The SuRF UK Sustainability Process and Indicator Guidance

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SuRF-UK

SuRF-UK is the United Kingdom's Sustainable Remediation Forum.

It was established in 2007 to advance the development of sustainable remediation, and published a UK framework in 2010.

It is a collaboration of regulators, industry, academics and consultants independently co-ordinated by the UK contaminated land knowledge hub CL:AIRE.

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Sustainability & Indicators

"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"

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Sustainable remediation defined 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"

ISO 18504 international standard

What is an indicator/criterion/metric?

An *indicator* is a single characteristic that represents a sustainability effect which can be compared across options to evaluate their relative performance. Hence, indicators need to be measurable or comparable in some way that is sufficient to allow this evaluation, for example amount of recycled soil. An indicator which is measurable might also be called a *metric*, for example, tonnage of recycled soil. (From Network for Industrially Contaminated Land in Europe (NICOLE) 'Road Map for Sustainable Remediation', www.nicole.org).

When an indicator is a basis for comparison to support a decision, then it becomes a *criterion*.

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The 2011 “Annex 1” guidance and its headline indicator categories

A broad frame of reference

15 headline indicator categories, equally distributed over the three elements of sustainability (environmental, social and economic)

A detailed listing of possible individual indicators for each headlines

Environmental	Economic	Social
ENV1: Emissions to air	ECON1: Direct economic costs and benefits	SOC1: Human health and safety
ENV2: Soil and ground conditions	ECON2: Indirect economic costs and benefits	SOC2: Ethics and equality
ENV3: Groundwater and surface water	ECON3: Employment and employment capital	SOC3: Neighbourhoods and locality
ENV4: Ecology	ECON4: Induced economic costs and benefits	SOC4: Communities and community involvement
ENV5: Natural resources and waste	ECON5: Project lifespan and flexibility	SOC5: Uncertainty and evidence

“Annex 1” guidance applications

Explicitly referred to in process guidance from UK regulators

Estimated that it has now been considered for several hundred remediation projects in the UK

>20 UK examples listed in 2018 *Sustainability* paper (see later)

This paper also identifies references in:

- Australia, Belgium, China, Colombia, Czech Republic, Denmark, Fiji, Finland, Japan, Netherlands, Poland, Portugal, Sweden and the USA.
- OECD (nuclear installations).

Background to the New Reports

2018-20 was a period of reflection and consultation about SuRF-UK guidance on the assessment process and its indicators

In the light of feedback received SuRF-UK has

- Consolidated process guidance in a Supplementary Report (SR1)
- Developed the “Annex 1” guidance to provide a greater depth in the rationale, for each headline, a more explicit set of instructions for their use, and a checklist, in a further Supplementary Report (SR2)

Now available:

- Supplementary Report 1 of the SuRF-UK Framework: A general approach to sustainability assessment for use in achieving sustainable remediation (SR1)
- Supplementary Report 2 of the SuRF-UK Framework: Selection of indicators / criteria for use in sustainability assessment for achieving sustainable remediation

Introducing the 2020 guidance: SR1 and SR2

SR1

Role of sustainability assessment

The process of sustainability assessment (preparation, definition, execution)

Summary of key points and citations

Annexes:

- Aide memoire
- SuRF-UK Qualitative Assessment
- Semi-quantitative and quantitative methods in brief
- Conceptual site models of sustainability

