

# Overview of the Environmental Site Assessment Process



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# Contents



- Drivers for Environmental Site Assessments
- Phase 1 Environmental Site Assessment
- Phase 2 Sampling and Analysis Program
- What is an Environmental Audit
- Risk Assessment
- Summary
- What is ACLCA?

# Introduction



- What is an Environmental Site Assessment or ESA?
- Why conduct an ESA?

# Relevant National Documents covering ESAs



- National Environment Protection (Assessment of Site Contamination) Measure – 1999
- ANZECC – 1992
- Australian Standards – 2005 and 1999
- Numerous EPA guidelines covering ESA and Auditing works in Victoria, incl “A Guide to the Sampling and Analysis of Waters, Wastewater, Soil and Wastes”.

# What is the Definition of an ESA?



- Defined in the NEPM as:  
“a set of formal methods for determining the nature, extent and levels of existing contamination and the actual or potential risk to human health on or off-site resulting from that contamination.”

The NEPM also notes that site assessment work should be conducted by professionals who are able to demonstrate to regulatory authorities that they have relevant qualifications and experience.”

# Why are ESAs Conducted?



- Due Diligence either by owner of site or potential purchaser
- Lending Institution Requirements
- Planning Triggers
- Clean Up Notices
- Following an incident or pollution event

# Phase 1 ESA



- What is it?

Effectively a preliminary site assessment with no physical sampling of soils, groundwater, surface water or sediment

# What is the key component of a Phase 1 ESA?



To gather sufficient information to understand the **POTENTIAL** for site contamination at the site being investigated

# How to determine “Potentially Contaminated”



- Need to understand the history of the site and activities undertaken at the site
- The site history review process is outlined in the NEPM and comprises investigating the site via the following sources
  - General Background information
  - Visual inspection of the site and surrounds

# Site History



- Current and historical site plans
- Review council and EPA records (rates for ownership, building permits, waste licences)
- Historical title search
- Chemical storage and disposal records

# Site History (2)



- Waste disposal records
- MMBW baseplans
- Records of any spills or incidents
- Interviews with site occupiers or employees
- Local Historical Society
- Earth moving records
- Old street directories or geological maps

# General Background Information



- Property Details
- Current and proposed use
- Expected geology
- Hydrogeology
- Zoning of site and surrounds
- Any existing uses of groundwater?
- Identification of potentially sensitive surrounding land uses
- Source information

# General Background Information (2)



- Zoning
- Present owners, occupiers and current users of the site
- Previous occupiers
- Previous activities/ uses
- Previous and present buildings and structures
- Industrial processes carried out on site and the products manufactured
- Raw materials used

# General Background Information (3)



- Intermediate products
- Wastes produced
- Waste disposal locations
- Discharges to land or water
- Sewer and underground services plans
- Chemical storage and transfer areas
- Motive power
- History of adjacent land uses
- Interview information

# Sources of information for the Site History and General Background Information



- Past and current owners/occupiers
- Workers and operators
- Local residents
- Aerial photographs
- Trade and street directories
- Historical societies
- Historical titles
- Complaint histories
- Site layout plans
- Local and state government agencies, EPA, DSE, DPI
- MFB
- Dangerous Goods Licences from WorkCover
- Cathodic protection register

*Key is to make sure all information can be cross referenced*

# Visual Site Inspection



- Has there been any filling of the site? (site development or on-site waste disposal)
- Site features
- Closest surface water body
- Describe surrounding land uses
- Unusual odour
- Low points, sumps, drainage pits and lines
- Vent pipes/fill points for above or below ground storage tanks/vessels
- Current use of the site and surroundings
- Disturbed/stained or bare soil
- Distressed vegetation
- Presence of stored chemicals
- Areas of waste disposal
- Odour
- Drainage of surface waters/spills
- Potential receptors of any contamination
- Underground structures
- Topography



# Outcomes of the Phase 1 ESA



- Is there potential for site contamination?
- If so what environmental media are likely to be contaminated?
- What is the likely source(s) of the contamination?
- What is the likely depth of contamination?
- What are the key properties of the potential contaminants?

