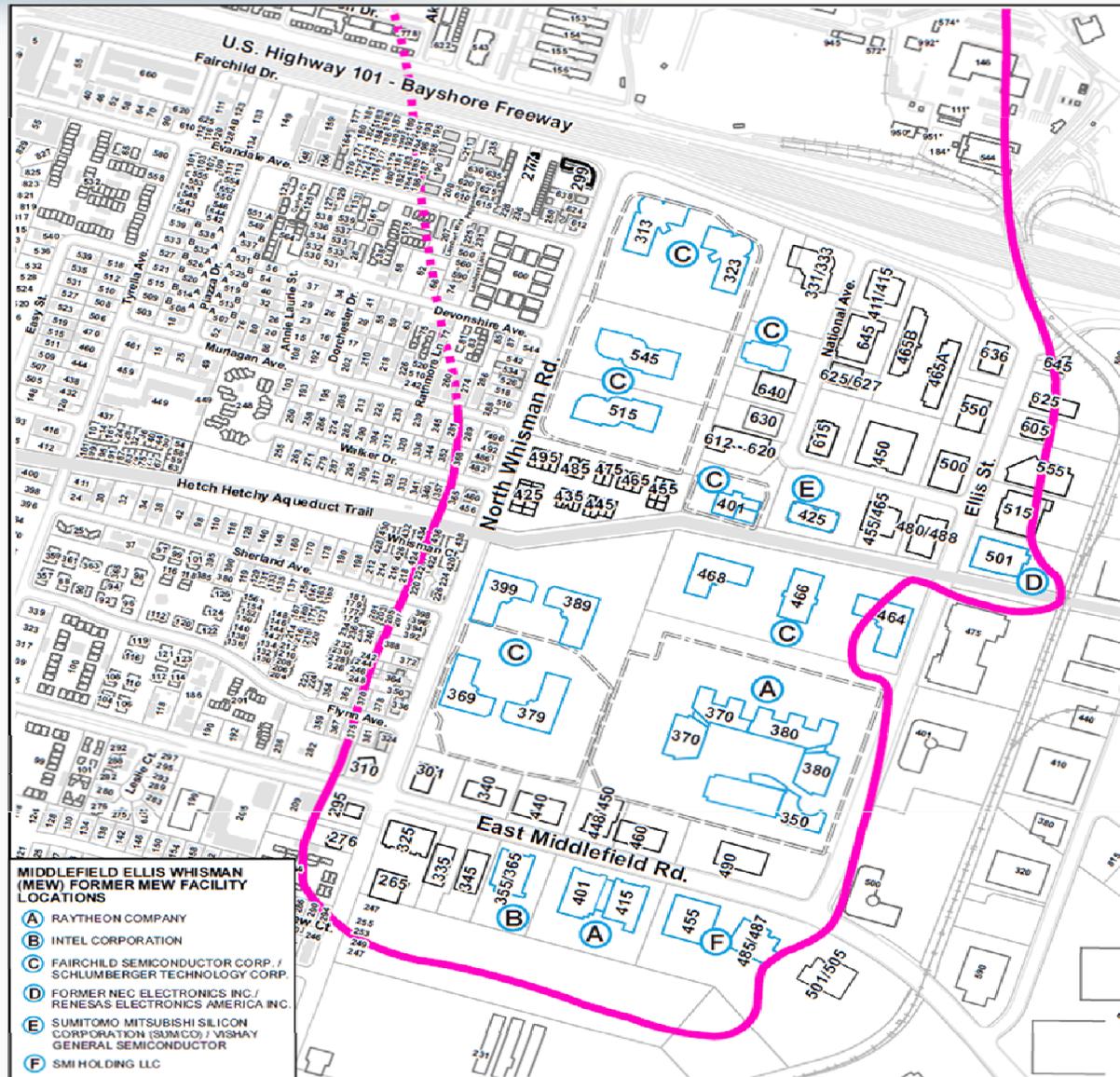
# Work Progress over the Past Five Years