SR2

Functionality of sustainability indicators / criteria

The rationale for the 15 SuRF-UK headline categories

How to use the checklist during framing

Summary of key points and citations

Annex 1: Indicator checklist, lines of evidence, mapping to UN SDGs

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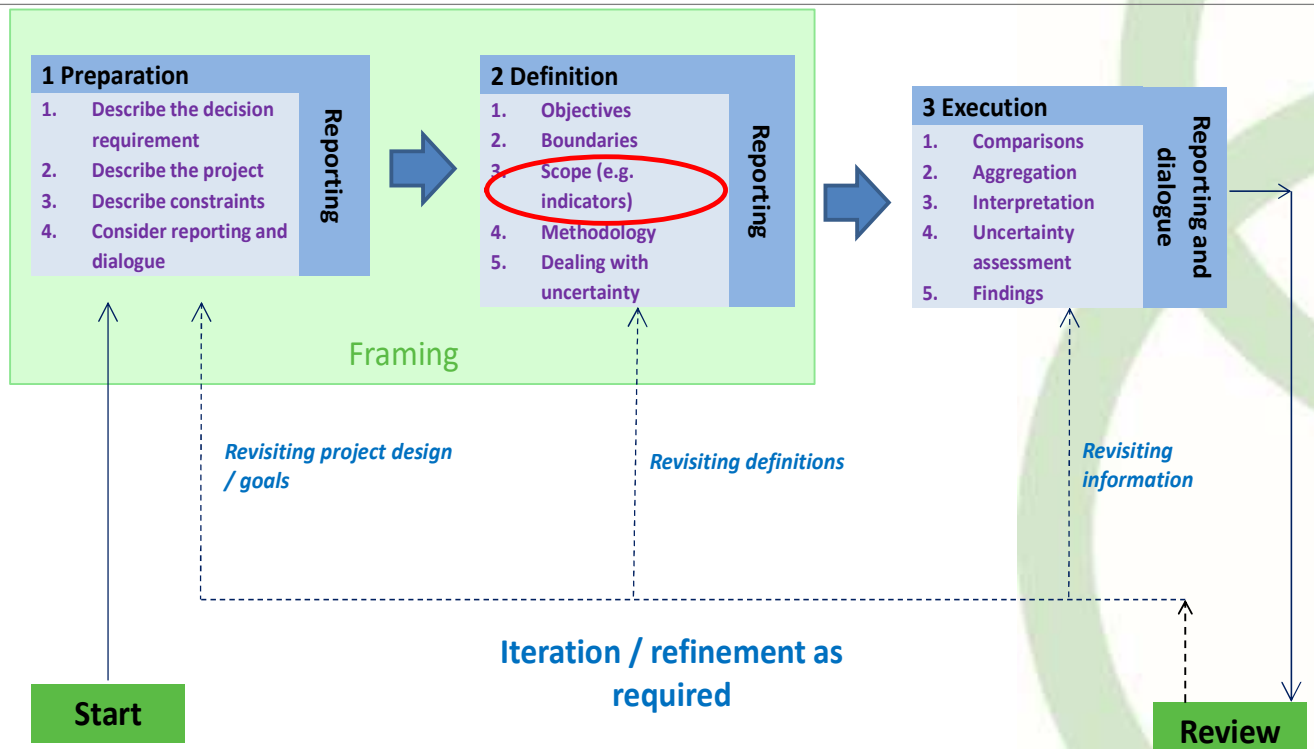
The sustainability assessment process



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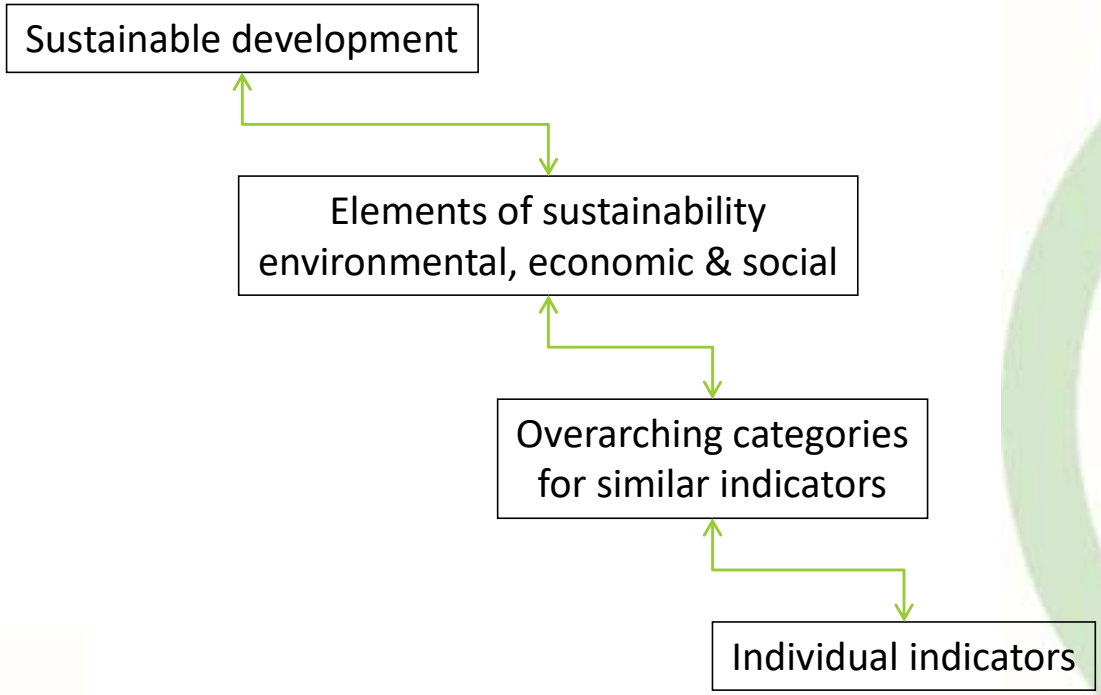
Indicator Hierarchy



