

# Maryland Square PCE Site

***Community Meeting***  
***to discuss the***  
***Proposed Plan for Cleanup of Groundwater***

***November 19, 2014***

- Nevada Division of Environmental Protection

# Maryland Square PCE Site: *Proposed Plan for Cleanup of Groundwater*

## Meeting Agenda

Introduction: *Jo Ann Kittrell - NDEP PIO*

Spanish Language: *Alex Lanza*

Site Summary: *Mary A. Siders, Ph.D.*

Remedy Selection Process: *Jo Ann Kittrell*

Evaluation of Alternatives: *Scott Smale*

Questions on Presentations: *Jo Ann Kittrell*

Comments on Proposed Plan: *Jo Ann Kittrell*

**Nevada Division of Environmental Protection**  
*Community Meeting, November 19, 2014*

## ***Información en español:***

**Si necesita asistencia, explicaciones o más información en español – por favor contacte a:**

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***Community Meeting, November 19, 2014***



State of Nevada  
Nevada Division of Environmental Protection  
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901 So. Stewart Street, Suite 4001, Carson City NV 89701-5249

# Maryland Square PCE Site: Site Summary

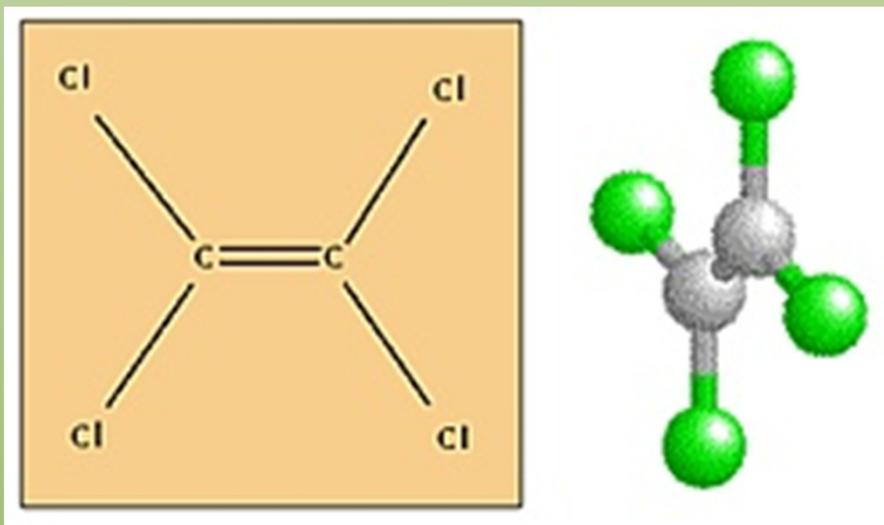
*Mary A. Siders, Ph.D.*

- Nevada Division of Environmental Protection

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# What is PCE?

- ❖ PCE is a manmade solvent and degreaser used by dry cleaners to clean fabrics
- ❖ Used in common consumer products such as glues, shoe polish, and spot cleaners



*Also known as:*

- Perchloroethylene
- Perchloroethene
- Perc
- Tetrachloroethylene
- Tetrachloroethene

# Why is PCE a health concern?

The **National Toxicology Program** states that:

- ❖ Long-term exposure to PCE can cause leukemia and other **cancers**
- ❖ Long-term exposure may also damage the **central nervous system**, liver, and kidneys
- ❖ Short-term exposure can cause dizziness, sleepiness, and irritation

