CL:AIRE

SuRF 7
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SuRF-UK bulletin

SuRF-UK bulletins provide additional guidance for implementing sustainable remediation.

Introduction to Sustainable Remediation

This bulletin introduces the concept of sustainable remediation and some of the main guidance and tools available on this subject. It is prepared for anyone with an interest in applying sustainability principles to land contamination risk management.

It covers:

- What is sustainable remediation?
- Why should we be considering sustainable remediation?
- Approach to sustainable remediation.
- Sustainability indicators.
- Other things to consider for sustainable remediation.
- Overlaps with other initiatives including the United Nations Sustainable Development Goals (UN SDGs).

1. WHAT IS SUSTAINABLE REMEDIATION?

Sustainable remediation is the application of sustainable development principles to risk-based land contamination management. Sustainable development is defined by the United Nations' Report of the World Commission on Environment and Development: Our Common Future (UN, 1987), commonly referred to as the Brundtland Report.

"Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs"

In the United Kingdom our understanding of sustainable remediation has been developed since 2007 through the CL:AIRE Sustainable Remediation Forum UK (SuRF-UK). This initiative involves industry, consultants, regulators and academics who formed a multi-stakeholder group to jointly develop good practice guidance.

SuRF-UK defines sustainable remediation as:

"The practice of demonstrating, in terms of environmental, economic and social indicators, that the benefit of undertaking remediation is greater than its impact and that the optimum remediation solution is selected through the use of a balanced decision-making process"

Sustainable remediation is synonymous with sustainable risk-based land contamination management and therefore is a natural progression from risk-based land management that has been industry standard for a number of decades.

A British and International Standard titled Soil Quality – Sustainable Remediation BS ISO 18504:2017 was subsequently published and is very closely aligned with SuRF-UK. It defines sustainable remediation as:

"Elimination and/or control of unacceptable risks in a safe and timely manner whilst optimising the environmental, social and economic value of the work"

To assist the understanding of what sustainable remediation is, SuRF-UK has produced a short (3 minute) animation that provides a simple introduction (Figure 1).

Figure 1. Screenshot from the SuRF-UK animation.

Aims of sustainable remediation

The aims of sustainable remediation are to:

- Achieve effective sustainable risk-based land contamination management
- Ensure the wider effects of this management are acceptable
- Ensure engagement of stakeholders and transparency of decision making
- Support balanced outcomes in terms of environmental, social and economic elements of sustainable development, which together help assessors
- Identify and apply the best, or most sustainable, remediation solutions.

Figure 2. shows where 'sustainable' lies in the area that balances social, economic and environmental factors.

Sustainable remediation is about the protection of human health and the environment by using the best, most sustainable method or methods. It should not be an "add on" but should be an integral part of how remediation strategies and remediation technique selection and application are chosen and processes are carried out.

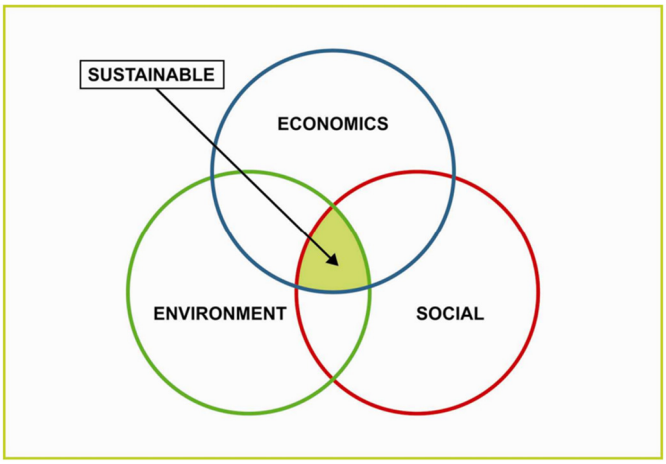

Figure 2. Social, economic and environmental factors (from the SuRF-UK Framework, 2010).

The concept of sustainable remediation and sustainability assessment is evolving internationally and is endorsed in international guidance, for example:

- Sustainable remediation documents published by the Network for Industrially Coordinated Sustainable Land Management in Europe (NICOLE)
- Joint position statement by NICOLE and the European Common Forum on Contaminated Land on risk informed and sustainable remediation
- Strategic Considerations for the Sustainable Remediation of Nuclear Installations (Nuclear Energy Agency)

Its use is also clearly promoted in UK regulatory good practice guidance, for example:

- Land Contamination Risk Management (LCRM) (Environment Agency)
- Planning practice guidance on Land affected by contamination (Department for Levelling Up, Housing and Communities)
- Remediation Techniques for Radioactive Contaminated Land on Nuclear Licensed Sites (Office for Nuclear Regulation)
- The Environment Agency's approach to groundwater protection
- Sustainability and Environmental Appraisal Tools handbook (SEAT) accessible through Infrastructure and Estate Policy, Standards and Guidance Knowledge in Defence (KiD) - GOV.UK (www.gov.uk)

Sustainable remediation principles and themes

SuRF-UK defines the six core principles of sustainable remediation as:

1. Protection of human health and the wider environment.
2. Safe working practices.
3. Consistent, clear and reproducible evidence-based decision making.
4. Record keeping and transparent reporting.
5. Good governance and stakeholder involvement.
6. Sound science.

