



# Site Specific Remediation Objectives for Soil Vapour in Alberta (Draft)

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# Outline

- Contaminated Site Management Policy
- General Principles of Risk Assessment
- Tiered Risk Assessment Framework
- Features of the Vapour Guidance
  - Conceptual Site Model
  - Calculation of the acceptable soil vapour concentration
  - Sampling Protocol
  - Data Interpretation and Analysis



# Contaminated site management *-Policy*

- Pollution prevention
- Not “pollute-up-to” guidelines
- Source control
- Full delineation
- Protection for cross-media transfer
- Protection of Water Resources



# Objectives of EPEA for Contaminated Sites Management System

## Environmental Management Goals

Equivalent land capability

- Maintaining ability of land to support various uses

Prevention of “adverse effect”

- Impairment/damage to environment, human health, safety, property

Past, present and future component

- “Has caused, is causing or may cause adverse effect”

Principle of sustainable development

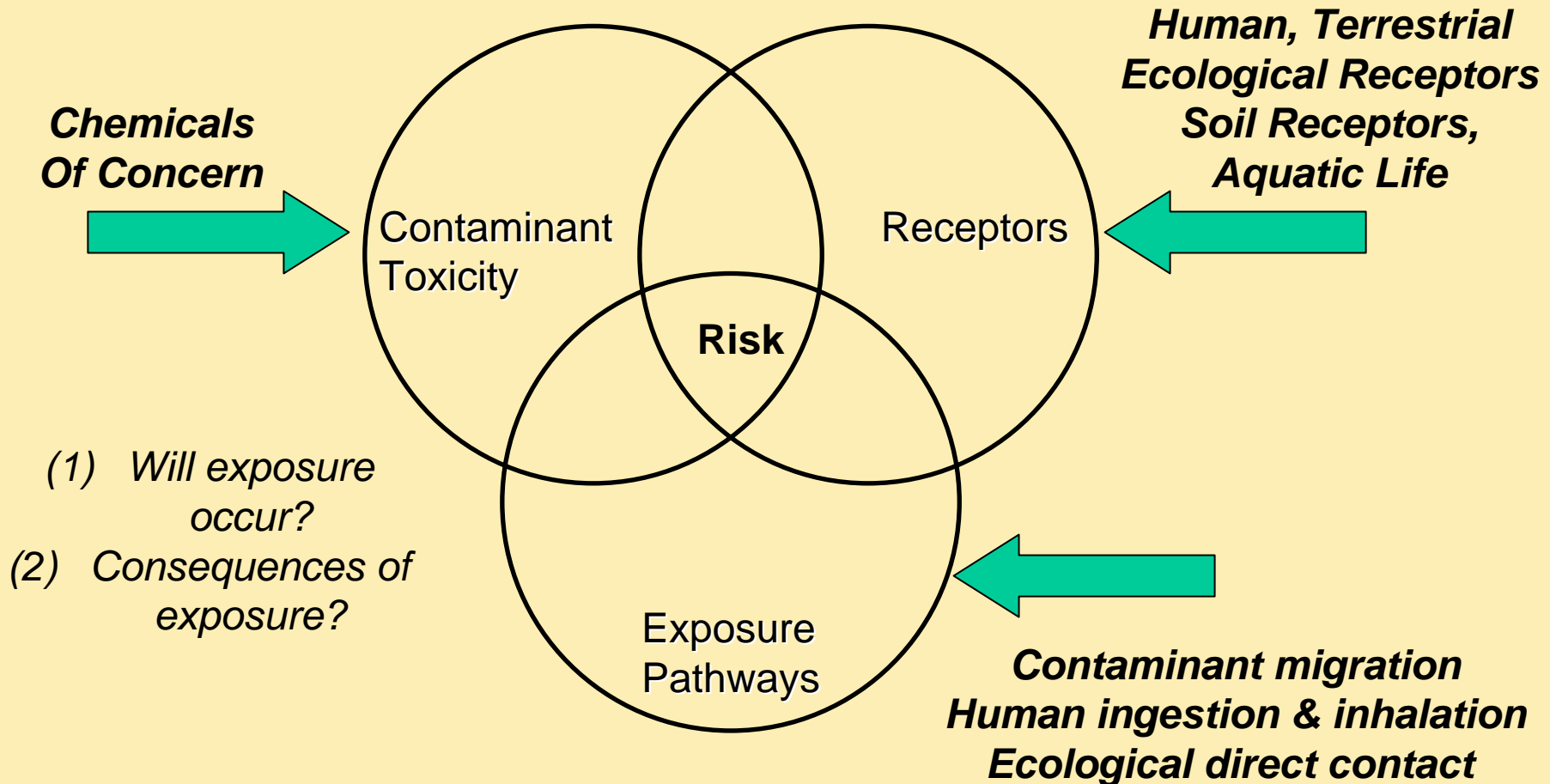
- Responsible use of resources and environment
- Maintain non-impairment for future generations