<http://ntp.niehs.nih.gov/pubhealth/roc/roc13/index.html>

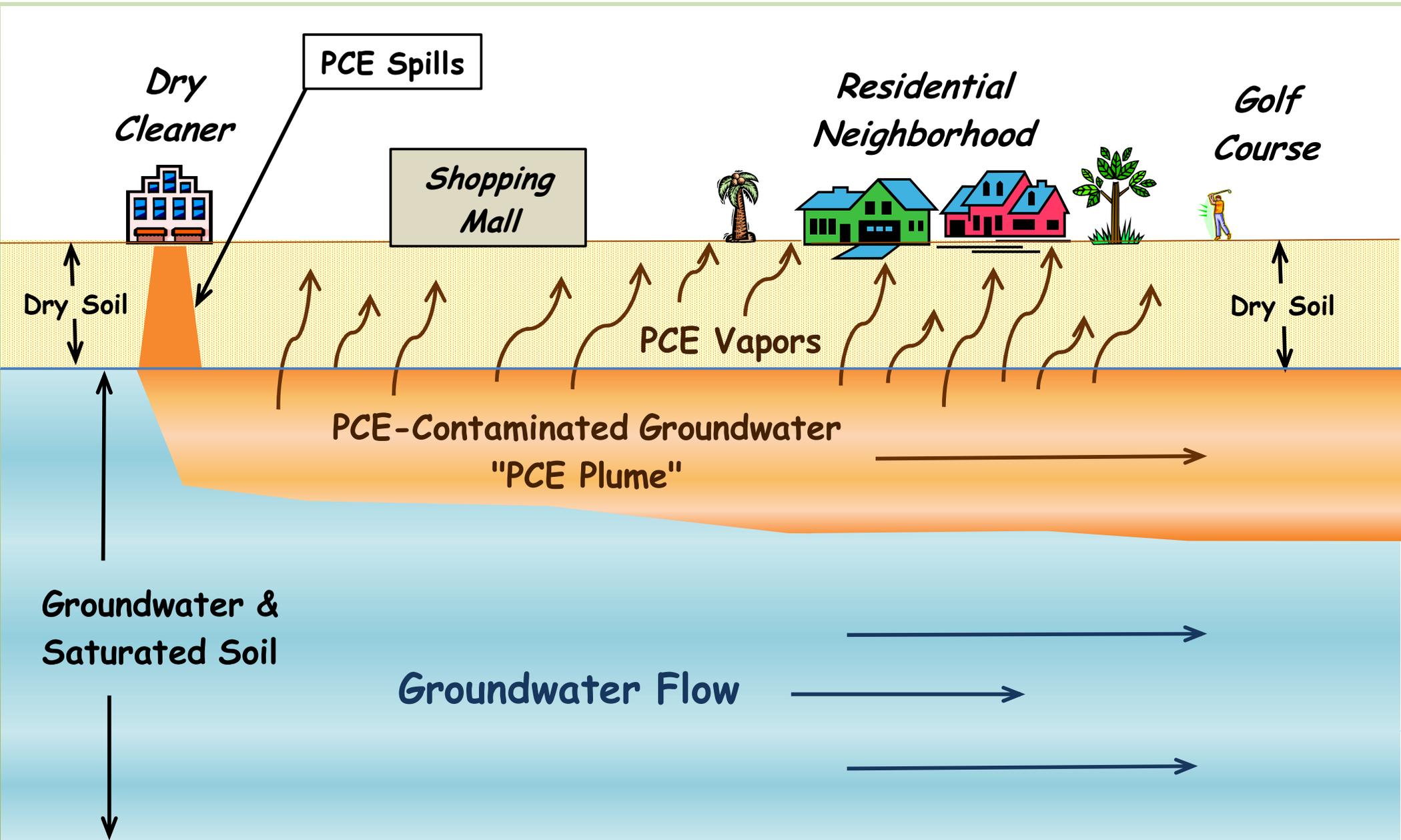
*What is the source of PCE at the Maryland Square site?*



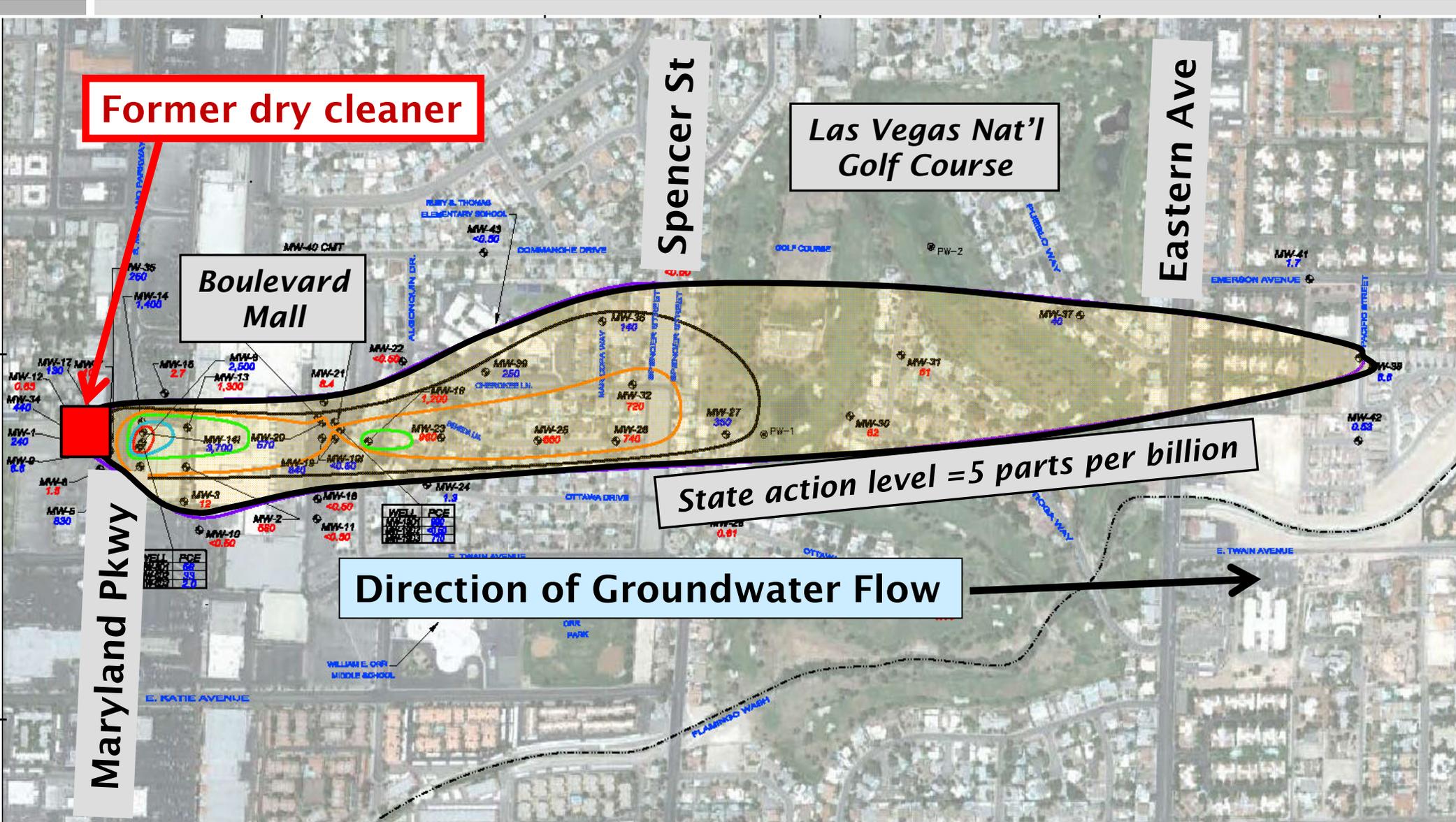
Former Maryland Square Shopping Center, 1969–2006  
Al Phillips the Cleaner on-site dry cleaning 1969–2000