- Optimization Efforts and Pilot Testing Progress



# MEW Facility- Specific Locations



# Pilot Test in TCE Hot Spot Area



## 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

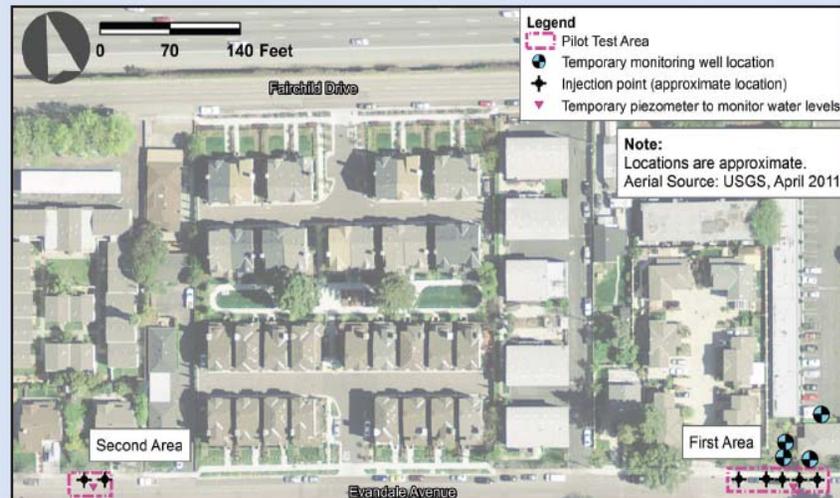
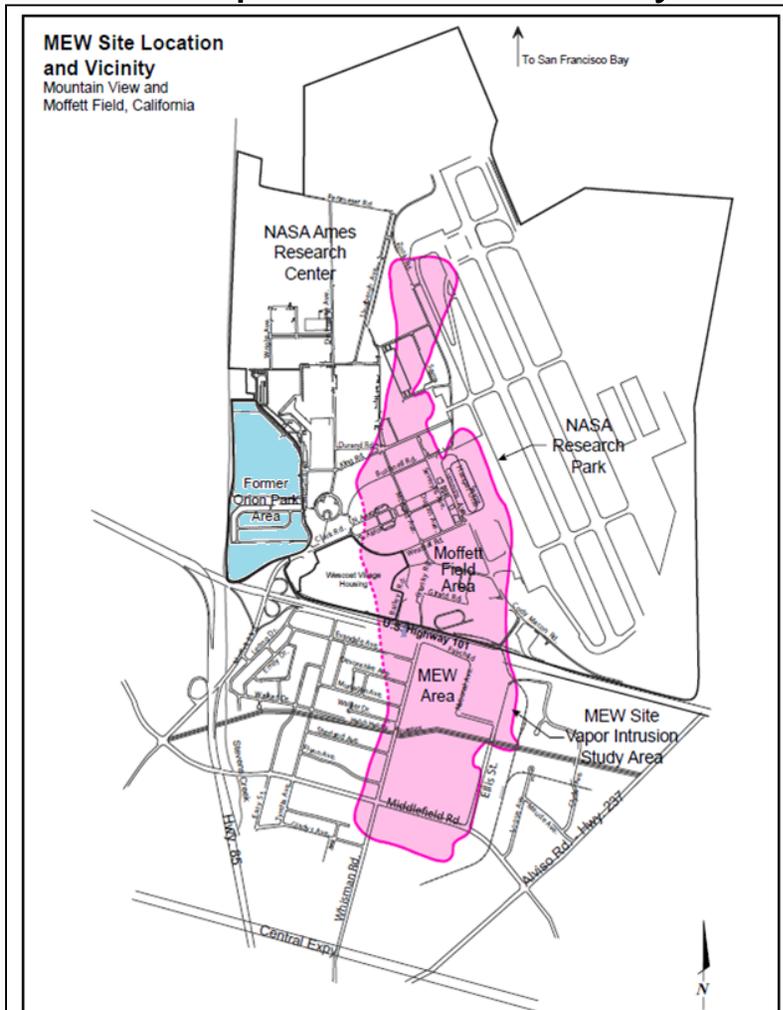


Figure 1: Pilot test location

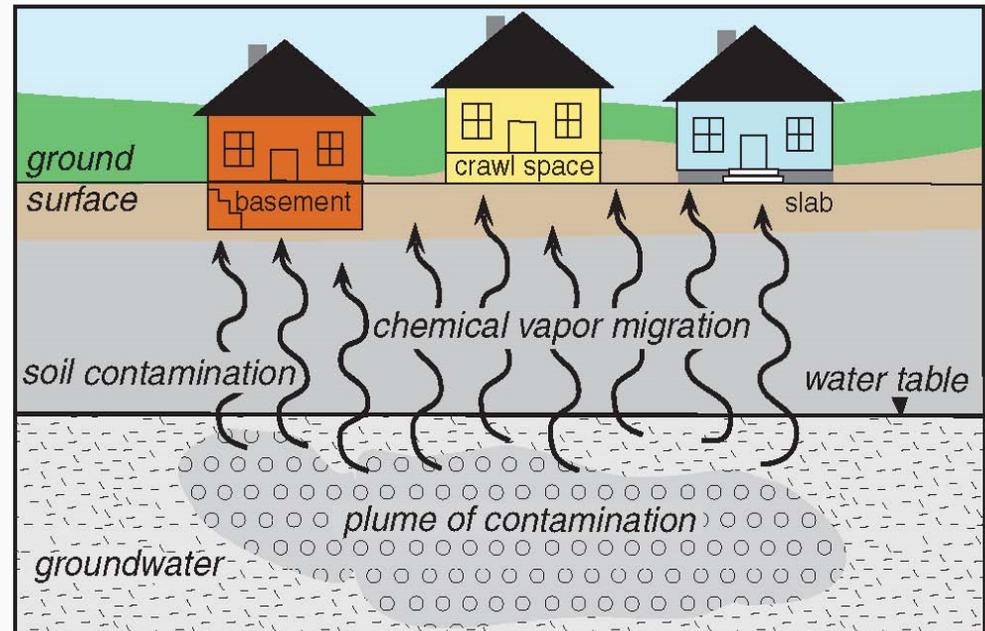
# Work Progress – Vapor Intrusion Pathway



## MEW Vapor Intrusion Study Area



## Schematic of Vapor Intrusion Pathway



# MEW/Moffett Field Vapor Intrusion Study Area



- Generally defined by the area where TCE concentrations in shallow groundwater are greater than 5 micrograms per liter ( $\mu\text{g/L}$ ), or parts per billion (ppb).
- In 2010, EPA selected a vapor intrusion remedy for the MEW Site, which applies to all existing and future residential and commercial buildings, within the MEW Vapor Intrusion Study Area.
- EPA has set TCE indoor air cleanup levels that are protective of both short-term and long-term health concerns.

# Vapor Intrusion Study Area



Slurry Wall



Ongoing Investigation (2013-2014) to delineate the 5 parts per billion (ppb) TCE plume boundary



Vapor Intrusion Study Area (>5 ppb TCE plume)