# Outcomes of the Phase 1 ESA



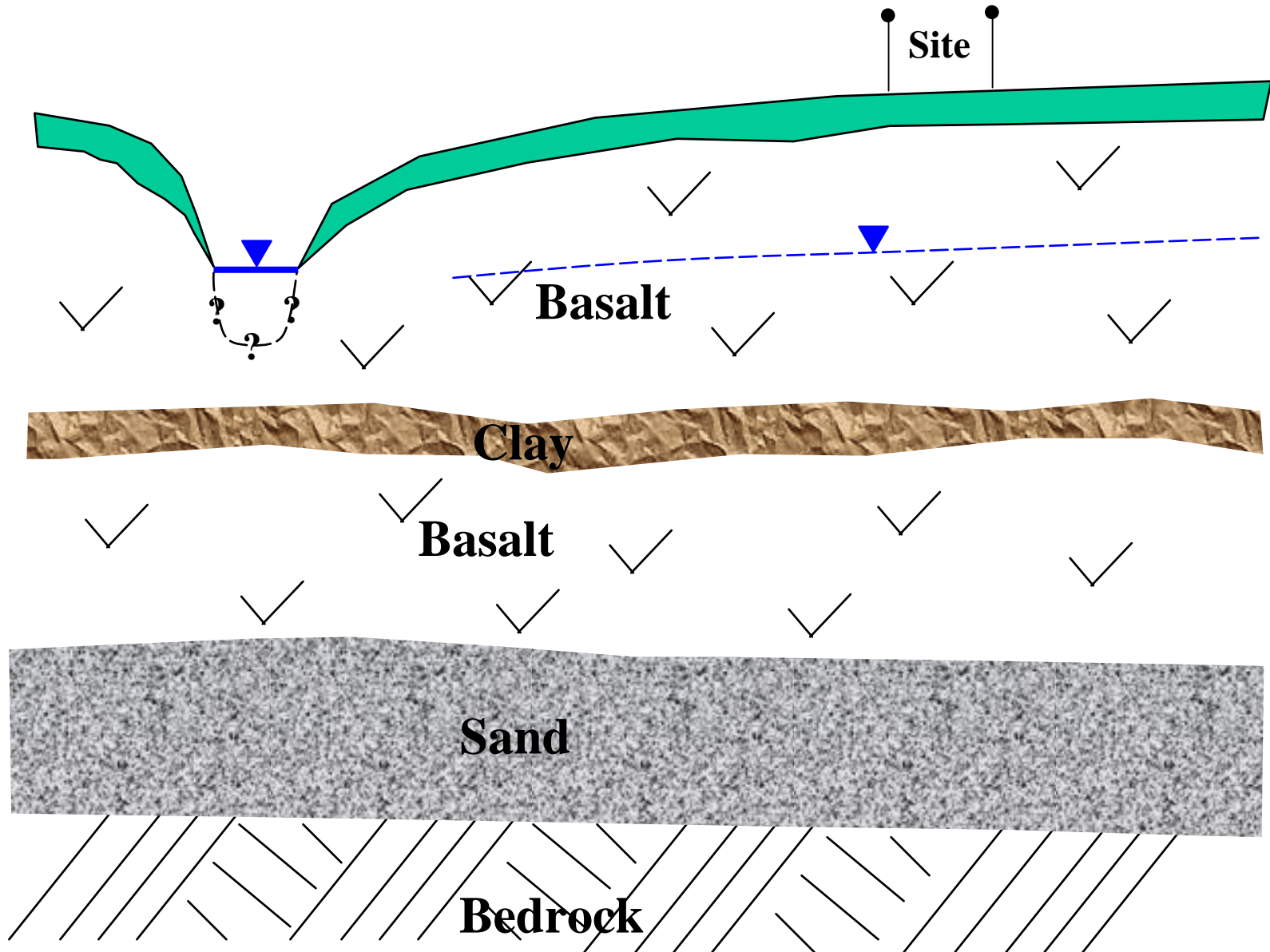
- What is the potential for interaction with the contamination given current and future land uses?
- What are the actual and potential pathways for exposure?
- Consider contaminant release area, possible transport mechanisms and possible intake routes
- Site conceptual model should be relatively straight forward and should not be complicated