# Conceptual Site Model:

## PCE Spilled at Dry Cleaner Migrated into Groundwater



# Maryland Square PCE Site: PCE “plume” in shallow groundwater



Please note: Your drinking water is NOT affected

# How long will the PCE plume last?

## *Chemical characteristics of PCE*

- ❖ PCE is only “**slightly soluble**” in water, so much of the mass gets “stored” in subsurface soils
- ❖ PCE does **not** degrade under natural conditions found in shallow groundwater in the Vegas Valley
- ❖ PCE is **volatile** and PCE vapors enter into soil gas in unsaturated soils

It is the **persistence of PCE** in the environment that necessitates active clean up of groundwater

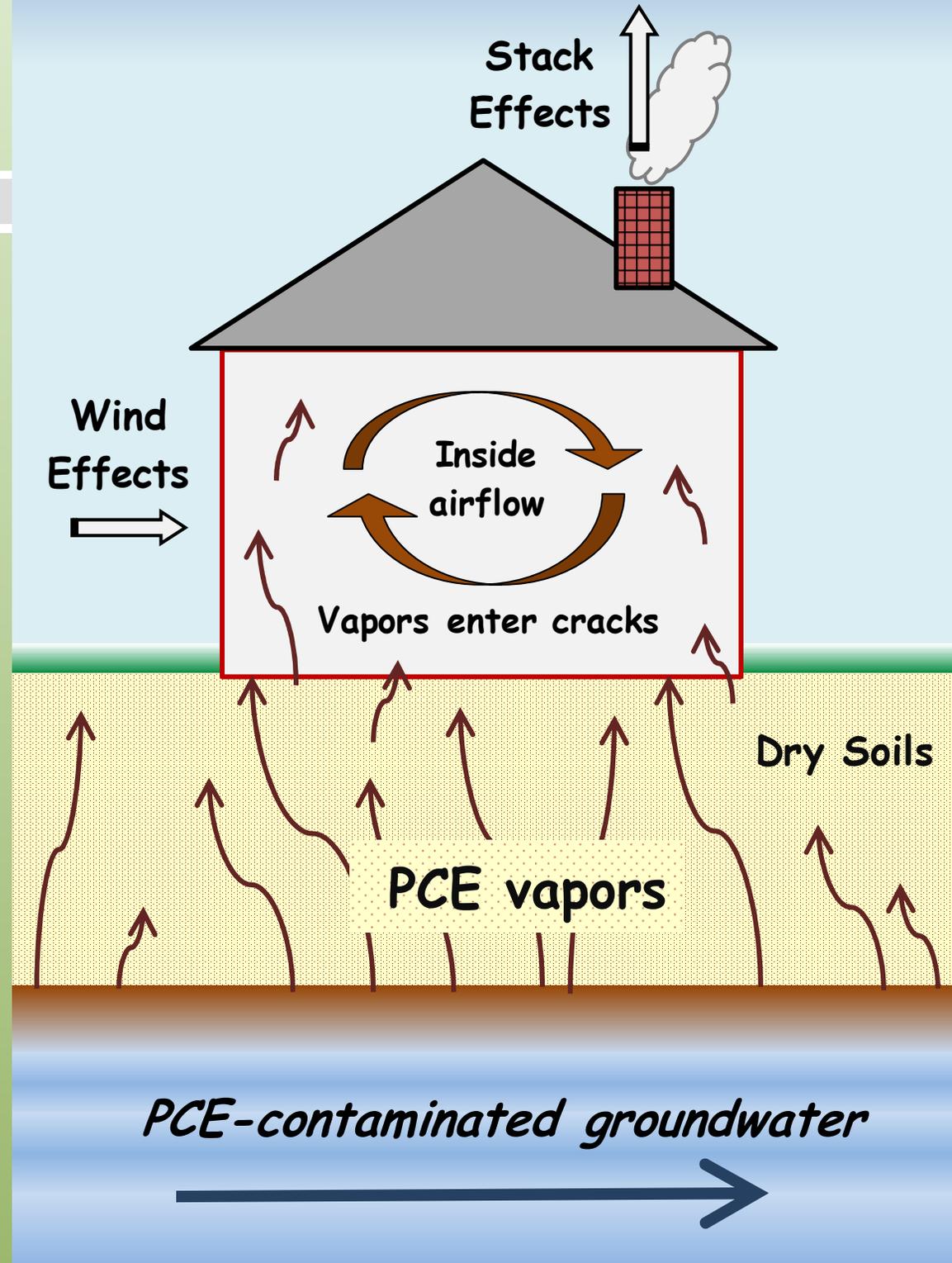
# “Vapor Intrusion”