**Regulatory risk management goal**

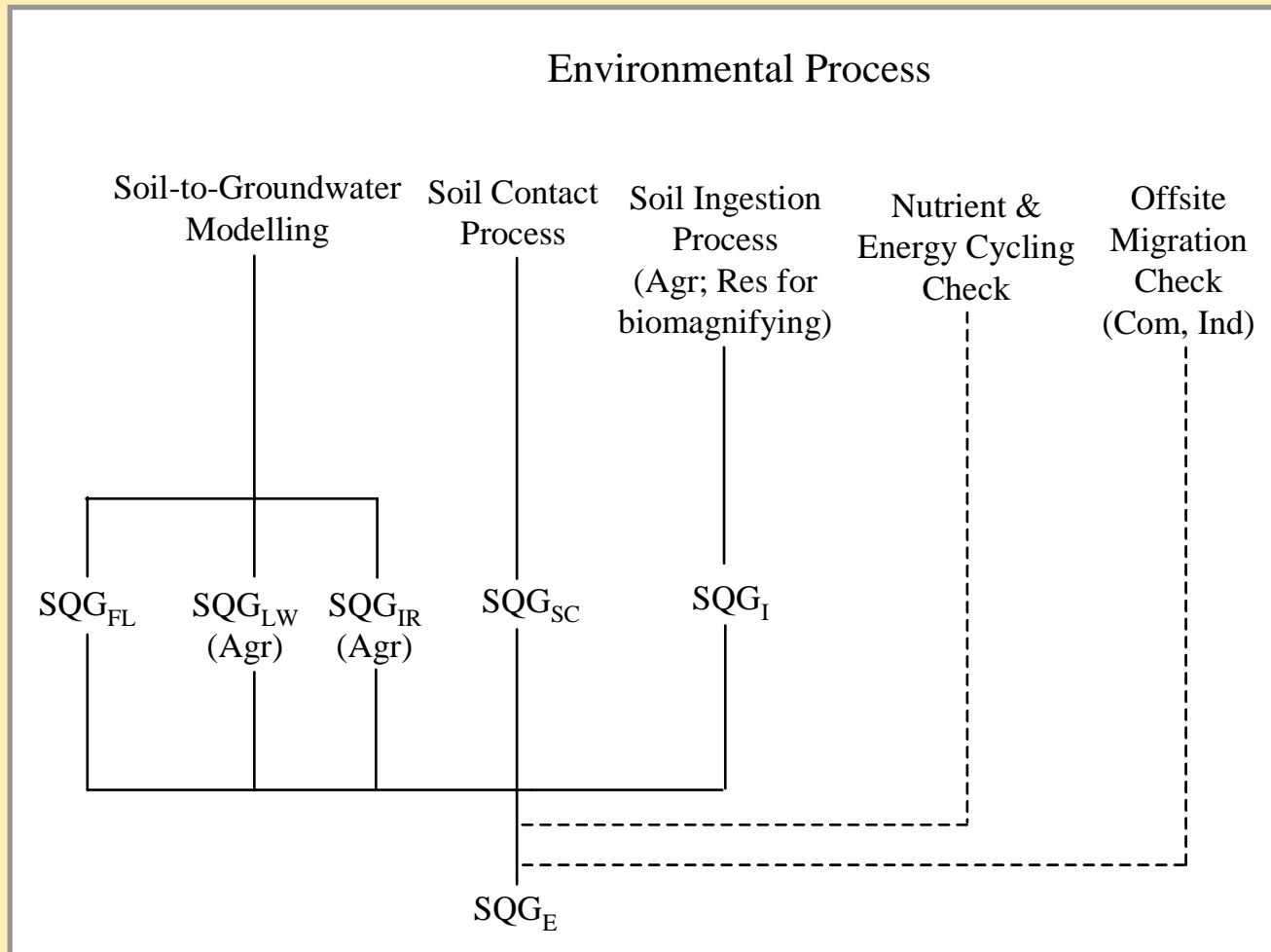
**Preserve range of land use options**

# Risk Assessment

*A characterization of the likelihood that a substance will produce harm to human health or ecosystems under specific conditions*