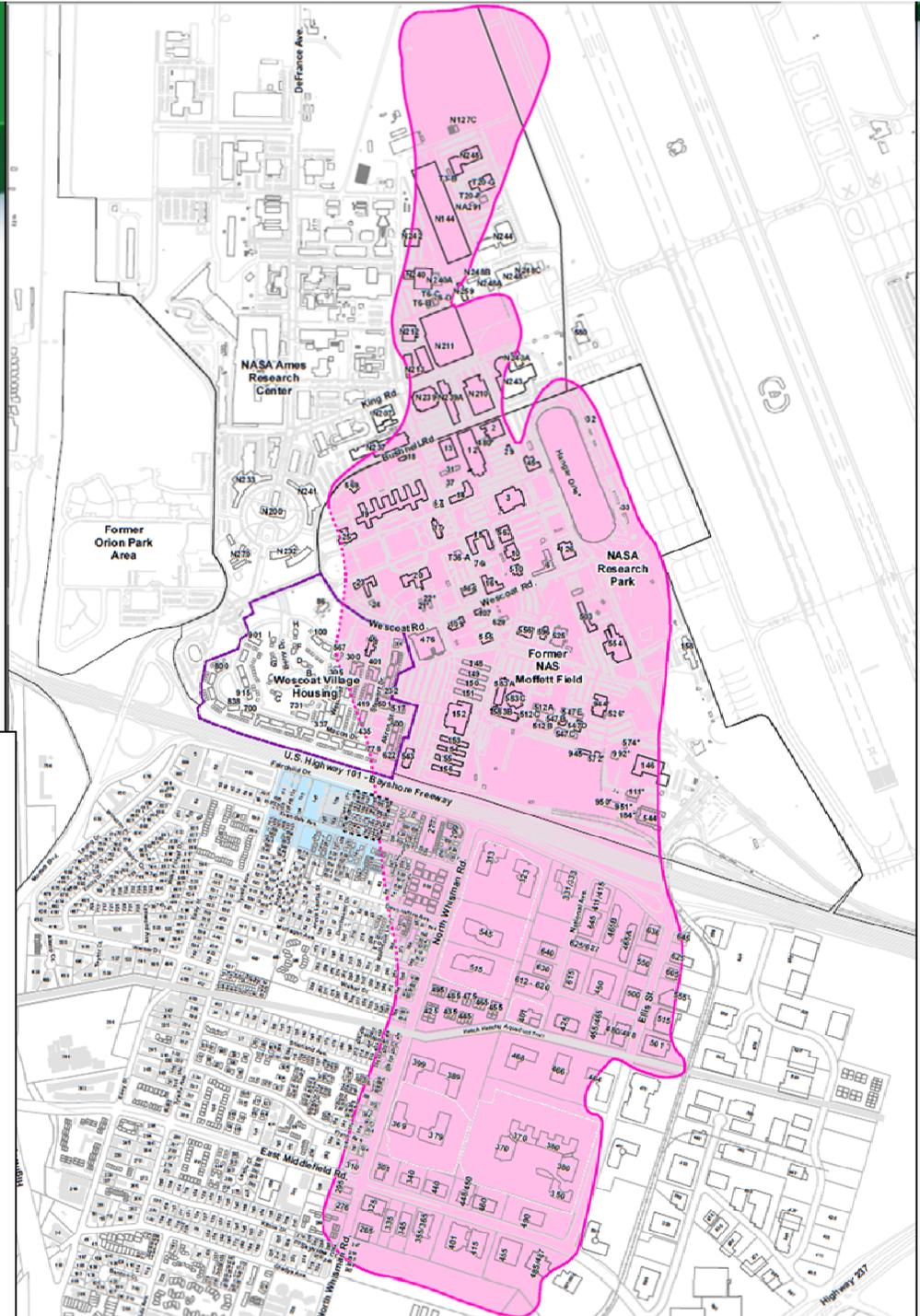
Residential Indoor Air Sampling Area



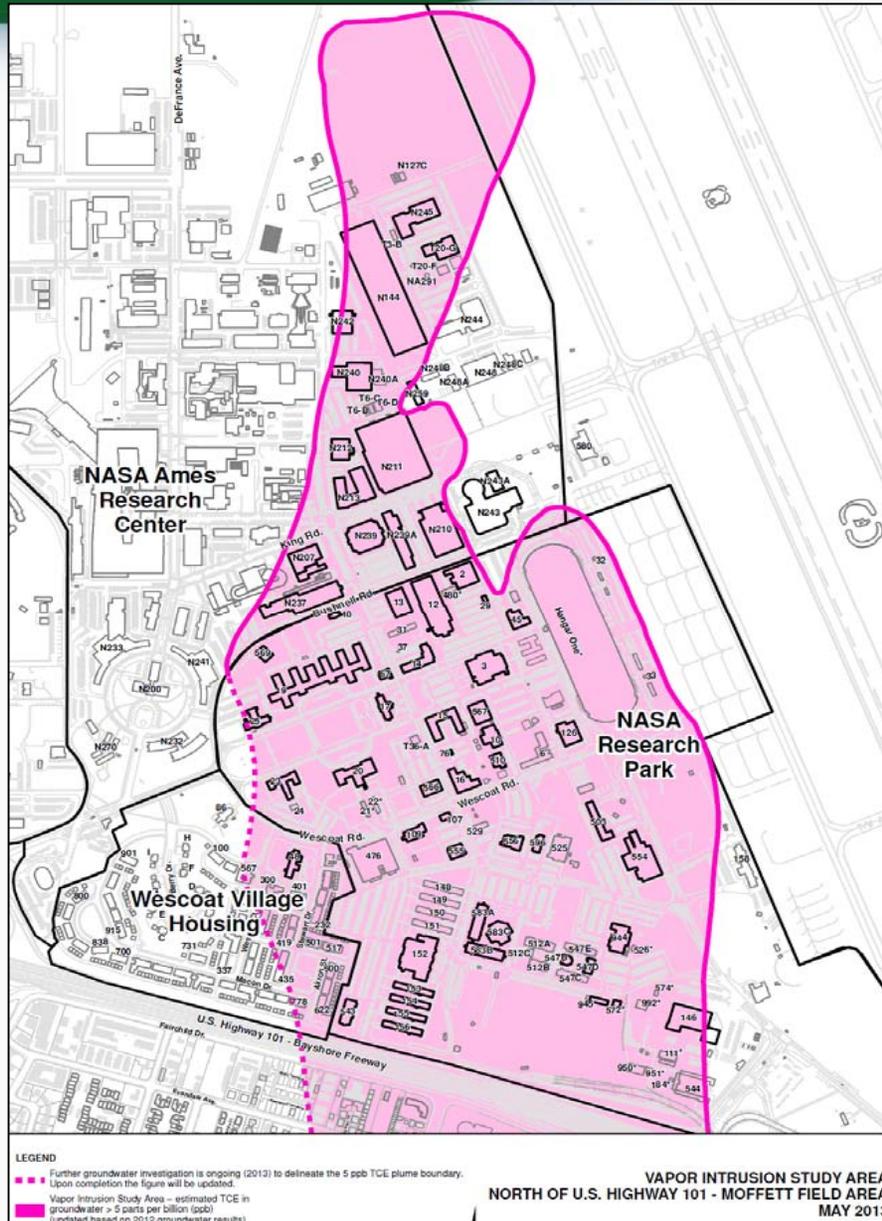
Classics homes built with vapor intrusion control system