PCE evaporates from groundwater

PCE vapors travel upward through soil

The PCE vapors can enter into homes and contaminate indoor air

Exposure occurs by breathing contaminated indoor air



# Maryland Square PCE Site: PCE “plume” in shallow groundwater



Please note: Your drinking water is NOT affected

## *Since discovery of PCE plume, the NDEP has done the following:*

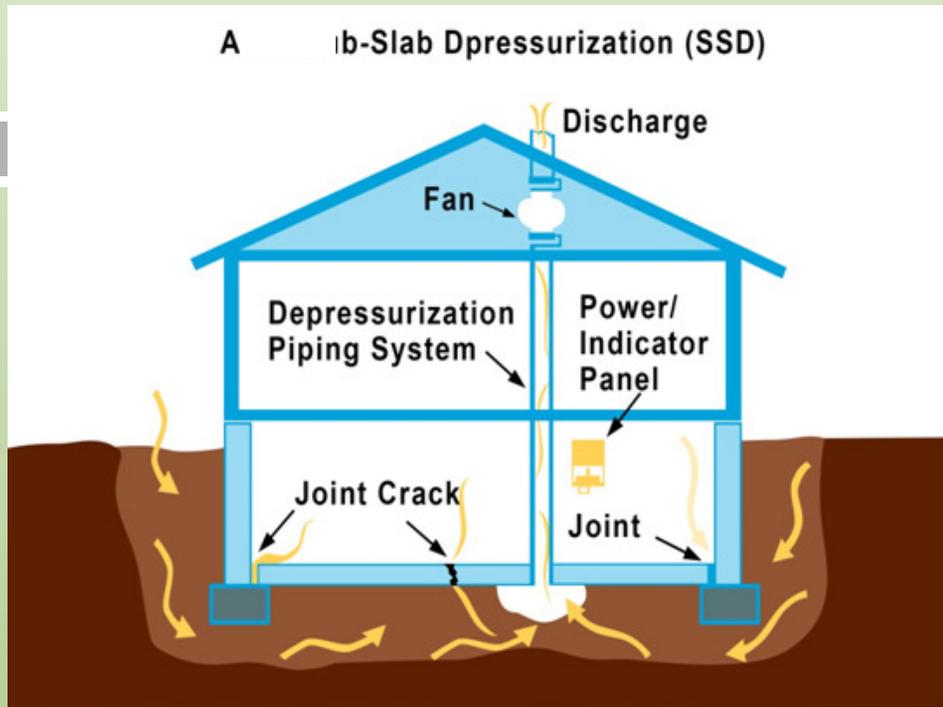
- 1) Identified potentially affected homes & offered sampling of indoor air (no cost to the homeowner)
- 2) Installed mitigation systems in homes where PCE concentrations exceed the interim-action level (installed at no cost to homeowner)
- 3) Cleaned up contaminated soil at the site of the former dry cleaner (4,500 tons of soil excavated)
- 4) Determined extent of the PCE plume (6,000 ft long)

# Sampled Indoor Air in Homes & Schools



Please note: Your drinking water is NOT affected

# Mitigated Homes for PCE in Indoor Air



## Home Mitigation Systems

Developed to mitigate intrusion of naturally occurring radon gas

Systems can reduce vapor levels by as much as 99%

Installed at no charge to qualifying homeowners

Voluntary (& free) annual testing of indoor air for homes in the area of concern



# *Cleaned up Source-Area Soil*

**Removal of PCE-contaminated soils at former dry cleaner**



**4,500 tons of soil excavated**

*Site of former dry cleaner after excavation & re-grading*



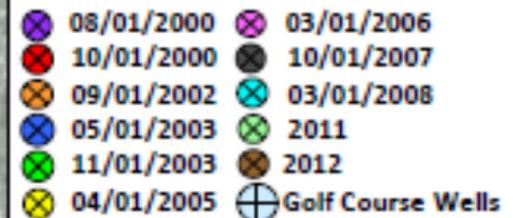
*View looking east across S. Maryland Pkwy toward Mall*

