

# Brownfield Award Winning Vapor Intrusion/Mitigation Site

**Medical Supply Warehouse  
Detroit, Michigan**

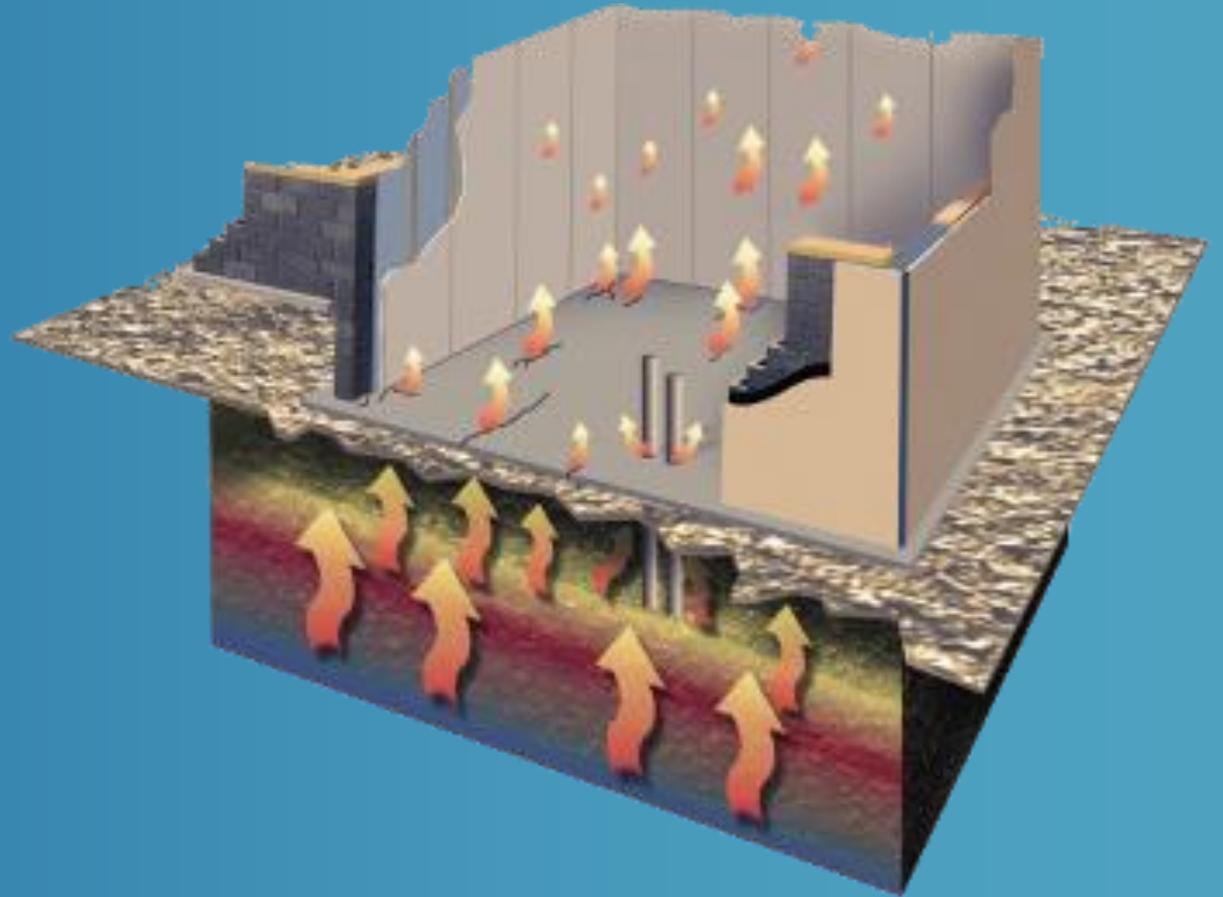
Thomas R. Szocinski, CEP  
Director of Vapor Intrusion  
Land Science

Washington State Brownfields Conference  
May 2019



# Vapor Intrusion Mitigation

What is Vapor Intrusion Mitigation (VIM)?