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Sustainability assessment indicators

Encourage wide ranging consideration of what is “in” sustainability

Improve the robustness of site specific decisions

Improve transparency of assessments

Support “framing” that can move across tiers

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Approach to indicator guidance

Avoid “false” quantification

Avoid being prescriptive

- Allow users to determine their own scope for their own purpose
- Allow consultants freedom to innovate and sell their own know-how / IP
- Ensure any stakeholder can benchmark the sustainability assessment approach
- Facilitate simple (non-quantitative) methods

Sustainability assessment is subjective, stakeholder and site specific, so prescriptive and standardised indicator sets seem nonsensical

SuRF-UK headline remain unchanged

Environmental	Economic	Social
ENV1: Emissions to air	ECON1: Direct economic costs and benefits	SOC1: Human health and safety
ENV2: Soil and ground conditions	ECON2: Indirect economic costs and benefits	SOC2: Ethics and equity
ENV3: Groundwater and surface water	ECON3: Employment and employment capital	SOC3: Neighbourhoods and locality
ENV4: Ecology	ECON4: Induced economic costs and benefits	SOC4: Communities and community involvement
ENV5: Natural resources and waste	ECON5: Project lifespan and flexibility	SOC5: Uncertainty and evidence

Figure 2. Best management practices of green remediation balance core elements of a cleanup project.

Similar to US EPA Greener Clean-Ups

Slide annex: a slide outlines each category for reference

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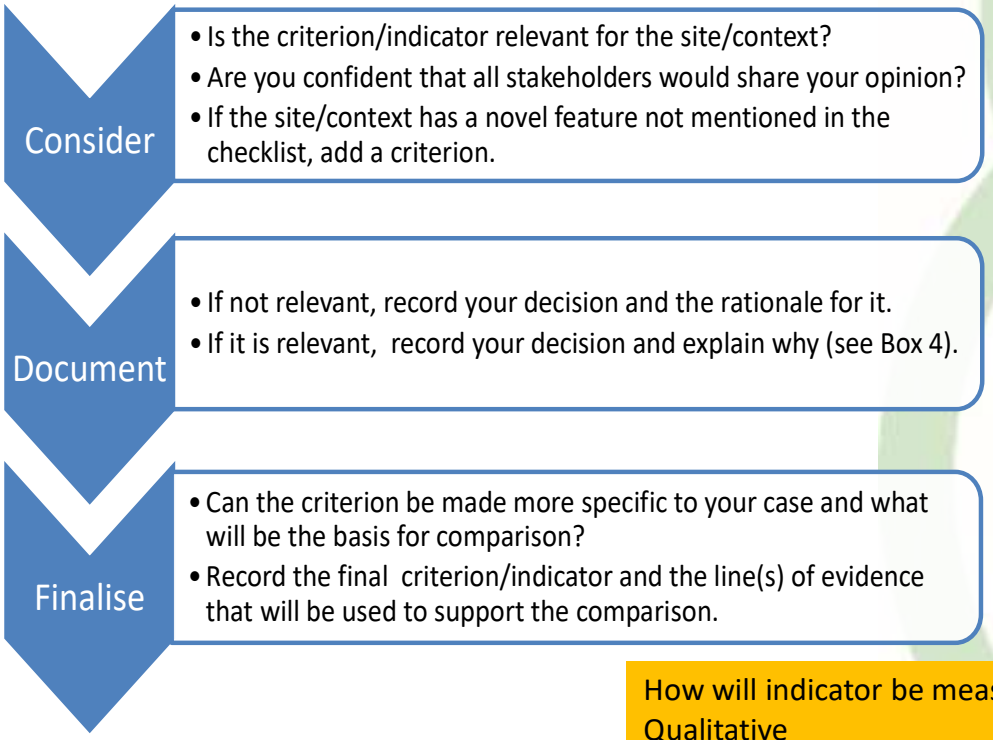
Selecting indicators / criteria



Site specific considerations
Stakeholder interests
National
International – UN Sustainbale Development Goals SDGs

Inclusion of indicators that don't discriminate between options

Avoid duplication
Consider negative/positive benefits
Local Temporary

How will indicator be measured
Qualitative
Quantitative

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The checklist provides

Possible individual indicators (73) / criteria by category

Lines of evidence that could be used to support a comparison

- Not metrics, but comparable features

Cross references to other indicators

UN SDG Links

The linked UN SDG wordings

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Concluding remarks

The headline categories themselves and the supporting detail behind them are intended as being advisory and not prescriptive. They are meant to allow decision maker to consider a wide scope of sustainability issues.