# Determined Extent of PCE Plume

This plume longer than other known PCE plumes in Vegas

History of Monitoring Well Installation  
Maryland Square PCE Site – Las Vegas, NV

Well Installation Dates



Las Vegas National  
Golf Course

Irrigation wells  
PW-1 & PW-2

Delineating a plume is a step-wise process

N

## *Additional work completed:*

- ❖ Secured funding for groundwater cleanup
- ❖ Conducted additional characterization of soil and groundwater
- ❖ Performed field testing of cleanup technologies for groundwater
- ❖ Evaluated possible remedies and prepared the *Proposed Plan* for groundwater cleanup

# *Case Officer - Contact Information*

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***[http://ndep.nv.gov/pce/maryland\\_square.htm](http://ndep.nv.gov/pce/maryland_square.htm)***



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# Maryland Square PCE Site: Remedy Selection Process

*Jo Ann Kittrell*

- Public Information Officer
- Nevada Division of Environmental Protection

*Community Meeting, November 19, 2014*

# Remedy Selection Process

- ❖ As part of remedy selection process, the NDEP must develop several **cleanup alternatives** for comparison
- ❖ The NDEP must identify a **preferred alternative**
- ❖ The **alternatives** must include—as a baseline for comparison—an alternative of “**no further action**” (the “do nothing” option)

# Remedy Selection Process

- ❖ Cleanup alternatives **MUST** meet the minimum standard (“threshold criterion”) of **protection of human health**
- ❖ Alternatives that do *not* meet this threshold are *not* evaluated further

# Cleanup alternatives are evaluated against a standard set of criteria:

**Long-term protectiveness:** How will the remedy perform over a long period?

**Short-term impacts:** How quickly will protectiveness be achieved? How disruptive is the installation?

**Reduction of wastes:** Are hazardous substance directly destroyed or immobilized?

**Implementability:** How difficult is the remedy to undertake?

**Cost:** How expensive is the remedy?

# Remedy Selection Process:

## What is the role of public comment?

- ❖ Gives the **public** a specific opportunity to provide input on the proposed cleanup
- ❖ Assists the NDEP to **gauge community acceptance** as an additional criterion in remedy selection
- ❖ May **identify information** that was previously unknown

# ***PIO - Contact Information***

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***[http://ndep.nv.gov/pce/maryland\\_square.htm](http://ndep.nv.gov/pce/maryland_square.htm)***



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# Maryland Square PCE Site: Cleanup Alternatives and Preferred Remedy

*Scott Smale*

- Nevada Division of Environmental Protection

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# Cleanup Goals

- ❖ Reduce PCE concentrations to achieve health protective standards in **indoor air** (**9.4  $\mu\text{g}/\text{m}^3$** )
- ❖ Achieve cleanup goal for PCE in **groundwater** (**100 ppb**) to be protective of indoor air
- ❖ Reduce the mass of PCE in the **groundwater** to protect water quality

# Cleanup Alternatives

**Alternative #1:** No further action

**Alternative #2:** Enhanced biological remediation

**Alternative #3:** Permeable reactive barrier

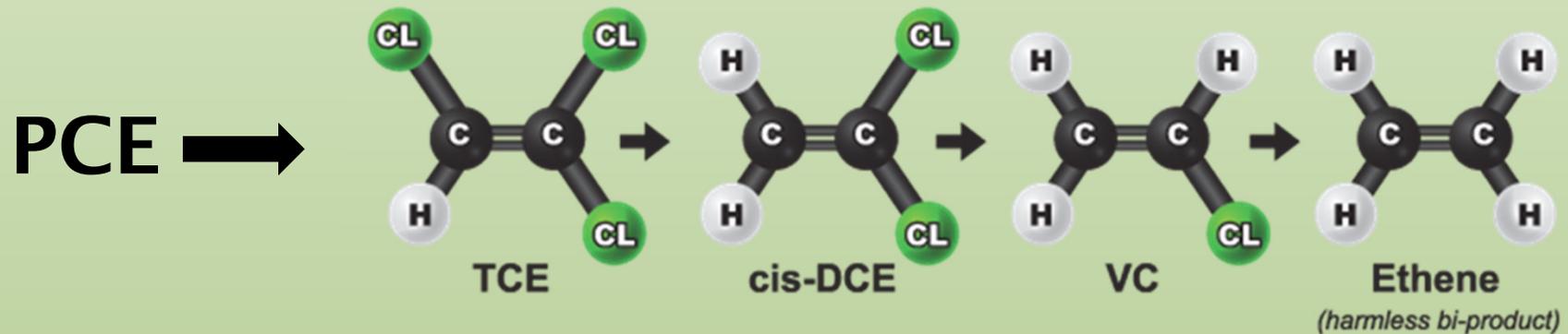
**Alternative #4:** In situ chemical oxidation of the entire plume

