

Sustainable management of contaminated sites

Presentation 3.2 Phase 3 - Site Remediation Plan

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Content

- Objectives site remediation assessment
- The legal basis & financial instrument
- Design site remediation campaign
- Content of the site remediation plan
- Example of site remediation plan
 - ✓ Report
 - ✓ Planning
 - ✓ Cost estimate

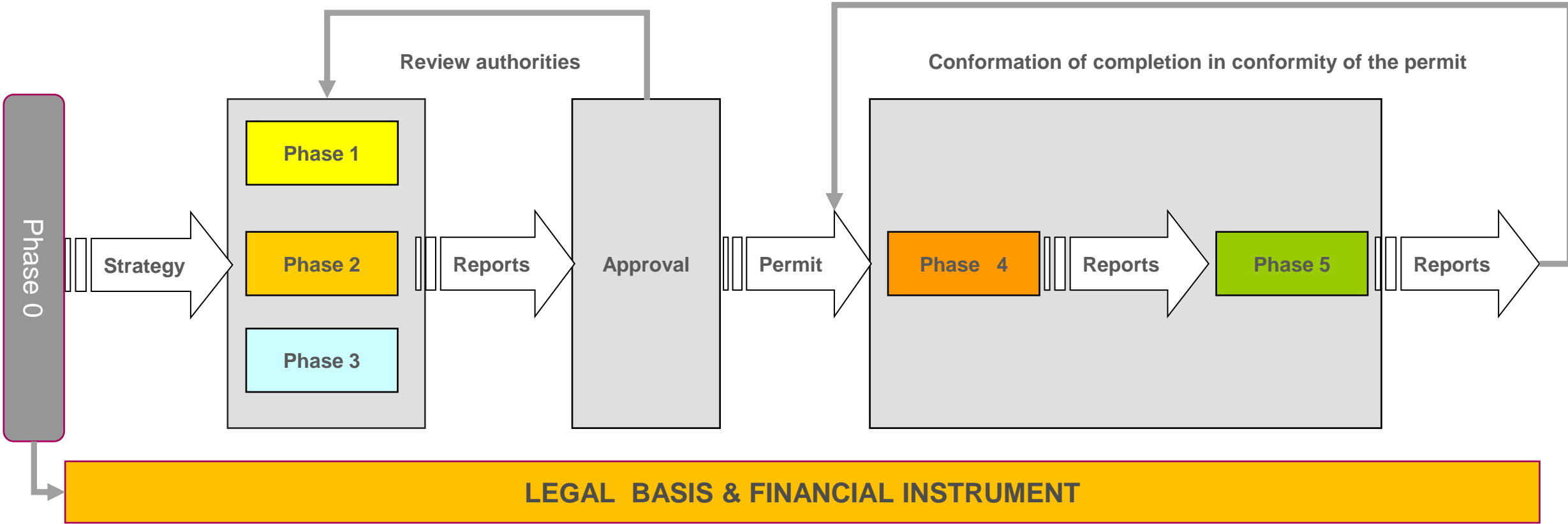


Objectives site remediation plan

1. **Provide input for the next Phase 4 remediation management / the execution of the remediation**
 - ✓ General information from Phase 1
 - ✓ Detailed Site Assessment results from Phase 2
2. **Present the selected best remedial option**
3. **Preliminary design (or detail design) the best remedial option**
4. **Inform all relevant stakeholders about the**
 - ✓ Environmental baseline conditions
 - ✓ Expected results
 - ✓ Uncertainties
5. **Obtain approval to proceed to execute the best remedial option**



The legal basis & financial instrument



Design site remediation campaign

- **Short term – Eliminate the direct risks**

- ✓ Removing the source(s) and/receptor pathway(s)
- ✓ Cut of the receptor pathway(s)
- ✓ Protect the receptor(s)

- **Mid term - Reducing potential risks**

- ✓ Contain source(s) and receptor pathway(s)
- ✓ Natural attenuate and monitor source(s) and receptor pathway(s)
- ✓ Maintain, aftercare and enforce measures

- **Long term - Containing the latent risks**

- ✓ Maintenance, aftercare and enforce the source(s) and/receptor pathway(s)
 - Phyto-remediate with no edible crops
 - Erosion control by maintaining drainage & forestation
 - Maintain/enforce restricted land-use
- ✓ Monitoring
- ✓ Awareness raising



