

SHARED VALUE SOLUTIONS

Environmental Site Assessments 101

November 27, 2024

SHAREDVALUESOLUTIONS.COM

AGENDA

1. Introductions
2. What is an Environmental Site Assessment?
3. Why are Environmental Site Assessments Important?
4. Who is involved in Environmental Site Assessments?
5. Phase I ESAs
6. Phase II ESAs
7. Phase III ESAs
8. Questions & Dialogue



INTRODUCTION



Alison Gamble

Senior Environmental Chemist

Environmental Science Team Lead

Shared Value Solutions Ltd.

SHARED VALUE SOLUTIONS

Opening Circle

- What is your name?
- What Nation are you representing?
- One thing I'm most interested in learning today…



SHARED VALUE SOLUTIONS

What is an Environmental Site Assessment?



Environmental Site Assessments (ESAs)

An analysis of a property's current and past uses, and neighbouring activities, that may have affected the property's environmental quality.



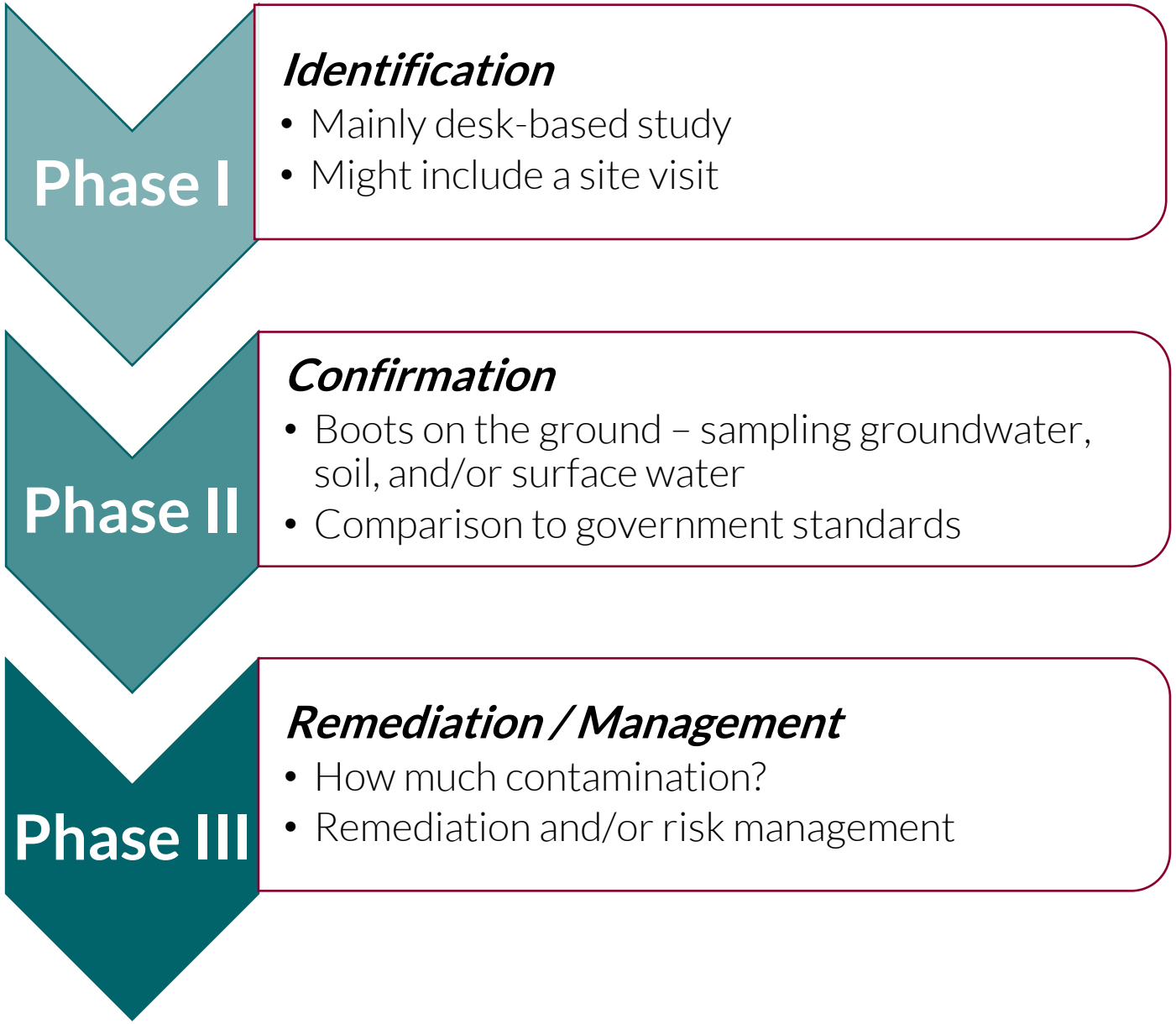
Contaminated Sites

Definition

An area where there are substances at concentrations above background (natural) levels and could or are likely to pose a hazard to human health or the environment, or are above levels specified in policies and regulations.



Environmental Site Assessments (ESAs)



Common Acronyms in ESAs



APEC	Area of Potential Environmental Concern
AEC	Area of Environmental Concern
COPC	Contaminant of Potential Concern
QP	Qualified Person

SHARED VALUE SOLUTIONS

Why are Environmental Site Assessments Important?



Importance of ESAs

- **Provides important information**
- **Is there contamination, and how much?**
- **Reduces liability and risk**

Important for:

- Additions to Reserve process
- Land purchases/acquisitions
- Prior to issuing/termination of a land instrument
- Framework Agreement on First Nation Land Management



Framework Agreement on First Nation Land Management

A government-to-government agreement that recognizes First Nations' inherent right to govern their reserve lands.

- For First Nations interested in replacing the land restrictions of the *Indian Act* a community land code.
- Only First Nations who are signatories to the agreement are affected by its application.
- First Nation assumes administration and law-making authority of their reserve lands when they ratify their land code

(RC First Nations Land Management Resource Centre, 2021)