# Outcomes of the Phase 1 ESA

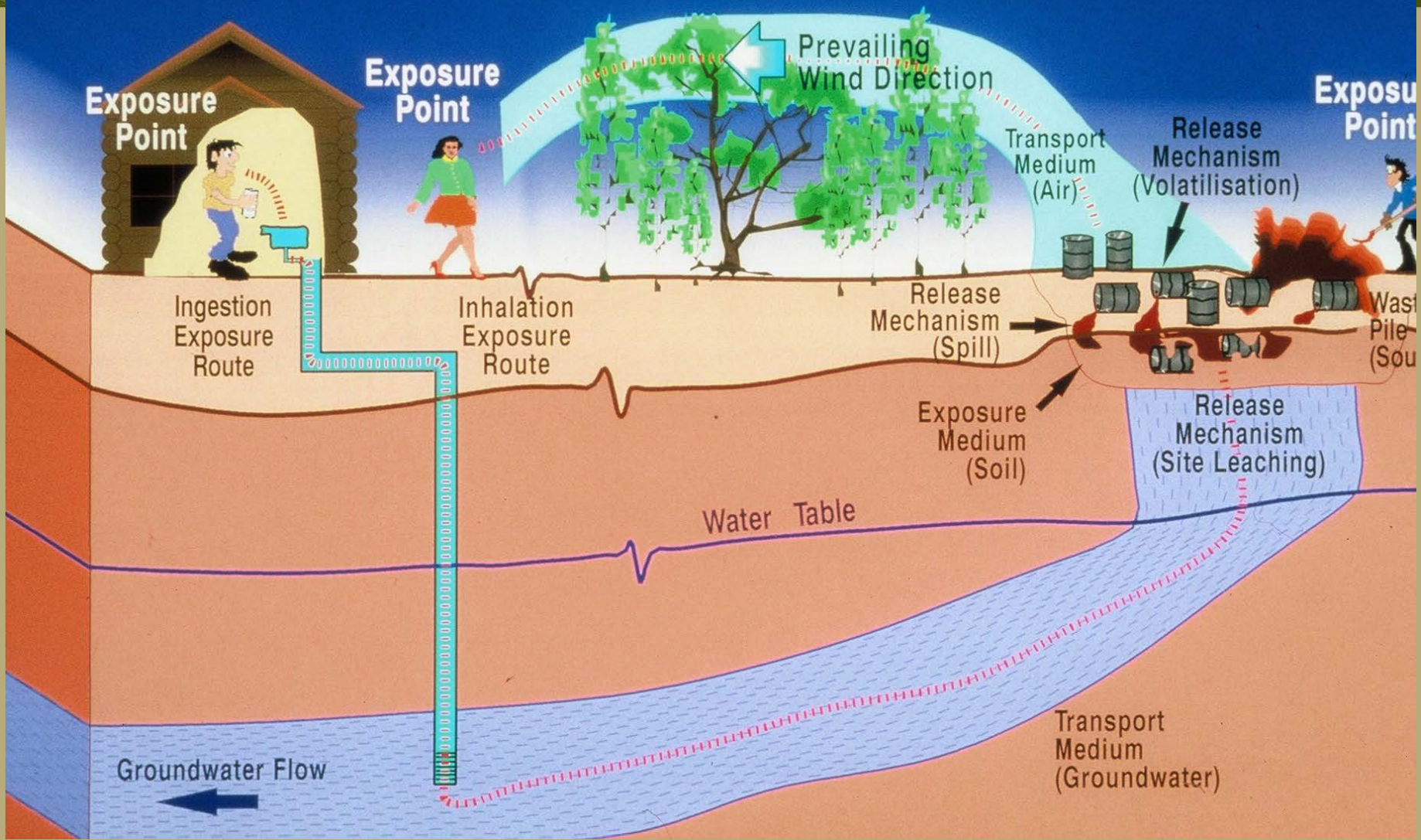


- Develop a Conceptual Site Model
  - Local/regional geology, soil types and aquifers
  - Groundwater occurrence and possible groundwater flow systems
  - Regional groundwater quality
  - What are the primary and secondary sources of contamination?
  - What are the likely human and ecological receptors

# Conceptual Regional Cross Section



# EXPOSURE PATHWAYS



# Site is Potentially Contaminated so where to now?



- Phase 2 ESA
- Physical Sampling and Analysis Program
- Develop a sampling and analysis program to physically assess the degree of site contamination

# Sampling and Analysis Plan



- Determine the nature of contamination, contaminant type, properties, propensity
- Determine the extent of contamination, concentration, depth, lateral extent
- Determine whether management measures are required
- Design and implementing management measures, including site specific risk assessment or physical remediation
- Determine whether management measures have been effective

# Investigation Levels



- What are they?
- How should they be used?

# Investigation Levels



- Soils – EILs and HILs set out in NEPM
  - *I* (Investigation) is the important letter
- Waters – ground or surface. WQOs set out in ANZECC or ANZECC/ARMCANZ
  - *O* (Objective) is the important letter
- Wastes – Limits or Maximum Concentrations set out in EPA Publication 448

# Investigation Levels



- *“Subject to clause 10(3), where contamination at a site is of a level which precludes a protected beneficial use of the relevant land use, a state of pollution exists and the land must be cleaned up and/or managed....”*

*(SEPP PMCL, clause 21 Polluted Land, emphasis added)*

- Indicators and objectives are linked to the NEPM EILs and HILs (Table 2 of the SEPP)