# Vapor Intrusion Mitigation

## Why Mitigate?

- Identified VI risk at site
- VI standards constantly evolving
- Avoid further investigation and evaluation
- Remediation alone may not eliminate VI risk
- Commence construction sooner
- Mitigation cost is low compared to relative property value
- Protect client's investment and avoid future liability



# Preemptive Vapor Intrusion Mitigation



Pre-emptive vapor intrusion mitigation is often implemented at sites in which even a low potential exists for vapor intrusion

- Gaining traction with regulators, financial (lending) institutes, and larger corporations
- Reduces liability concerns
- Overall protective of property

# Potential for VI on a Brownfield Site?

- VI or the potential for VI on Brownfield Redevelopment Sites is quite common;
- Designing the appropriate approach to address the VI situation is crucial to the development both from an environmental and a budget aspect.



# Award Winning VI Brownfield Site

## Medical Supply Warehouse – Detroit, Michigan

- CVOC, Petroleum, and mercury VI risk
- 275,000 sq. ft.
- Sub-slab passive venting and VI barrier system
- Award winning



# Medical Supply Warehouse

Location: Southeast Michigan

## Site Conditions:

- 98 separate parcel (6 city blocks) acquisition and merger, many with existing or potential for existing environmental concerns, including VI.
- Numerous investigations identified CVOC and petroleum with multiple source areas.
- Concentrations of CVOCs, Petroleum VOCs and mercury above VI screening levels.
- Michigan Department of Environmental Quality (MDEQ) Brownfield Site
- 275,000 sq. ft. Medical Supply Warehouse



# Brownfield Redevelopment

## Multifaceted Site

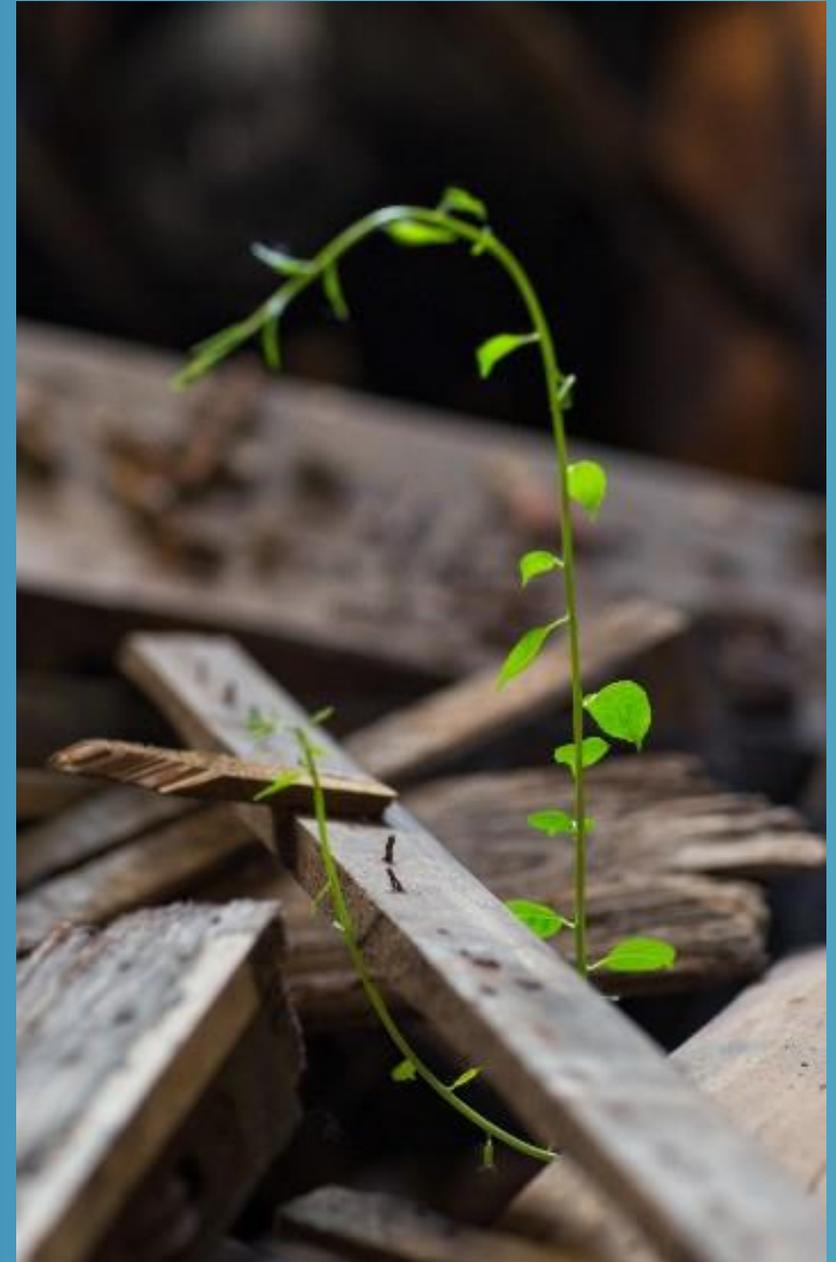
- Parcel acquisitions and mergers, many with existing or potential for existing environmental concerns
- Significant demolition, including residential and commercial buildings, underground storage tank (UST) removals, numerous road abandonments and reclassifications
- 2/3's of the site had been occupied by industrial use at some point, which included railyard areas, spurs, tunnels, pits, and vaults
- Numerous “source areas” identified petroleum and chlorinated volatile organic compounds (VOCs) within soil and soil vapor.