Although the guidance presented here has a wide-ranging scope, it cannot be exhaustive, and it is quite possible that stakeholders may wish to include additional considerations that they feel would otherwise not be represented.

SuRF-UK's intent was to create an equal number of categories under the three elements of sustainability (i.e. environmental, economic, social) to exemplify and underpin a balanced approach to consideration of each of them. However, for a particular site/project stakeholders may wish to alter this structure.

However, SuRF-UK does recommend that these decisions are taken before the assessment as part of the framing process, and they need to be agreeable to all of the stakeholders who might have an interest in the sustainability assessment being produced, within the 15 headline category structure.

Concluding remarks –

There is not one “light and truth” that defines how sustainability assessment should be carried out and SuRF-UK offers guidance and not obligation and prescription.

Structure can determine outcome, but it is open for users to introduce new headlines (e.g. climate change) and demote others as best meets the needs of their project and its stakeholders... Just record what you do!

We believe our approach is optimal for the UK, and moreover has great flexibility to be used elsewhere.

This depends on both regulatory / policy context *and* culture.

Where we are firm is in our opinion that there is no such thing as an objective sustainability assessment.

- Some components are not quantifiable.
- Many components depend on stakeholder values.
- It is always subject to context.

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Supporting journal publications

Bardos et al (2011) Applying Sustainable Development Principles to Contaminated Land Management Using the SuRF-UK Framework. *Remediation Journal* **Spring 2011** pp 77-100

Bardos et al (2016) The rationale for simple approaches for sustainability assessment and management in contaminated land practice. *Science of the Total Environment* **563-564** pp 755-768

Bardos et al (2018) The Development and Use of Sustainability Criteria in SuRF-UK's Sustainable Remediation Framework. *Sustainability* **2018**, 10 (6) 1781; doi:10.3390/su10061781

Smith (2019) Debunking myths about sustainable remediation. *Remediation Journal*, 29, 7-15.

Bardos et al (2020) Sustainability assessment framework and indicators developed by SuRF-UK for land remediation option appraisal *Remediation*. **2020**;31:5–27. doi: 10.1002/rem.21668

All can / will be found via www.claire.co.uk/surfuk

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Annex

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ENV1: Emissions to air

A. Climate change - greenhouse gases (e.g. CO_2, CH_4, N_2O, etc.)

B. Acid rain - emissions of NOX, SOX

C. Ground Air quality - Particulates (especially PM5 and PM10), ground level ozone; volatile contaminants / reagents, ammonia (from biopiles) etc.

D. Ozone depleting substances

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ENV2: Soil and ground conditions

A. Changes in soil functionality (particularly topsoil) for flora and fauna

B. Changes in water filtration, drainage and purification processes in the subsurface

C. Changes in soil erosion, particularly affecting surface water / sediments

D. Changes in soil / subsurface structure affecting drainage, including soil sealing

E. Structures in the subsurface (impact of wells, impact on buried services)

F. Changes in geotechnical properties (incl. compaction)

G. Impact/benefits to sites of special geological interest e.g. SSSIs and geoparks

ENV3: Groundwater and surface water

A. Effects on suitability of water for potable or other uses… including pH, taint as well as contamination

B. Effects on legally binding environmental objectives e.g. Water FD

C. Effects on biological function and chemical function

D. Effects on mobilisation of dissolved substances

E. Effects on marine, brackish/transitional waters

F. Effects/benefits of water abstraction resulting from the remediation process or its outcome, e.g. changing river levels or water tables

G Effects on the movement of surface or groundwater and possible impacts (ponding, flooding risks, changes in flow regime)

H. Synergies with surface water management, including sediments, banks, flood management regimes

I. Effects on coastline management including benefits for / issues from the management of sediments, dredgings

ENV4: Ecology

A. Effects on flora, fauna and food chains (esp. protected species, biodiversity, protected sites, consideration of alien species)

B. Significant changes in ecological community structure or function and consequent impacts on ecosystem services

C. Effects of disturbance (e.g., light, noise and vibration) on ecology

D. Use of equipment that affects/protects fauna (e.g. bird/bat flight, or animal migration)

ENV5: Natural resources and waste

A. Impacts/benefits for land re-use such as landscape changes, multifunctionality

B. Use of energy/fuels taking into account their type/origin and the possibility of generating renewable energy by the project

C. Use of primary resources and substitution of primary material resources within the project or external to it, rates of recycling, rates of legacy waste generation, use of other recyclates.