Framework Agreement on First Nation Land Management

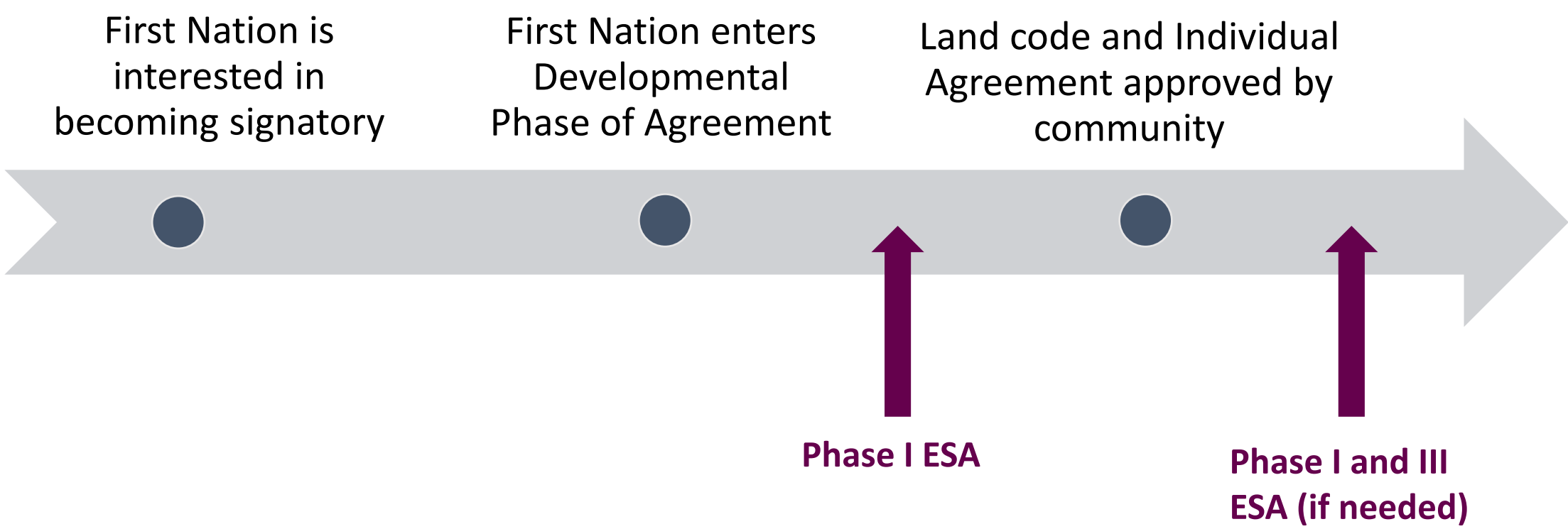
Phase I

Phase I ESAs are required under the Framework Agreement

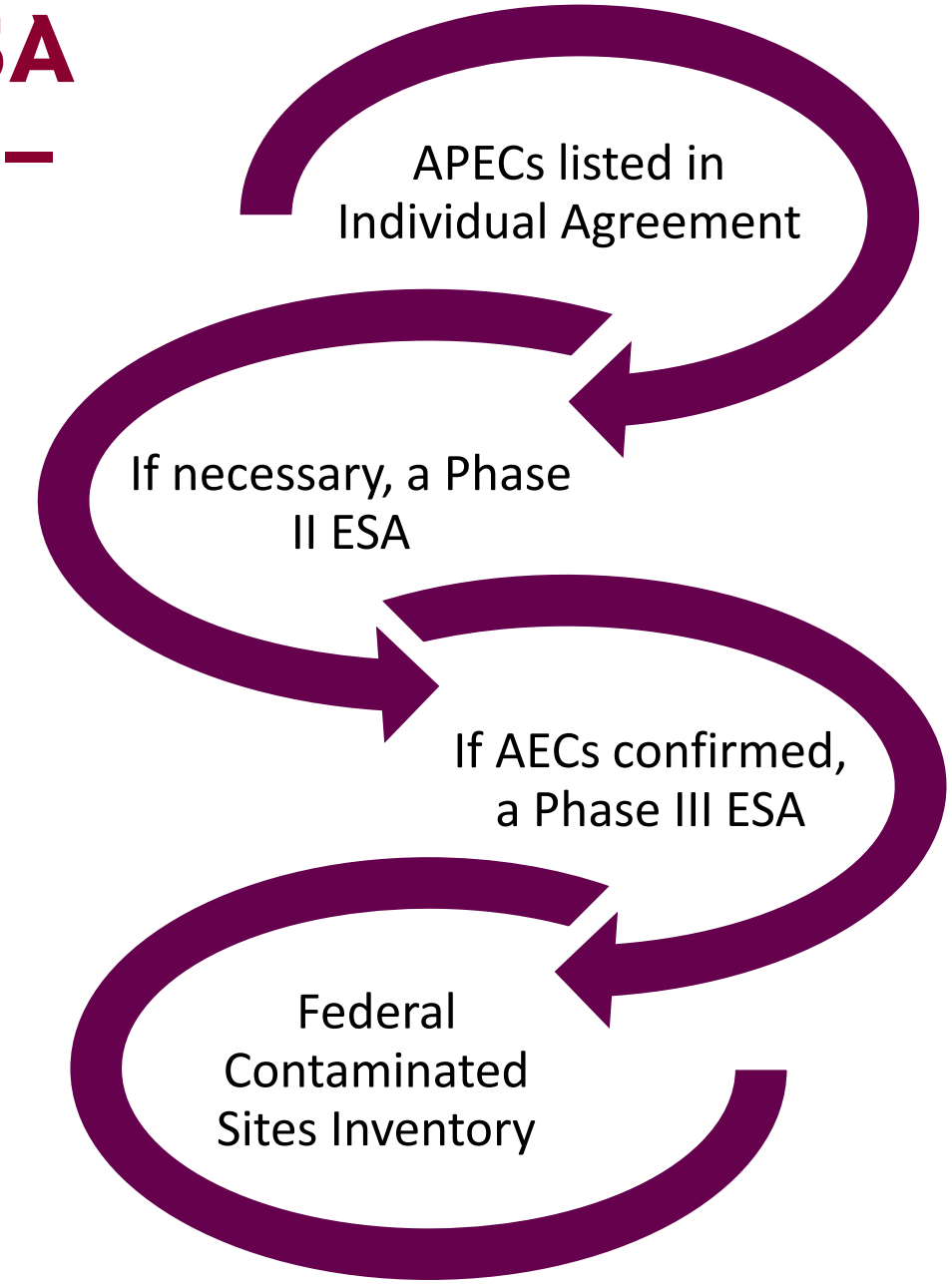
- Gives an idea of the reserve lands' environmental conditions
- Could lead to further investigations (Phase II ESA)
- Forms part of the First Nation's Individual Agreement with Canada
- Canada is responsible for any acts or omissions that occurred before the Land Code is ratified

(RC First Nations Land Management Resource Centre, 2021)