# Brownfield Redevelopment

## Forward Progression

- Despite the numerous reasons to negate redevelopment of these parcels, based on the location and proximity to local hospitals and other city components, the Fortune 500 company moved forward with their project.
- Innovative partnership between many “Players”
- MDEQ \$1 Million grant
- \$1.5 Million loan
- Detroit/Wayne County Port Authority provided a \$915,000 loan

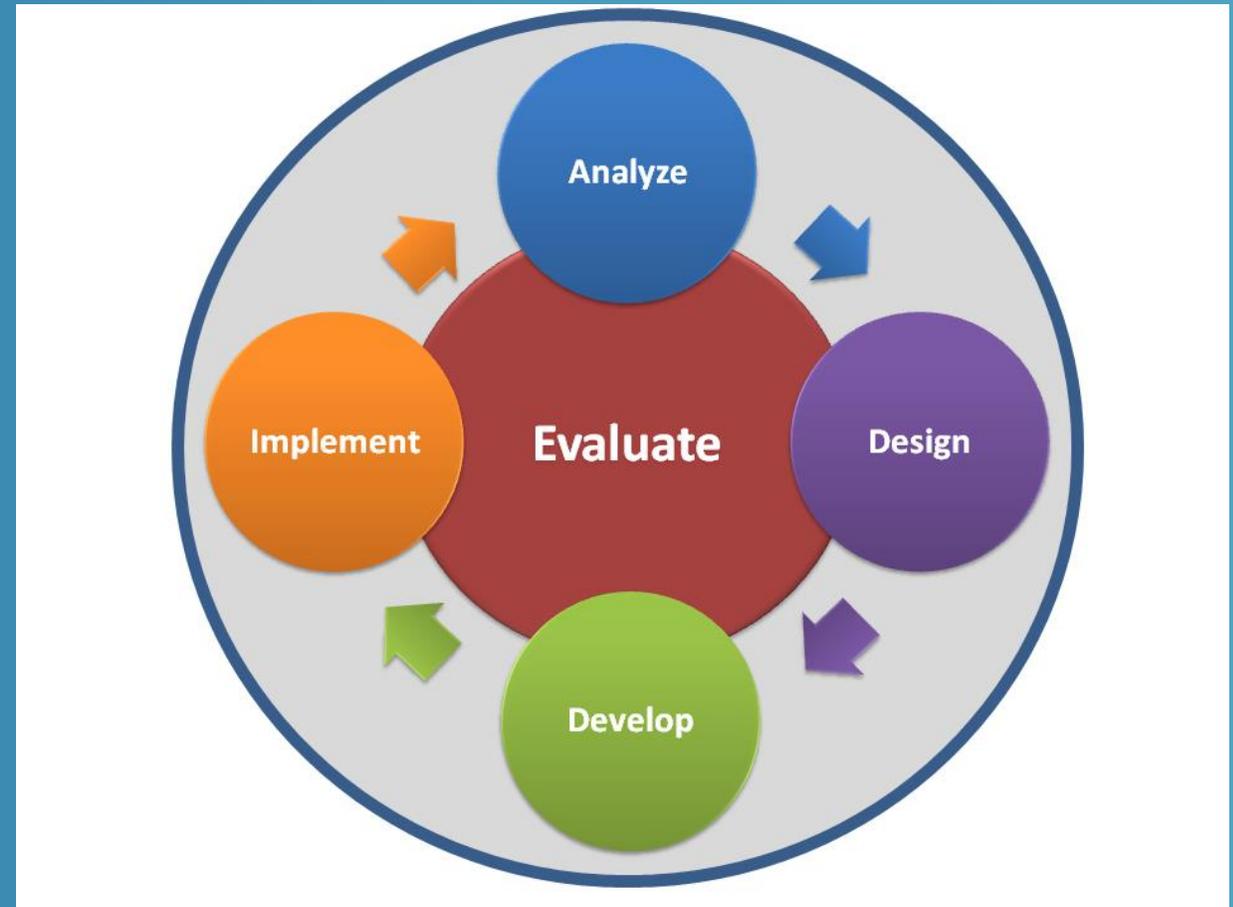


# Vapor Intrusion Mitigation System Evaluation

Environmental consultant evaluated multiple VIM systems and approaches including:

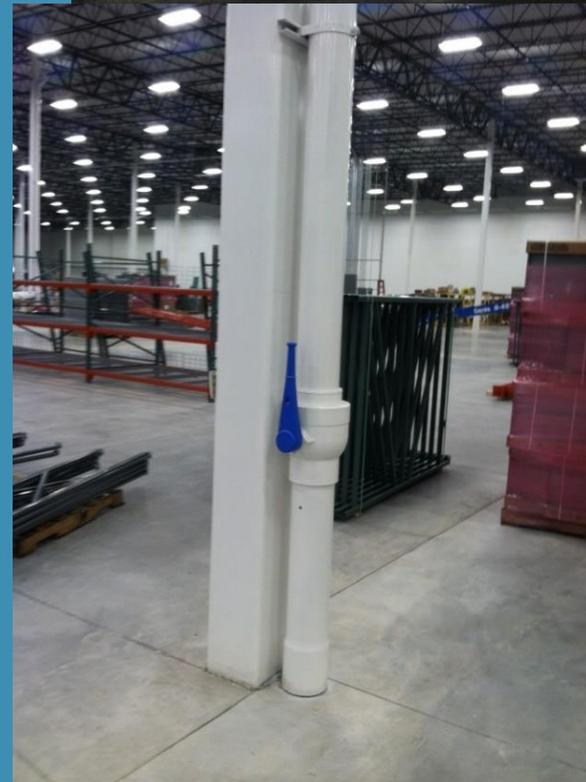
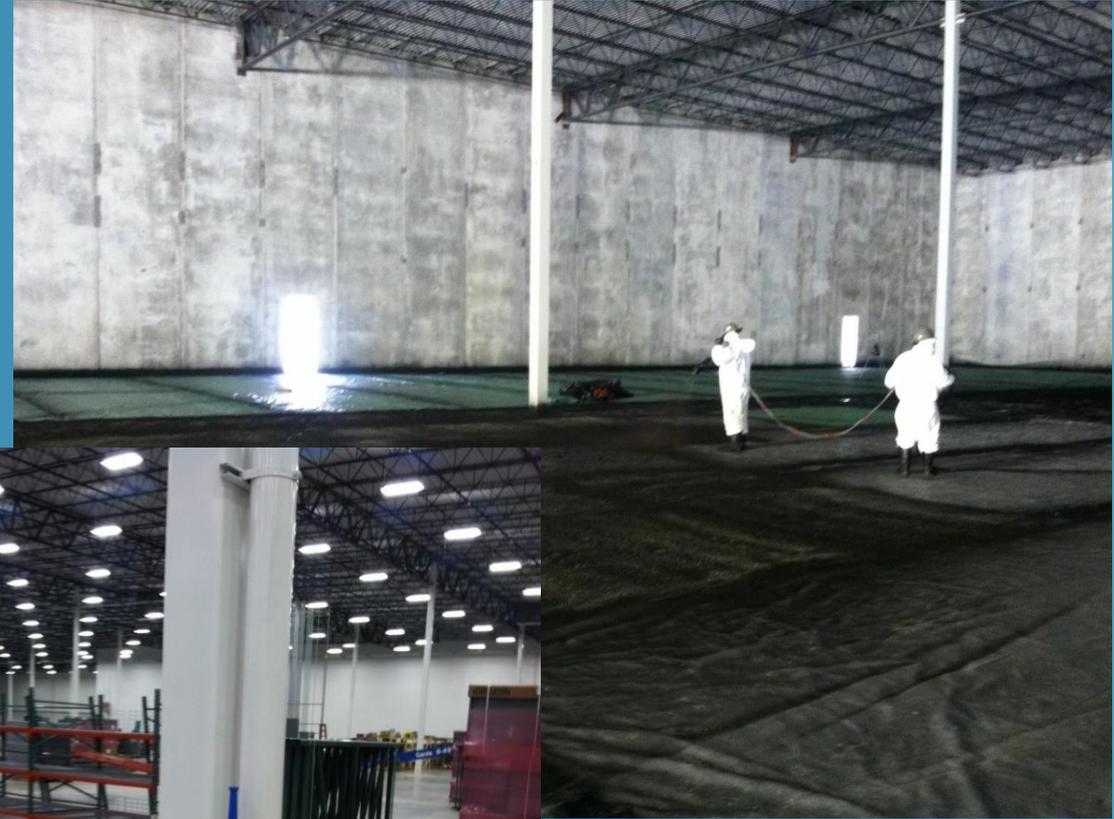
- Active venting
- Building pressurization
- and passive VI barrier system