**#5 Preferred Alternative:** Groundwater control (“pump and treat”) immediately upgradient of residential neighborhood, with **targeted destructive treatment** in high-concentration areas of the plume

# **Alternative #1: No Further Action**

**What would happen if no additional actions were taken to clean up groundwater?**

# Alternative #2: Enhanced Biological Remediation



**Approach:** Support and enhance the natural process that would result in degradation & destruction of PCE

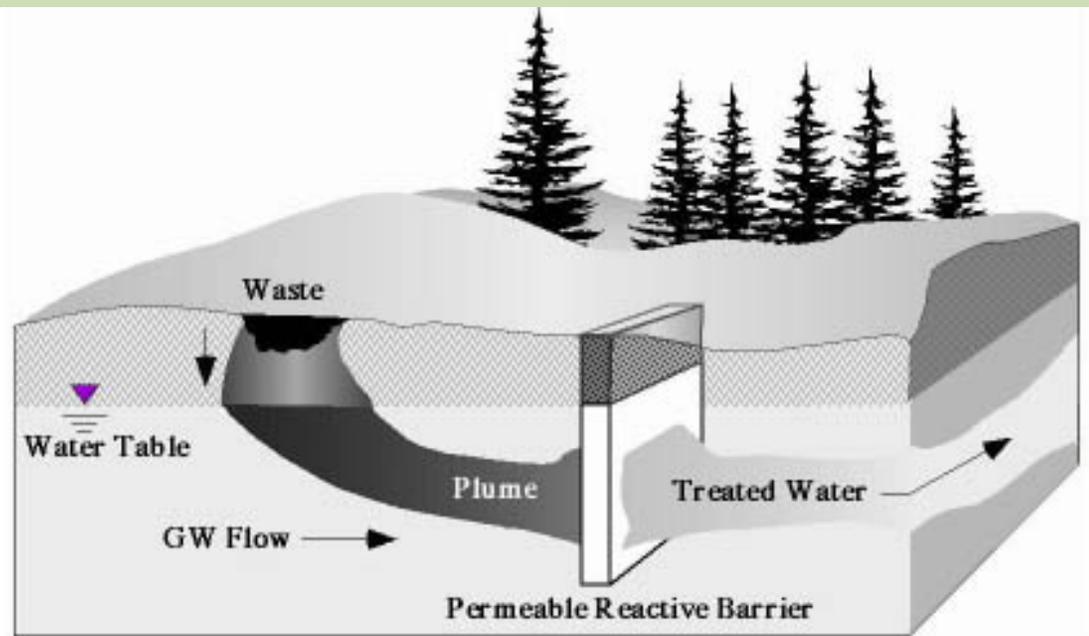
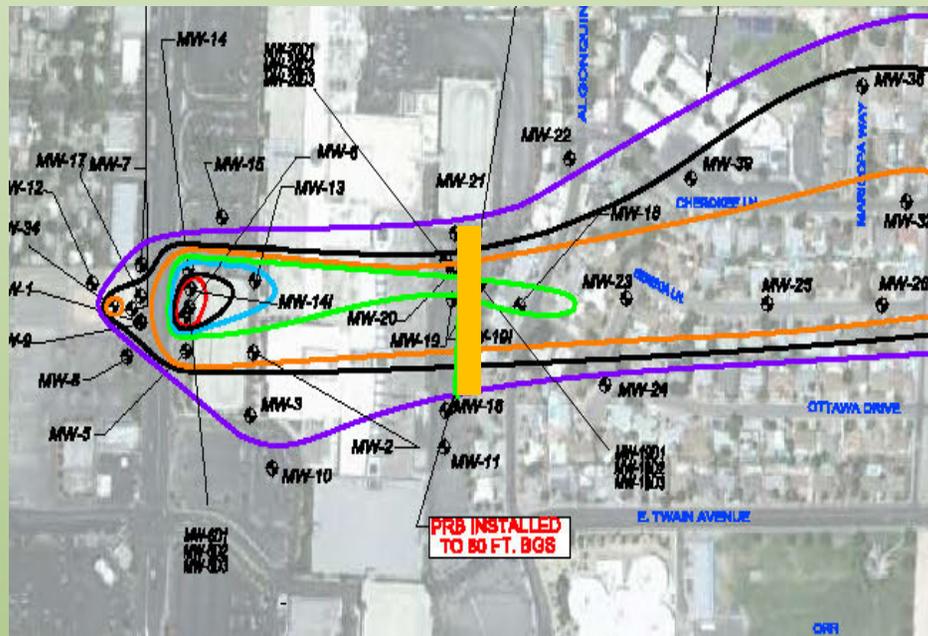
## Advantages

- ❖ Can be less costly and less invasive than other remedies

## Disadvantages

- ❖ Difficult to create & maintain appropriate conditions
- ❖ Incomplete degradation creates toxic compounds

# Alternative #3: Permeable Reactive Barrier



**Approach:** Install a “barrier wall” below ground

As contaminated groundwater flows through this barrier, the PCE is degraded and destroyed.