ESA Timing Under Framework Agreements

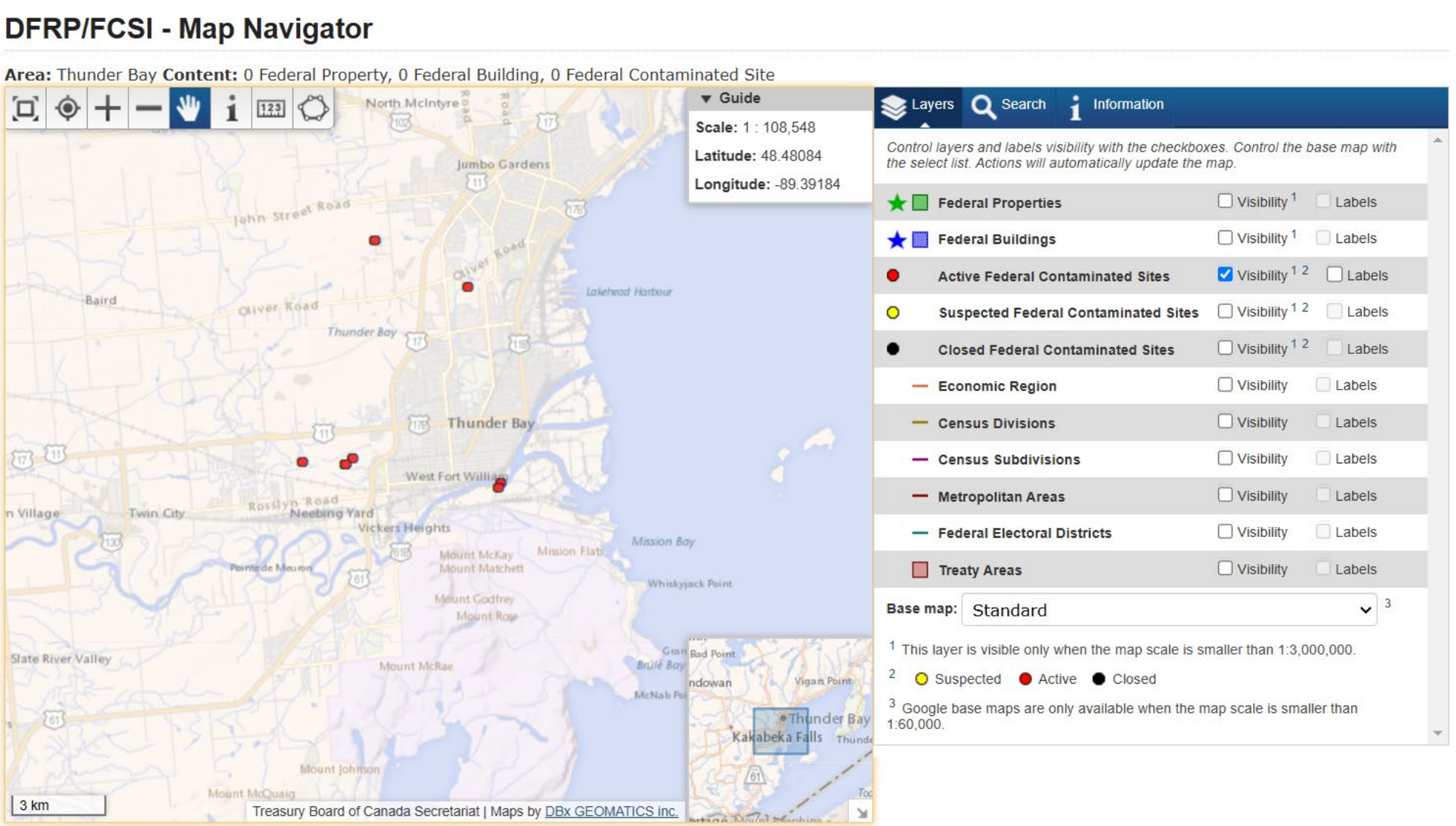


A Phase I ESA is Complete – Now What?



Federal Contaminated Sites Inventory

https://www.tbs-sct.gc.ca/fcsi-rscf/home-accueil-eng.aspx



SHARED VALUE SOLUTIONS

Who is involved in Environmental Site Assessments?



Qualified Person (QP)

In Ontario, a qualified person is somebody who is either:

- A licenced Professional Engineer (P.Eng.)

OR

- A licensed Professional Geoscientist (P.Geo.)

A QP conducts or supervises the completion of the ESA

Joint Management Committee

Oversees the Phase I ESA when conducted as part of the Framework Agreement process

1 First Nation Representative	1 ISC Representative
• Finalizes Phase I ESA SOW • Distributes call for proposals • Helps select the QP • Receives funding from ISC and disburses funds • Manages the project • Reviews and comments on draft materials • Provides approval of final Phase I ESA report	• Works with First Nation to develop SOW • Helps review proposal and selection of QP • Reviews draft reports • Provides FN and QP with access to pertinent records • Expedites funding for Phase I ESA • Technical support as requested

Land Manager

Depending on the Nation and the Land Manager's capacity, involvement may include:

- Interview with QP conducting Phase I ESA
- Help coordinate interviews with staff, Elders, and other members
- Provide relevant records and information
- Accompany QP on site visits
- Coordinate access to areas for Phase II investigation
- Be present for utility locates for Phase II ESA
- Participate in meetings with QP, ISC, others

Independent Consultant

Typically for situations not associated with Framework Agreement

- Canada may select QP to conduct an ESA
- First Nation may want support of an independent, trusted consultant to:
  - Review and comment on the outcomes of the ESA
  - Participate in meetings with ISC
  - Provide independent technical advice on outcomes and next steps
  - Project manage the ESA

This is the role that Shared Value Solutions often plays for First Nations

POLL QUESTION #1

Have you been involved in an ESA?

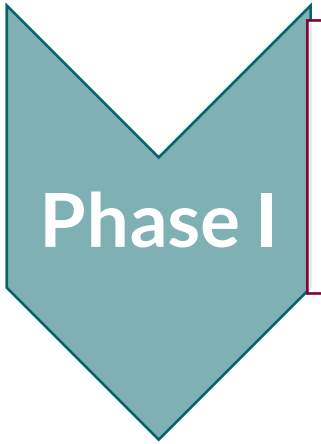
- Yes
- No
- I don’t remember

SHARED VALUE SOLUTIONS

Phase I: Desktop Review



Phase I ESA



Goal is to identify Areas of Potential Environmental Concern

POLL QUESTION #2

What are some areas of potential concern that you know about on your reserve?

- Above ground fuel storage tanks
- Underground fuel storage tanks
- Chemical storage areas
- Past chemical spills
- Pesticide applications
- Old transformer boxes
- Other

Phase I ESA: Research/Historical Review

1. **Historical/Records Review**
   - Gather and review all historical information about the site

2. **Interviews**
   - Conduct interviews with staff, Elders and community members in the area



Phase I: Research/Historical Review

3. **Site Visit**
   - Visit the site and record observations

4. **Review and Evaluation**
   - Review all collected information from records review, interviews, site visit

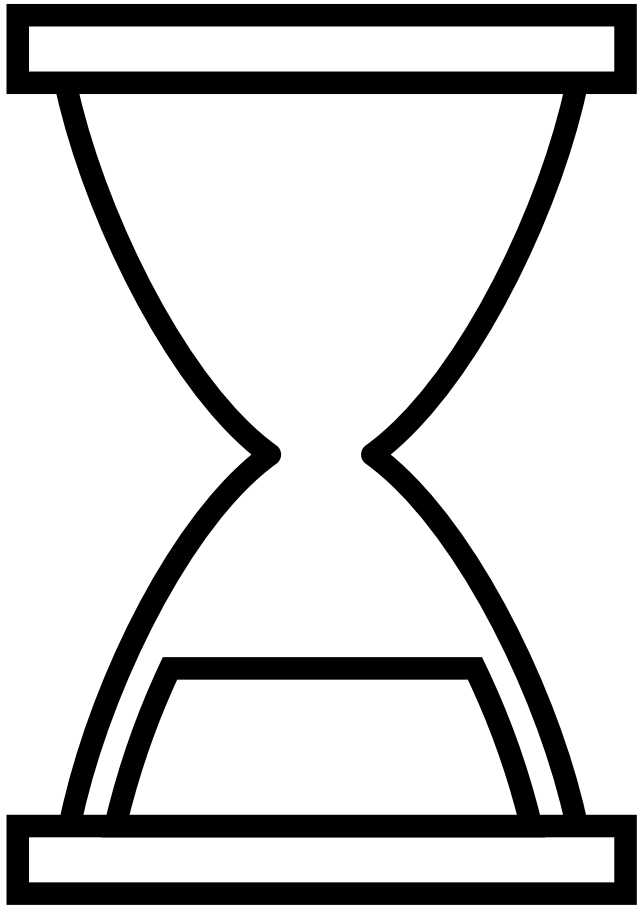
5. **Reporting**
   - Provide findings from Phase I