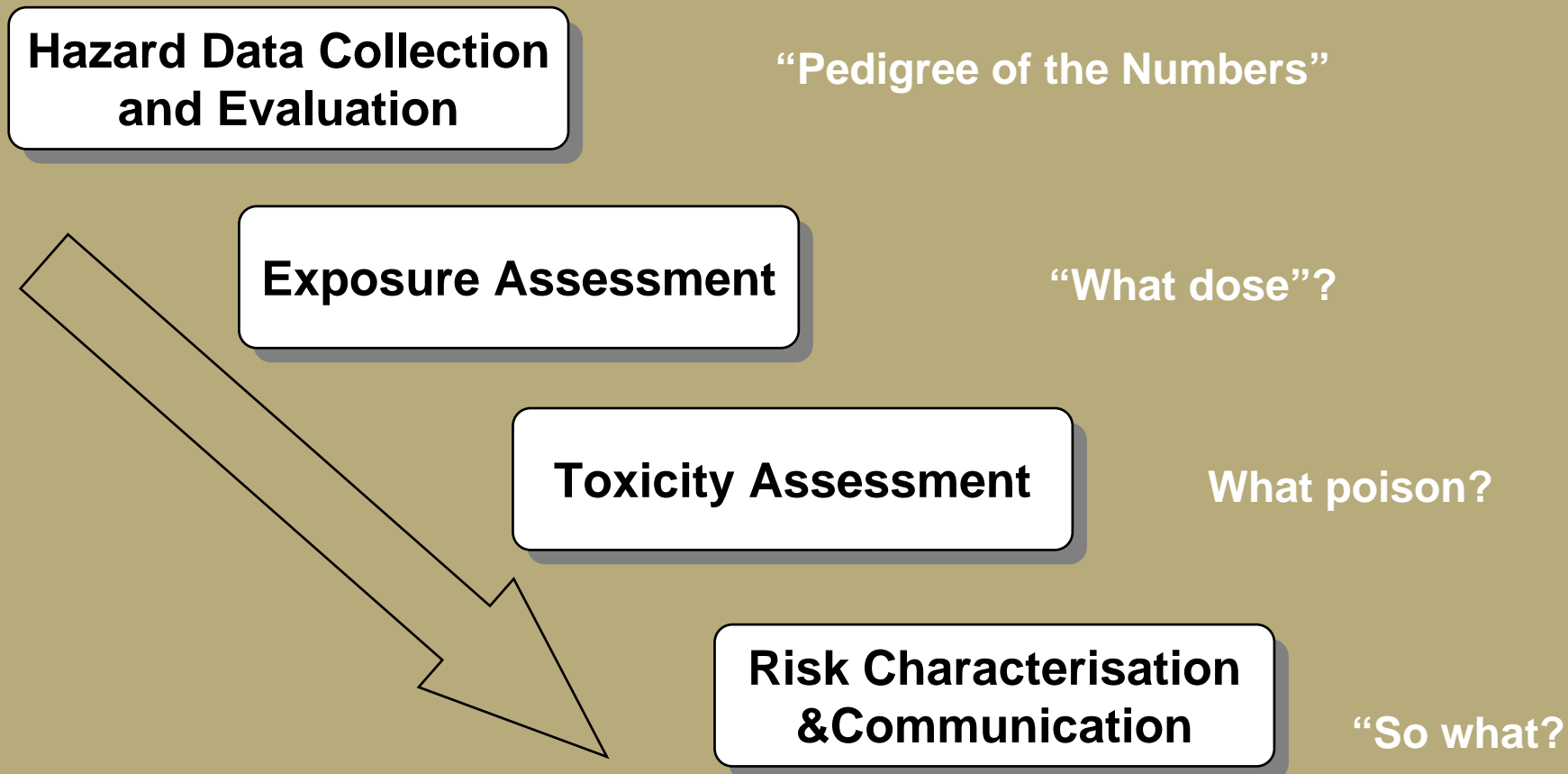
*The level of any indicator should not be greater than any levels derived using an acceptable risk assessment methodology*

# Risk Assessment



- **What is risk?–**
  - The potential for an adverse effect to occur.
  - The potential for a hazardous effect to occur
  - The probability that a hazardous effect will occur.
- **Human Health Risk?–**
  - The potential for a toxicological effect to manifest in any person from a group of people who are exposed to a chemical that can cause this effect.
- **Ecological Risk?–**
  - The potential for a toxicological effect to manifest in any plant or animal of value and cause an unwanted ecological disruption due to chemical exposure.