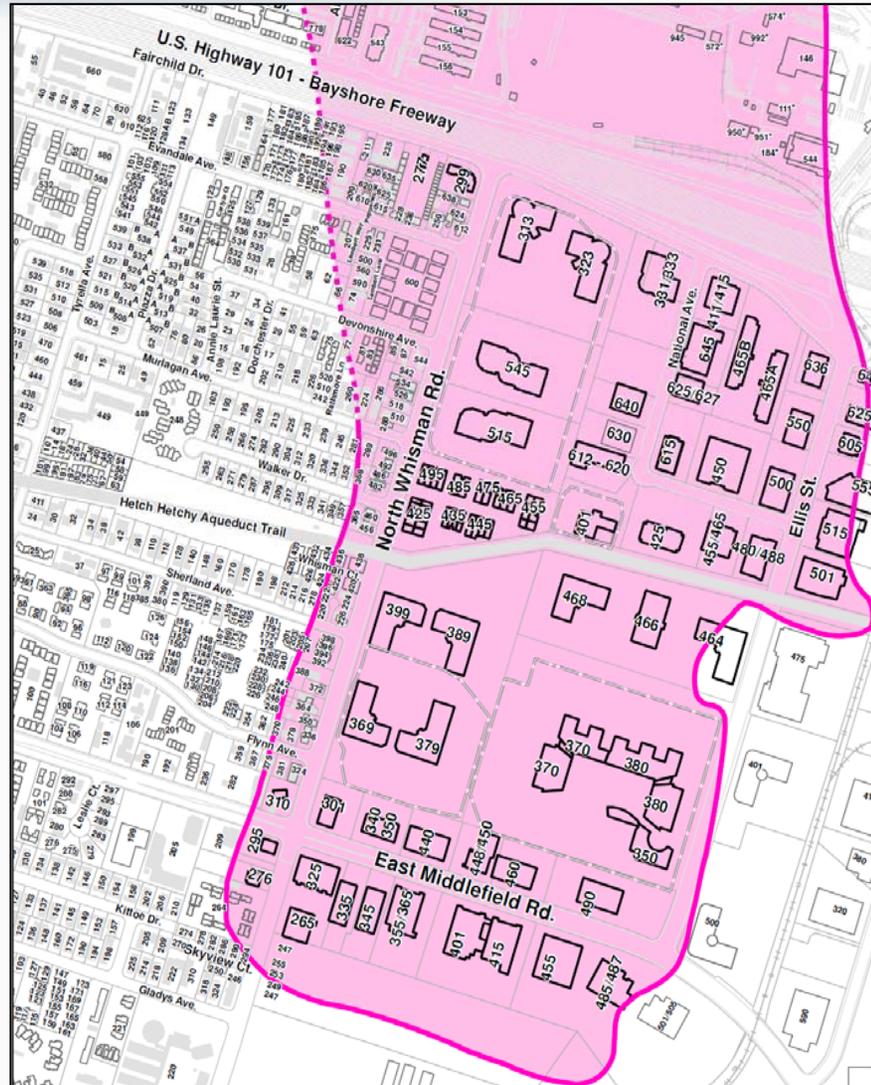
Wescoat Village Residential Area (2006 homes built with vapor intrusion control system)