Stale-dating of Phase I ESAs

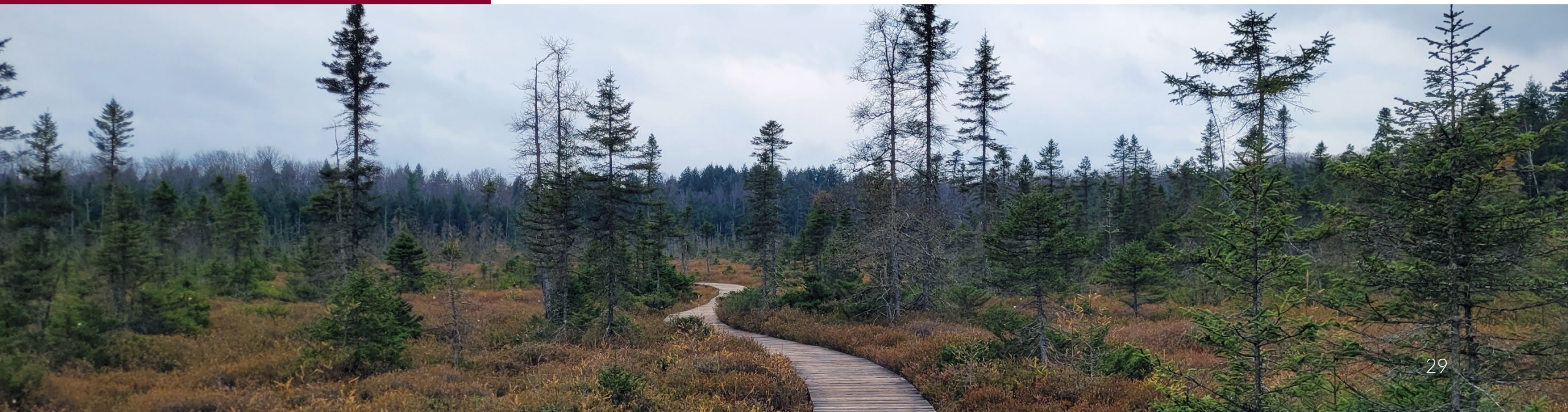
As per Land Management Manual for Additions to Reserve:

- Phase I ESAs are typically only “good” for 5 years before the expire
- After 5 years, a re-assessment is required
- Re-assessment might include a file review, a site visit, or a new Phase I ESA



SHARED VALUE SOLUTIONS

Phase II: Sampling



Phase II ESA

Phase II

Goal is to confirm whether contamination is present at the Areas of Potential Environmental Concern from Phase I

Phase II: Sampling

1. **Planning**
   - Develop a suitable workplan

2. **Field Investigation and Sampling**
   - Further in-depth investigations and analysis of APECs
     - Soil sampling Groundwater sampling
     - Surface water sampling
     - Additional sampling

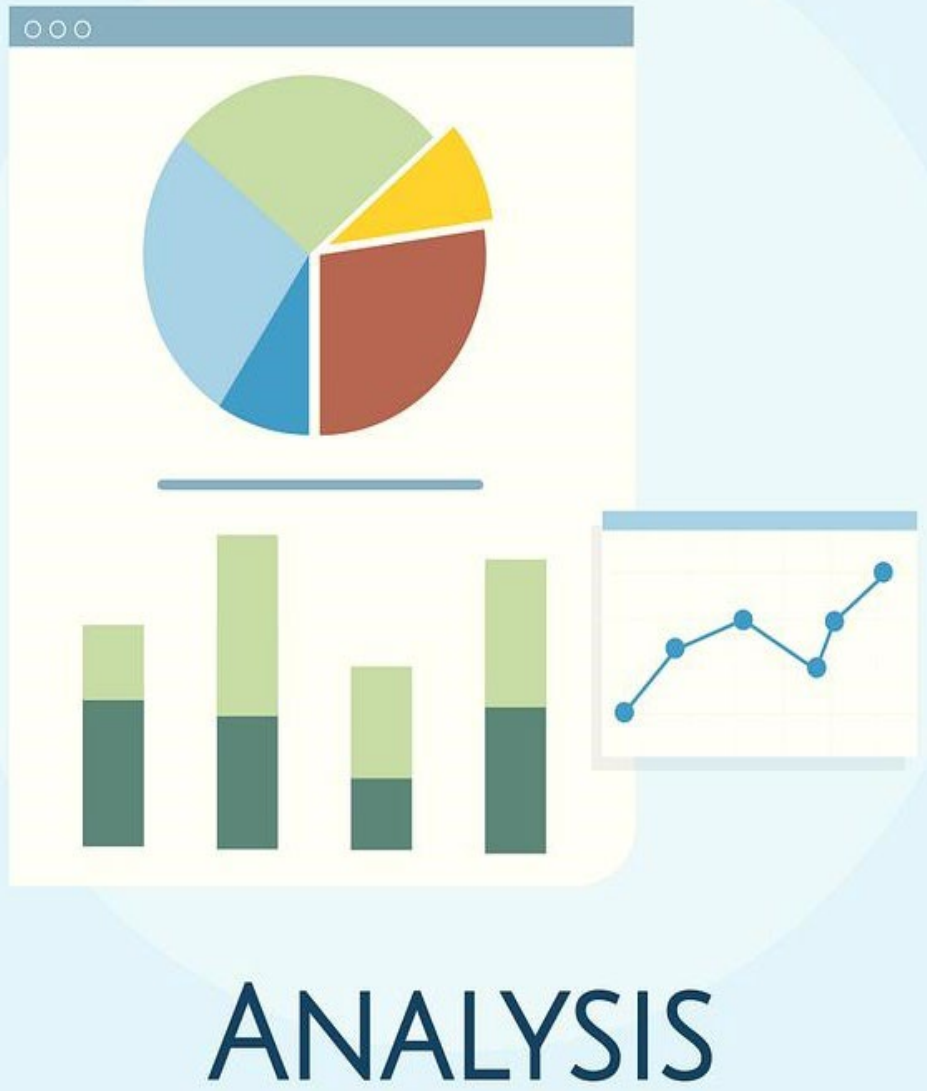


31

Phase II: Sampling

3. **Sample Analyses**
   - Are there contaminants present at the APECs?

4. **Data Interpretation and Evaluation**
   - Compare sampling results to applicable guidelines
   - Evaluate the quality assurance/quality control data



Phase II: Sampling

What are environmental quality guidelines?

Guidelines for soil, water, and sediment created by the Federal and/or Provincial governments for different purposes.

Table 1. Soil quality guidelines for inorganic arsenic ($mg \cdot kg^{-1}$).

	Land use			
	Agricultural	**Residential/ parkland**	**Commercial**	**Industrial**
Guideline	**12**[a]	**12**[a]	**12**[a]	**12**[a]
SQG_{HH} Limiting pathway for SQG_{HH}	12 Soil ingestion	12 Soil ingestion	12 Soil ingestion	12 Soil ingestion
Provisional SQG_{HH} Limiting pathway for provisional SQG_{HH}	NC[b] ND	NC[b] ND	NC[b] ND	NC[b] ND
SQG_E Limiting pathway for SQG_E	17 Soil contact	17 Soil contact	26 Soil contact	26 Soil contact
Provisional SQG_E Limiting pathway for provisional SQG_E	NC[c] ND	NC[c] ND	NC[c] ND	NC[c] ND
Interim soil quality criterion (CCME 1991)	20	30	50	50

Notes: NC = not calculated; ND = not determined; SQG_E = soil quality guideline for environmental health; SQG_{HH} = soil quality guideline for human health.

[a]Data are sufficient and adequate to calculate an SQG_{HH} and an SQG_E. Therefore the soil quality guideline is the lower of the two and represents a fully integrated de novo guideline for this land use, derived in accordance with the soil protocol (CCME 1996a). The corresponding interim soil quality criterion (CCME 1991) is superseded by the soil quality guideline.

[b]Because data are sufficient and adequate to calculate an SQG_{HH} for this land use, a provisional SQG_{HH} is not calculated.

[c]Because data are sufficient and adequate to calculate an SQG_E for this land use, a provisional SQG_E is not calculated.