# Alternative #3: Permeable Reactive Barrier

## Advantages

- ❖ Passive operation means less chance of mechanical failure

## Disadvantages

- ❖ Depth complicates installation at this site
- ❖ Lifespan and replacement concerns
- ❖ Precipitation of minerals can clog the barrier



# **Alternative #4:**

## **In Situ Chemical Oxidation of Plume**

### Advantages

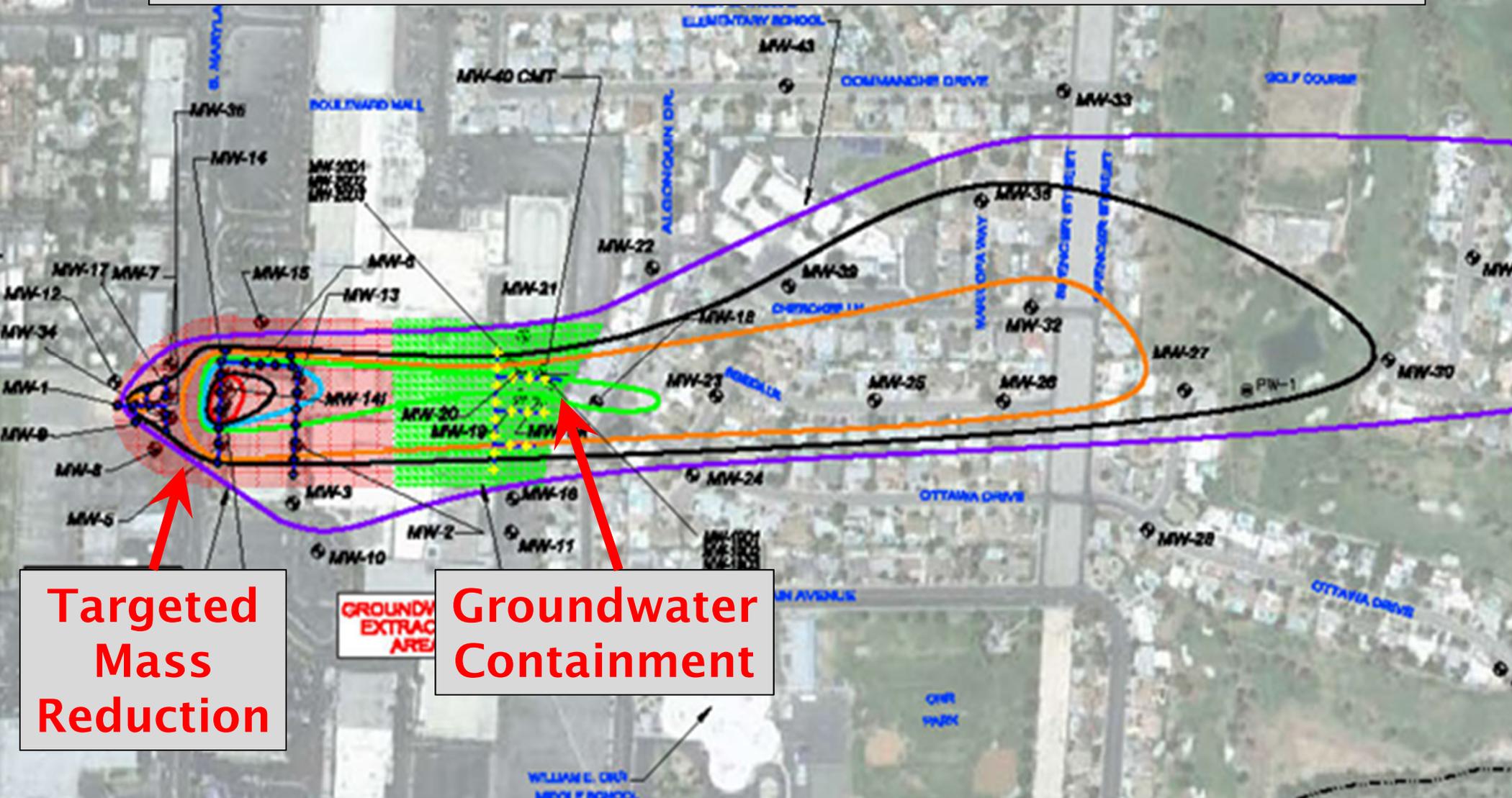
- ❖ In theory, could reduce the greatest amount of PCE in the shortest time, but...