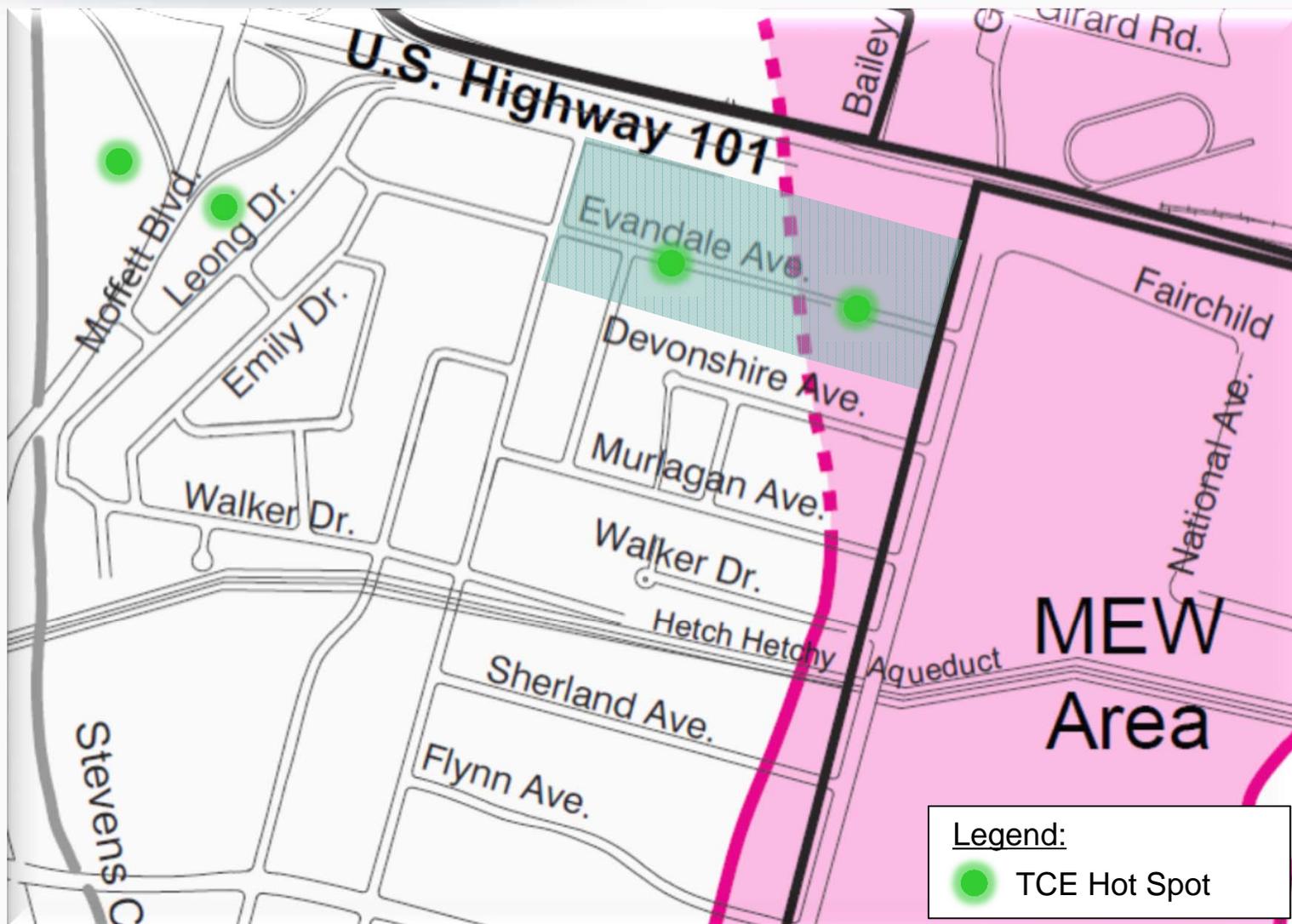
# Vapor Intrusion Study Area – Moffett Field Area



# Vapor Intrusion Study Area – MEW Area



# TCE Hot Spot Area and Residential Air Sampling Area



# Residential Indoor Air Sampling Results



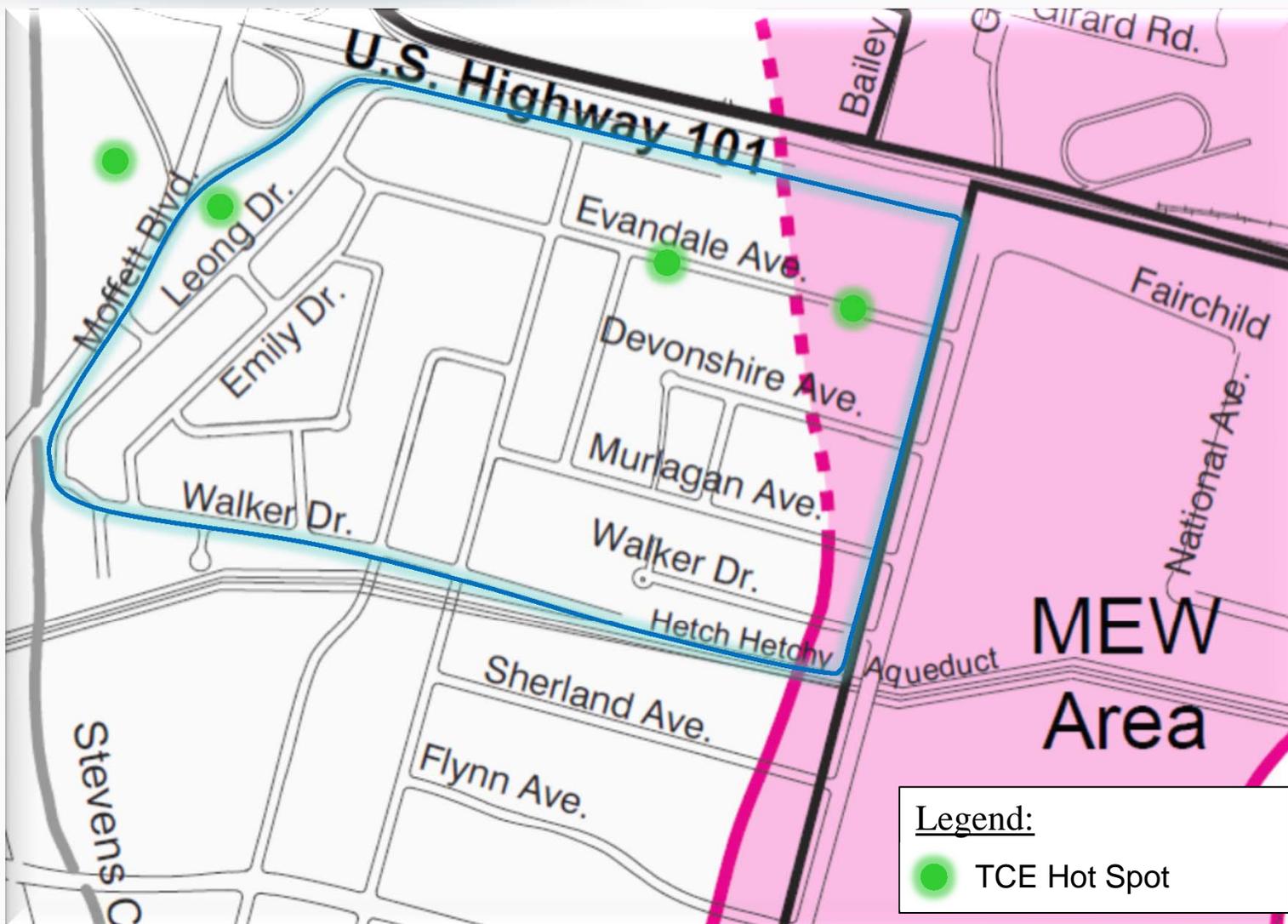
- EPA sampled over 90 residences in expanded residential areas, and over 140 residences
- No TCE was detected in most residences sampled.
- TCE was detected in some residences, but below indoor air cleanup levels. These homes were re-sampled to confirm TCE below indoor air cleanup levels.
- TCE was found in only two residences exceeding EPA's TCE indoor air cleanup level of 1 microgram per cubic meter.
- Vapor intrusion control systems were installed to mitigate TCE indoor air concentrations to below indoor air cleanup levels.