Phase II: Sampling

Environmental Guideline Purposes

- **Soil Guidelines**
  - Developed for different land uses: agricultural, residential/parkland, commercial and industrial
- **Groundwater and Surface Water Criteria**
  - Developed for different water uses: freshwater supporting aquatic life, water for irrigation, livestock watering and human drinking water
- **Sediment Guidelines**
  - Developed for either freshwater or marine/estuarine environments

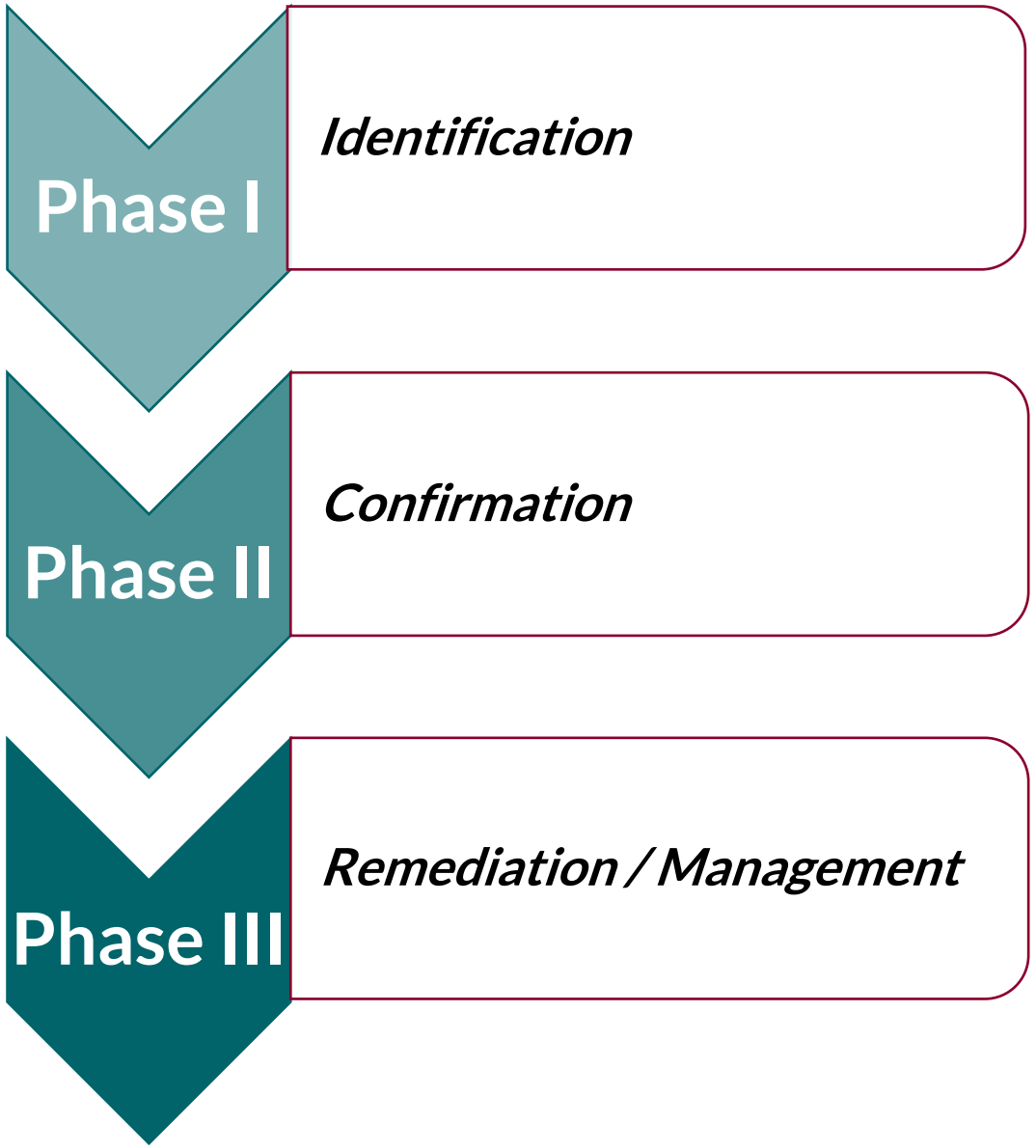


Phase II: Sampling

Phase II is complete, what is next?

- Results from Phase II ESA confirm if the site has contamination or not
  - APEC → AEC

- If the site is contaminated, then a Phase III ESA may be completed



POLL QUESTION #3

Do contaminated soils always need to be dug up and removed?

- Yes
- No
- I don’t know

SHARED VALUE SOLUTIONS

Phase III: Remediation & Risk Management



Phase III ESA

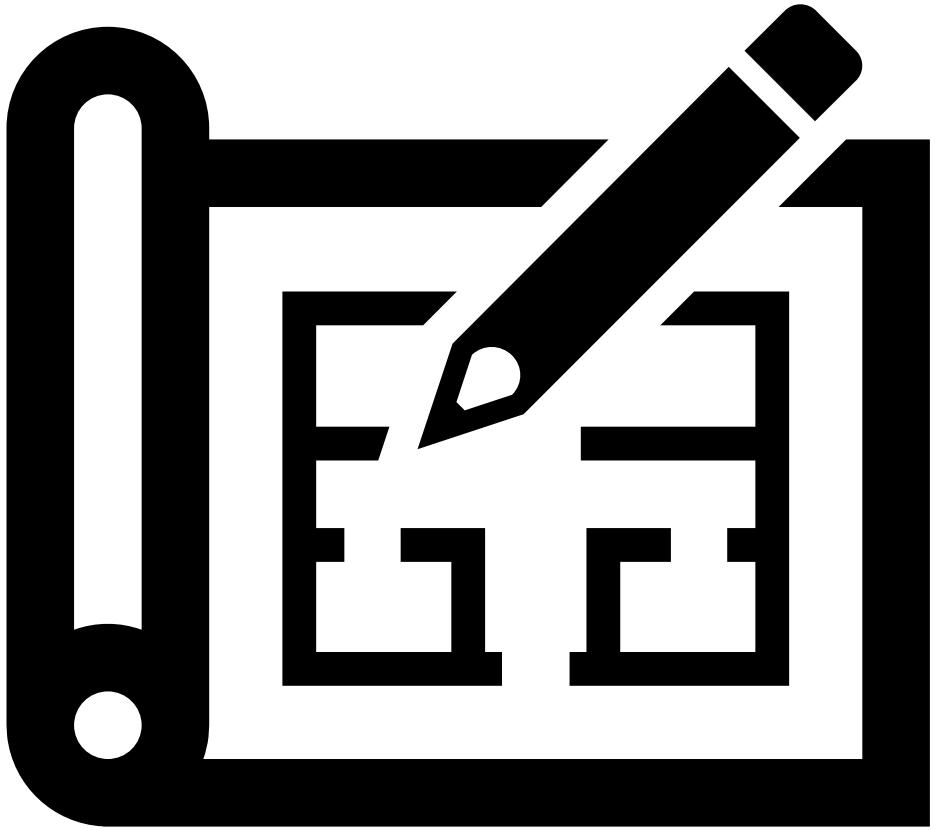
Phase III

Goal is to determine amount of contamination and plan out the best path forward.

Phase III: Remediation

Step 1. Detailed Sampling

- Delineate contaminant boundaries at APECs
  - How much contamination is present?
  - How far does it extend?