# Site Specific Risk Assessment -Policy



# *Site Specific Risk Assessment -Policy*

**Soil Quality,  
Environmental Processes**

**Soil Quality,  
Human Health Processes**

$SQG_F$

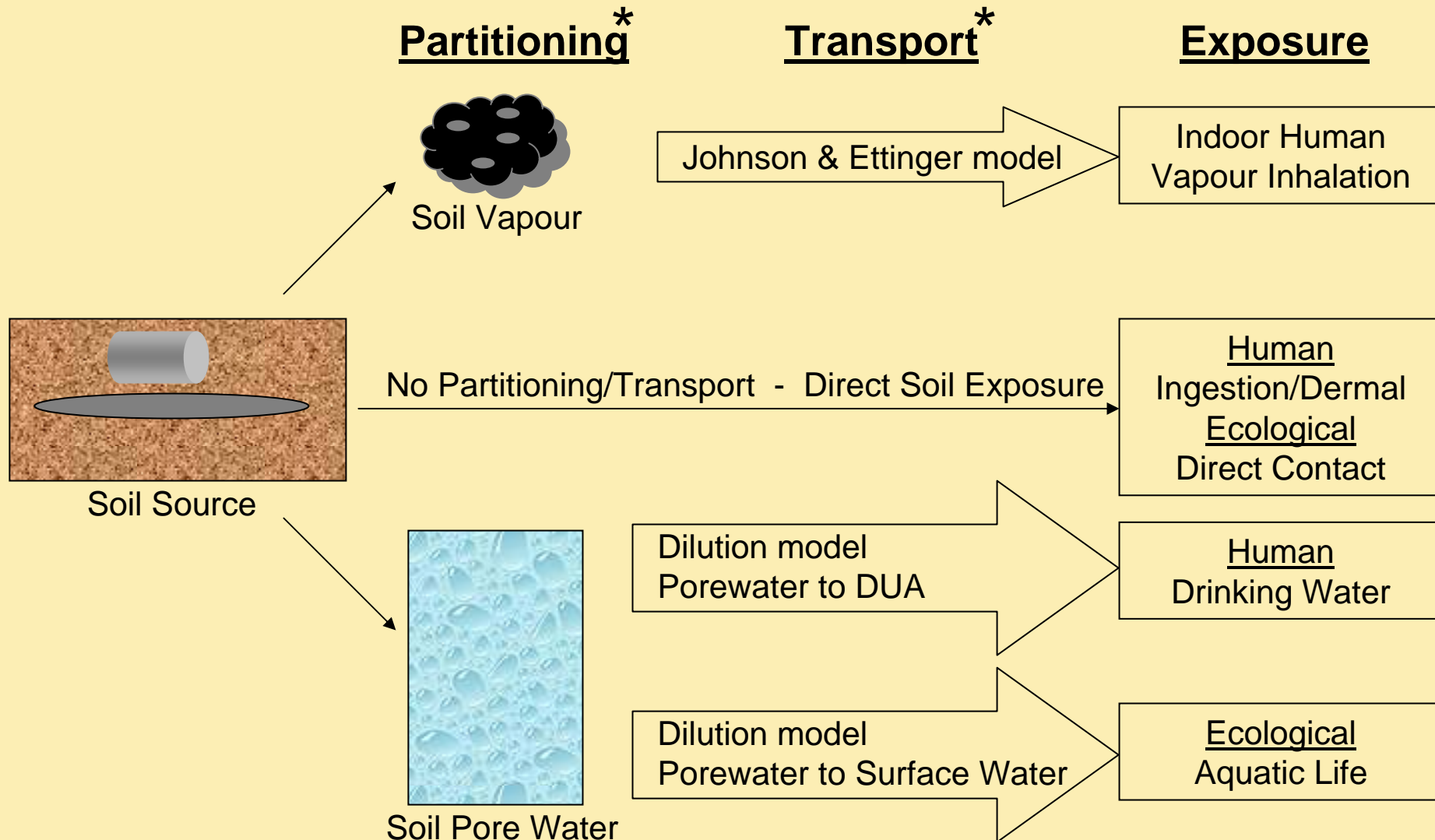
## **Other Considerations**

**Management & Non-Toxicity  
Considerations**

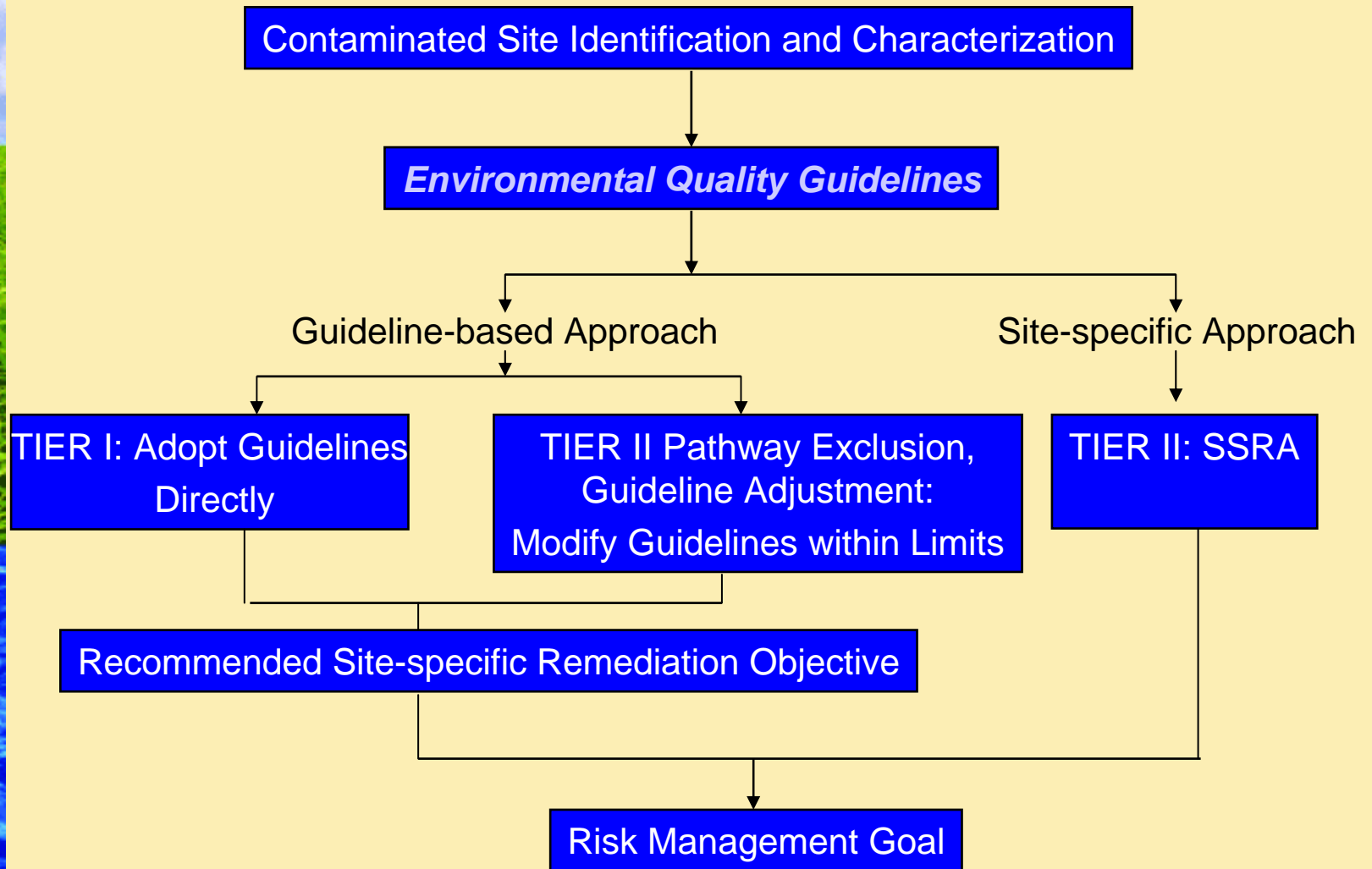
Check against:

- plant nutrient requirements
- background concentrations

# Exposure - Contaminant Fate & Behavior



# Framework for Contaminated Site Assessment and Remediation

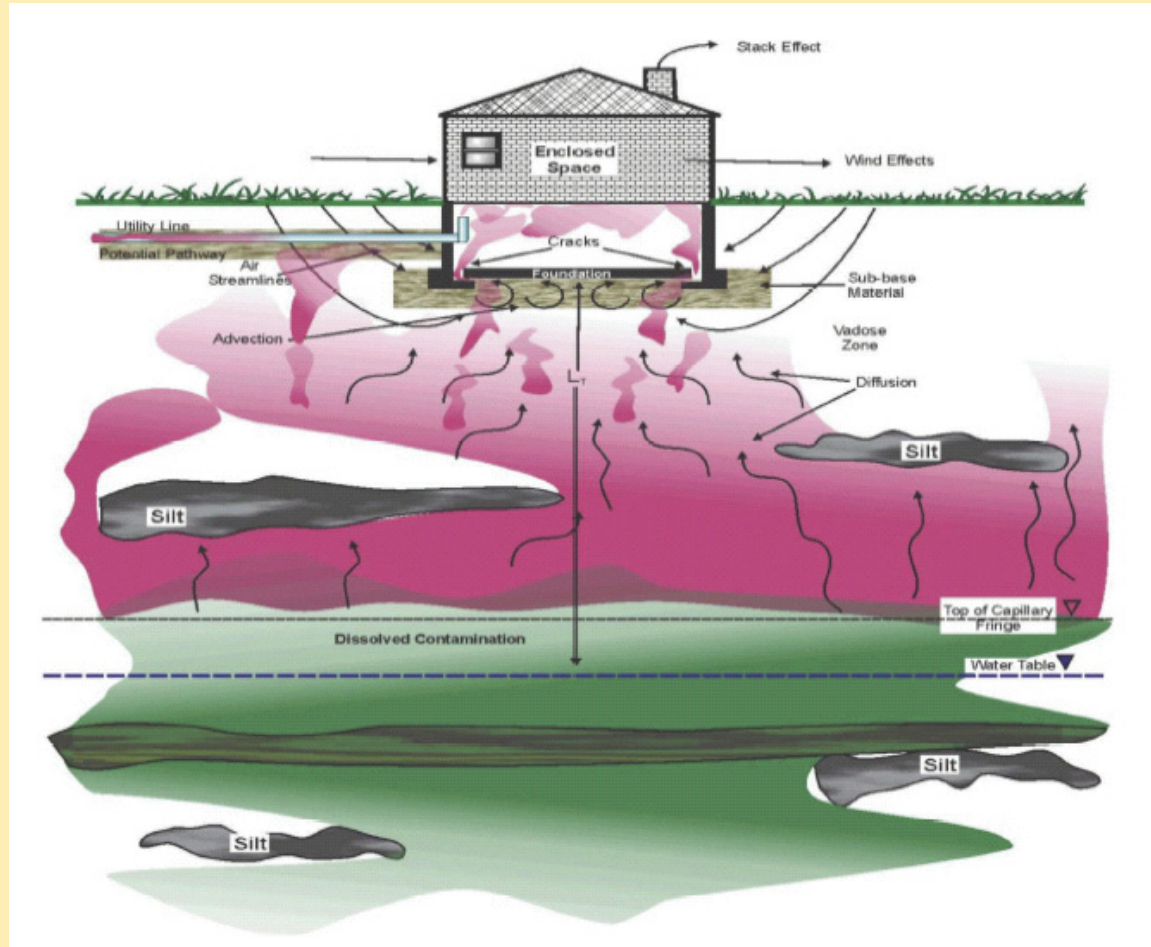





# Major Features of the Vapour Guidance.

- Conceptual Site Model
- Calculation of the acceptable soil vapour concentration
- Sampling Protocol
  - Sampling Strategy
  - Probe Construction and Installation
  - Soil Gas Analysis
- Data Interpretation and Analysis

# Conceptual Site Model



**Example of a Conceptual Site Model for Vapour Intrusion into a Residential Building (adapted from US EPA, 2002)**



# CSM Risk Evaluation, Main Features

- Source and distribution of Contamination
- Receptor Risks
- Description of Fate and Transport



# CSM Data Evaluation, Main Features

- Delineation: chemical distribution and presence in different media of concern
- Location and distribution of all contaminants of concern
- Geological Information
- Hydrogeological information (where relevant based on contaminant distribution)
- Utility corridors that may influence contaminant migration
- Others as may be relevant to site specific circumstances.