These principles are explained and further guidance is provided in the key SuRF-UK document A Framework for Assessing the Sustainability of Soil and Groundwater Remediation.

2. WHY SHOULD WE BE CONSIDERING SUSTAINABLE REMEDIATION?

There are a huge number of reasons why sustainability should be considered when undertaking remediation, some of the main reasons are listed below:

- Adds value to a project
- Reduces environmental and social impacts
- Reduces costs
- Helps assessors identify opportunities for environmental, social and economic improvement (and synergies across all three categories)
- Adds transparency
- Great for stakeholder engagement
- Aligns with government good practice guidance e.g. LCRM
- Helps meet clients Corporate Social Responsibility commitments
- Good for business
- Improves education about sustainability
- Links with Environmental, Social and Governance (ESG) matters

Sustainable remediation is the logical extension of risk-based remediation guidance that seeks to not only manage risks posed by land contamination but does so in a way that identifies and optimises the balance between environmental, social and economic factors that represent sustainability for a given site.

In doing so there are several potential benefits; at a corporate or company level the management of land contamination can be integrated and measured within an ESG framework and / or aligned with key performance indicators. At a site specific level there may be environmental (e.g. reduced environmental footprint or enhanced natural capital), economic (e.g. reduced or optimised costs) and social benefits (e.g. improved community engagement) that can add value.

3. APPROACH TO SUSTAINABLE REMEDIATION

SuRF-UK promotes a structured but tiered approach to implementing sustainable remediation. It can be used to support decision making at several stages in the process of land contamination risk management. Supplementary Report 1 (SR1) to the main SuRF-UK Framework detailed above presents a general approach to sustainability assessment for use in achieving sustainable remediation.

The tiered approach should include consideration of the following:

- what are the objectives for the sustainability assessment?
- what management decision does the assessment support?
- which stakeholders need to be consulted?
- what are the boundaries or limits of the assessment?
- what sustainability indicators are going to be used?

- what remedial options are going to be compared?
- what assessment techniques will be used (e.g. qualitative, semi-quantitative or quantitative methods)?
- sensitivity analysis – what parameters is the outcome most sensitive to?
- other issues such as uncertainty and how that is managed.

The important, early stages of setting objectives and goals, identifying stakeholders and defining the assessment boundaries and scope is referred to as 'project framing' (see Figure 3).

Figure 3. Project framing involving stakeholder engagement (extracted from SuRF-UK animation).

Sustainable remediation can be implemented throughout the risk management process - from integration into the regional and local planning stage, to including sustainable practices when performing site investigation or verification.

Sustainability assessments

When carrying out a sustainability assessment, simple qualitative approaches will often be appropriate. SuRF-UK has published guidance on carrying out simple qualitative (tier 1) assessments and a spreadsheet (see Figure 4). However, where more complex assessments are necessary, consideration can be given to using quantitative tools such as multi criteria, cost benefit, or natural capital analysis and lifecycle assessment.

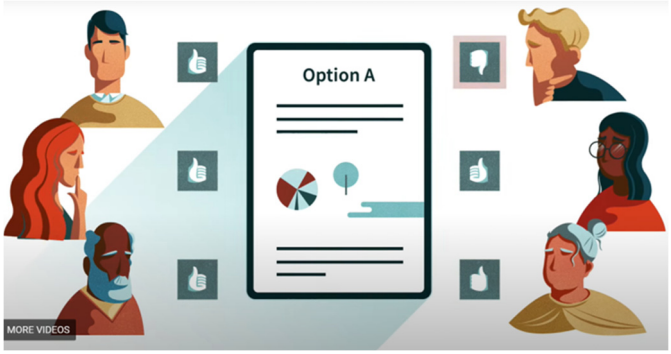

Figure 4. Qualitative assessment ensuring like-for-like options are assessed (extracted from SuRF-UK animation).

Qualitative and semi-quantitative approaches have the advantage that they require less option-specific data. They also allow the comparison of a broad range of sustainability indicators, including those that can be quantified and those that cannot.

Quantitative cost benefit analysis has the advantage that some of the subjectivity of the qualitative assessments is removed, as all costs and benefits are assessed through the common factor of monetary value. However, such an assessment requires more data and can only consider those indicators that can be monetised.

A common approach is to commence at the lower tiers of assessment and progress as far as is necessary, or appropriate for the project, to provide a robust and defensible outcome.