Based on overall cost, schedule and effectiveness of the VIM approaches listed above the environmental consultant and MDEQ reviewed and approved the installation of a passive VI barrier system.



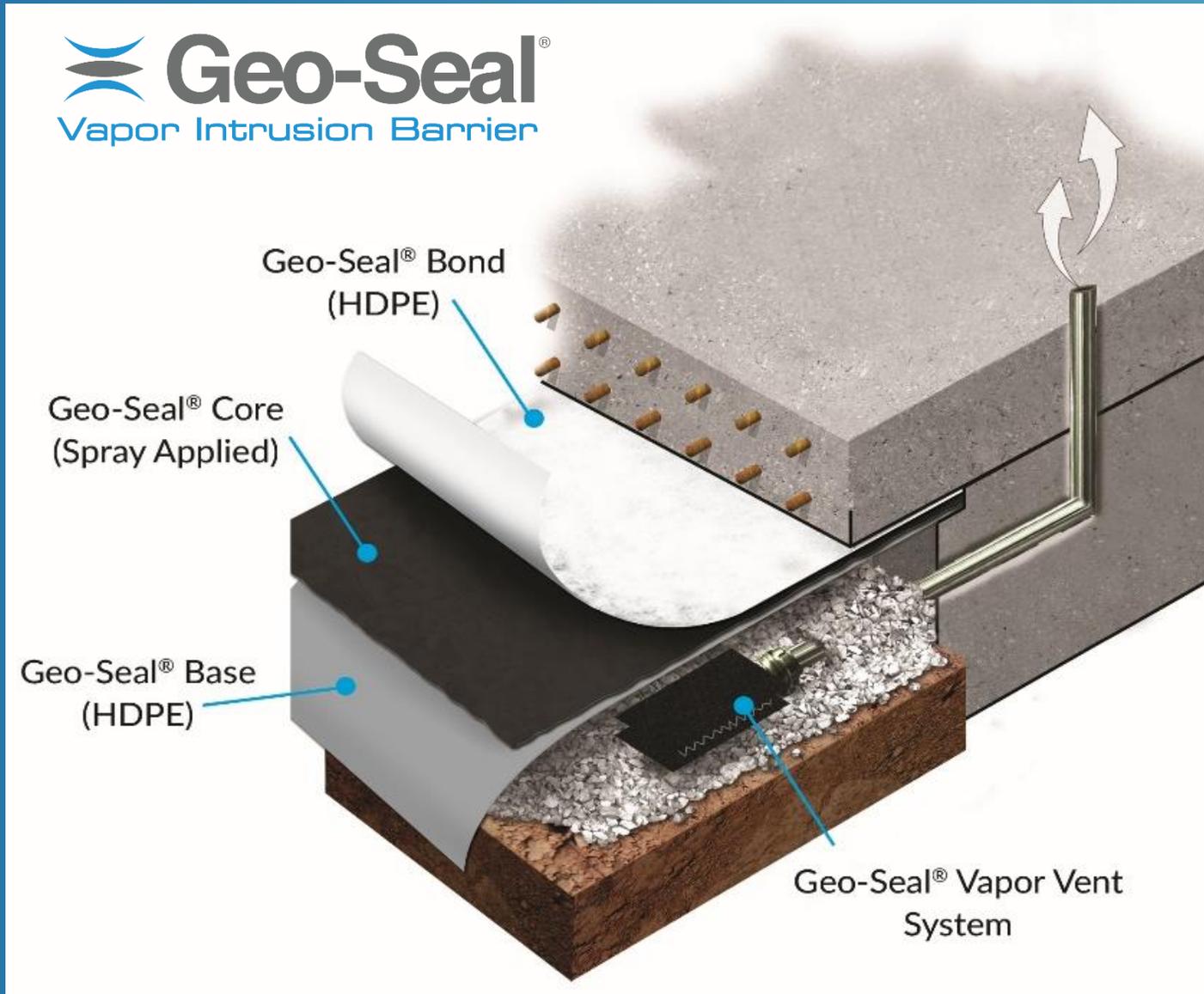
# Vapor Intrusion Mitigation

- Passive ventilation system that included sub-slab venting, vent risers, and testing ports was identified as most cost effective and appropriate for site
  - Use of MDEQ Brownfield funding's required "Buy in" by MDEQ on remediation and mitigation proposed
    - Sensitive receptor (medical building)
    - Cost analysis of mitigation
    - Need for VIM based on VOCs sporadic across the site with multiple sources areas.
- Contaminant vapor barrier across the entire building footprint
- VIM System Work Plan submitted to MDEQ for approval



 **Geo-Seal**<sup>®</sup>  
Vapor Intrusion Barrier

# Vapor Intrusion Mitigation



# Vapor Barrier Thickness

Agency	Barrier Thickness Recommendations
United States Environmental Protection Agency	30-60 mil
Michigan Department of Environmental Quality	60 mil
New Jersey Department of Environmental Protection	40 mil
Massachusetts Department of Environmental Protection	40-60 mil
Illinois Environmental Protection Agency	60 mil
California Department of Toxic Substances Control	60 mil
Interstate Technology & Regulatory Council	60-100 mil

...monomer) rubber. Sheet membranes less than 30 mil (e.g., 6 mil visqueen) are not durable enough to prevent significant damage during placement of reinforcing steel and concrete and thus are not recommended in sub-slab applications. An example of how a membrane is typically