# Sampling Summary and 2014 Investigation Activities



- Results from all indoor air sampling to date showed vapor intrusion not a problem in most residences sampled.
- Based on groundwater and air sampling to date, areas that overlie lower TCE groundwater concentrations are considered as low vapor intrusion risk.
- EPA conducting potential source investigation of TCE Hot Spot Areas and conducted additional groundwater investigation to fill data gaps on Fairchild Drive.

# 2014 Residential Study Area



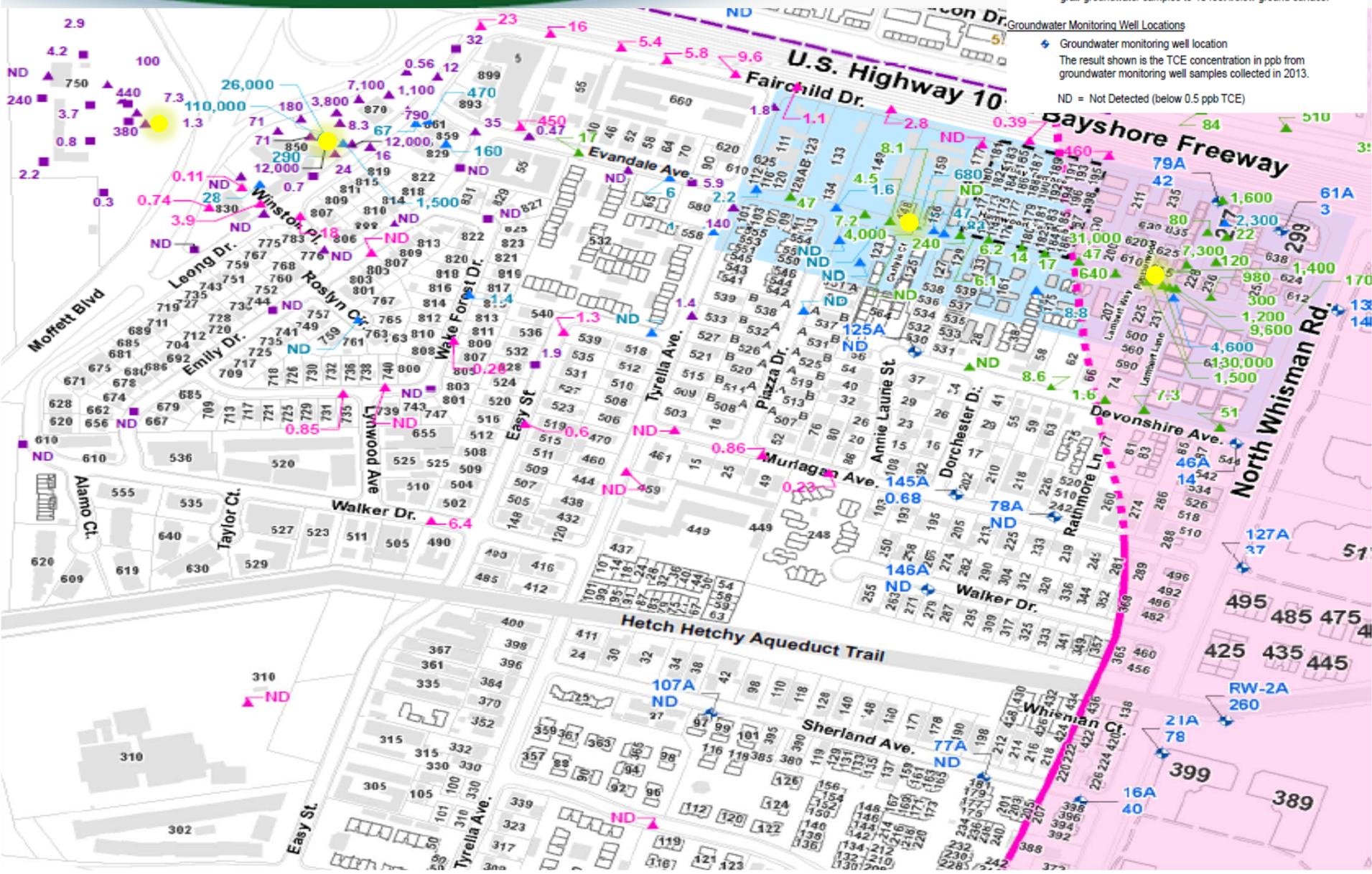
# TCE Shallow Groundwater Results Residential Areas (2005 - 2014)