# Calculation of the Site Specific Dilution Factor

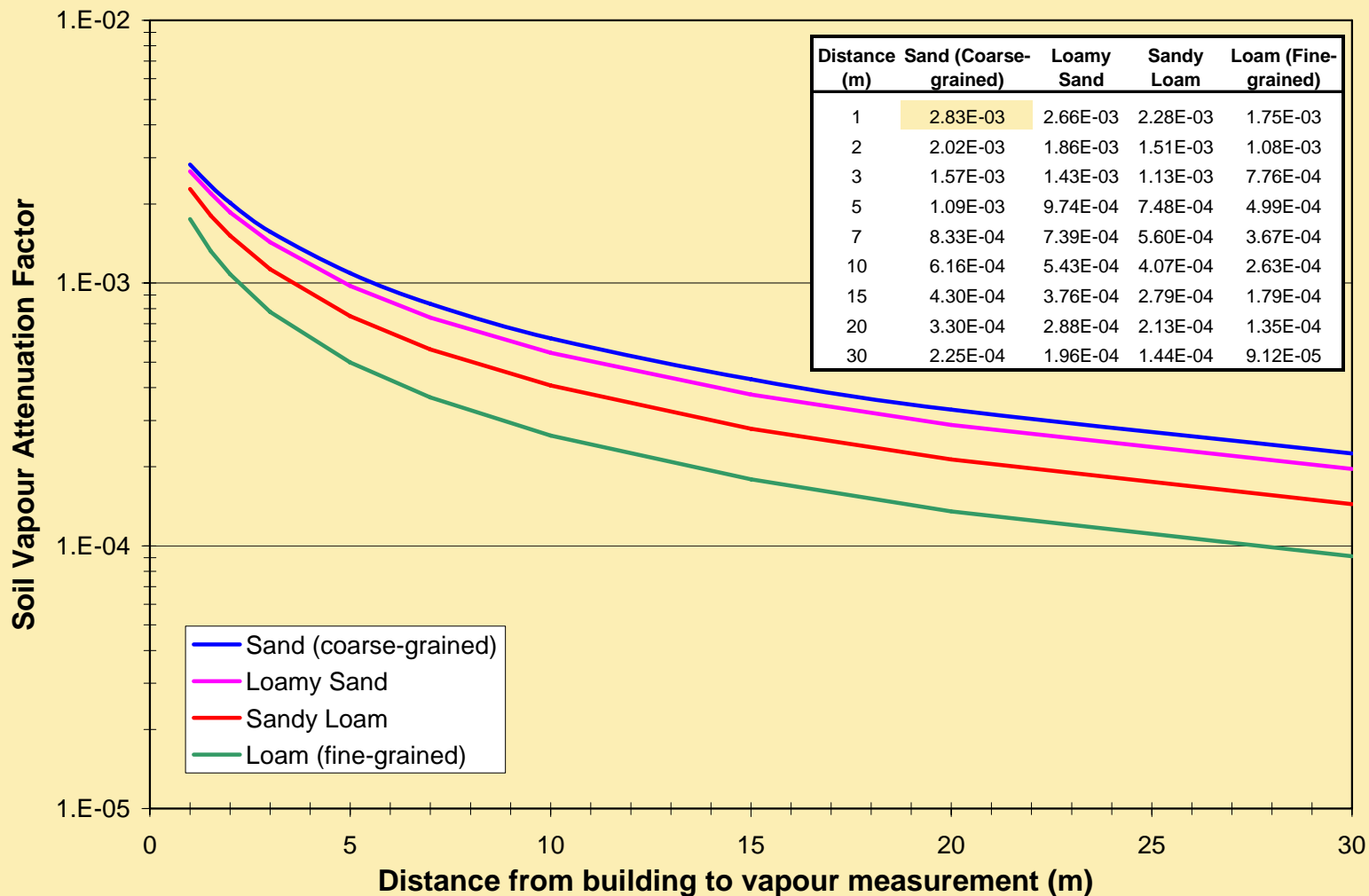
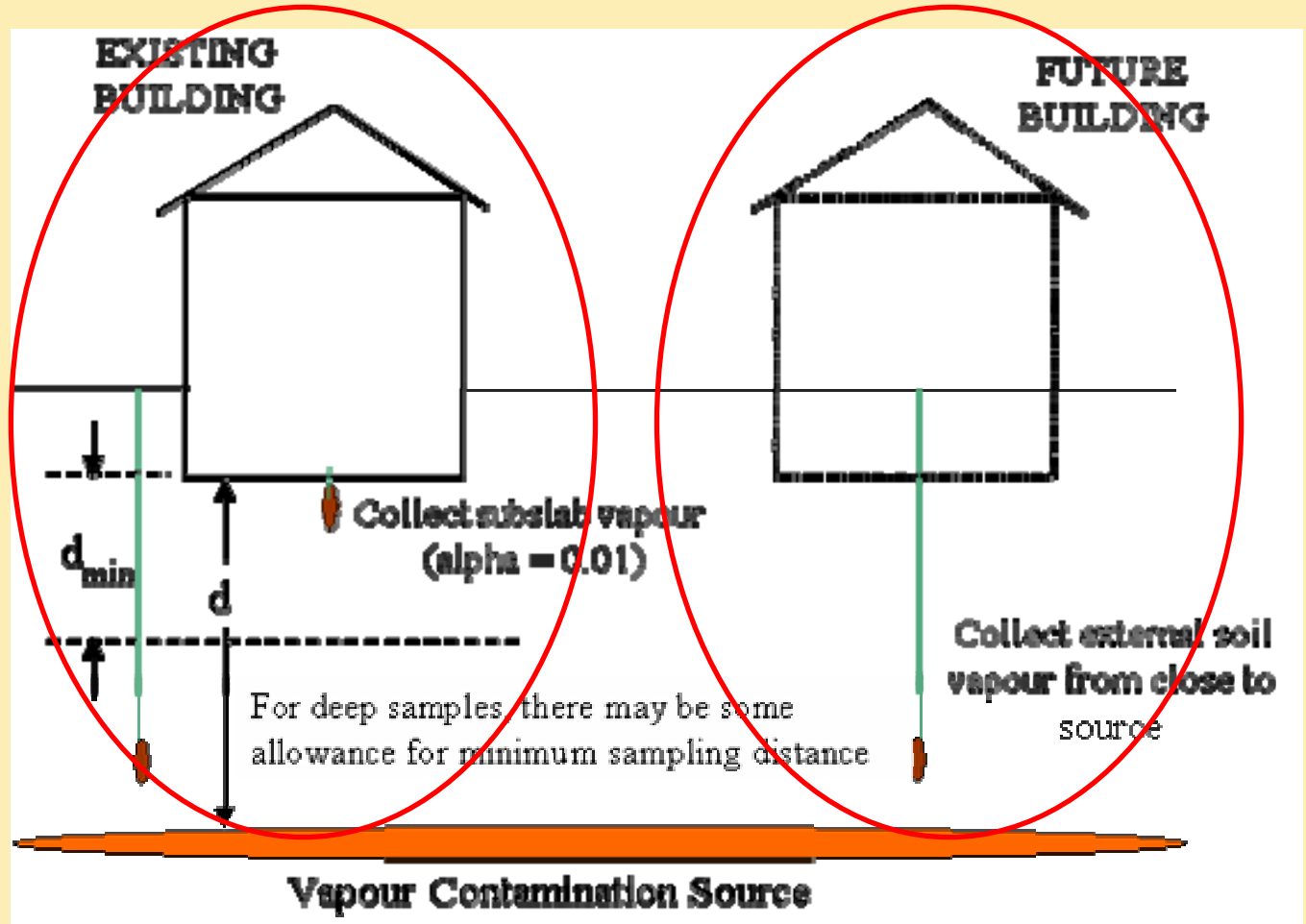
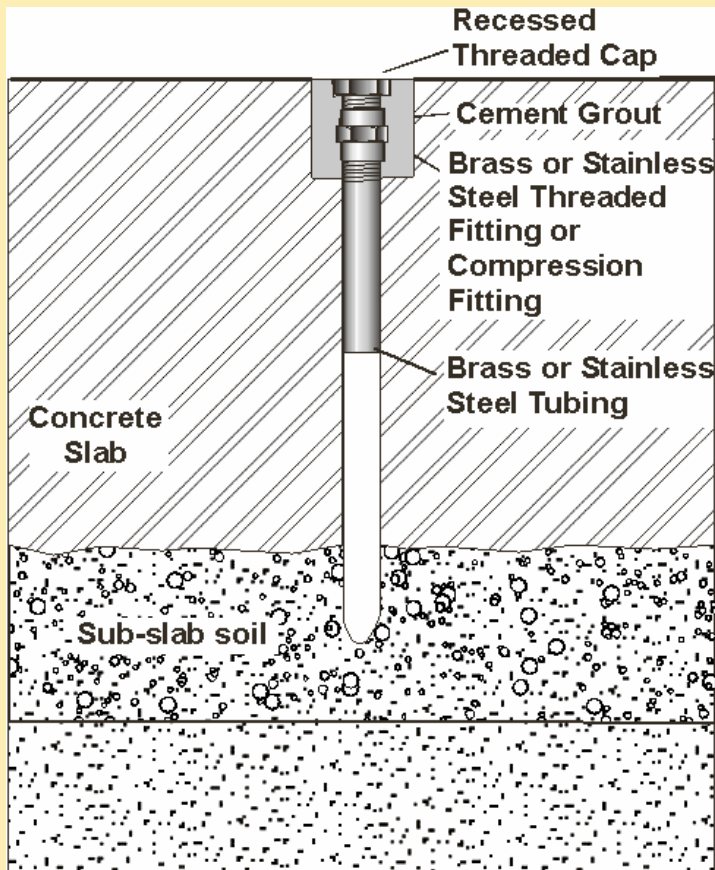


Figure 5. Residential Soil Vapour to Indoor Air Attenuation Factors

# Sampling Strategy



# Probe Construction and Installation



- Sampling QA/QC
- Well Equilibration
- Leak/Short circuiting detection.
- Well Purging
- Flow and Performance Checks
- Sampling, sample collection and Storage Requirements.



# Soil Gas Analysis

- Final site assessment will require analysis at fixed laboratory facilities
- Field screening methods cannot be used for final site assessment although they may provide screening information during preliminary and remedial stages.
- Sampling protocols will need to correspond with sample preservation needs required for fixed laboratory analysis. Some sampling methods do not provide adequate sample preservation.
- Protocols will be defined against detection limit requirements.



# Data Interpretation and Analysis

- Outline of data reporting requirements
- Data quality analysis: Final QA/QC check
- Data consistency: are results consistent through different lines of evidence/predictions/CSM.



# Timelines

- Completion of Draft Vapour Guidance (2007)
- Completion of Public Review (Winter, 2008)
- Completion of Final Draft (Spring 2008)

Thank you