 United States Environmental Protection Agency
Engineering Issue

## Indoor Air Vapor Intrusion Mitigation Approaches

**Table of Contents**

- 1 PURPOSE 1
- 2 INTRODUCTION 1
  - 2.1 Subject and Intended Audience 1
  - 2.2 Overview of Contaminant Entry into Structures and Mitigation 3
  - 2.3 Vapor Intrusion into Various Building Types 6
  - 2.4 Quality Assurance Considerations 8
- 4.6 Risk Communication and Stakeholder Involvement Considerations 34
- 5 VERIFICATION OF MITIGATION PERFORMANCE 35
  - 5.1 Defining the Performance Objective 35
  - 5.2 Defining the Performance Baseline 37
  - 5.3 Methods of Measuring Indoor Contaminants 37
  - 5.4 Measuring or Estimating Sub-slab Soil Gas Concentrations During Mitigation Performance 39
  - 5.5 Indirect Measurements of Mitigation Performance 40
  - 5.6 Initial and Long-Term Verification of System Performance 41
  - 5.7 The Role of Ongoing Warning Devices and System Labeling 42
- 6 ACRONYMS AND ABBREVIATIONS 43
- 7 ACKNOWLEDGMENTS 43
- 8 REFERENCES 44

**1 PURPOSE**

The U.S. Environmental Protection Agency (EPA) Engineering Issue is one of a new series of technology transfer documents that summarize the latest available information on selected treatment and site remediation technologies and related issues. The Engineering Issues are designed to help remedial project managers (RPMs), on-scene coordinators (OSCs), contractors, and other site management under-

into your browser or e-mail them. As science and technology associated with this route of exposure continues to develop, other mitigation measures may become available.