Content Remediation plan

Table of content Remediation plan

1. General information
2. Summary of Phase 2
3. Remediation assessment
4. Preliminary/detailed design of the best remedial option
5. Remediation planning

Appendices

1. Hazardous waste inventory data
2. Map with soil and groundwater contamination
3. Preliminary design soil and groundwater remediation
4. Cost estimate site clean-up / site remediation campaign
5. Proposed project planning



Remediation plan

Section 1 - General information

- Basic site information
- List of all stakeholders
- Objectives and goals of the remediation
- The legal basis of the remediation



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Remediation plan

Section 2 - Summary of Phase 2

- **General site information**

- ✓ Geographic coordinates and elevation of the site
- ✓ Site location maps with clear site boundaries
- ✓ Contact details site owners and/or site users

- **Natural conditions**

- ✓ Topography and geology
- ✓ The hydrology
- ✓ Soil characteristics
- ✓ Climatic/weather conditions

- **Socio-economic conditions**

- ✓ People living and working at the site
- ✓ People living and working at the site surrounding
- ✓ Site land use
- ✓ Surrounding land use

- **Site assessment results**

- ✓ Past site surveys in chronological order
- ✓ Site history, current and future use
- ✓ Update CSM Source, Pathways and Receptors
- ✓ Results of Risks Assessment



Remediation plan

Section 3 - Remediation assessment

- Remedial options
 - ✓ Conceptual designs remediation options
 - ✓ Preliminary design of each option
 - ✓ Cost estimate each option +/- 30 %
- Selection of the best remedial option
 - ✓ Criteria for the comparison
 - ✓ MCDA results
 - ✓ Points of concerned of the selected option
- Conclusions and recommendations



Section 4 Preliminary design of the best remedial option

For each site component preliminary design for the

- Short-term measures to
 - ✓ Eliminate/remediate the direct environmental risks
- Mid-term measures to
 - Remediate the potential environmental risks
- Long- term measure to
 - ✓ Contain the latent environmental risks
 - ✓ Monitor, aftercare and maintain the latent environmental risks



Remediation plan

Section 4 - Preliminary design selected best option

- For each site component
 - Objectives of the technical measures
 - Level risks reduction
 - Quantities to repack, excavate, remediate, contain and monitor
 - Technology
 - Implementation processes
 - Requirements for ensure health and safety
 - Requirements for supervision and monitoring
 - Requirements for monitoring and aftercare
 - Stakeholder involvement tasks



Remediation plan

Section 4 - Preliminary design best remedial option

Site component	Preliminary design
Hazardous waste stockpiles	Repackaging plan
Contaminated building	Decontamination plan
Buried hazardous waste	Excavation plan
Contaminated soil, hot spot in soil bottom sediments and groundwater	Soil and groundwater remediation plan

Preliminary design

Short-term: Eliminate direct risks

Site component	Clean	Remove	Excavate	Repack	Transport	Restrict use	Fence	Store	Destruct
Hazardous waste stockpiles		X		X	X			X	
Contaminated building	X					X	X		
Buried hazardous waste			X	X	X			X	
Hotspot / source area in soil			X	X	X			X	
Contaminated soil bottom sediments and groundwater						X	X		

Preliminary design

Mid-term: Remediate potential risks

Site component	Demolish	Remove	Excavate	Remediate	Restrict use	Maintain Fence	Store	Destruct
Hazardous waste stockpiles								X
Contaminated building	X							
Buried hazardous waste								X
Hotspot / source area in soil								X
Contaminated soil bottom sediments and groundwater				X	X	X		

Preliminary design

Long-term: Contain latent risks

Site component	Monitor	Maintenance	Restrict use	Fence	Store	Destruct
Hazardous waste stockpiles						
Contaminated building						
Buried hazardous waste						
Hotspot / source area in soil						
Contaminated soil bottom sediments and groundwater	X	X	X	X		



Remediation plan

Section 5 - Remediation Planning

For each site component

- The main activities
 - The time frame
 - The milestones
 - The responsible organization to implement
- The cost estimate +/- 10 %
 - ✓ Preparation costs
 - ✓ Execution costs
 - ✓ Supervision and laboratory costs
 - ✓ Monitoring and aftercare costs
 - ✓ Contingencies



Questions?

Contact



Thank you for your attention



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