## Grab Groundwater Locations

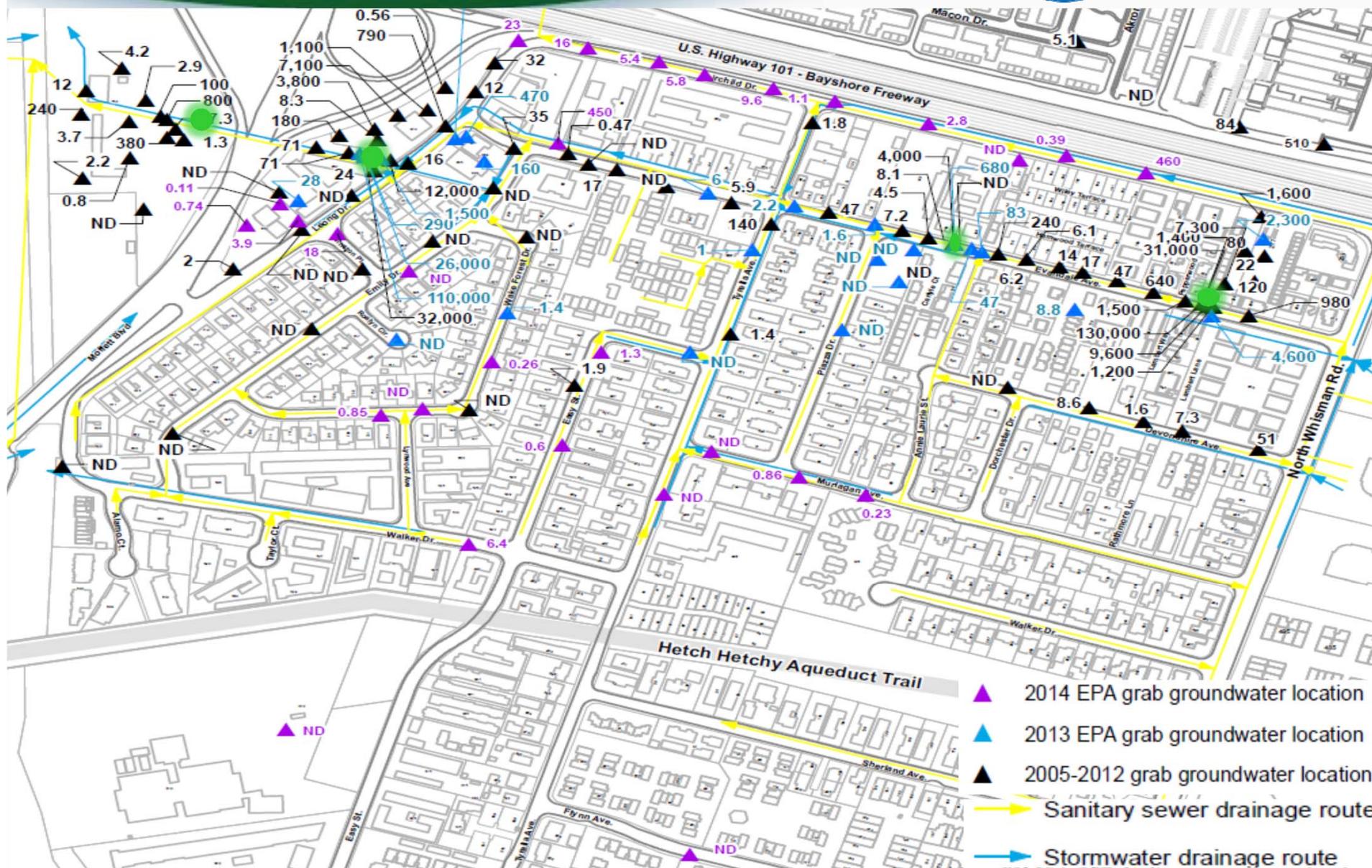
- ▲ 2014 EPA grab groundwater location
  - ▲ 2013 EPA grab groundwater location
  - ▲ 2012/2013 MEW grab groundwater location
  - ▲ 2011 EPA grab groundwater location
  - 2005 EPA grab groundwater location
- The result shown is the maximum TCE concentration in ppb from grab groundwater samples to 40 feet below ground surface.

## Groundwater Monitoring Well Locations

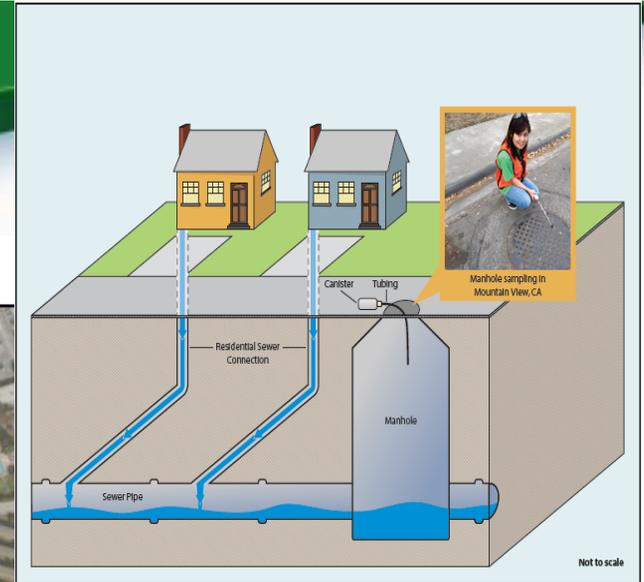
- ◆ Groundwater monitoring well location
- The result shown is the TCE concentration in ppb from groundwater monitoring well samples collected in 2013.
- ND = Not Detected (below 0.5 ppb TCE)