**2 INTRODUCTION**

**2.1 Subject and Intended Audience**

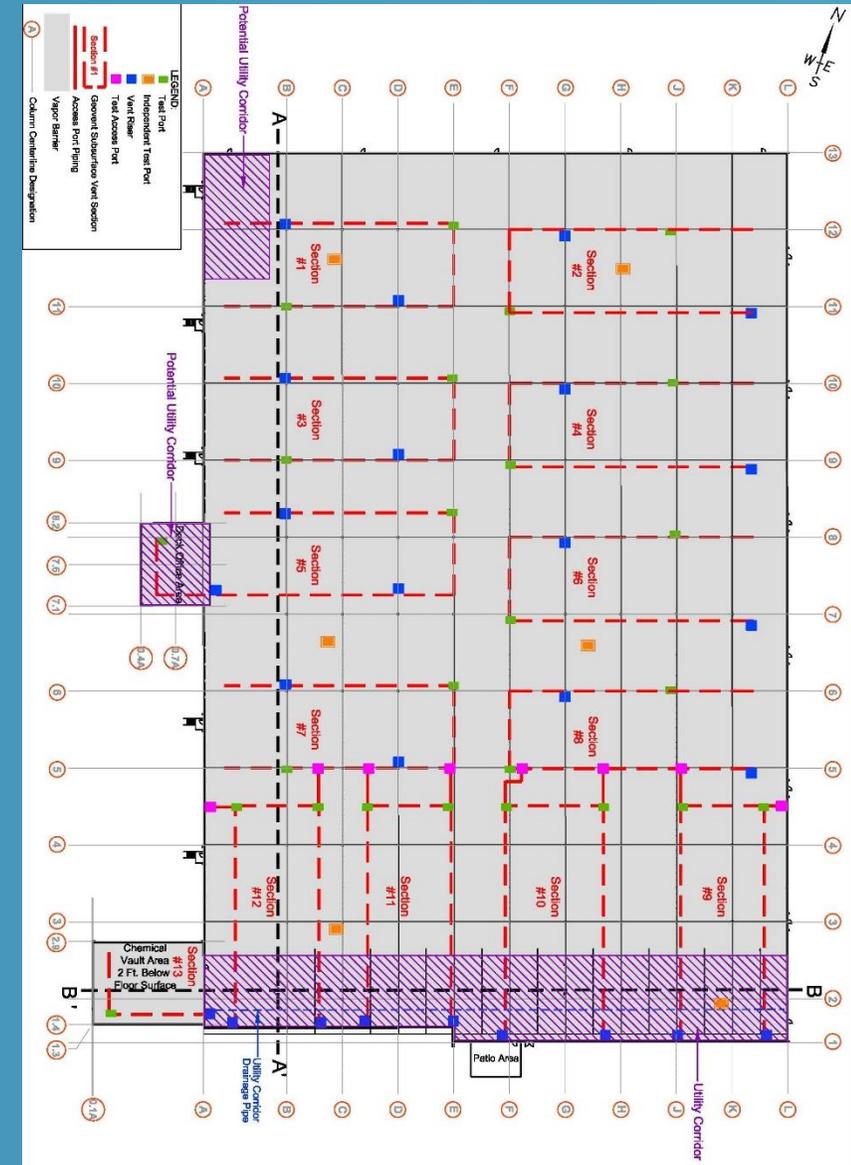
Vapor intrusion is defined as the migration of volatile contaminants from the subsurface into overlying buildings. Volatile contaminants from buried wastes and/or contaminated groundwater or soil can migrate through subsurface soils and into indoor air spaces of overlying buildings. The vapor intrusion risk pathway may be important for buildings with or without a basement (EPA, 2002a).

Vapor intrusion issues are widespread; for example, as of March 15, 2006, there were 268 site investigations in the State of New York and mitigations were underway or completed at 72 of those sites

# Vapor Intrusion Mitigation

## Vapor Mitigation System Design

- Passive ventilation system includes sub-slab vents, vent risers, and test ports
- Vapor barrier across entire footprint
- Work Plan detailing design submitted to MDEQ for approval
- Bidding process
  - Received bids from multiple certified installation contractors
  - Review and approval of bids were confirmed with MDEQ
  - Geo-Seal™, product of Land Science Technologies, was proposed by lowest bid contractor (MTN, Inc. – Littleton, Colorado)



# Vapor Intrusion Mitigation



# Vapor Intrusion Mitigation



# Vapor Intrusion Mitigation - QA/QC



Smoke Testing



# Vapor Intrusion Mitigation



# Vapor Intrusion Mitigation



# Vapor Intrusion Mitigation

- Recognized successful VI Brownfield Site
- Multiple Brownfield Awards



# Conclusion

With an innovative and determined approach successful Brownfield Redevelopment can revitalize once blighted areas.