Sustainability assessment involves consideration of a wider range of factors than just looking solely at the carbon footprint of a project. However, the evaluation of greenhouse gas emissions can form part of an assessment if appropriate.

There are a number of technical reports about cost benefit assessment hosted on the CL:AIRE Water and Land Library (www.claire.co.uk/WALL) under detailed evaluation of remediation options (INFO-OA2) including:

- Cost-Benefit Analysis for Remediation of Land Contamination, R&D Technical Report P316. EA, 1999.
- Costs and benefits associated with the remediation of contaminated Groundwater: Application and Example, R&D Technical Report P2-078/TR. EA, 2002.

The Environment Agency has also published research on Assessing the Value of Groundwater.

HM Treasury has published:

- The Green Book, 2022. The Green Book (2022) - GOV.UK (www.gov.uk) which provides guidance on appraising policies, programmes and projects.
- Supplementary subject guidance. The Green Book and accompanying guidance and documents - GOV.UK (www.gov.uk).
- climate change and environmental valuation. Green Book supplementary guidance: climate change and environmental valuation - GOV.UK (www.gov.uk).
- valuation of energy use and greenhouse gas emissions for appraisal. Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal - GOV.UK (www.gov.uk).
- multi-criteria decision analysis. Green Book supplementary guidance: multi-criteria decision analysis - GOV.UK (www.gov.uk).

4. SUSTAINABILITY INDICATORS

Table 1 shows SuRF-UKs suggested headline sustainability indicators that could be considered in a sustainability assessment. This is not an absolute list - for any particular assessment there may be other indicators, some will not be relevant or there may be a subset of indicators that need to be considered. It is important to have a holistic view and involve stakeholders in selecting suitable indicators.

Table 1. SuRF-UK headline sustainability indicators.

Environmental (ENV)	Social (SOC)	Economic (ECON)
1.Emissions to air	1. Human health and safety	1. Direct economic costs and benefits
2. Soil and ground conditions	2. Ethics and equity	2. Indirect economic costs and benefits
3. Groundwater and surface water	3. Neighbourhoods and locality	3. Employment and employment capital
4. Ecology	4. Communities and community involvement	4. Induced economic costs and benefits
5. Natural resources and waste	5. Uncertainty and evidence	5. Project lifespan and flexibility

Selection of indicators for a sustainability assessment

The selection of sustainability indicators with relevant stakeholders is a critical part of the framing of a sustainability assessment.

SuRF-UK has published guidance on how to do this in Supplementary Report 2 (SR2) to the SuRF-UK Framework: Selection of indicators/ criteria for use in sustainability assessment for achieving sustainable remediation. Accompanying this is a spreadsheet covering the above Table 1 indicators in greater detail, including sub-indicators for each and mapping them against the UN SDGs (see Figure 5).

Figure 5. United Nations 17 Sustainable Development Goals.

Other groups of sustainability indicators exist and, in some cases, it might be appropriate to create a bespoke indicator set for a particular project. For example, the Nuclear Decommissioning Authority's (NDA) Value Framework describes environmental, social, economic and other factors that should be taken into account in decision making on NDA nuclear sites and this could be used as a sustainability indicator set.

Sustainable management practices

In addition to the tiered approach to sustainability assessment, SuRF-UK has developed a list of simple sustainable management practices (SMPs). SMPs are examples of simple, common-sense actions that can be implemented at any stage in a land contamination management project to improve its environmental, social and/or economic performance. SMPs can be used to improve the benefits or reduce the negative impacts of a project, leading to project 'sustainability gains' without requiring a formal sustainability assessment (Box 1).

Box 1. Sustainability assessment or SMPs

A sustainability assessment is a process, often using some form of tool that compares the sustainability performance of remediation strategies or technical options. SMPs have a more general application on any project and at any stage, and are simple to apply actions that result in more sustainable site management activities. Appropriate SMPs are selected from a simple spreadsheet and do not require technical assessment.

The SMPs are available on a spreadsheet on the CL:AIRE website and the supporting guidance with examples of their use are presented in the report Sustainable Management Practices for Management of Land Contamination (Figure 6).

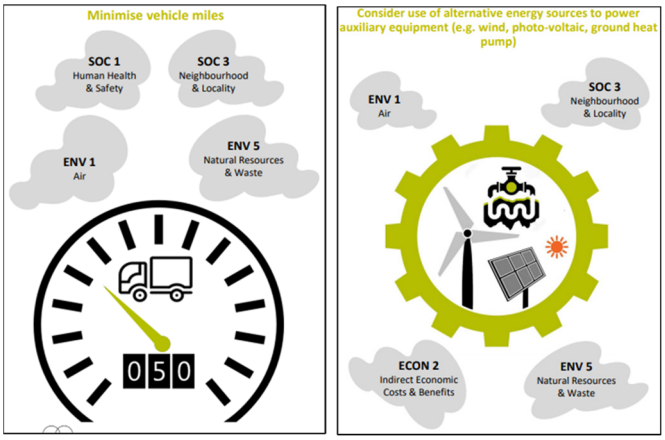

Figure 6. Example SMPs (taken from SuRF-UK Sustainable Management Practices).