Phase III: Remediation

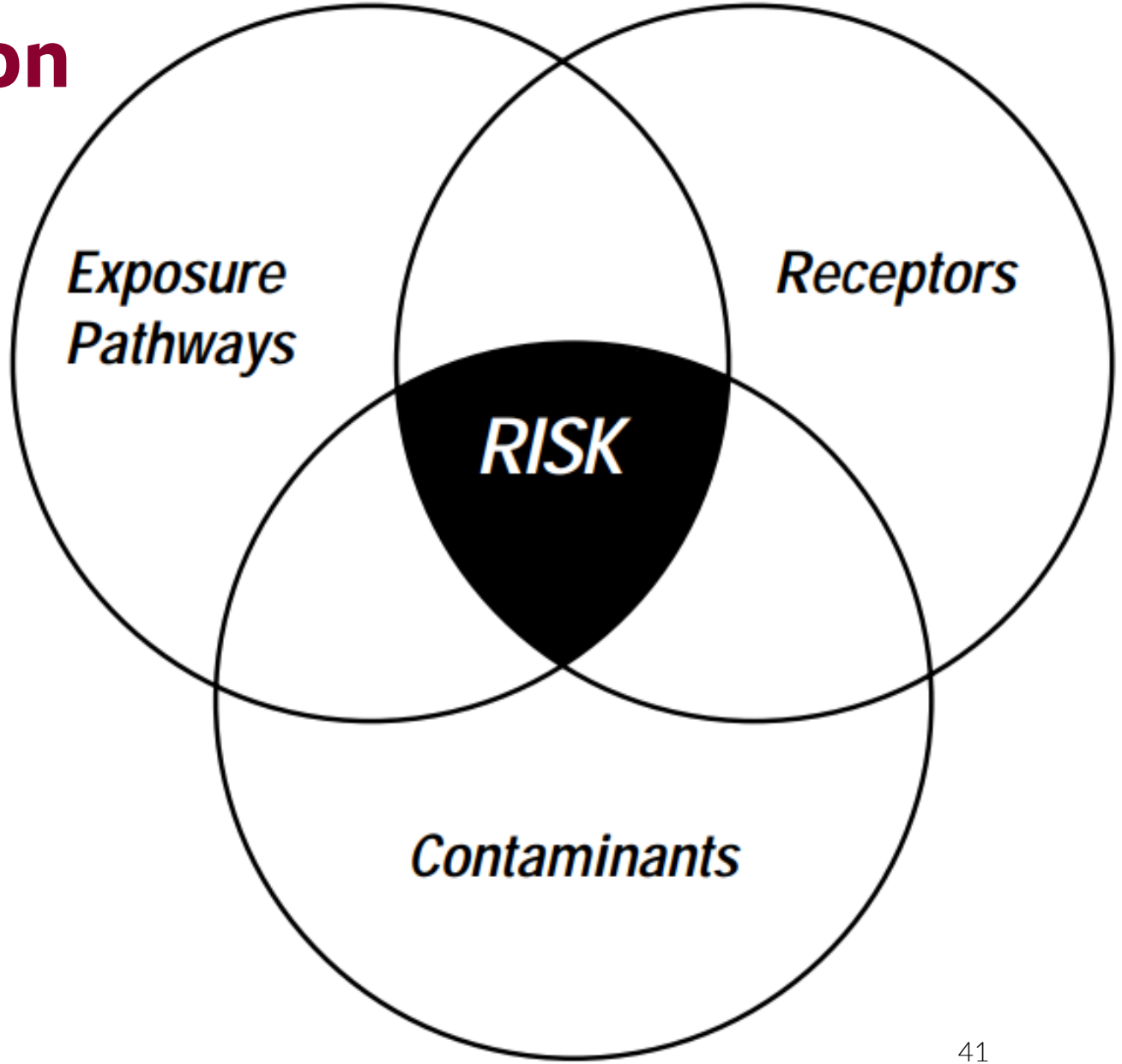
Step 1. Detailed Sampling

- Similar to Phase II Sampling
- May include:
  - More intrusive investigations
  - More samples



Phase III: Remediation

2. **Risk Identification**
   - Contaminants
     - Nature and location of contaminants
   - Exposure Pathways
     - Where and how contaminants can move
   - Receptors
     - Nearby sensitive receptors (plants, wildlife, humans)



Phase III: Remediation

Classifying Contaminated Site Using the CCME National Classification System

- Determine the level of concern and management priorities for contaminated sites
- Sites are classified as high, medium and low risk to prioritize action
- Online tool to classify AECs



Phase III: Remediation

Detailed Evaluation Form includes filling out information regarding:

- Pre-Screening Checklist
- Site Description
- Contaminant Characteristics
- Migration Potential
- Exposure Pathways



CCME National Classification System (2008) version 1.3
Score Summary

Site: No site identifier chosen

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCSCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	---	4
2. Chemical Hazard	---	4
3. Contaminant Exceedance Factor	---	4
4. Contaminant Quantity	---	4
5. Modifying Factors	---	4
Raw Total Score	---	20
Raw Combined Total Score (Known + Potential)	20	
Adjusted Total Score (Raw Combined Total/40*33)	**16.5**	(max 33)

II. Migration Potential	Known	Potential
1. Groundwater Movement	---	5.9
2. Surface Water Movement	---	6.9
3. Soil	---	7
4. Vapour	---	7.5
5. Sediment Movement	---	6
6. Modifying Factors	---	2
Raw Total Score	---	35.3
Raw Combined Total Score (Known + Potential)	35.3	
Adjusted Total Score (Raw Combined Total/64*33)	**18.2**	(max 33)

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B Potential		
a. Land Use		1.5
b. Accessibility		1
c. Exposure Route		
i. Direct Contact		1.5
ii. Inhalation		3.5
iii. Ingestion		4.5
2. Human Receptors Modifying Factors	---	1
Raw Total Human Score	---	13
Raw Combined Total Human Score (Known + Potential)	13	
Adjusted Total Human Score	13	(maximum 22)
3. Ecological Receptors		
A. Known Impact	---	
B. Potential		
a. Terrestrial		5
b. Aquatic		4.5
4. Ecological Receptors Modifying Factors	---	5
Raw Total Ecological Score	---	14.5
Raw Combined Total Ecological Score (Known + Potential)	14.5	
Adjusted Total Ecological Score	14.5	(maximum 18)
5. Other Receptors	---	3
Total Other Receptors Score (Known + Potential)	3	
Total Exposure Score (Human + Ecological + Other)	30.5	
Adjusted Total Score (Total Exposure/46*34)	**22.5**	(maximum 34)

Site Score

Site Letter Grade	**F**
Certainty Percentage	**0%**
% Responses that are "Do Not Know"	**100%**
Total NCSCS Score for site	**57.2**
Site Classification Category	**INS**

Site Classification Categories*:

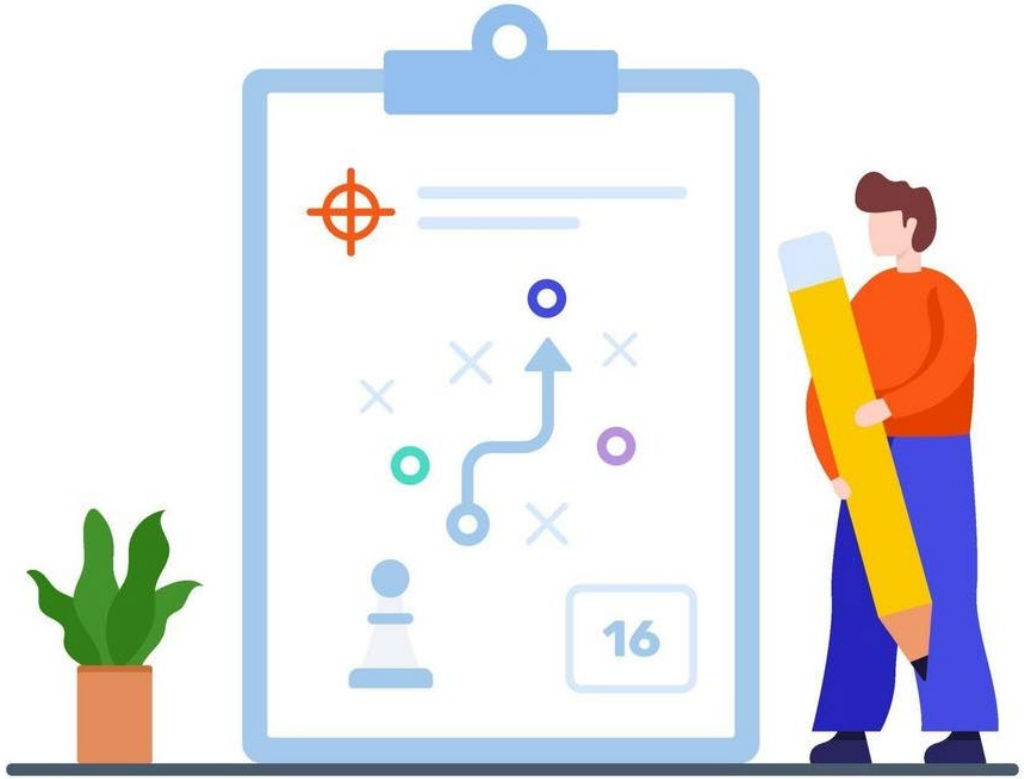
Class 1 - High Priority for Action (Total NCS Score >70)
Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
Class N - Not a Priority for Action (Total NCS Score <37)
Class INS - Insufficient Information (≥15% of responses are "Do Not Know", or a site letter grade of F has been assigned)

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

Phase III: Remediation

Step 3. Develop Remediation and Risk Management Strategies

- Establish remediation/risk management goals
- Develop a Remediation Strategy and Risk Management Strategy

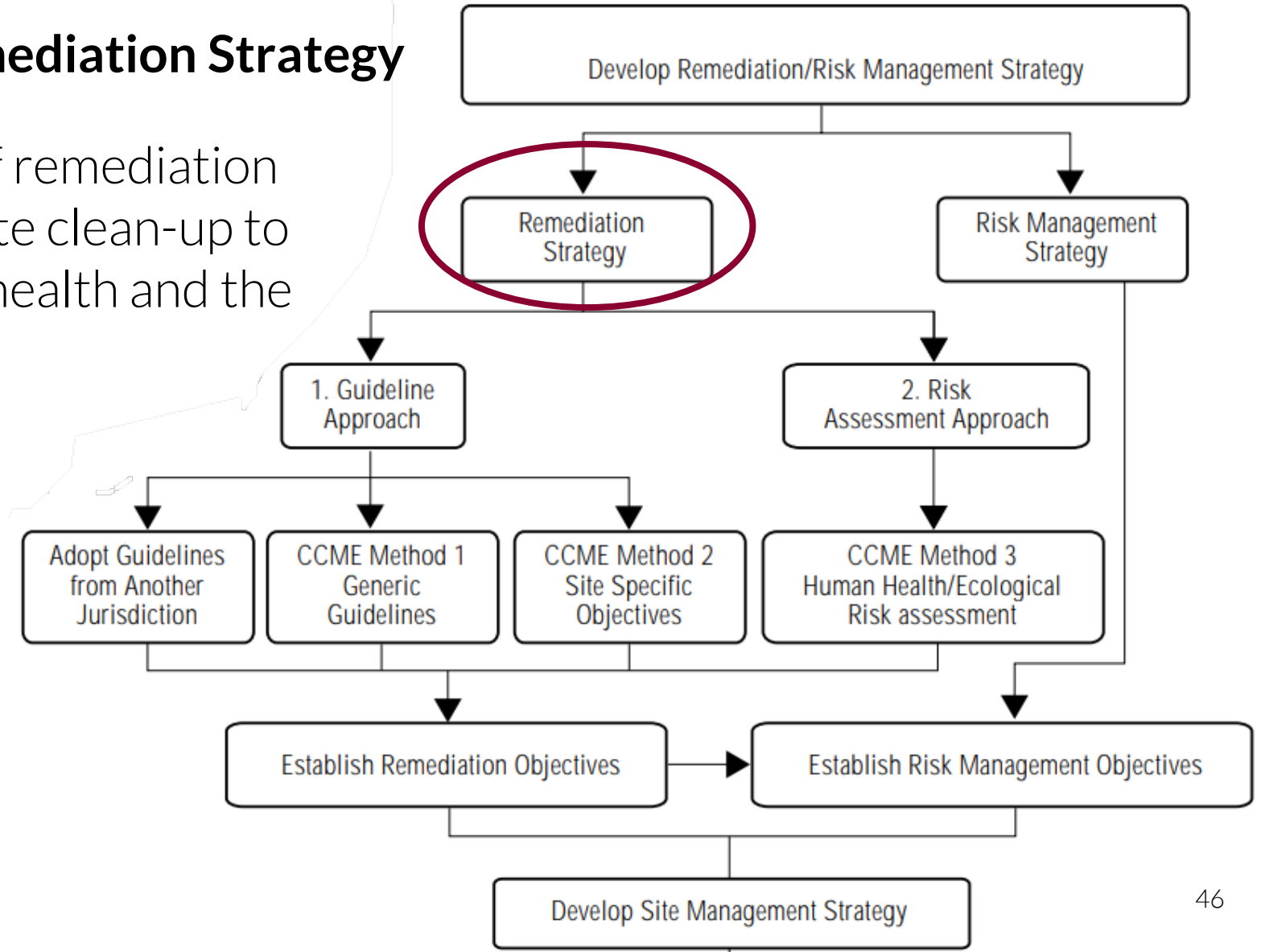


This step is only completed if the results from Phase II and the Detailed Sampling Program in Phase III meet or exceed applicable guidelines.