# Risk Assessment



# What is an Environmental Audit?



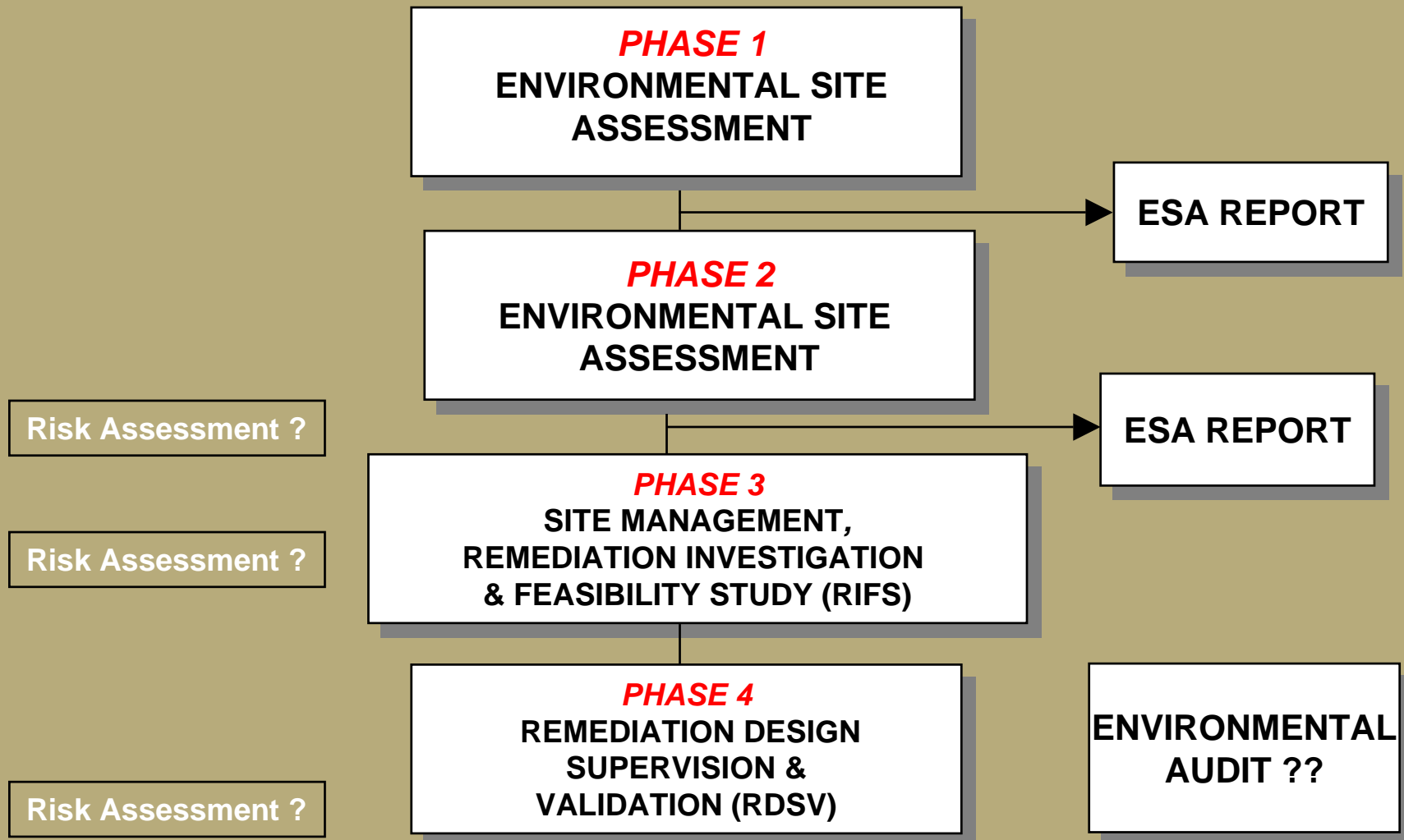
- Independent assessment of the condition of a site in terms of suitability for use.
- Auditor must be truly independent (eg financial interest, relatives, previous assessment, independence from remediation details)
- Audit is NOT limited to an evaluation of the assessment work undertaken by others – it requires an opinion of the actual condition of the site.
- Omissions by the assessor are not an excuse for an Auditor. A major part of auditing is assessing the quality and completeness of assessment work

# Audit Outcomes



- Certificate
  - Site considered suitable for any beneficial use
- Statement
  - Some restriction/conditionality on site use, either:
    - Not suitable for any use
    - Suitable for specific uses without further conditions or limitations
    - Suitable for specific uses subject to conditions/limitations on use and management
- (Common misconception: assessment for audit can be targeted to a Statement rather than a certificate)

# LAND CONTAMINATION MANAGEMENT



# ACLCA Code of Practice



**All members commit to a Code of Practice to ensure that the community recognises our integrity and trusts our professional judgment**



# Australian Contaminated Land Consultants Association

[www.aclcavic.org.au](http://www.aclcavic.org.au)