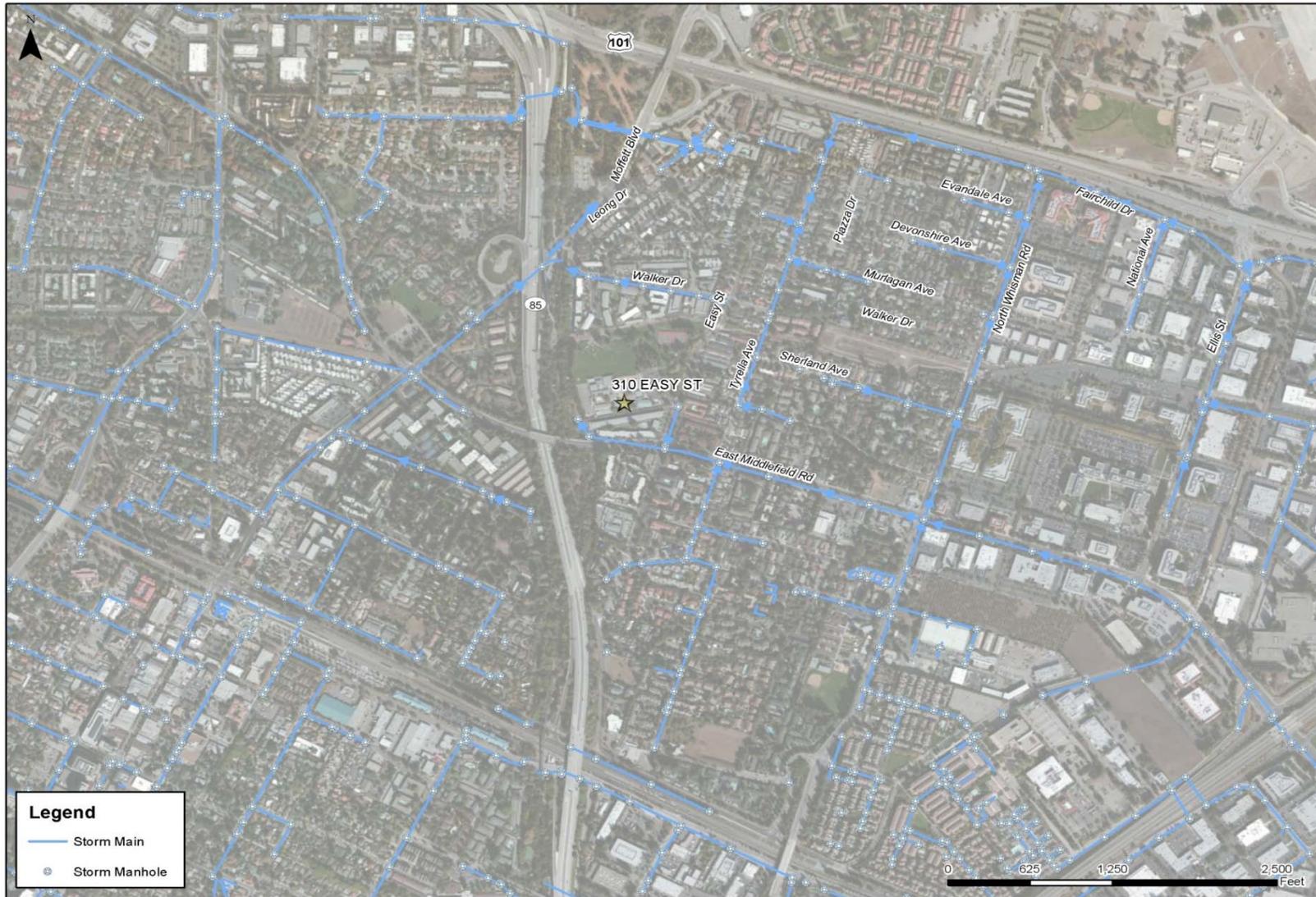
# TCE Shallow Grab Groundwater Results (2005 -2014)



# Sewer Flow Direction Map



# Storm Drainage Flow



# Draft Third Five-Year Review



## Issues, Recommendations and Follow-Up Actions

Issue	Recommendation/Follow-Up Actions
New TCE groundwater hot spot areas identified in residential area.	Determine the source of TCE hot spot areas and extent of TCE contamination in residential area. If other TCE hot spots are found, evaluate and address contamination by treatment or hydraulic control
Need assessment of how the current vapor intrusion remedy implementation procedures take into account the impact of the near-term TCE risks	Assess the impact of the near-term TCE risks on current MEW vapor intrusion remedy operational framework.

# Issues, Recommendations, and Follow-up Actions



Issue	Recommendations/Follow-up Actions
<p>The extent and capture of TCE contamination in the B1 aquifer zone and downgradient of the TCE hotspot areas in the shallow A-zone in the residential area on the west has not been fully defined and addressed.</p>	<p>Develop and implement cleanup approach to address contamination in the A and B1 zone areas in the residential area.</p>
<p>Inward gradients within slurry walls and upward vertical gradients are not consistently maintained.</p>	<p>Evaluate and implement other alternative cleanup strategies inside the slurry walls that do not require inward and upward gradients to control source contamination.</p>
<p>Declining efficiency of groundwater remedy will not achieve groundwater cleanup levels for many decades.</p>	<p>Implement optimization pilot tests at the facility-specific areas and based on results, develop and propose a new groundwater remedy plan.</p>

# Issues, Recommendations, and Follow-up Actions



Issue	Recommendation/Follow-Up Action
No Institutional Controls selected for the groundwater remedy.	Include groundwater institutional controls when final groundwater remedy is selected.

# Protectiveness Statement



The vapor intrusion remedy selected in the 2010 ROD Amendment for the MEW Site is expected to be protective of human health when fully implemented. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks at the MEW Site. To be protective in the long-term, the vapor intrusion remedy implementation procedures need to be assessed to take into account the impact of the near-term TCE risks on current operational framework.

# Protectiveness Statement



The groundwater remedy at the MEW Site is currently protective of human health and the environment because exposure to groundwater is being controlled. In order to be protective in the long term, the following actions need to be completed:

- Determine the source of the TCE hot spot areas and extent of TCE contamination in the A and B1 aquifer zones;
- Evaluate and implement alternative cleanup strategies inside the slurry walls that do not necessarily require inward and upward gradients to control source area contamination;
- Implement the current optimization pilot tests at the source areas and TCE hot spot areas; and
- Based on the information collected, prepare a revised Groundwater Feasibility Study and Proposed Plan, and select a final groundwater remedy in a ROD Amendment.

# Community Involvement



- EPA welcomes and encourages community input on the cleanup work being conducted at the MEW Superfund Study Area at any time. EPA will consider all public input provided on EPA's Draft Third Five-Year Review Report through Monday, August 25, 2014.
- EPA conducts community involvement activities throughout the process through updates and meetings with the Moffett Field Restoration Advisory Board, MEW/Moffett Community Advisory Board, City of Mountain View, Property Owners, Residents/Tenants, Community Members

# For More Information



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**EPA Websites –  
For More Information**

[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)