Phase III: Remediation

Developing a Remediation Strategy

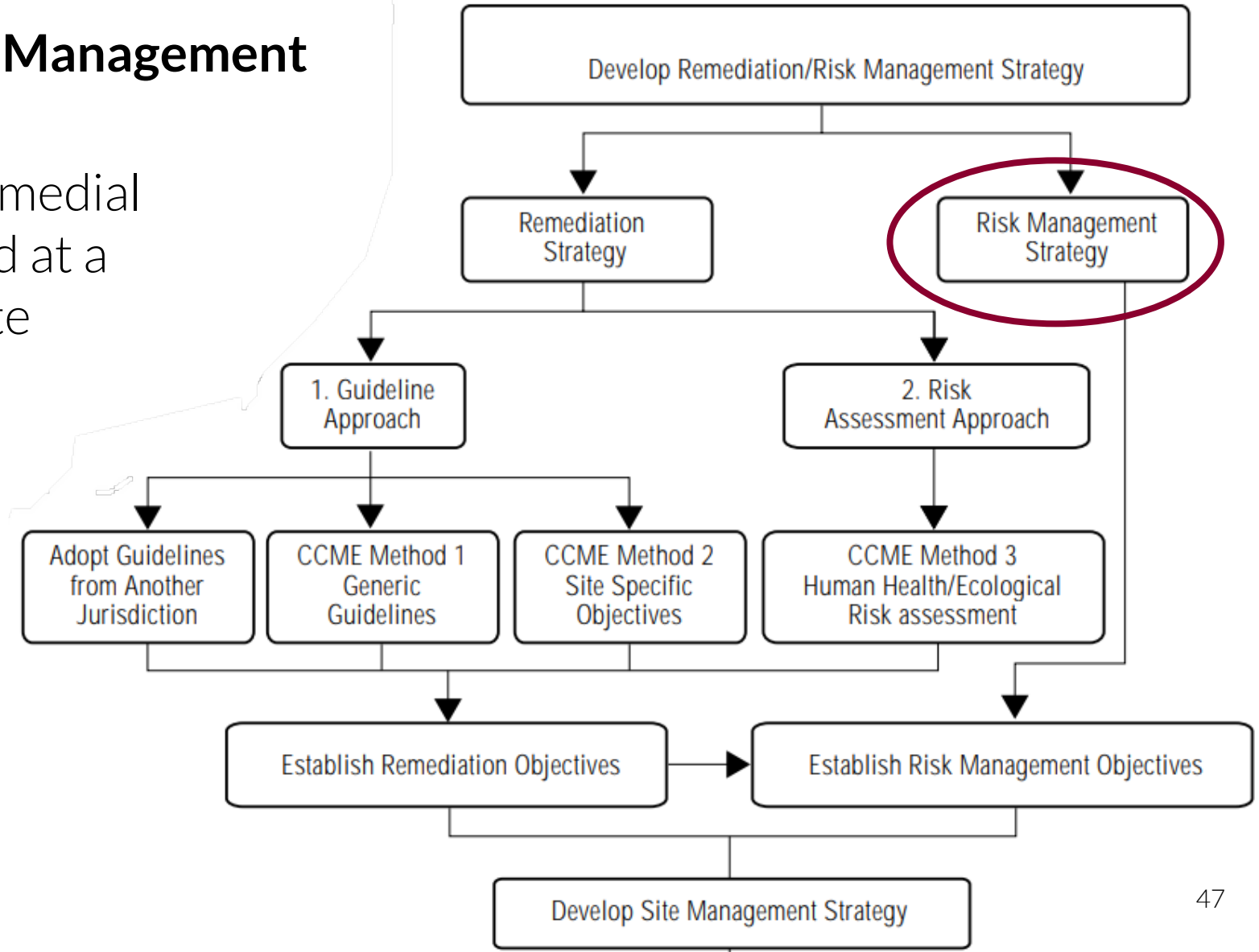
- Development of remediation objectives for site clean-up to protect human health and the environment



Phase III: Remediation

Developing a Risk Management Strategy

- Determines if remedial action is required at a contaminated site



Phase III: Remediation

Step 4. Implement Remediation and Risk Management Strategies

- Includes:
  - Determining appropriate technology needed for cleanup
  - Completing a cost benefit analysis
  - Preparing remedial action plan
  - Selecting a contractor
  - Maintaining proper documentation, quality control and communication



48

Phase III: Remediation

Identifying and Evaluating Remedial Technologies

Three main remedial approaches:

1. Removal and disposal
2. Containment or encapsulation
3. Treatment



Three main methods for approaches:

1. In-situ
2. Ex-situ
3. Off-site

Phase III: Remediation

Step 5. Confirmatory Sampling and Final Reporting

- Verifies the success of the remediation/risk management strategy

- Includes:
  - Sampling of areas being remediated
  - Comparing sample results to remediation objectives
  - Possible further remediation
  - Final report



50

Phase III: Remediation

(Optional) Step 6. Long-Term Monitoring

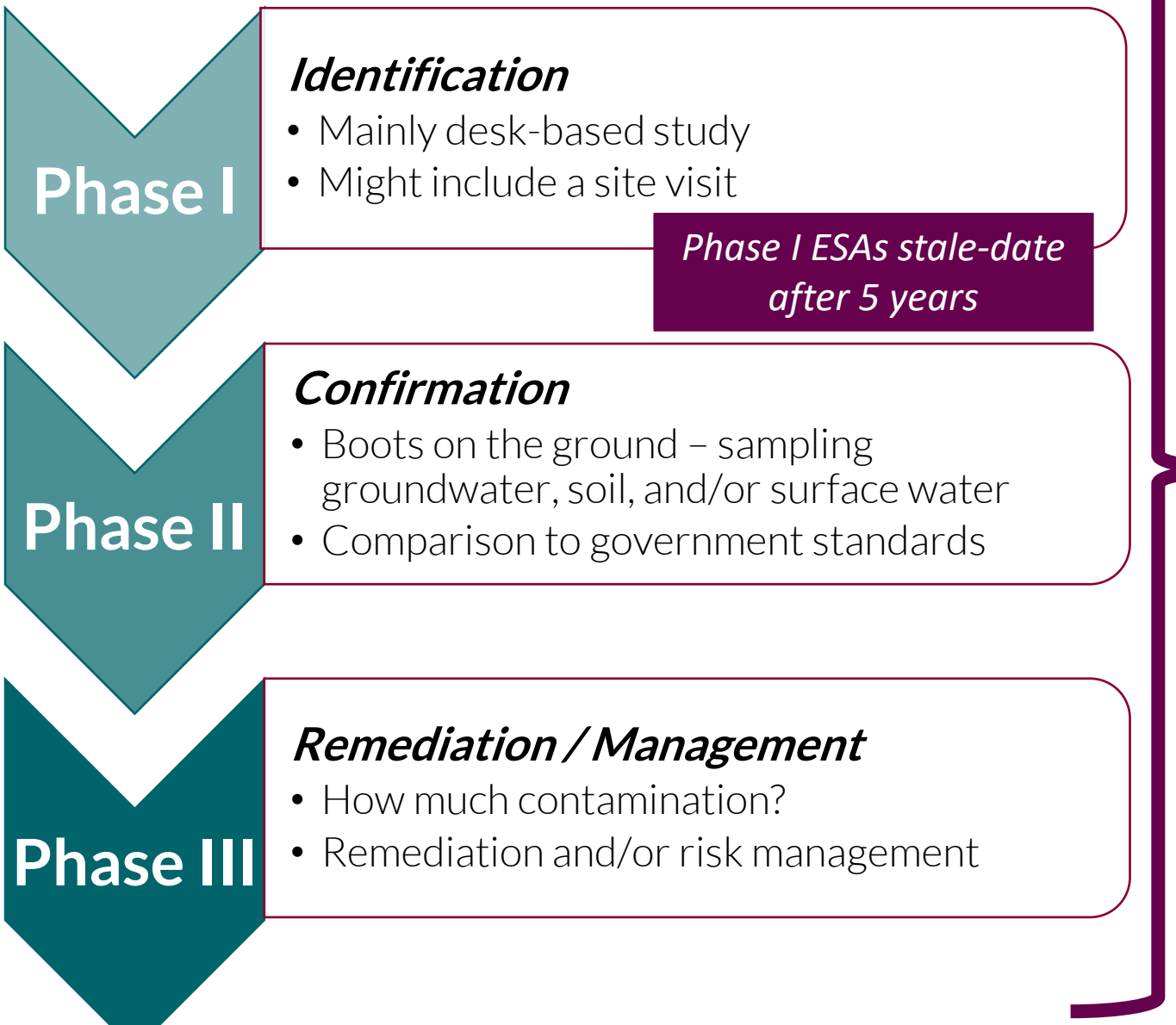
- If required, ensures remediation and long-term risk management goals are achieved

It may not always be possible to clean up a site to a level that results in removal of all significant concentrations of contaminants.



51

Recap of Key Points



- Additions to Reserve process
- Land purchases/acquisitions
- Prior to issuing/termination of a land instrument
- Framework Agreement on First Nation Land Management

SHARED VALUE SOLUTIONS

Questions & Dialogue




THANK YOU!
Have questions or need support? Please reach out!
alison.gamble@sharedvaluesolutions.com
PROSPERITY.
STEWARDSHIP.
JURISDICTION.