### Disadvantages

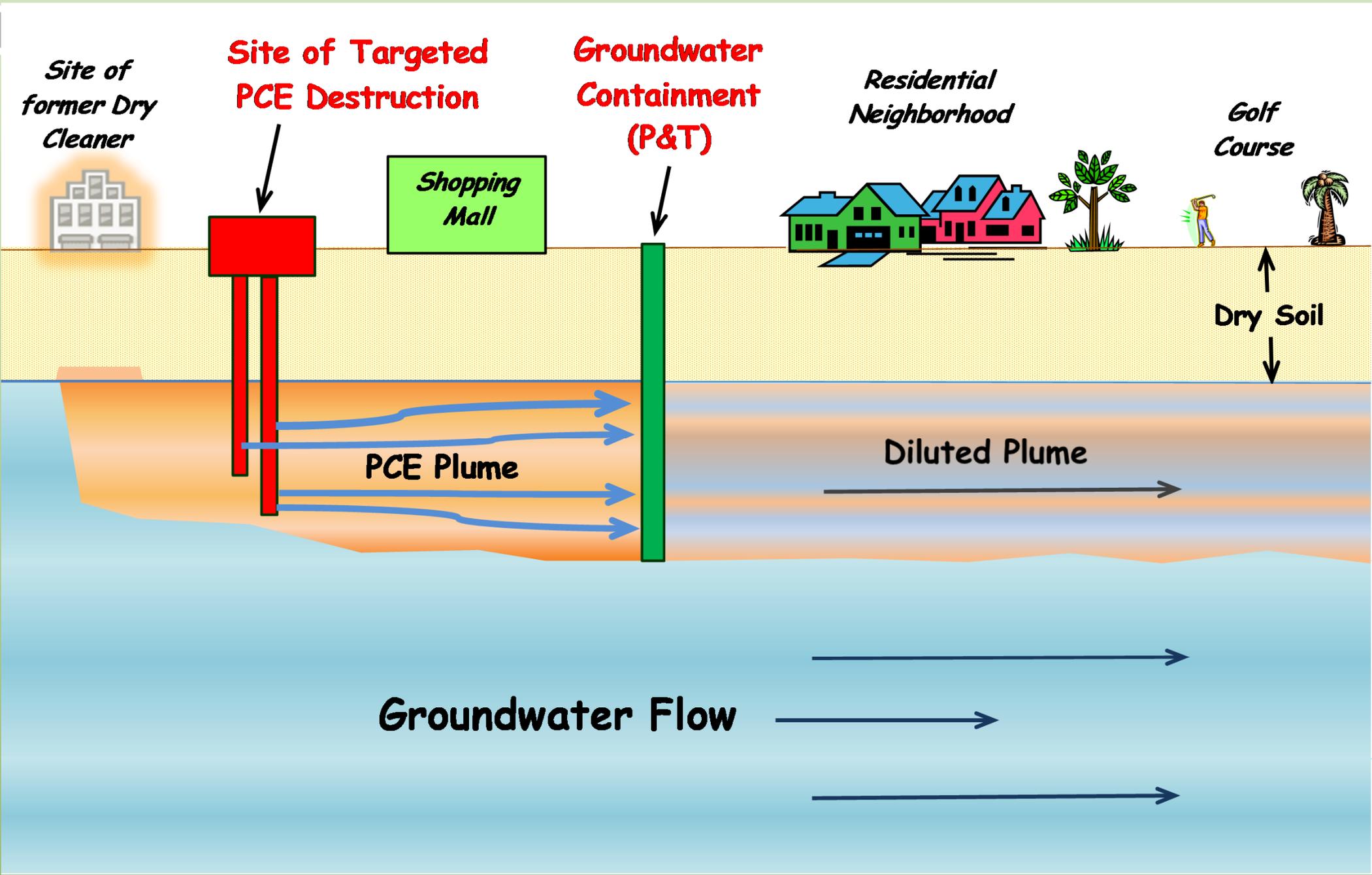
- ❖ Installation in neighborhood is highly intrusive
- ❖ Difficult to control injected chemicals in subsurface
- ❖ Only effective if chemical reaches contaminants
- ❖ Chemical storage & handling in residential neighborhood raises safety concerns
- ❖ Cost may be greater than other alternatives

# Alternative #5: Groundwater Containment & Mass Reduction

Alternative 5 is the “Preferred Remedy”



# Overview of the Preferred Remedy: Containment & Targeted Mass Reduction



# Overview of the Preferred Remedy: Containment & Targeted Mass Reduction

## Advantages

- ❖ Well-understood and implementable technology and engineering
- ❖ “Hydraulic containment” reduces flow of contaminated groundwater into neighborhood
- ❖ Targeted destruction of PCE in area of highest concentrations near S. Maryland Pkwy reduces mass

## Disadvantages

- ❖ Does not treat groundwater now under the neighborhood, instead relies on flushing and dilution

## *Maryland Square PCE Site: Next steps*

**2015** NDEP receives public comments on Proposed Plan, prepares **Record of Decision (ROD)**

**2015** Responsible party's contractor provides work plan & remedy design documents to NDEP for approval

**2015 - 2016** Contractor installs remediation system for cleanup of groundwater

**2015 - 2020s** Continue annual sampling of indoor air & sampling of groundwater

# ***Contact Information***

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