5. OTHER THINGS TO CONSIDER FOR SUSTAINABLE REMEDIATION

The purpose or benefits of implementing sustainable remediation are sometimes misunderstood. The following points highlight and correct some of these potential areas of misunderstanding.

Sustainability should not be used as an excuse to do less remediation and leave unacceptable risks in place. The fundamental aims of a project need to be clearly articulated and agreed before the assessment commences, and should always be achieved whilst choosing the best, sustainable option to achieve them.

Saying a project is sustainable does not necessarily make it so. It should be shown to be, and documented, through a proportionate, science-based process involving stakeholders.

It is not about saving money. However, in some cases this can be one of the benefits - sustainability takes into account and tries to find the best balance between environmental, social and economic factors.

Green remediation and sustainable remediation are not the same thing. Green remediation only takes into account the environmental factors; environmental, social and economic factors must all be considered in sustainability assessments.

Sustainability is not a new thing that requires vast amounts of expertise, time, and consequently cost. Sustainability assessments can be undertaken at different tiers of complexity and in many cases, it is an evolution of the risk-based approach.

Sustainability assessment is not the same as conducting a carbon footprint analysis. Carbon analysis is just one potential part of sustainable remediation; a holistic approach considering other factors is required for a complete assessment.

The assessment of social performance does not always require complex input from social scientists. Comparison of remediation option performance against the high-level SuRF-UK social indicators is often straightforward, although quantification is more challenging.

Sustainability cannot be directly and precisely measured. A more holistic qualitative and/or quantitative approach that compares various options using relevant indicators is needed.

Achieve net benefits. It is important that the net benefit to people and the environment both now and in the future is clearly covered (but is not the sole focus) in any sustainability assessment.

More information on these issues can be found in the paper Debunking myths about sustainable remediation (Smith, 2019).

6. OVERLAPS WITH OTHER INITIATIVES

The SuRF-UK Framework and core principles share similar concepts and goals with a wide range of other initiatives that encourage integrated consideration of economic, environmental, social and other aspects in decision making. These include social value, biodiversity net gain and ESG and examples are provided in Box 2.

Box 2. Overlaps with other initiatives

- Social Value - when commissioning public services wider social, economic and environmental benefits should be secured. Social Value Act: information and resources - GOV.UK (www.gov.uk)
- Environmental Social Governance - to facilitate non-financial aspects in investments and business. Invest in Sustainable Development | UN Global Compact
- Greening Finance: A Roadmap to Sustainable Investing – Investments factoring in climate and nature-related risks and opportunities. Greening Finance: A Roadmap to Sustainable Investing - GOV.UK (www.gov.uk)
- The Green Finance Strategy sets out the blueprint to ensure that necessary finance flows for net zero, energy security and environmental industries. Mobilising Green Investment - 2023 Green Finance Strategy
- Biodiversity Net Gain - an approach which aims to leave the natural environment in a measurably better state than beforehand. Biodiversity net gain - GOV.UK (www.gov.uk)
- Taskforce for Climate-related Financial Disclosures (TCFD) – managing climate-related risks including disclosure of greenhouse gas emissions, and the use of targets. Task Force on Climate-Related Financial Disclosures (fsb-tcfd.org)
- Taskforce for Nature-related Financial Disclosures (TFND) – a risk management and disclosure framework for nature-related risks and opportunities. Taskforce on Nature-related Financial Disclosures (tnfd.global)
- ISO14001 - internationally agreed standard for environmental management systems. ISO 14001:2015 - Environmental management systems — Requirements with guidance for use
- ISO90001 - internationally agreed standard for quality management systems. ISO 9001:2015 - Quality management systems — Requirements
- BREEAM Infrastructure (formerly CEEQUAL) evidence based, sustainability assessment scheme for civil engineering projects that aims to drive and verify sustainability performance and standards. The BREEAM Infrastructure Technical Manuals - BRE Group
- Nuclear Decommissioning Authority (NDA) Value Framework - describes the factors that the NDA and its businesses consider when assessing the performance of options during decision making. The NDA Value Framework (publishing.service.gov.uk)

7. CONCLUSION

This document has provided a brief overview of the fundamentals of sustainable remediation and the benefits it can bring. For more information and the full suite of supporting documentation including case studies please visit https://www.claire.co.uk/surf-uk.

This bulletin has been prepared by the SuRF-UK steering group. For further information about SuRF-UK go to www.claire.co.uk/surf-uk