D. Use / re-use of water, impacts/benefits for water abstraction, use and disposal

SOC1: Human health and safety

A. Risk management performance of the project (long term) in terms of delivery of mitigation of unacceptable human health risks (chronic and acute)

B. Risks on site workers, site neighbours and the public during restoration / management works (excavation, machinery and traffic, as well as smaller machinery, use of hazardous reagents or processes (e.g. heat) and potential transport of hazardous wastes

C. Risk management performance on remediation works and ancillary operations (incl. process emissions such as bioaerosols, allergens, PM10)

D. General impacts on human health and well being: positive impacts might be from the provision of amenity; negative impacts might relate to fears, for example over the release of dread contaminants.

SOC2: Ethics and equity

A. How well the spirit of the ‘polluter pays principle’ is upheld with regard to distribution of impacts/benefits.

B. Whether impacts/benefits of works are unreasonably disproportionate to particular groups, including gender concerns and consideration of "green gentrification" concerns

C. What is the duration of remedial works and are there issues of intergenerational equity (e.g. avoidable transfer of contamination impacts to future generations)?

D. How options compare in the business ethics of their providers (e.g. sustainability of supply chains for inputs to remediation work, transparency, working practices, in procurement processes)

E. Whether treatment approaches raise any ethical concerns for (some) stakeholders, e.g. use of genetically modified organisms, corporate practices

SOC3: Neighbourhoods and locality

A. Effects from dust, light, noise, odour and vibrations during works and associated with traffic, including both working-day and night-time/weekend operations

B. Wider effects of changes in site usage by local communities (e.g. reduction in antisocial activities on a derelict site)

C. Changes in the built environment, architectural conservation, conservation of archaeological resources.

D. Improvement in facilities / services

SOC4: Communities and community involvement

A. Changes in the way the community functions and the services they can access (all sectors – commercial, residential, educational, leisure, amenity).

B. Quality of communications and community engagement (where this differs between options being considered)

C. Effect of the project on local culture and vitality

D. Compliance with local policies/spatial planning objectives, as well as national and international good practice

SOC5: Uncertainty and evidence

A. Robustness and rigour the information provided for each option considered

B. How options differ in their intrinsic levels of uncertainty

C. Requirements for validation/verification

D. Degree to which robust site-specific risk-based remedial criteria have been established (e.g. justified & realistic conceptual site model versus unnecessarily conservative and/or precautionary assumptions/data)

ECON1: Direct economic costs and benefits

A. Direct financial costs and benefits of remediation / management for organisation

B. Other costs associated with the work (incl. operation and any ongoing monitoring, regulator costs, planning, permits licences, and debt financing if relevant)

C. Uplift in site value to facilitate future development or investment

D. Consequences of capital and operation costs on liability discharge, ease of divestment etc

ECON2: Indirect economic costs and benefits

A. Allocation of financial resources internally

B. Changes in surrounding land/property values

C. Risks of damages (e.g. to surrounding property, or from improper disposal of wastes)

D. Impact on corporate reputation

E. Consequences for the locality's economic performance

F. Tax implications (e.g. from local property taxation)

ECON3: Employment and employment capital

A. Job creation

B. Employment levels (short and long term)

C. Skill levels before and after (for people)

D. Opportunities for education and training

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ECON4: Induced economic costs and benefits

A. Creating opportunities for inward investment into the area, for example, facilitating a follow-on remediation project

B. Benefits to the technology provider (e.g. in facilitating technology replication/demonstration)

C. Innovation and new skills (for organisations)

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ECON5: Project lifespan and flexibility

A. Duration of the risk management (remediation) benefit, e.g. fixed in time for a containment system / length of time taken for beneficial effects to become apparent

B. Factors affecting chances of success of the remediation / management works and issues that may affect works, incl. community, contractual, environmental, procurement and technological risks

C. Ability of project to respond to changing circumstances, including discovery of additional contamination, different soil materials, or timescales

D. Ability to respond to changing regulation or its implementation

E. Robustness of solution to climate change effects

F. Robustness of solution to altering economic circumstances

G. Requirements for ongoing institutional controls